Outlook

Re: Messages & Communications Doc. No. 38GL-26-2382 through 2393.

From Guam Legislature Clerks <clerks@guamlegislature.gov>
Date Wed 5/27/2026 2:18 PM
To 38th Committee On Rules <committeeonrules@guamlegislature.gov>

Hâfa Adai,

Received, and thank you.

Kiana E. B. Wusstig
Clerks Office
I Mina'trentai Ocho na Liheslaturan Guåhan
Guam Congress Building, 163 Chalan Santo Papa, *Hagåtña,* Guam 96910
Voice: (671) 472-3465/3460 Fax: (671) 472-3524
guamlegislature.gov

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From: 38th Committee On Rules <committeeonrules@guamlegislature.gov>
Sent: Wednesday, May 27, 2026 11:16 AM
To: Guam Legislature Clerks <clerks@guamlegislature.gov>
Cc: Frank Blas Jr. <speakerblas@guamlegislature.gov>
Subject: Messages & Communications Doc. No. 38GL-26-2382 through 2393.

Hâfa Adai Clerks Office,

Please see attached, **Messages & Communications Doc. No. 38GL-26-2382 through 2393** for processing:

√	**38GL-26-2382**	Department of Public Health and Social Services	Acting Director Designation of PeterJohn D. Camacho, MPH, for the Department of Public Health and Social Services from May 27, 2026 to May 29, 2026, and June 1, 2026 to June 4, 2026*
√	**38GL-26-2383**	Department of Education	Fiscal Year 2026 2nd Quarter Fiscal Execution Report*
√	**38GL-26-2384**	Guam Memorial Hospital Authority	Notification of Temporary Assignment or Detail – Genese M. Morrison, Management Analyst II, 4/27/26; Marylyne R.P. Pecina, Management Analyst IV, 5/5/26; Nadine Tricia T. Calvo, Chief of Security, 5/11/26; Petrina Alexis P. Perez, Buyer II, 5/11/26; Anna Bianca M. De Castro, Buyer II, 5/11/26; Osie F. Cruz II, Buyer II, 5/11/26; Audrey Lynn G. Paulino, Hospital Materials Management Assistant Administrator, 5/11/26.
√	**38GL-26-2385**	Department of Education	Guam Education Board Meeting Packet for May 19, 2026*
√	**38GL-26-2386**	Bureau of Statistics and Plans	Port Authority of Guam (PAG) 2025 Master Plan.
√	**38GL-26-2387**	Guam Housing Corporation	Acting President Designation of Angela M. Camacho, for Guam Housing Corporation from May 26, 2026 to May 29, 2026*
√	**38GL-26-2388**	Guam Housing Corporation	Unaudited Statement of Revenue and Expenditure Report for April 2026*
√	**38GL-26-2389**	Guam Community College	Unaudited Revenues and Expenditures Report and Staffing Pattern as of April 30, 2026*
√	**38GL-26-2390**	Guam Community College	Board of Trustees Meeting Packet for May 11, 2026*
√	**38GL-26-2391**	Guam Land Use Commission	GLUC Zone Change Approval for Application No. 2024-21 from "R1" to "C" Zone, Lot 2322-NEW-1-2-R2, in the Municipality of Mangilao*
√	**38GL-26-2392**	Office of the Governor of Guam	Appointment and Supporting Documents for Joshua Santos Miller, Member, Guam Ethics Commission Board of Commissioners.
√	**38GL-26-2393**	Department of Public Health and Social Services	Guam Board of Examiners for Optometry Board Meeting Packet for May 26, 2026*

Please retrieve Doc. No. 38GL-26-2386, 2390 through 2393 from link below:

Messages & Communications Physical Scanned Copy - Google Drive

Kindly reply to this email

Si Yu'os ma'âse',
Marie Crisostomo
Committee on Rules Assistant
COMMITTEE ON RULES
Vice Speaker V. Anthony Ada, Chairperson
I Mina'trentai Ocho Na Liheslaturan Guåhan
38th Guam Legislature

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Messages and Communications 38GL-26-2386.

2 messages

Speaker Frank Blas Jr. <speakerblas@guamlegislature.gov> Tue, May 26, 2026 at 10:51 AM
To: 38th Committee On Rules <committeeonrules@guamlegislature.gov>, Sabrina Salas Matanane <office.senatorbri@guamlegislature.gov>

Håfa Adai,

Please see attached M&C Doc. No. 38GL-26-2386

38GL-26-2386	Bureau of Statistics and Plans	Port Authority of Guam (PAG) 2025 Master Plan.

Si Yu'os Ma'åse'

Bernice Rivera

Administrative Assistant

Office of Speaker Frank F. Blas, Jr.

I Mina'trentai Ocho na Liheslaturan Guåhan 38th Guam Legislature

Guam Congress Building, 163 Chalan Santo Papa, Hagatña

(671)969-6456
speakerblas@guamlegislature.gov

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38GL-26-2386.pdf

38th Committee On Rules <committeeonrules@guamlegislature.gov> Tue, May 26, 2026 at 11:01 AM
To: "Speaker Frank Blas Jr." <speakerblas@guamlegislature.gov>

Håfa Adai,

Received, and thank you.

Si Yu'os ma'åse',

Marie Crisostomo

Committee on Rules Assistant

COMMITTEE ON RULES

Vice Speaker V. Anthony Ada, Chairperson

I Mina'trentai Ocho Na Liheslaturan Guåhan

38th Guam Legislature

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[Quoted text hidden]

LOLA E. LEON GUERRERO
Director
MATTHEW C. SANTOS
Deputy Director

BUREAU OF STATISTICS AND PLANS

Sagan Planu Siha Yan Emfotmasion

LOURDES A. LEON GUERRERO
Governor of Guam
JOSHUA F. TENORIO
Lieutenant Governor

38GL-26-2386
OFFICE OF THE SPEAKER
FRANK F. BLAS JR.
MAY 22 2026
Time: 2:58 pm
Received:

May 22, 2026

To: 38th Guam Legislature
Hon. Frank Blas, Jr., Speaker

From: Director, Bureau of Statistics and Plans

Subject: Port Authority of Guam (PAG) 2025 Master Plan

Hafa Adai! On behalf of the Bureau of Statistics and Plans, I am pleased to transmit the Port Authority of Guam (PAG) 2025 Master Plan Memorandum from the Honorable Lourdes A. Leon Guerrero, Governor of Guam for your perusal.

Should you have any questions, please do not hesitate to contact myself, or Mr. Christian Paul N. Benitez, Planner at 671-472-4201/2/3 or by email respectively at lolalg@bsp.guam.gov or christianpaul.benitez@bsp.guam.gov. *Si Yu'os Ma'åse.*

Lola E. Leon Guerrero

Attachments

Thumb drive
Master Plan Binder

38GL-26-2386
Messages and Communications
RECEIVED
COMMITTEE ON RULES
May 26, 2026
10:51 a.m.
Marie Crisostomo

LOURDES A. LEON GUERRERO
GOVERNOR

JOSHUA F. TENORIO
LT. GOVERNOR

UFISINAN I MAGA'HÅGAN GUÅHAN
OFFICE OF THE GOVERNOR OF GUAM

OFFICE OF THE SPEAKER
FRANK F. BLAS JR.
MAY 22 2026
Time: 2:53 pm
Received: MEY

May 18, 2026

THE HON. FRANK BLAS, JR., *Speaker*
38th Guam Legislature
Guam Congress Building
163 Chalan Santo Papa
Hagåtña, Guam 96910

RE: PORT AUTHORITY OF GUAM (PAG) 2025 MASTER PLAN

Dear Speaker Blas:

Buenas Yan Hafa Adai! Pursuant to my authority as Governor of Guam, I am formally transmitting the Port Authority of Guam (PAG) 2025 Master Plan for official adoption by I Liheslaturan Guåhan. Upon adoption, this document will serve as a vital element of Guam's Comprehensive Development Plan. As mandated by Title 5 GCA §1205 and §1206, the PAG 2025 Master Plan underwent a comprehensive public review process. The Bureau of Statistics and Plans (BSP) officially received the plan from PAG on February 9, 2026, and initiated the formal process for plan review. A public hearing was conducted on March 25, 2026, at the PAG Board Conference Room, where oral and written testimonies were solicited from stakeholders and the general community.

To ensure maximum transparency and participation, the plan was made available for public review on the websites of both PAG and BSP. Notice of the public hearing was widely disseminated through local media and the Government of Guam Public Notice Portal. Additionally, copies were transmitted to Government of Guam agencies for specialized review pertinent to their mandates.

The PAG 2025 Master Plan serves as a critical modernization strategy for Guam's primary lifeline. It incorporates vital Zero-Emission and Zero-Waste sustainability goals and outlines a detailed capital improvement program to address aging infrastructure, including the critical replacement of Ship-to-Shore gantry cranes. The plan is designed to enhance operational resilience, ensure readiness for military realignment activities, and secure the Port's financial self-sufficiency over the next 7 to 10 years.

Enclosed for your review and action are BSP's recommendation for approval, the summary of testimony and proceedings from the public hearing, and both print and electronic copies (via enclosed flash drive) of the PAG 2025 Master Plan.

I have reviewed the submitted documents and approve the Port Authority of Guam's 2025 Master Plan pursuant to 5 GCA §§ 1206 and 9303(a)(4). I appreciate your continued partnership in securing Guam's strategic future.

Senseramente,

LOURDES A. LEON GUERRERO
I Maga'hågan Guahan
Governor of Guam

LOURDES A. LEON GUERRERO
GOVERNOR

JOSHUA F. TENORIO
LT. GOVERNOR

UFISINAN I MAGA'HÅGAN GUÅHAN
OFFICE OF THE GOVERNOR OF GUAM

May 8, 2026

In accordance with 5 GCA §1205.1, the Bureau of Statistics and Plans (BSP) submitted its recommendation for my review and approval of the Port Authority of Guam's 2025 Master Plan. BSP's recommendation summarizes the administrative process, public testimony, and BSP's final recommendation.

The submission included:

- The Historical Reference to the Port Authority of Guam's Master Plan
- Administrative Timeline and Procedural Compliance
- Summary of Testimony and Comments
- Port Authority of Guam's Response to Comments and Testimonies
- Bureau of Statistics and Plans Final Recommendation

Pursuant to 5 GCA §§ 1206 and 9303(a)(4), after review of the submitted documents, I approve the Port Authority of Guam's 2025 Master Plan.

Senseramente,

LOURDES A. LEON GUERRERO
Maga'hågan Guåhan
Governor of Guam

RICARDO J. BORDALLO GOVERNOR'S COMPLEX
513 W. Marine Corps Drive Hagåtña, Guam 96910
governor.guam.gov | (671) 472-8931

LOLA E. LEON GUERRERO
Director
MATTHEW C. SANTOS
Deputy Director

BUREAU OF STATISTICS AND PLANS

Guam Coastal Management Program

LOURDES A. LEON GUERRERO
Governor of Guam
JOSHUA F. TENORIO
Lieutenant Governor

April 24, 2026

Memorandum

To: Governor of Guam

Via: Governor's Legal Counsel
Governor's Policy Director

2026 - 25835
OFFICE OF THE GOVERNOR
CENTRAL FILES OFFICE
Rec'd By: Jessica Dydasco
Date: 4/24/26 Time: 3:50PM

From: Director, Bureau of Statistics and Plans

Subject: Recommendation of Adoption of the Port Authority of Guam 2025 Master Plan

***Buenas yan Håfa Adai*!** In accordance with 5 GCA, Chapter 1, §1205.1, the Bureau of Statistics and Plans (BSP) hereby submits its recommendation for the official adoption of the Port Authority of Guam (PAG) Master Plan 2025. This memorandum summarizes the administrative process, public testimony, and BSP's final recommendation.

Historical Reference to the PAG Master Plan
On April 10, 2023, the PAG submitted the 2023 Master Plan to the BSP, initiating the formal public review process. A public hearing was held on May 5, 2023, followed by a public comment deadline of May 31, 2023. The PAG reviewed and responded to all comments received by the deadline.

On June 6, 2023, pursuant to 5 GCA Ch. 1, Article 2, § 1203(e) and in light of post-recovery efforts resulting from Typhoon Mawar, BSP requested an extension to conduct a thorough assessment of the Plan; and to give the BSP time to coordinate with networking agencies to provide comments on the plan.

The submission of the updated 2025 Master Plan to the BSP on February 9, 2026, initiated a new public review process. While the 2025 Master Plan is not a new planning document, through Resolution No. 2023-04, the PAG Board amended the Master Plan to incorporate the Port's zero-emission and zero-waste resiliency and sustainability goals as part of the Port's long-term strategic direction. The PAG Board, through Resolution No. 2025-24, requested that the title of the document be updated from "2023" to "2025" solely to reflect the current implementation timeline and formal use of the document, without altering the substance, strategic direction, or priority projects previously adopted.

Administrative Timeline and Procedural Compliance
BSP has ensured that all statutory requirements for plan review and public participation were met and are documented as follows:

- Plan Receipt: Pursuant to 5 GCA, Chapter 1, §1205, which governs the Plan Review and Public Hearings process, BSP officially received the PAG 2025 Master Plan from the PAG on February 9, 2026. The memorandum from PAG to BSP transmitting the PAG 2025 Master Plan, resolutions enclosed with the memorandum, and the PAG 2025 Master Plan are attached (Attachment A).
- Public Notice: Notice of the public hearing was widely disseminated through local news media, the Government of Guam Public Notice Portal, the PAG and BSP websites, and the Port Users Group beginning March 5, 2026, with subsequent postings on March 15, 18, 23, and 24, 2026. The publications/distribution of Public Hearing Notices for the Port Authority of Guam 2025 Master Plan are attached (Attachment B)
- Support and Coordination for Comprehensive Planning: On February 19, 2026, BSP, via a memorandum (Attachment C), engaged the network agencies of the Government of Guam in the review of the Plan pertinent to their respective agency mandates and to ensure it is comprehensive, responsive, and accurate in meeting the needs of our growing community.
- Public Hearing: The BSP, in conjunction with the PAG, conducted a public hearing on March 25, 2026, from 3:00 PM to 5:00 PM at the PAG Board Conference Room. The record of proceedings to include the minutes from the public hearing, copies of presentation, and the resolutions that were referenced at the public hearing, and attendance sheet provided by PAG are attached (Attachment D).

Summary of Testimony and Comments
During the public hearing and the subsequent comment period which ended March 26, 2026, the following testimonies were received and have been compiled and provided as an attachment. One comment was submitted after the comment period and was accepted as an official submission for this Plan review (Attachment E):

***Port Authority of Guam*:** PAG General Manager, Rory Respicio, provided testimony emphasizing the plan's role in national security and its support of INDOPACOM's Pacific Deterrence Initiative. He identified $525 million in priority improvements, with the Ship-to-Shore (STS) Gantry Crane Replacement being the most critical project. The plan covers a comprehensive assessment of the Port's current governance, financial condition, operational capacity, physical infrastructure, and projected cargo demand. The Master Plan highlights key improvements that are necessary to accommodate organic growth, transshipment opportunities, and the significant military realignment activities that influence Guam's economy.

***Department of Land Management (DLM)*:** Director Joseph Borja expressed support, particularly regarding the updated Land Use Designations in Section 4.2.2, commending the PAG for updating land use designations to reflect current conditions and anticipated future needs. These land use designation updates to maps will prove valuable to DLM in review of development proposals, business license applications, and related permitting processes. Land use designation updates will strengthen the DLM's ability to conduct accurate and consistent permit reviews in alignment with adopted plans. The DLM further noted, as the administrators to the Guam Seashore Protection Commission, attention to land use and shoreline protection within the Master Plan is important to support responsible management of critical coastal areas. The PAG acknowledges the DLM's support of the Master Plan.

***Guam Waterworks Authority (GWA)*:** General Manager Miguel Bordallo submitted extensive testimony regarding aging infrastructure within the Port property and operational inefficiencies. GWA requested that PAG assume full ownership and billing responsibility for water/wastewater assets on Port property and relocate a critical 50-year-old water main currently running through the active container yard. The GWA called for increased utility coordination between the Port for construction, excavation, and future planning activities affecting GWA utility infrastructure.

***General Public*:** Mr. Julian Reyes submitted written support for the plan, specifically encouraging the Port to leverage the Guam-Saipan channel for transshipment and noting the recent federal designation of the Guam-CNMI Route as a Marine Highway Project.

PAG Response to Comments and Testimonies

Following the review of all testimonies, the BSP engaged the PAG regarding any internal actions or further revisions or amendments to the plan based on the comments and testimonies received. On April 21, 2026, the PAG determined that the suggestion regarding the U.S. Marine Highway Route aligns with their vision and does not require material changes to the current draft. Additionally, PAG clarified that while it will address GWA's infrastructure concerns through focused interagency discussions, these issues do not require material changes to the PAG 2025 Master Plan's strategic framework.

Final Recommendation

The Bureau of Statistics and Plans has determined that the PAG 2025 Master Plan accurately reflects the long-range goals of the territory and has been developed with appropriate stakeholder coordination. Furthermore, the PAG 2025 Master Plan is a comprehensive modernization strategy that integrates vital Zero-Emission and Zero-Waste (ZEZW) goals and prepares the island for increased military and commercial throughput. The BSP concurs that a resilient and modernized and code-compliant Port is essential to building and sustaining Guam's economy, supporting military readiness, and ensuring the Port's long-term operational resilience. Therefore, the Bureau of Statistics and Plans respectfully recommends your approval of the Port Authority of Guam Master Plan 2025 for submission to the Guam Legislature.

Should you have any questions regarding this matter, please do not hesitate to contact me at lolalg@bsp.guam.gov, or reach our office via telephone at (671) 472-4201/2/3. We appreciate your continued cooperation and commitment to Guam's strategic development.

Si Yu'os Ma'åse'.

Lola E. Leon Guerrero

LOLA E. LEON GUERRERO
Director

Attachments: A, B, C, D, & E

Attachment A:

Port Authority of Guam (PAG) 2025 Master Plan submittal to the Bureau of Statistics and Plans (BSP)

PORT OF GUAM
ATURIDAT I PUETTON GUAHAN
Jose D. Leon Guerrero Commercial Port
1026 Cabras Highway, Suite 201, Piti, Guam 96915
Telephone: 671-477-5931/35 Facsimile: 671-477-2689/4445
Website: www.portguam.com

Lourdes A. Leon Guerrero
Governor of Guam
Joshua F. Tenorio
Lieutenant Governor

RECEIVED
FEB 09 2026
BUREAU OF STATISTICS AND PLANS

February 9, 2026

MEMORANDUM

TO: Lola Leon Guerrero, Director, Bureau of Statistics & Plans

FROM: Rory J. Respicio, General Manager

SUBJECT: **Adoption of Port Authority of Guam 2025 Master Plan**

Hafa Adai! The Board of Directors of the Jose D. Leon Guerrero Commercial Port, at its regular board meeting held on November 27, 2024, unanimously adopted Board Resolution No. 2024-18, which states:

> *Relative to adopting the Zero-Emission and Zero-Waste (ZEZW) Resiliency and Sustainability goals developed by Jacobs and WSP USA, Inc. for the Port of Guam and integrating these goals and objectives into the sustainability component of the 2023 Master Plan for the Port Authority of Guam.*

Subsequently, at its regular meeting on July 14, 2025, the Board of Directors unanimously passed and adopted Resolution No. 2025-24, which states:

> *Relative to requesting the Honorable I Maga'Haga Lou Leon Guerrero, Governor of Guam, and the Bureau of Statistics and Plans to officially amend the title of the Port Authority of Guam Master Plan from "2023" to "2025," solely as a change to the title, without altering the substance of the document as adopted in resolution no. 2023-04, relative to adopting the Port Authority of Guam Master Plan 2023 as the official planning document for the Port Authority of Guam, and as amended by Resolution No. 2024-18, relative to adopting Zero-Emission and Zero-Waste goals as part of the Port Authority of Guam's sustainability component of the Port Master Plan 2023. The new title shall read: "Port Authority of Guam Master Plan 2025."*

In accordance with 5GCA, Chapter 1, §1205: Plan Review: Public Hearings, transmitted herewith is one (1) hard copy and one (1) USB flash drive of the 2025 Master Plan for your review. The Port Authority of Guam stands ready to fully support the Bureau of Statistics & Plans (BSP) during this process of review, public hearing and final adoption. Upon completion, the Port understands that BSP will forward its recommendation of the 2025 Master Plan to the Governor for ultimate submission to the Guam Legislature.

Please note that a copy of the 2025 Master Plan has been provided to Joint Region Marianas (JRM) Commander Rear Admiral Brett Mietus, USN for his review and approval.

We appreciate your continued support in ensuring proper planning for the development and sustainability of the Port's critical facilities. Should you require additional information or wish to discuss this matter further, please do not hesitate to contact me at 671-477-5931/4, ext. 201 or 202, via email at rjrespicio@portofguam.com or Chief Planner Joe Javellana at ext. 234, via email at jgjavellana@portofguam.com.

Enclosures:

- Resolution No. 2024-18
- Resolution No. 2025-24
- Hard Copy of 2025 Master Plan
- USB flash drive of 2025 Master Plan

BOARD OF DIRECTORS
Dorothy P. Harris, Chairperson
Conchita S.N. Taitano, Vice Chairperson
Fe R. Valencia-Ovalles, Board Secretary

GUAM

Resolution No. 2024-18

RELATIVE TO ADOPTING THE ZERO-EMISSION AND ZERO-WASTE (ZEZW) RESILIENCY AND SUSTAINABILITY GOALS DEVELOPED BY JACOBS AND WSP USA INC. FOR THE PORT OF GUAM AND INTEGRATING THESE GOALS AND OBJECTIVES INTO THE SUSTAINABILITY COMPONENT OF THE 2023 MASTER PLAN FOR THE PORT AUTHORITY OF GUAM.

BE IT RESOLVED BY BOARD OF DIRECTORS OF THE JOSE D. LEON GUERRERO COMMERCIAL PORT:

WHEREAS, the Port Authority of Guam (the Port) is committed to advancing sustainability and resiliency as core pillars of its operations, ensuring long-term environmental stewardship, operational efficiency, and alignment with local, regional, and global sustainability initiatives; and

WHEREAS, the Port recognizes the importance of adopting innovative strategies to reduce its carbon footprint and achieve zero-emission and zero-waste goals; and

WHEREAS, the Port acknowledges the need for continuous improvement and adaption to address emerging environmental sustainability and resiliency challenges; and

WHEREAS, the Port has been awarded $2,410,415 through the U.S. Environmental Protection Agency's (EPA) Clean Ports Program under the Climate and Air Quality Planning Competition, a prestigious and highly competitive grant program funding only 55 projects across 27 states and territories; and

WHEREAS, the EPA grant reflects the collective efforts of the Port Team, with WSP serving as the Port's Owner Agent, Jacobs as its Subcontractor, and the leadership of Vice Chairperson Conchita S.N. Taitano, whose 30-plus years with Guam EPA and public service uniquely position her to advance the Port's sustainability goals; and

WHEREAS, Vice Chairperson Taitano's contributions, including her certification through the Massachusetts Institute of Technology (MIT) Sustainability Program and her collaboration with First Gentleman Jeff Cook on Guam's Zero Waste Task Force, have been instrumental in shaping the Port's Sustainability and Resiliency Plan and aligning it with Guam's broader environmental initiatives; and

WHEREAS, the Port's Strategic Planning Division, led by Chief Planner Joe Javellana III, played a critical role in advancing the ZEZW goals by collectively leveraging their expertise and aligning the initiatives with the Port's long-term strategic vision; and

WHEREAS, the Port acknowledges the vision and leadership of Governor Lou Leon Guerrero and Lt. Governor Joshua Tenorio, whose appointment of Vice Chairperson Taitano and steadfast support for sustainability initiatives have laid the foundation for the Port's success in securing this grant; and

WHEREAS, Guam EPA Administrator Michelle Lastimoza and her Team have provided invaluable collaboration and support, reinforcing the shared goal of creating a sustainable and resilient Port for Guam's future; and

WHEREAS, the Clean Ports Program funding will directly support the Port's Net Zero Emissions Strategy Update and Implementation Plan, which aligns with the ZEZW Plan and includes the following key objectives:

1. Conducting a mobile emissions inventory to quantify and address emissions sources;
2. Updating the Net Zero Emissions Strategy to reflect current priorities and opportunities;
3. Preparing a workforce development plan to equip the Port's staff for a sustainable future;
4. Developing a resiliency strategy to assess climate risks and vulnerabilities; and
5. Creating an implementation plan to outline actionable steps for decarbonizing and electrifying Port operations; and

WHEREAS, the ZEZW Plan and the EPA-funded initiatives are integral to achieving the Port's sustainability goals and improving air quality, climate resilience, and operational efficiency, all of which align with the 2023 Master Plan's sustainability component and the "Look Ahead 2024" framework; and

WHEREAS, the Port's efforts are rooted in collaboration with key stakeholders, including Guam EPA, the Bureau of Statistics and Plans (BSP), Guam Power Authority (GPA), Department of Public Works (DPW), private industry, and non-profits, to ensure the successful integration of these initiatives; and

WHEREAS, the Port is dedicated to fostering a culture of environmental responsibility through community engagement, which is a fundamental aspect of the Port's approach, reinforcing a shared vision for a cleaner and more sustainable Guam;

NOW, THEREFORE, BE IT RESOLVED, that the Board of Directors of the Port Authority of Guam hereby adopts the zero-emission and zero-waste resiliency and sustainability goals developed by Jacobs and WSP USA Inc., integrates these goals into the sustainability component of the 2023 Master Plan, and incorporates the initiatives funded by the EPA Clean Ports Program; and

BE IT FURTHER RESOLVED, that the General Manager is directed to oversee the implementation of the ZEZW Plan and the EPA-funded initiatives, ensuring progress is tracked, reported to the Board, and aligned with emerging technologies, funding opportunities, and best practices; and

BE IT FURTHER RESOLVED, that the Board of Directors requests the support of the Governor of Guam and the Bureau of Statistics and Plans in incorporating the zero-emission and zero-waste (ZEZW) resiliency and sustainability goals developed by Jacobs and WSP USA Inc. into the 2023 Master Plan prior to its official transmittal to the Guam Legislature for review and approval; and

BE IT FURTHER RESOLVED, that the Chairperson certify to, and the Secretary attest to, the adoption hereof; and that copies of this resolution shall be transmitted to the Governor of Guam, the Speaker of the Guam Legislature, the Director of the Bureau of Statistics and Plans, and other relevant stakeholders.

PASSED AND ADOPTED UNANIMOUSLY BY THE BOARD OF DIRECTORS THIS 27th DAY OF NOVEMBER, 2024.

DOROTHY P. HARRIS
CHAIRPERSON, BOARD OF DIRECTORS
PORT AUTHORITY OF GUAM

FE R. VALENCIA-OVALLES
BOARD SECRETARY, BOARD OF DIRECTORS
PORT AUTHORITY OF GUAM

BOARD OF DIRECTORS
Dorothy P. Harris, Chairperson
Conchita S.N. Taitano, Vice Chairperson
Fe R. Valencia-Ovalles, Board Secretary
Mark B. Mendiola, Board Member

Resolution No. 2025-24

RELATIVE TO REQUESTING THE HONORABLE *I MAGA'HÅGA* LOU LEON GUERRERO, GOVERNOR OF GUAM, AND THE BUREAU OF STATISTICS AND PLANS TO OFFICIALLY AMEND THE TITLE OF THE PORT AUTHORITY OF GUAM MASTER PLAN FROM "2023" TO "2025," SOLELY AS A CHANGE TO THE TITLE, WITHOUT ALTERING THE SUBSTANCE OF THE DOCUMENT AS ADOPTED IN RESOLUTION NO. 2023-04, RELATIVE TO ADOPTING THE PORT AUTHORITY OF GUAM MASTER PLAN 2023 AS THE OFFICIAL PLANNING DOCUMENT FOR THE PORT AUTHORITY OF GUAM, AND AS AMENDED BY RESOLUTION NO. 2024-18, RELATIVE TO ADOPTING ZERO-EMISSION AND ZERO-WASTE GOALS AS PART OF THE PORT AUTHORITY OF GUAM'S SUSTAINABILITY COMPONENT OF THE PORT MASTER PLAN 2023. THE NEW TITLE SHALL READ: "PORT AUTHORITY OF GUAM MASTER PLAN 2025."

BE IT RESOLVED BY BOARD OF DIRECTORS OF THE JOSE D. LEON GUERRERO COMMERCIAL PORT:

WHEREAS, the Port Authority of Guam Board of Directors adopted the Port Authority of Guam Master Plan 2023 as the official planning document for the Port Authority of Guam pursuant to Resolution No. 2023-04; and

WHEREAS, Resolution No. 2024-18 further amended the Port Master Plan 2023 by adopting zero-emission and zero-waste goals as part of the Port Authority's sustainability commitments under the same plan; and

WHEREAS, the Master Plan outlines a comprehensive strategy for modernization, sustainability, and resiliency at the Jose D. Leon Guerrero Commercial Port, including phased capital investments in wharf expansion and rehabilitation, gantry crane replacements, fuel pier upgrades, digital transformation, sustainability measures, and climate adaptation projects. These improvements are designed to support long-term commercial growth, national defense readiness, and environmental responsibility; and

WHEREAS, the Port Authority of Guam is actively working to diversify its revenue base beyond container and breakbulk throughput by maximizing commercial land use, modernizing facilities, and attracting long-term federal and military partnerships. This approach positions the Port to serve as a critical dual-use facility, with the U.S. military projected to become the Port's largest customer. Early indicators of this shift are already evident through expanded military cargo movements, project staging agreements, and sustained federal investments tied to strategic operations at Apra Harbor; and

WHEREAS, the substance, projects, and strategic direction of the Port Master Plan remain unchanged, but the year reflected in the title no longer accurately reflects the date of the plan's final adoption and active implementation; and

WHEREAS, updating the title from "Port Authority of Guam Master Plan 2023" to "Port Authority of Guam Master Plan 2025" will better reflect the current implementation timeline without revising the content or priorities of the adopted planning document; and

WHEREAS, despite not being able to officially transmit the Master Plan to the Honorable Members of *I Liheslaturan Guåhan* through the Plan Adoption process pursuant to Section 1206, Article 2, Chapter 1 of Title 5, Guam Code Annotated for justifiable reasons, the Port Authority of Guam has not missed a beat in executing its strategic priorities. The Port has demonstrated compliance, discipline, and measurable accomplishments in line with the course laid out in the Port Authority of Guam Master Plan 2023, including progress in gantry crane replacement, facility rehabilitation, sustainability initiatives, and federal funding alignment; and

WHEREAS, updating the title requires coordination with the Honorable *I Maga'håga* Lou Leon Guerrero, Governor of Guam, and the Bureau of Statistics and Plans, consistent with established protocols for official government planning documents; and

WHEREAS, the Port Authority of Guam affirms its preparedness to comply with any timelines and requirements imposed under Article 2, Chapter 1 of Title 5, Guam Code Annotated prior to the Master Plan being ripe for transmittal to *I Liheslaturan Guåhan* for formal adjudication;

NOW, THEREFORE, BE IT RESOLVED, that the Board of Directors of the Port Authority of Guam hereby requests the Honorable *I Maga'håga* Lou Leon Guerrero, Governor of Guam, and the Bureau of Statistics and Plans to officially amend the title of the Port Authority of Guam Master Plan from "2023" to "2025," solely to reflect the current year of formal use and adoption, without altering the substance of the document as previously approved by the Port Authority of Guam's Board of Director's; and

BE IT FURTHER RESOLVED, that the new title shall read: "Port Authority of Guam Master Plan 2025," inclusive of the zero-emission and zero-waste goals adopted in Resolution No. 2024-18 as part of the Port Authority of Guam's sustainability component; and

BE IT FURTHER RESOLVED, that the Chairperson certify to, and the Secretary attest to, the adoption hereof.

PASSED AND ADOPTED UNANIMOUSLY BY THE BOARD OF DIRECTORS THIS 14th DAY OF JULY, 2025.

DOROTHY P. HARRIS
Chairperson, Board of Directors
Port Authority of Guam

FE R. VALENCIA-OVALLES
Secretary, Board of Directors
Port Authority of Guam

Attachment B:

Publications/distribution of Public Hearing Notices for the Port Authority of Guam (PAG) 2025 Master Plan

Public Notices Portal - Government of Guam

- **Quick Links:**
- View ALL Notices
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- Posted This Week
- Posted This Month
- More Filters...

Notice of Public Hearing - 2025 Master Plan of Port Authority

PUBLIC HEARING

- **Posted on:** 03/24/2026 07:14 AM
- **Posted by:** Marge Duenas
- **Department(s):** PORT AUTHORITY OF GUAM
- **Division(s):** PORT AUTHORITY OF GUAM
- **Notice Topic(s):** PUBLIC HEARING
- **Types of Notice:** PUBLIC HEARING
- **For Audience(s):** PUBLIC
- **Share this notice**

PUBLIC HEARING on 2025 Master Plan

Notice of Public Hearing

Jose D. Leon Guerrero Commercial Port of Guam
2025 Master Plan
Wednesday, March 25, 2026
PAG Board Conference Room
3:00 pm – 5:00 pm

In accordance with the requirements of 5 GCA § 1205, the Bureau of Statistics and Plans, in conjunction with the Port Authority of Guam (PAG), will be conducting a public hearing on **the Jose D. Leon Guerrero Commercial Port of Guam 2025 Master Plan**.

Agenda: I. Call to Order; II. Introductions; III. Master Plan Presentation; IV. Public Comment Period; V. Adjournment.

The public is invited to attend and provide comment on the Port of Guam 2025 Master Plan, which is available for public review on the Port's website at www.portofguam.com/modernization or by clicking here. and the Bureau of Statistics and Plans website, https://bsp.guam.gov/latest-news/. Hard copies are available for review at the Bureau of Statistics and Plans, Office of the Director, 513 West Marine Corps Drive, Ricardo J. Bordallo Complex, Hagatna, 8am-5pm and at the Port's

Doc. No. 38GL-26-2386.*

Strategic Planning Division, 1026 Cabras Highway, Suite 203, Piti. Oral and written testimonies will be accepted at the hearing or may be submitted online to gcmp@bsp.guam.gov. Please include your name when submitting testimonies online.
Deadline to submit comments is 5:00 PM on March 26, 2026.

For more information, please contact PAG Chief Planner Joe Javellana at 671-477-5931/4, ext. 234. Any persons needing special accommodations, please email mduenas@portofguam.com or call 671-477-5931/4, ext. 201/202.

Modernization - Port Authority of Guam

Welcome to the Port Authority of Guam

Hafa Adai and welcome to the Port Authority of Guam's Modernization Program! Hundreds of millions of dollars will be spent to transform our commercial sea port into a world-class facility ready to meet the demands of the future. The Port, along with its Owner's Agent/Engineer, has developed this section of our website to streamline all web-based information related to our modernization program, and inform the public about the progress of all of our projects here at the commercial sea port. We invite you to join us on this exciting journey as we continue to strengthen the lifeline to our island.

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/s/ RORY J. RESPICIO
General Manager

Doc. No. 38GL-26-2386.*

Margret Duenas

From:	Margret Duenas <mduenas@portofguam.com>
Sent:	Tuesday, March 24, 2026 7:17 AM
To:	life; news; editor; mar vic cagurangan; john; michael weakley; kstokish; kishfm102 9; Tricia Granillo; taentgu; Kandit News Group; production; raygibson; senator lujan; info; nestor; newsdirector; Joshua N CIV USCG SEC GUAM 'Blocker, USA; jessica s worst; Peter J LCDR USCG CGFM Fransson, SEC GUAM (USA)
Cc:	Christian Paul Benitez, BSP
Subject:	RE: Notice of Public Hearing - 2025 Master Plan (Port Authority)
Attachments:	Public Notice PAG Master Plan.pdf; Agenda.pdf

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From: Margret Duenas <mduenas@portofguam.com>
Sent: Monday, March 23, 2026 7:23 AM

To: life <life@guampdn.com>; news <news@guampdn.com>; editor <editor@postguam.com>; mar vic cagurangan <[redacted]>; john <john@postguam.com>; michael weakley <michael.weakley@guam.gov>; kstokish <kstokish@gmail.com>; kishfm102 9 <kishfm102.9@gmail.com>; Tricia Granillo <tgranillo@amibrokers.com>; taentgu <[redacted]>; Kandit News Group <news@kanditnews.com>; production <production@joyfmradio.net>; raygibson <[redacted]>; senator lujan <senator.lujan@guamlegislature.gov>; info <info@power98.com>; nestor <nestor@postguam.com>; newsdirector <newsdirector@kuam.com>; Joshua N CIV USCG SEC GUAM 'Blocker, USA <Joshua.N.Blocker@uscg.mil>; jessica s worst <jessica.s.worst@uscg.mil>; Peter J LCDR USCG CGFM Fransson, SEC GUAM (USA) <Peter.J.Fransson@uscg.mil>
Cc: Christian Paul Benitez, BSP <christianpaul.benitez@bsp.guam.gov>
Subject: RE: Notice of Public Hearing - 2025 Master Plan (Port Authority)

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From: Margret Duenas <mduenas@portofguam.com>
Sent: Wednesday, March 18, 2026 8:00 AM
To: life <life@guampdn.com>; news <news@guampdn.com>; editor <editor@postguam.com>; mar vic cagurangan

<[redacted]; john <john@postguam.com>; michael weakley <michael.weakley@guam.gov>; kstokish <kstokish@gmail.com>; kishfm102 9 <kishfm102.9@gmail.com>; Tricia Granillo <tgranillo@amibrokers.com>; taentgu <[redacted]; Kandit News Group <news@kanditnews.com>; production <production@joyfmradio.net>; raygibson <[redacted]; senator lujan <senator.lujan@guamlegislature.gov>; info <info@power98.com>; nestor <nestor@postguam.com>; newsdirector <newsdirector@kuam.com>; Joshua N CIV USCG SEC GUAM 'Blocker, USA <Joshua.N.Blocker@uscg.mil>; jessica s worst <jessica.s.worst@uscg.mil>; Peter J LCDR USCG CGFM Fransson, SEC GUAM (USA) <Peter.J.Fransson@uscg.mil>
Cc: Christian Paul Benitez, BSP <christianpaul.benitez@bsp.guam.gov>
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Margret Duenas

From:	Margret Duenas <mduenas@portofguam.com>
Sent:	Tuesday, March 24, 2026 7:17 AM
To:	rsablan; bvalera; ed cruz; guam-ops; franklin taitague; Renee Ibanez at GUM x5984; Jason' 'MENDOZA; Michelle' 'QUIDACHAY; Toney' 'FONG; gdavid; Operations Guam; logistics; Patrick Bulaon at GUM x5992; Gloria Perez at GUM x5975; EMSLEY Charles; Jacob Tareyama; Patrick Doromal; ray hartley; CRUZ Brandy; kjcalvo; hsholley; jennifer r duenas; leonardk; Mathews Pothen; jaysen farley; Jacob P. Guerrero; John Limtiaco; management; John Aflleje; Tristar Admin; Bill Ada; bkoeppen; 'Seabridge; cduenas
Cc:	Christian Paul Benitez, BSP
Subject:	RE: Public Hearing Notice - 2025 Master Plan (Port Authority)
Attachments:	Public Notice PAG Master Plan.pdf; Agenda.pdf

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Sent: Monday, March 23, 2026 7:22 AM
To: rsablan <rsablan@msa-guam.com>; bvalera <bvalera@msa-guam.com>; ed cruz <ed_cruz@mariana-express-guam.com>; guam-ops <guam-ops@nortonlilly.com>; franklin taitague <franklin.taitague@cqa.guam.gov>; Renee Ibanez at GUM x5984 <RIbanez@matson.com>; Jason' 'MENDOZA <jason.mendoza@apl.com>; Michelle' 'QUIDACHAY <michelle.quidachay@apl.com>; Toney' 'FONG <toney.fong@apl.com>; gdavid <gdavid@ambyth.com>; Operations Guam <ops@ambyth.com>; logistics <logistics@ambyth.com>; Patrick Bulaon at GUM x5992 <pbulaon@matson.com>; Gloria Perez at GUM x5975 <gperez@matson.com>; EMSLEY Charles <charles.emsley@apl.com>; Jacob Tareyama <jtareyama@ambyth.com>; Patrick Doromal <pdoromal@nortonlilly.com>; ray hartley <ray.hartley@cevalogistics.com>; CRUZ Brandy <Brandy.CRUZ@apl.com>; kjcalvo <kjcalvo@cabtug.com>; hsholley <HSholley@matson.com>; jennifer r duenas <jennifer.r.duenas@exxonmobil.com>; leonardk <leonardk@blackguam.com>; Mathews Pothen <MPothen@guamshipyard.net>; jaysen farley <jaysen.farley@heidelbergmaterials.com>; Jacob P. Guerrero <jacob.guerrero@ipehq.com>; John Limtiaco <jlimtiaco@pacificunlimitedguam.com>; management <management@sakmanlogistics.com>; John Aflleje <jaflleje@tristar-guam.com>; Tristar Admin <admin@tristar-guam.com>; Bill Ada <bada@sppcorp.com>; bkoeppen <bkoeppen@sppcorp.com>; 'Seabridge <gairibarren@seabridgeguam.com>; cduenas <cduenas@matson.com>
Cc: Christian Paul Benitez, BSP <christianpaul.benitez@bsp.guam.gov>
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From: Margret Duenas <mduenas@portofguam.com>
Sent: Wednesday, March 18, 2026 8:01 AM
To: rsablan <rsablan@msa-guam.com>; bvalera <bvalera@msa-guam.com>; ed cruz <ed_cruz@mariana-express-guam.com>; guam-ops <guam-ops@nortonlilly.com>; franklin taitague <franklin.taitague@cqa.guam.gov>; Renee Ibanez at GUM x5984 <RIbanez@matson.com>; Jason' 'MENDOZA <jason.mendoza@apl.com>; Michelle' 'QUIDACHAY <michelle.quidachay@apl.com>; Toney' 'FONG <toney.fong@apl.com>; gdavid <gdavid@ambyth.com>; Operations Guam <ops@ambyth.com>; logistics <logistics@ambyth.com>; Patrick Bulaon at GUM x5992 <pbulaon@matson.com>; Gloria Perez at GUM x5975 <gperez@matson.com>; EMSLEY Charles <charles.emsley@apl.com>; Jacob Tareyama <jtareyama@ambyth.com>; Patrick Doromal <pdoromal@nortonlilly.com>; ray hartley <ray.hartley@cevalogistics.com>; CRUZ Brandy <Brandy.CRUZ@apl.com>; kjcalvo <kjcalvo@cabtug.com>; hsholley <HSholley@matson.com>; jennifer r duenas <jennifer.r.duenas@exxonmobil.com>; leonardk <leonardk@blackguam.com>; Mathews Pothen <MPothen@guamshipyard.net>; jaysen farley <jaysen.farley@heidelbergmaterials.com>; Jacob P. Guerrero <jacob.guerrero@ipehq.com>; John Limtiaco <jlimtiaco@pacificunlimitedguam.com>; management <management@sakmanlogistics.com>; John Aflleje <jaflleje@tristar-guam.com>; Tristar Admin <admin@tristar-guam.com>; Bill Ada <bada@sppcorp.com>; bkoeppen <bkoeppen@sppcorp.com>; 'Seabridge <gairibarren@seabridgeguam.com>; cduenas <cduenas@matson.com>
Cc: Christian Paul Benitez, BSP <christianpaul.benitez@bsp.guam.gov>
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From: Margret Duenas <mduenas@portofguam.com>
Sent: Sunday, March 15, 2026 8:27 AM
To: rsablan <rsablan@msa-guam.com>; bvalera <bvalera@msa-guam.com>; ed cruz <ed_cruz@mariana-express-guam.com>; guam-ops <guam-ops@nortonlilly.com>; franklin taitague <franklin.taitague@cqa.guam.gov>; Renee Ibanez at GUM x5984 <RIbanez@matson.com>; Jason' 'MENDOZA <jason.mendoza@apl.com>; Michelle' 'QUIDACHAY <michelle.quidachay@apl.com>; Toney' 'FONG <toney.fong@apl.com>; gdavid <gdavid@ambyth.com>; Operations Guam <ops@ambyth.com>; logistics <logistics@ambyth.com>; Patrick Bulaon at GUM x5992 <pbulaon@matson.com>; Gloria Perez at GUM x5975 <gperez@matson.com>; EMSLEY Charles <charles.emsley@apl.com>; Jacob Tareyama <jtareyama@ambyth.com>; Patrick Doromal <pdoromal@nortonlilly.com>; ray hartley <ray.hartley@cevalogistics.com>; CRUZ Brandy <Brandy.CRUZ@apl.com>; kjcalvo <kjcalvo@cabtug.com>; hsholley <HSholley@matson.com>; jennifer r duenas <jennifer.r.duenas@exxonmobil.com>; leonardk <leonardk@blackguam.com>; Mathews Pothen <MPothen@guamshipyard.net>; jaysen farley <jaysen.farley@heidelbergmaterials.com>; Jacob P. Guerrero <jacob.guerrero@ipehq.com>; John Limtiaco <jlimtiaco@pacificunlimitedguam.com>; management <management@sakmanlogistics.com>; John Aflleje <jaflleje@tristar-guam.com>; Tristar Admin <admin@tristar-guam.com>; Bill Ada <bada@sppcorp.com>; bkoeppen <bkoeppen@sppcorp.com>; 'Seabridge <gairibarren@seabridgeguam.com>; cduenas <cduenas@matson.com>
Cc: Christian Paul Benitez, BSP <christianpaul.benitez@bsp.guam.gov>
Subject: Public Hearing Notice - 2025 Master Plan (Port Authority)

NOTICE OF PUBLIC HEARING

Jose D. Leon Guerrero Commercial Port of Guam
2025 Master Plan
Wednesday, March 25, 2026
PAG Board Conference Room
3:00 pm – 5:00 pm

In accordance with the requirements of 5 GCA § 1205, the Bureau of Statistics and Plans, in conjunction with the Port Authority of Guam (PAG), will be conducting a public hearing on **the Jose D. Leon Guerrero Commercial Port of Guam 2025 Master Plan**.

Agenda: I. Call to Order; II. Introductions; III. Master Plan Presentation; IV. Public Comment Period; V. Adjournment.

The public is invited to attend and provide comment on the Port of Guam 2025 Master Plan, which is available for public review on the Port's website at www.portofguam.com/modernization or by clicking here and the Bureau of Statistics and Plans website, https://bsp.guam.gov/latest-news/. Hard copies are available for review at the Bureau of Statistics and Plans, Office of the Director, 513 West Marine Corps Drive, Ricardo J. Bordallo Complex, Hagatna, 8am-5pm and at the Port's Strategic Planning Division, 1026 Cabras Highway, Suite 203, Piti. Oral and written testimonies will be accepted at the hearing or may be submitted online to gcmp@bsp.guam.gov. Please include your name when submitting testimonies online.
Deadline to submit comments is 5:00 PM on March 26, 2026.

For more information, please contact PAG Chief Planner Joe Javellana at 671-477-5931/4, ext. 234. Any persons needing special accommodations, please email mduenas@portofguam.com or call 671-477-5931/4, ext. 201/202.

Newspaper Bundles available for you today!

Newspaper bundles $10.00 for each pack of 150 papers

Pick up at:
THE GUAM DAILY POST
@ the CORE TECH CENTER
388 S. Marine Corps Dr., Suite 301
Tamuning, Mon-Fri
8:30am-5pm.
First come, first served. Cash only, please!

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/s/ RORY J. RESPICIO
General Manager

This advertisement is paid with government funds by the Port Authority of Guam.

NOTICE OF PUBLIC SALE OF PERSONAL PROPERTY

Facility: Guam Mini Storage
Address: 380 East Harmon Industrial Park Rd
Tamuning, GU 96913

Notice is hereby given that the contents of the following units will be sold at public sale to satisfy the owner's lien pursuant to applicable law. Sale conducted ONLINE at www.bid13.com.

Auction Starts: March 16, 2026 at 10:00 AM
Auction Ends: March 27, 2026 at 10:00 AM

E60 -	D. Powell
E62 -	M. Funikugub
B15 -	L. Ambros
E49 -	M. Remis
F41 -	T. Ogo
B6 -	S. Taves
B7 -	P. Milner
C17C38 -	D. Dungca

Property sold to highest bidder, cash. $100 refundable cleaning deposit required. Removal within 72 hrs. Facility reserves the right to withdraw any unit prior to auction close.

Early bidding encouraged. Register at www.bid13.com.
Info: (671) 647-5720 | Find us on Facebook & IG

GUAM POWER AUTHORITY
ATURIDÅT ILEKTRESEDÅT GUAHAN
P.O. BOX 2977 • HAGÅTÑA, GUAM U.S.A. 96932-2977
Telephone Nos. 671 648-3045/55 or Facsimile 671-648-3165

Robert T. Lewis
CCU Chairman

John M. Benavente, P.E.
General Manager

FINAL ADVERTISEMENT
INVITATION FOR BID
This notice is paid for by the GUAM POWER AUTHORITY REVENUE FUNDS
Public Law 26-12

BID NO.:	DUE DATE:	TIME:	DESCRIPTION:
GPA-034-26	03/17/2026	09:00 A.M.	Pad Mounted Transformers (Revenue)
GPA-033-26	03/17/2026	10:00 A.M.	Technical Services to Service and Calibrate the High Voltage Rubber Glove and Sleeve Tester (Revenue)
GPA-035-26	03/17/2026	11:00 A.M.	LED Luminaire (Revenue)
GPA-036-26	03/17/2026	02:00 PM	Wire (Revenue)

Bid packages may be picked up at the GPWA Procurement Office, 1st. Floor, Room 101, Gloria B. Nelson Public Service Building, 688 Route 15, Mangilao, Guam. All interested firms should register with GPA's Procurement Division to be able to participate in the bid. Please call our office at (671) 648-3045 / 3055 to register. Registration is required to ensure that all "Amendments and Special Reminders" are communicated to all bidders throughout the bid process. Procurement instructions are posted on the Authority's web site at https://notices.guam.gov

/s/ JOHN M. BENAVENTE, P.E.
General Manager

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CCU Chairman

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General Manager

ADVERTISEMENT
INVITATION FOR BID
This notice is paid for by the GUAM POWER AUTHORITY REVENUE FUNDS
Public Law 26-12

BID NO.:	DUE DATE:	TIME:	DESCRIPTION:
RE-BID GPA-029-26	04/07/2026	2:00 P.M.	Type V Group Disconnect Switch Set (CIP)
GPA-039-26	04/07/2026	10:00 A.M.	Crossarms (Revenue)
GPA-040-26	04/07/2026	9:00 A.M.	Clamps (Revenue)
GPA-042-26	04/07/2026	11:00 A.M.	35 Ton Split Ducted Air Conditioning Unit (CIP)

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/s/ JOHN M. BENAVENTE, P.E.
General Manager

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PORT OF GUAM
Jose D. Leon Guerrero Commercial Port

NOTICE OF PUBLIC HEARING
Jose D. Leon Guerrero Commercial Port of Guam
2025 Master Plan
Wednesday, March 25, 2026 • PAG Board Conference Room • 3:00 pm - 5:00 pm

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Info: (671) 647-5720 | Find us on Facebook & IG

Modernization - Port Authority of Guam

Welcome to the Port Authority of Guam

Hafa Adai and welcome to the Port Authority of Guam's Modernization Program! Hundreds of millions of dollars will be spent to transform our commercial sea port into a world-class facility ready to meet the demands of the future. The Port, along with its Owner's Agent/Engineer, has developed this section of our website to streamline all web-based information related to our modernization program, and inform the public about the progress of all of our projects here at the commercial sea port. We invite you to join us on this exciting journey as we continue to strengthen the lifeline to our island.

PUBLIC HEARING on 2025 Master Plan

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/s/ RORY J. RESPICIO
General Manager

Doc. No. 38GL-26-2386.*

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Notice of Public Hearing - 2025 Master Plan of Port Authority

PUBLIC HEARING

- **Posted on:** 03/23/2026 07:17 AM
- **Posted by:** Marge Duenas
- **Department(s):** PORT AUTHORITY OF GUAM
- **Division(s):** PORT AUTHORITY OF GUAM
- **Notice Topic(s):** PUBLIC HEARING
- **Types of Notice:** PUBLIC HEARING
- **For Audience(s):** PUBLIC
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PUBLIC HEARING on 2025 Master Plan

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Margret Duenas

From:	Margret Duenas <mduenas@portofguam.com>
Sent:	Monday, March 23, 2026 7:23 AM
To:	life; news; editor; mar vic cagurangan; john; michael weakley; kstokish; kishfm102 9; Tricia Granillo; taentgu; Kandit News Group; production; raygibson; senator lujan; info; nestor; newsdirector; Joshua N CIV USCG SEC GUAM 'Blocker, USA; jessica s worst; Peter J LCDR USCG CGFM Fransson, SEC GUAM (USA)
Cc:	Christian Paul Benitez, BSP
Subject:	RE: Notice of Public Hearing - 2025 Master Plan (Port Authority)
Attachments:	Public Notice PAG Master Plan.pdf; Agenda.pdf

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From: Margret Duenas <mduenas@portofguam.com>
Sent: Wednesday, March 18, 2026 8:00 AM

To: life <life@guampdn.com>; news <news@guampdn.com>; editor <editor@postguam.com>; mar vic cagurangan <mar_vic_cagurangan@yahoo.com>; john <john@postguam.com>; michael weakley <michael.weakley@guam.gov>; kstokish <kstokish@gmail.com>; kishfm102 9 <kishfm102.9@gmail.com>; Tricia Granillo <tgranillo@amibrokers.com>; taentgu <taentgu@gmail.com>; Kandit News Group <news@kanditnews.com>; production <production@joyfmradio.net>; raygibson <raygibson@gmail.com>; senator lujan <senator.lujan@guamlegislature.gov>; info <info@power98.com>; nestor <nestor@postguam.com>; newsdirector <newsdirector@kuam.com>; Joshua N CIV USCG SEC GUAM 'Blocker, USA <Joshua.N.Blocker@uscg.mil>; jessica s worst <jessica.s.worst@uscg.mil>; Peter J LCDR USCG CGFM Fransson, SEC GUAM (USA) <Peter.J.Fransson@uscg.mil>
Cc: Christian Paul Benitez, BSP <christianpaul.benitez@bsp.guam.gov>
Subject: RE: Notice of Public Hearing - 2025 Master Plan (Port Authority)

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Sent: Monday, March 23, 2026 7:22 AM
To: rsablan; bvalera; ed cruz; guam-ops; franklin taitague; Renee Ibanez at GUM x5984; Jason' 'MENDOZA; Michelle' 'QUIDACHAY; Toney' 'FONG; gdavid; Operations Guam; logistics; Patrick Bulaon at GUM x5992; Gloria Perez at GUM x5975; EMSLEY Charles; Jacob Tareyama; Patrick Doromal; ray hartley; CRUZ Brandy; kjcalvo; hsholley; jennifer r duenas; leonardk; Mathews Pothen; jaysen farley; Jacob P. Guerrero; John Limtiaco; management; John Aflleje; Tristar Admin; Bill Ada; bkoeppen; 'Seabridge; cduenas
Cc: Christian Paul Benitez, BSP
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Guam <ops@ambyth.com>; logistics <logistics@ambyth.com>; Patrick Bulaon at GUM x5992 <pbulaon@matson.com>; Gloria Perez at GUM x5975 <gperez@matson.com>; EMSLEY Charles <charles.emsley@apl.com>; Jacob Tareyama <jtareyama@ambyth.com>; Patrick Doromal <pdoromal@nortonlilly.com>; ray hartley <ray.hartley@cevalogistics.com>; CRUZ Brandy <Brandy.CRUZ@apl.com>; kjcalvo <kjcalvo@cabtug.com>; hsholley <HSholley@matson.com>; jennifer r duenas <jennifer.r.duenas@exxonmobil.com>; leonardk <leonardk@blackguam.com>; Mathews Pothen <MPothen@guamshipyard.net>; jaysen farley <jaysen.farley@heidelbergmaterials.com>; Jacob P. Guerrero <jacob.guerrero@ipehq.com>; John Limtiaco <jlimtiaco@pacificunlimitedguam.com>; management <management@sakmanlogistics.com>; John Aflleje <jaflleje@tristar-guam.com>; Tristar Admin <admin@tristar-guam.com>; Bill Ada <bada@sppcorp.com>; bkoeppen <bkoeppen@sppcorp.com>; 'Seabridge <gairibarren@seabridgeguam.com>; cduenas <cduenas@matson.com>
Cc: Christian Paul Benitez, BSP <christianpaul.benitez@bsp.guam.gov>
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The public is invited to attend and provide comment on the Port of Guam 2025 Master Plan, which is available for public review on the Port's website at www.portofguam.com/modernization or by clicking here and the Bureau of Statistics and Plans website, https://bsp.guam.gov/latest-news/. Hard copies are available for review at the Bureau of Statistics and Plans, Office of the Director, 513 West Marine Corps Drive, Ricardo J. Bordallo Complex, Hagatna, 8am-5pm and at the Port's Strategic Planning Division, 1026 Cabras Highway, Suite 203, Piti. Oral and written testimonies will be accepted at the hearing or may be submitted online to gcmp@bsp.guam.gov. Please include your name when submitting testimonies online.
Deadline to submit comments is 5:00 PM on March 26, 2026.

For more information, please contact PAG Chief Planner Joe Javellana at 671-477-5931/4, ext. 234. Any persons needing special accommodations, please email mduenas@portofguam.com or call 671-477-5931/4, ext. 201/202.

From: Margret Duenas <mduenas@portofguam.com>
Sent: Sunday, March 15, 2026 8:27 AM
To: rsablan <rsablan@msa-guam.com>; bvalera <bvalera@msa-guam.com>; ed cruz <ed_cruz@mariana-express-guam.com>; guam-ops <guam-ops@nortonlilly.com>; franklin taitague <franklin.taitague@cqa.guam.gov>; Renee Ibanez at GUM x5984 <RIbanez@matson.com>; Jason' 'MENDOZA <jason.mendoza@apl.com>; Michelle' 'QUIDACHAY <michelle.quidachay@apl.com>; Toney' 'FONG <toney.fong@apl.com>; gdavid <gdavid@ambyth.com>; Operations

Guam <ops@ambyth.com>; logistics <logistics@ambyth.com>; Patrick Bulaon at GUM x5992 <pbulaon@matson.com>; Gloria Perez at GUM x5975 <gperez@matson.com>; EMSLEY Charles <charles.emsley@apl.com>; Jacob Tareyama <jtareyama@ambyth.com>; Patrick Doromal <pdoromal@nortonlilly.com>; ray hartley <ray.hartley@cevalogistics.com>; CRUZ Brandy <Brandy.CRUZ@apl.com>; kjcalvo <kjcalvo@cabtug.com>; hsholley <HSholley@matson.com>; jennifer r duenas <jennifer.r.duenas@exxonmobil.com>; leonardk <leonardk@blackguam.com>; Mathews Pothen <MPothen@guamshipyard.net>; jaysen farley <jaysen.farley@heidelbergmaterials.com>; Jacob P. Guerrero <jacob.guerrero@ipehq.com>; John Limtiaco <jlimtiaco@pacificunlimitedguam.com>; management <management@sakmanlogistics.com>; John Aflleje <jaflleje@tristar-guam.com>; Tristar Admin <admin@tristar-guam.com>; Bill Ada <bada@sppcorp.com>; bkoeppen <bkoeppen@sppcorp.com>; 'Seabridge <gairibarren@seabridgeguam.com>; cduenas <cduenas@matson.com>
Cc: Christian Paul Benitez, BSP <christianpaul.benitez@bsp.guam.gov>
Subject: Public Hearing Notice - 2025 Master Plan (Port Authority)

NOTICE OF PUBLIC HEARING

Jose D. Leon Guerrero Commercial Port of Guam
2025 Master Plan
Wednesday, March 25, 2026
PAG Board Conference Room
3:00 pm – 5:00 pm

In accordance with the requirements of 5 GCA § 1205, the Bureau of Statistics and Plans, in conjunction with the Port Authority of Guam (PAG), will be conducting a public hearing on **the Jose D. Leon Guerrero Commercial Port of Guam 2025 Master Plan.**

Agenda: I. Call to Order; II. Introductions; III. Master Plan Presentation; IV. Public Comment Period; V. Adjournment.

The public is invited to attend and provide comment on the Port of Guam 2025 Master Plan, which is available for public review on the Port's website at www.portofguam.com/modernization or by clicking here and the Bureau of Statistics and Plans website, https://bsp.guam.gov/latest-news/. Hard copies are available for review at the Bureau of Statistics and Plans, Office of the Director, 513 West Marine Corps Drive, Ricardo J. Bordallo Complex, Hagatna, 8am-5pm and at the Port's Strategic Planning Division, 1026 Cabras Highway, Suite 203, Piti. Oral and written testimonies will be accepted at the hearing or may be submitted online to gcmp@bsp.guam.gov. Please include your name when submitting testimonies online.
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PORT OF GUAM

PORT OF GUAM
Jose D. Leon Guerrero Commercial Port

NOTICE OF PUBLIC HEARING
Jose D. Leon Guerrero Commercial Port of Guam
2025 Master Plan
Wednesday, March 25, 2026 • PAG Board Conference Room • 3:00 pm - 5:00 pm

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Agenda: I. Call to Order, II. Introductions III. Master Plan Presentation, IV. Public Comment Period, V. Adjournment

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For more information, please contact PAG Chief Planner Joe Javellana at 671-477-5931/8, ext. 234. Any persons needing special accommodations, please email mdeleonguerrero@portofguam.com or call 671-477-5931/8, ext. 201/202.

/s/ RORY J. RESPICIO
General Manager

This advertisement is paid with government funds by the Port Authority of Guam.

JOB ANNOUNCEMENT

Civil Engineers; Bach. deg. in Civil Engrg. (may be foreign equiv); 2 yrs. exp. as Civil Engr, Site Engr, Project Engr, Quantity Surveyor or CADD Detailer/Operator. Perform engrg. duties in planning, designing & overseeing const. & maintenance of building structures & facilities for const. co. located in Harmon, Guam. Monitor engrg. progress against budget & forecasted schedule. Send resume to Black Construction Corporation, P.O. Box 24667, Barrigada, Guam 96921

JOB ANNOUNCEMENT

Electrical Engineer; Bach. deg. in Electrical Engrg. (may be foreign equiv); 5 yrs. exp. Perform all related electrical engineering duties for petroleum services company. Design, implement, maintain & improve electrical generation & storage systems, equipment & components for commercial & industrial applications. Oversee project implementation efforts. Send resume to IP&E Holdings, LLC, 643 Chalan San Antonio Ste. 100, Tamuning, Guam 96913

CANNABIS CONTROL BOARD
NOTICE OF REGULAR MEETING

The Cannabis Control Board will be meeting on Wednesday, March 25, 2026, at 10:00 am via Zoom Video Conference.
Meeting Link: https://us06web.zoom.us/j/84521273138

OFFICE OF MICHAEL J GATEWOOD LLC
MICHAEL J. GATEWOOD

IN THE SUPERIOR COURT OF GUAM
IN THE MATTER OF THE ESTATE OF

PORT OF GUAM

PORT OF GUAM
Jose D. Leon Guerrero Commercial Port

NOTICE OF PUBLIC HEARING
Jose D. Leon Guerrero Commercial Port of Guam
2025 Master Plan
Wednesday, March 25, 2026 • PAG Board Conference Room • 3:00 pm - 5:00 pm

In accordance with the requirements of 5 GCA § 1305, the Bureau of Statistics and Plans, in conjunction with the Port Authority of Guam (PAG), will be conducting a public hearing on the Jose D. Leon Guerrero Commercial Port of Guam 2025 Master Plan.

Agenda: I. Call to Order; II. Introductions; III. Master Plan Presentation; IV. Public Comment Period; V. Adjournment.

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For more information, please contact PAG Chief Planner Joe Javellana at 671 477 5931/4, ext. 214. Any persons needing special accommodations, please email mdivera@portofguam.com or call 671 477-5931/4, ext. 201/202.

/s/ RORY J. RESPICIO
General Manager

This advertisement is paid with government funds by the Port Authority of Guam

VEHICLES FOR BID
"AS IS"

2025 Nissan Frontier
2025 Nissan Sentra
2022 Kia Seltos
2024 Mitsubishi Mirage G4 Sedan
2024 Mitsubishi Mirage Hatchback
2023 Mitsubishi Mirage G4 Sedan

Vehicles may be viewed at Bank of Guam Hagåtña Branch **by appointment only**, Monday through Friday, from 9:00am to 4:00pm. Last day for bidding will be on Friday, March 27, 2026 at 4:00pm. For more information, please contact Jacie Manibusan at (671) 472-5442/(671) 688-8966 or Ignacio Aldan at (671) 472-5600/(671) 685-4108. Bank of Guam reserves the right to refuse any or all bids.

Bank of Guam

JOB ANNOUNCEMENT

Civil Engineers; Bach. deg. in Civil Engrg. (may be foreign equiv); 2 yrs. exp. as Civil Engr, Site Engr, Project Engr, Quantity Surveyor or CADD Detailer/Operator. Perform engrg. duties in planning, designing & overseeing const. & maintenance of building structures & facilities for const. co. located in Harmon, Guam. Monitor engrg. progress against budget & forecasted schedule. Send resume to Black Construction Corporation, P.O. Box 24667, Barrigada, Guam 96921

JOB ANNOUNCEMENT

Electrical Engineer; Bach. deg. in Electrical Engrg. (may be foreign equiv); 5 yrs. exp. Perform all related electrical engineering duties for petroleum services company. Design, implement, maintain & improve electrical generation & storage systems, equipment & components for commercial & industrial applications. Oversee project implementation efforts. Send resume to IP&E Holdings, LLC, 643 Chalan San Antonio Ste. 100, Tamuning, Guam 96913

CANNABIS CONTROL BOARD
NOTICE OF REGULAR MEETING

The Cannabis Control Board will be meeting on Wednesday, March 25, 2026, at 10:00 am via Zoom Video Conference Meeting Link: https://us06web.zoom.us/j/84327278188
Conference Guam Department of Revenue and Taxation Teleconference

AGENDA
I. Call to Order
II. Roll Call of Members/Quorum
III. Secretary's Report
(A) CCB Mtg #44 Minutes Jan 13, 2026 Pending Approval
(B) CCB Mtg #45 Minutes Oct 29, 2025 Pending Approval
(C) CCB Mtg #46 Minutes Feb 26, 2026 Pending Approval
(D) CCB Mtg #47 Minutes Jan 29, 2026 Pending
(E) CCB Mtg #48 Minutes February 25, 2026 Pending
IV. DAI Business
(A) DAI Ofc. NO. 2026-001 Guam Land Forms, Inc. (Edible)
(B) DAI Ofc. NO. 2026-002 Blue Wave Inc (Edible)
V. New Business
(A) Board Secretary Vacancy
(B) Annual Cannabis Summit
(C) Responsible Official Appointment
VI. Cannabis Application & Licensure Status
VII. Other Discussion
(A) Department of Public Health Annual Cannabis Summit after action report
(B) Department of Agriculture HEMP report
(C) Cannabis Establishment Licensee Guidance
(D) Bill No. ____-38 (COR)
VIII. Next CC Board Meeting
IX. Open Forum/Public Comment
X. Meeting Adjournment

For any special accommodations, please contact ALIS MCAEL
This ad is paid with the Department of Revenue & Taxation's General Fund

OFFICE OF MICHAEL J. GATEWOOD LLC
MICHAEL J. GATEWOOD
michael@gatewoodlegal.com
101E Chalan Santa Papa, Suite 102
Hagåtña, GU 96910
Tel No.: 671.688.4285

IN THE SUPERIOR COURT OF GUAM
IN THE MATTER OF THE ESTATE OF
JOHN ZOILO CAMACHO
Deceased
PROBATE CASE NO. PR 0011 26

NOTICE TO CREDITORS

NOTICE IS HEREBY GIVEN by Victoria Louise Camacho, Administratrix of the Estate of JOHN ZOILO CAMACHO deceased, to the creditors of, and all persons having claims against said Estate or against said Decedent, that within sixty (60) calendar days after the date of the first publication of this notice, they either file them with necessary vouchers in the Office of Clerk of the Superior Court of Guam, or exhibit them with the necessary vouchers to said Administratrix or her attorneys of record, OFFICE OF MICHAEL J GATEWOOD LLC, 101E Chalan Santa Papa, Suite 102, Hagåtña, GU 96910, the same being the place for the transaction of the business of said Estate.

DATED: Hagåtña, Guam March 12, 2026

/s/ MICHAEL J. GATEWOOD

GUAM HOUSING CORPORATION
P.O. Box 3457, Hagåtña, Guam 96932

Lourdes B. Leon Guerrero
Governor

Joshua F. Tenorio
Lt. Governor

REQUEST FOR INFORMATION (REI)
No. GHC 2026-02
FOR DEVELOPMENT OF AFFORDABLE HOMES

The Guam Housing Corporation (GHC) is soliciting information to determine if there are businesses interested in building affordable homes on GHC properties.

Interested developers are requested to submit a proposal of interest addressed to:
Edith C. Pangelinan, President
590 South Marine Corps. Drive, Suite 514, 5th Floor, ITC Building
Tamuning, Guam 96931

The project criteria are available upon request. Deadline to submit proposal of interest is
April 27, 2026.

For more information, please contact Cassandra Santos, Assistant Supply Management Administrator at (671)647-4143 or via email at cassandra.santos@ghc.guam.gov

590 S. Marine Corps Drive, Ste. 514 ITC Building, Tamuning, Guam 96913

GUAM WATERWORKS AUTHORITY
Gloria B. Nelson Public Service Building, 688 Route 15 Mangilao, Guam 96913
P.O. Box 3010, Hagåtña, Guam 96932
Tel. No.: (671) 300-6845/40 Fax No. (671) 648-3290

THIS AD IS PAID FOR BY GWA (PUBLIC LAW 26-12)

INVITATION FOR BID

The Guam Waterworks Authority invites sealed bids for the **Insertion Valves** under **GWA IFB NO. 2026-13**. Bids will be received until 10:00 a.m. Chamorro Standard Time on **April 10, 2026**, at the GWA Procurement Office situated on the first floor of the Gloria B. Nelson Public Services Building in Mangilao. At this appointed time and location, all bids will be publicly and virtually opened via GoToMeeting and read aloud. Bidders interested in attending the virtual meeting may send their request to pbid@guamwaterworks.org to obtain the GoToMeeting (GTM) Link prior to the due date and time.

Each bid must be accompanied by a Bid/Performance Bond amounting to fifteen percent (15%) of the total bid price. Acceptable bid securities include Bid/Performance Bonds, Surety Bonds, or certified cashier's checks payable to the Guam Waterworks Authority.

A non-refundable fee of $15.00 is required for each set of bidding documents, available for purchase at the GWA Procurement Office. Alternatively, bidders can access the bid package for download at www.guamwaterworks.org without charge. However, vendors are strongly encouraged to register via email at pbid@guamwaterworks.org or visit the GWA Procurement Office to ensure receipt of updated information, notices, or bid amendments.

GWA retains the right to amend, reject, or revise any or all proposals and to waive minor imperfections in the bid proposal in the best interest of the Guam Waterworks.

/s/Miguel C. Bordallo, P.E.
General Manager

Modernization - Port Authority of Guam

Welcome to the Port Authority of Guam

Hafa Adai and welcome to the Port Authority of Guam's Modernization Program! Hundreds of millions of dollars will be spent to transform our commercial sea port into a world-class facility ready to meet the demands of the future. The Port, along with its Owner's Agent/Engineer, has developed this section of our website to streamline all web-based information related to our modernization program, and inform the public about the progress of all of our projects here at the commercial sea port. We invite you to join us on this exciting journey as we continue to strengthen the lifeline to our island.

PUBLIC HEARING on 2025 Master Plan

Notice of Public Hearing

Jose D. Leon Guerrero Commercial Port of Guam
2025 Master Plan
Wednesday, March 25, 2026
PAG Board Conference Room
3:00 pm – 5:00 pm

In accordance with the requirements of 5 GCA § 1205, the Bureau of Statistics and Plans, in conjunction with the Port Authority of Guam (PAG), will be conducting a public hearing on **the Jose D. Leon Guerrero Commercial Port of Guam 2025 Master Plan**.

Agenda: I. Call to Order; II. Introductions; III. Master Plan Presentation; IV. Public Comment Period; V. Adjournment.

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/s/ RORY J. RESPICIO
General Manager

Doc. No. 38GL-26-2386.*

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Notice of Public Hearing - 2025 Master Plan of Port Authority

PUBLIC HEARING

- **Posted on:** 03/15/2026 07:56 AM
- **Posted by:** Marge Duenas
- **Department(s):** PORT AUTHORITY OF GUAM
- **Division(s):** PORT AUTHORITY OF GUAM
- **Notice Topic(s):** PUBLIC HEARING
- **Types of Notice:** PUBLIC HEARING
- **For Audience(s):** PUBLIC
- **Share this notice**

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Margret Duenas

From:	Margret Duenas <mduenas@portofguam.com>
Sent:	Sunday, March 15, 2026 8:27 AM
To:	rsablan; bvalera; ed cruz; guam-ops; franklin taitague; Renee Ibanez at GUM x5984; Jason' 'MENDOZA; Michelle' 'QUIDACHAY; Toney' 'FONG; gdavid; Operations Guam; logistics; Patrick Bulaon at GUM x5992; Gloria Perez at GUM x5975; EMSLEY Charles; Jacob Tareyama; Patrick Doromal; ray hartley; CRUZ Brandy; kjcalvo; hsholley; jennifer r duenas; leonardk; Mathews Pothen; jaysen farley; Jacob P. Guerrero; John Limtiaco; management; John Aflleje; Tristar Admin; Bill Ada; bkoeppen; 'Seabridge; cduenas
Cc:	Christian Paul Benitez, BSP
Subject:	Public Hearing Notice - 2025 Master Plan (Port Authority)
Attachments:	Ad Notice MP.pdf; Agenda.pdf

NOTICE OF PUBLIC HEARING

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Margret Duenas

From:	Margret Duenas <mduenas@portofguam.com>
Sent:	Sunday, March 15, 2026 8:25 AM
To:	life; news; editor; mar vic cagurangan; john; michael weakley; kstokish; kishfm102 9; Tricia Granillo; taentgu; Kandit News Group; production; raygibson; senator lujan; info; nestor; newsdirector; Joshua N CIV USCG SEC GUAM 'Blocker, USA; jessica s worst; Peter J LCDR USCG CGFM Fransson, SEC GUAM (USA)
Cc:	Christian Paul Benitez, BSP
Subject:	Notice of Public Hearing - 2025 Master Plan (Port Authority)
Attachments:	Ad Notice MP.pdf; Agenda.pdf

NOTICE OF PUBLIC HEARING

Jose D. Leon Guerrero Commercial Port of Guam
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PORT OF GUAM
ATURIDAT I PUETTON GUAHAN
Jose D. Leon Guerrero Commercial Port
1026 Cabras Highway, Suite 201, Piti, Guam 96915
Telephone: 671-477-5931/35 Facsimile: 671-477-2689/4445
Website: www.portguam.com

Lourdes A. Leon Guerrero
Governor of Guam
Joshua F. Tenorio
Lieutenant Governor

PUBLIC HEARING
Jose D. Leon Guerrero Commercial Port of Guam
2025 Master Plan
PAG Board Conference Room
Wednesday, March 25, 2026
3:00 p.m. – 5:00 p.m.

AGENDA

I. CALL TO ORDER

II. INTRODUCTIONS
- Lola Leon Guerrero, Director, Bureau of Statistics & Plans
- Rory J. Respicio, General Manager, Port Authority of Guam

III. MASTER PLAN PRESENTATION
- Conducted by Rory J. Respicio

IV. PUBLIC COMMENT PERIOD

V. ADJOURNMENT

During the public comment period, please state your name. Written testimony (include name) may be submitted online to gcmp@bsp.guam.gov or mailed or delivered to Bureau of Statistics and Plans, located at 513 West Marine Corps Drive, Ricardo J. Bordallo Governor's Complex, Hagatna, Guam. Deadline to submit comments is Thursday, March 26, 2026 at 5:00 p.m.

Port of Guam, Jose D. Leon Guerrero Commercial Port is an Equal Employment Opportunity Employer.
Complaints of discrimination should be sent to the Human Resources Division.

PORT OF GUAM
ATURIDAT I PUETTON GUAHAN
Jose D. Leon Guerrero Commercial Port
1026 Cabras Highway, Suite 201, Piti, Guam 96915
Telephone: 671-477-5931/35 Facsimile: 671-477-2689/4445
Website: www.portguam.com

Lourdes A. Leon Guerrero
Governor of Guam
Joshua F. Tenorio
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NOTICE OF PUBLIC HEARING

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/s/ RORY J. RESPICIO
General Manager

Port of Guam, Jose D. Leon Guerrero Commercial Port is an Equal Employment Opportunity Employer.
Complaints of discrimination should be sent to the Human Resources Division.

NOTICE

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10:00AM BBQ Pavilion

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PORT OF GUAM

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Jose D. Leon Guerrero Commercial Port

Lourdes A. Leon Guerrero

NOTICE OF PUBLIC HEARING
Jose D. Leon Guerrero Commercial Port of Guam
2025 Master Plan
Wednesday, March 25, 2026 • PAG Board Conference Room • 3:00 pm - 5:00 pm

In accordance with the requirements of 5 GCA § 1205, the Bureau of Statistics and Plans, in conjunction with the Port Authority of Guam (PAG), will be conducting a public hearing on the Jose D. Leon Guerrero Commercial Port of Guam 2025 Master Plan.

Agenda: I. Call to Order; II. Introductions; III. Master Plan Presentation; IV. Public Comment Period; V. Adjournment.

The public is invited to attend and provide comment on the Port of Guam 2025 Master Plan, which is available for public review on the Port's website at www.portofguam.com/modernization and the Bureau of Statistics and Plans website, https://bsp.guam.gov/latest-news/. Hard copies are available for review at the Bureau of Statistics and Plans, Office of the Director, 513 West Marine Corps Drive, Ricardo J. Bordallo Complex, Hagatna, 8am-5pm and at the Port's Strategic Planning Division, 1026 Cabras Highway, Suite 203, Piti. Oral and written testimonies will be accepted at the hearing or may be submitted online to comments@bsp.guam.gov. Please include your name when submitting testimonies online. Deadline to submit comments is 5:00 PM on March 26, 2026.

For more information, please contact PAG Chief Planner Joe Javellana at 671-477-5931/4, ext. 234. Any persons needing special accommodations, please email mduenas@portofguam.com or call 671-477-5931/4, ext. 201/202.

/s/ RORY J. RESPICIO
General Manager

This advertisement is paid with government funds by the Port Authority of Guam.

Public Notices Portal - Government of Guam

Notice of Public Hearing - 2025 Master Plan of Port Authority

PUBLIC HEARING

- **Posted on:** 03/18/2026 08:01 AM
- **Posted by:** Marge Duenas
- **Department(s):** PORT AUTHORITY OF GUAM
- **Division(s):** PORT AUTHORITY OF GUAM
- **Notice Topic(s):** PUBLIC HEARING
- **Types of Notice:** PUBLIC HEARING
- **For Audience(s):** PUBLIC
- **Share this notice**

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2025 Master Plan
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3:00 pm – 5:00 pm

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Modernization - Port Authority of Guam

Welcome to the Port Authority of Guam

Hafa Adai and welcome to the Port Authority of Guam's Modernization Program! Hundreds of millions of dollars will be spent to transform our commercial sea port into a world-class facility ready to meet the demands of the future. The Port, along with its Owner's Agent/Engineer, has developed this section of our website to streamline all web-based information related to our modernization program, and inform the public about the progress of all of our projects here at the commercial sea port. We invite you to join us on this exciting journey as we continue to strengthen the lifeline to our island.

PUBLIC HEARING on 2025 Master Plan

Notice of Public Hearing

Jose D. Leon Guerrero Commercial Port of Guam
2025 Master Plan
Wednesday, March 25, 2026
PAG Board Conference Room
3:00 pm – 5:00 pm

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/s/ RORY J. RESPICIO
General Manager

Doc. No. 38GL-26-2386.*

Margret Duenas

From:	Margret Duenas <mduenas@portofguam.com>
Sent:	Wednesday, March 18, 2026 8:01 AM
To:	rsablan; bvalera; ed cruz; guam-ops; franklin taitague; Renee Ibanez at GUM x5984; Jason' 'MENDOZA; Michelle' 'QUIDACHAY; Toney' 'FONG; gdavid; Operations Guam; logistics; Patrick Bulaon at GUM x5992; Gloria Perez at GUM x5975; EMSLEY Charles; Jacob Tareyama; Patrick Doromal; ray hartley; CRUZ Brandy; kjcalvo; hsholley; jennifer r duenas; leonardk; Mathews Pothen; jaysen farley; Jacob P. Guerrero; John Limtiaco; management; John Aflleje; Tristar Admin; Bill Ada; bkoeppen; 'Seabridge; cduenas
Cc:	Christian Paul Benitez, BSP
Subject:	RE: Public Hearing Notice - 2025 Master Plan (Port Authority)
Attachments:	Public Notice PAG Master Plan.pdf; Agenda.pdf

NOTICE OF PUBLIC HEARING

Jose D. Leon Guerrero Commercial Port of Guam
2025 Master Plan
Wednesday, March 25, 2026
PAG Board Conference Room
3:00 pm – 5:00 pm

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From: Margret Duenas <mduenas@portofguam.com>
Sent: Sunday, March 15, 2026 8:27 AM
To: rsablan <rsablan@msa-guam.com>; bvalera <bvalera@msa-guam.com>; ed cruz <ed_cruz@mariana-express-guam.com>; guam-ops <guam-ops@nortonlilly.com>; franklin taitague <franklin.taitague@cqa.guam.gov>; Renee Ibanez at GUM x5984 <RIbanez@matson.com>; Jason' 'MENDOZA <jason.mendoza@apl.com>; Michelle' 'QUIDACHAY <michelle.quidachay@apl.com>; Toney' 'FONG <toney.fong@apl.com>; gdavid <gdavid@ambyth.com>; Operations Guam <ops@ambyth.com>; logistics <logistics@ambyth.com>; Patrick Bulaon at GUM x5992 <pbulaon@matson.com>; Gloria Perez at GUM x5975 <gperez@matson.com>; EMSLEY Charles <charles.emsley@apl.com>; Jacob Tareyama <jtareyama@ambyth.com>; Patrick Doromal <pdoromal@nortonlilly.com>; ray hartley <ray.hartley@cevalogistics.com>; CRUZ Brandy <Brandy.CRUZ@apl.com>; kjcalvo <kjcalvo@cabtug.com>; hsholley <HSholley@matson.com>; jennifer r duenas <jennifer.r.duenas@exxonmobil.com>; leonardk <leonardk@blackguam.com>; Mathews Pothen <MPothen@guamshipyard.net>; jaysen farley <jaysen.farley@heidelbergmaterials.com>; Jacob P. Guerrero <jacob.guerrero@ipehq.com>; John Limtiaco <jlimtiaco@pacificunlimitedguam.com>; management <management@sakmanlogistics.com>; John Aflleje <jaflleje@tristar-guam.com>; Tristar Admin <admin@tristar-guam.com>; Bill Ada <bada@sppcorp.com>; bkoeppen <bkoeppen@sppcorp.com>; 'Seabridge <gairibarren@seabridgeguam.com>; cduenas <cduenas@matson.com>
Cc: Christian Paul Benitez, BSP <christianpaul.benitez@bsp.guam.gov>
Subject: Public Hearing Notice - 2025 Master Plan (Port Authority)

NOTICE OF PUBLIC HEARING

Jose D. Leon Guerrero Commercial Port of Guam
2025 Master Plan
Wednesday, March 25, 2026
PAG Board Conference Room
3:00 pm – 5:00 pm

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Margret Duenas

From:	Margret Duenas <mduenas@portofguam.com>
Sent:	Wednesday, March 18, 2026 8:00 AM
To:	life; news; editor; mar vic cagurangan; john; michael weakley; kstokish; kishfm102 9; Tricia Granillo; taentgu; Kandit News Group; production; raygibson; senator lujan; info; nestor; newsdirector; Joshua N CIV USCG SEC GUAM 'Blocker, USA; jessica s worst; Peter J LCDR USCG CGFM Fransson, SEC GUAM (USA)
Cc:	Christian Paul Benitez, BSP
Subject:	RE: Notice of Public Hearing - 2025 Master Plan (Port Authority)
Attachments:	Public Notice PAG Master Plan.pdf; Agenda.pdf

NOTICE OF PUBLIC HEARING

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VALLEY OF GUAM [illegible]
Vice Chair

J. B, Tiyan

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Auction Ends: March 27, 2026 at 10:00 AM

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NOTICE OF PUBLIC HEARING
Jose D. Leon Guerrero Commercial Port of Guam
2025 Master Plan
Wednesday, March 25, 2026 • PAG Board Conference Room • 3:00 pm - 5:00 pm

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/s/ RORY J. RESPICIO
General Manager

This advertisement is paid with government funds by the Port Authority of Guam.

Margret Duenas

From: Margret Duenas <mduenas@portofguam.com>
Sent: Thursday, March 5, 2026 12:23 PM
To: life; news; editor; mar vic cagurangan; john; michael weakley; kstokish; kishfm102 9; Tricia Granillo; taentgu; Kandit News Group; production; raygibson; senator lujan; info; nestor; newsdirector; Joshua N CIV USCG SEC GUAM 'Blocker, USA; jessica s worst; Peter J LCDR USCG CGFM Fransson, SEC GUAM (USA)
Subject: Notice of Public Hearing - 2025 Master Plan

NOTICE OF PUBLIC HEARING

Jose D. Leon Guerrero Commercial Port of Guam
2025 Master Plan
Wednesday, March 25, 2026
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Sent: Thursday, March 5, 2026 12:21 PM
To: rsablan; bvalera; ed cruz; guam-ops; franklin taitague; Renee Ibanez at GUM x5984; Jason' 'MENDOZA; Michelle' 'QUIDACHAY; Toney' 'FONG; gdavid; Operations Guam; logistics; Patrick Bulaon at GUM x5992; Gloria Perez at GUM x5975; EMSLEY Charles; Jacob Tareyama; Patrick Doromal; ray hartley; CRUZ Brandy; kjcalvo; hsholley; jennifer r duenas; leonardk; Mathews Pothen; jaysen farley; Jacob P. Guerrero; John Limtiaco; management; John Aflleje; Tristar Admin; Bill Ada; bkoeppen; 'Seabridge; cduenas
Subject: Public Hearing Notice - 2025 Master Plan
Attachments: 2025 Master Plan Public Notice.pdf

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2025 Master Plan

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PAG Board Conference Room

3:00 pm – 5:00 pm

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Public Notices Portal - Government of Guam

Notice of Public Hearing - 2025 Master Plan of Port Authority

PUBLIC HEARING

- **Posted on:** 03/05/2026 11:32 AM
- **Posted by:** Marge Duenas
- **Department(s):** PORT AUTHORITY OF GUAM
- **Division(s):** PORT AUTHORITY OF GUAM
- **Notice Topic(s):** PUBLIC HEARING
- **Types of Notice:** PUBLIC HEARING
- **For Audience(s):** PUBLIC
- **Share this notice**

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Attachment C:

Memorandum to Government of Guam Agencies for the Notice of Public Review and Public Hearing for the Adoption of the Port Authority of Guam (PAG) 2025 Master Plan

LOLA E. LEON GUERRERO
Director
MATTHEW C. SANTOS
Deputy Director

BUREAU OF STATISTICS AND PLANS

Sagan Planu Siha Yan Emfotmasion

LOURDES A. LEON GUERRERO
Governor of Guam
JOSHUA F. TENORIO
Lieutenant Governor

February 19, 2026

Memorandum

To: All Department and Agency Heads

From: Director, Bureau of Statistics and Plans

Subject: Notice of Public Review and Public Hearing for the Adoption of the Port Authority of Guam 2025 Master Plan

***Buenas yan Håfa Adai*!** Pursuant to 5 GCA, Chapter 1, Article 2, § 1205–1205.2, the Bureau of Statistics and Plans (BSP) is initiating the formal public review process for the adoption of the Port Authority of Guam (PAG) 2025 Master Plan.

Your input is vital to ensuring this plan is comprehensive and accurately reflects the long-range goals of your agency. We invite you to review the sections pertinent to your mandate and provide feedback to ensure alignment with our community's needs.

Review Period & Document Access

The Master Plan is available for digital review on the PAG website at www.portofguam.com/modernization. Hard copies are available for review at the BSP, Office of the Director, 513 West Marine Corps Drive, Ricardo J. Bordallo Complex, Hagatna, 8am-5pm and at the Port's Strategic Planning Division, 1026 Cabras Highway, Suite 203, Piti.

Public Hearing Details

We invite you or your authorized representatives to attend the scheduled public hearing:

- **Date:** March 25, 2026
- **Time:** 3:00 PM
- **Location:** PAG Board Conference Room

Submission of Comments

Please submit all written testimony and agency feedback no later than **5:00 PM on March 26, 2026**.

- **Via Email:** gcmp@bsp.guam.gov
- **Physical Delivery:** BSP Office, Ricardo J. Bordallo Complex

If no comments are received by the deadline, it will be presumed that your agency concurs with the plan as presented.

Contact Information

Should you have any questions or require additional information, please contact Mr. Christian Benitez, Planner, at christianpaul.benitez@bsp.guam.gov. You may also contact me directly at lolalg@bsp.guam.gov, or reach our office via telephone at (671) 472-4201/2/3. We appreciate your continued cooperation and commitment to Guam's strategic development. Si Yu'os Ma'åse'.

Lola E. Leon Guerrero

LOLA E. LEON GUERRERO
Director

Cc:
Director, Bureau of Budget Management Research
Director, Department of Administration
Administrator, Guam State Clearinghouse
Chief Technology Officer, Office of Technology
Executive Director, Civil Service Commission
Attorney General of Guam, Office of the Attorney General
Administrator, Guam Environmental Protection Agency
Director, Department of Land Management
Administrative Director, Chamorro Land Trust Commission
Executive Director, Guam Ancestral Lands Commission
Director, Department of Agriculture
Director, Department of Parks and Recreation
Director, Guam Energy Office
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General Manager, Guam Power Authority
General Manager, Guam Waterworks Authority
General Manager, Guam Solid Waste Authority
Administrator, Guam Economic Development Authority
President, Guam Visitors Bureau
General Manager, Port Authority of Guam
Executive Manager, Guam International Airport Authority
Director, Department of Revenue and Taxation
Director, Department of Labor
Chief of Police, Guam Police Department
Fire Chief, Guam Fire Department
Homeland Security Advisor, Guam Homeland Security/Office of Civil Defense
The Adjutant General, Department of Military Affairs
Director, Guam Customs and Quarantine Agency
Director, Department of Corrections
Superintendent, Guam Department of Education
Director, Guam Behavioral Health and Wellness Center
Director, Department of Integrated Services for Individuals with Disabilities
Director, Department of Youth Affairs
Director, Guam Veterans Affairs Office
Executive Director, Public Defender Service Corporation
President, Mayors Council of Guam
President, Department of Chamorro Affairs

Executive Director, Commission on Decolonization
Executive Director, Hagåtña Restoration and Redevelopment Authority
Executive Director, Guam Housing and Urban Renewal Authority
President, Guam Housing Corporation
Director, Guam Council on the Arts & Humanity
Director, Bureau of Women's Affairs

Attachment D:

Record of Proceedings: Public Hearing Minutes, Presentation, Resolutions & Attendance Sheet

2025 Master Plan
Jose D. Leon Guerrero Commercial Port of Guam
Port Authority of Guam
Wednesday, March 25, 2026, PAG Board Conference Room
3:00 p.m.

PUBLIC HEARING

MINUTES

I. CALL TO ORDER

The Public Hearing was called to order on Wednesday, March 25, 2026 at 3:00 p.m., PAG Board Conference Room. Present at the public hearing were:

BSP Officials:
Lola Leon Guerrero, Director
Matthew Santos, Deputy Director
April Trinidad, Planner IV
Christian Benitez, Planner III

PAG Officials:
Rory Respicio, General Manager
Dominic Muna, Deputy General Manager, Operations
Pacifico Martir, Deputy General Manager, Admin/Finance
James Canto, Port Staff Attorney
Junior Topasna, Stevedoring Superintendent
Jacob Aquiningoc, Transportation Supervisor
Annette Mafnas, General Administration Manager
Annie Sablan, Acting Procurement Manager
Dennis Perez, Systems Manager
Jesse Mendiola, Port Police Chief
Roseanna Stone, Assistant Port Police Chief
Frances Candoleta, Administrative Services Officer
Jojo Guevara, Chief Financial Officer
Paul Salas, Safety Administrator
Clarence Lagutang, CIP/Engineering Manager
Chris Flores, Harbor Master
Joe Javellana, Chief Planner
Shine San Agustin, Assistant Equipment Manager
Leo Espia, Planner IV
Janice Flores, Terminal Superintendent
Shawn Cepeda, Personnel Services Administrator
Donna Lizama-Acosta, Planner IV
Christopher Aguon, Planner III
Jared Perez, Planner III
Alex Aflague, Facilities Maintenance Manager

Also present were: AM Insurance-Corissa Untalan, APL-Charles Emsley, MEL Lines-Edward Cruz, Ambyth-Jacob Tareyama, Hansen Cement-Jaysen Farley, Guam Daily Post-Jonah Benavente, Tristar-John Aflleje, PUGG President-Joseph Cruz, Senator Jesse Lujan and Marvin Crisostomo, Matson-Patrick Bulaon, Pacific Daily News-Uriah Aguon, and SPPC-Alice Mantanona.

II. INTRODUCTIONS

Lola Leon Guerrero – *Buenas yan Hafa Adai.* Good afternoon everyone. We're here for the public hearing for the Jose D. Leon Guerrero Commercial Port of Guam 2025 Master Plan and its being held here at the Port Authority of Guam Board Conference Room. Today is Wednesday, March 25, 2026 and its 3:00p.m.

The Bureau of Statistics and Plans (BSP) in coordination with the Port Authority of Guam, welcomes you to the Public Hearing for the Port Authority of Guam 2025 Master Plan. Pursuant to the mandate of Title 5, GCA, subsections 1205 and 1206, the adoption of all master plan must undergo a public hearing process. BSP received the Port Authority of Guam's 2025 Master Plan on February 9, 2026. Under subsection 1205, BSP has 45 days from receipt of the plan to hold one or more public hearings. This afternoon this is the public hearing for the initial process. In collaboration with the Port Authority of Guam, four (4) advertised public notices for the public hearing were issued which appeared in the Guam Daily Post on March 15, March 18, March 23 and March 24, 2026. Pursuant to the mandate, two announcements must be printed in a newspaper of general circulation on Guam ten (10) days prior to the public hearing and one (1) day prior to the public hearing. In addition, the public hearing notice was sent to the local news media network, Port Users Group and the public hearing notice was also posted on the Government of Guam Public Notice Portal to ensure compliance with Guam Public Law 32-37.

Furthermore, on February 19, 2026, BSP issued a memorandum via email and hard copies were sent out as well, to BSP Guam Coastal Management Program network agencies as well as other government of Guam and stakeholders inviting them to participate in the public review of the Port Authority of Guam 2025 Master Plan. A follow-up email was also sent on March 26, 2026. The memorandum that was sent out as well as emailed requested comments by March 26, 2026. The email included the attachment containing a link to the Port Authority of Guam's master plan and the signed memorandum from the Director of the Bureau of Statistics and Plans that was dated February 19, 2026. All written and verbal comments for the public hearing along with the comments submitted by agencies will be compiled and summarized by BSP's Guam Coastal Management Program.

BSP will then transmit to the Governor its recommendation on the plan accompanied by a written summary of the testimony received from the public hearing. Pursuant to subsection 1205.1, the plan submission within 30 days after the hearing of the plan or any elements of this plan, BSP shall submit to the Governor its recommendation thereon including a summary of testimonies at the hearings. Upon receipt of BSP's recommendation, the Governor will approve, disapprove or refer the plan back to BSP for further recommendations. Within 10 calendar days

of approval by the Governor, the plan or any elements shall be submitted to the Legislature for adoption. The Legislature shall review and approve or disapprove the plan or any of its elements within 180 calendar days of its receipt. In the event of failure by the Legislature to act within such, of the 180 calendar day period, the plan or any of its elements so submitted shall be deemed approved pursuant to subsection 1206 which is the plan adoption.

This is the process of the plan review, plan submission and plan adoption. We want everyone to provide their feedback and we would like written comments or verbal comments by no later than tomorrow. March 26 is the deadline for the comment period.

Thank you for your time.

III. PRESENTATION

Rory Respicio: Thank you Director for your opening and to your Deputy Director and to your staff of Bureau of Statistics and Plans. Thank you for being here as part of the process for us to get the Master Plan 2025 adopted. Just a matter of context, I would like to also enter into the record resolution, first of all, I am Rory Respicio, General Manager of the Port Authority of Guam. With me is Joe Javellana who is the Chief Planner. We also have all the Division Heads and all of the Planning Staff that will be available to answer any questions that you may have or the public may have regarding the specific elements of this plan.

I just wanted to first establish for context our Board of Directors passed Resolution 2023-04 on April 6, 2023 officially transmitting this 2023 Master Plan to Bureau of Statistics and Plans and to the Governor as part of the process. And while we were engaged in that process certain things have happened – we had to get a letter from the Admiral, Joint Region Marianas, so we had that. When the leadership changed, we wanted to get the incoming Admiral at the time opportunity to comment and so we were doing that as well.

Resolution 2024-18, the Board also transmitted this resolution, a request to Bureau of Statistics and Plans to insert the zero-emission and zero-waste resiliency and sustainability goals developed by Jacobs and WSP for the Port of Guam and integrate these goals and objectives into the sustainability of the 2023 Master Plan for the Port Authority of Guam. This resolution was passed and approved by the Port Board on November 27, 2024.

On July 14, 2025, the Board is asking Bureau of Statistics and Plans to do, which you are doing for us, is to take the entire 2023 Master Plan and simply just change the title from 2023 to 2025. That change warranted us to come back to this public hearing process so we can re-present the 2025 Master Plan. As we go through the master plan, we do have a powerpoint presentation that kind of succinctly summarizes it. The Planning staff together with WSP updated this from 2023 to 2025, we just kept all the updates in red for purposes of transparency.

(Port Board Resolution Nos. 2023-04, 2024-18 and 2025-24 is made part of this minutes).

Purpose:

- The purpose of the 2025 Port of Guam Master Plan is to assist the PAG define its near-term and long-term approach to improving the Port by maintaining fiscally sustainable operations and promoting increased awareness and consensus on its approach among all affected stakeholders and the rate payers of Guam.

Goals:

- Provide a comprehensive overview of the Port's current conditions including governance, financial, operational, and physical attributes;
- Assess the current and projected cargo opportunities based on Guam's market drivers, which consist of military realignments, tourism, transshipment and organic growth;
- Determine near-term resiliency and sustainability improvements and operational adjustments to accommodate the peak of the military build-up, support Indo-Pacific Command's Pacific Deterrence initiative (PDI) and ensure maritime posture for future deployments of military assets;

One of the things that we were looking at in developing the 2023, now 2025 Master Plan, is we take a look at the Port as an infrastructure and kind of de-tool that so our revenues are not coming solely from container throughput or breakbulk input. We have about 600 acres of commercial property and for the last several years now we have been saying that if the Port is not ready, the military will not be ready. And there's certain investments that the military can make here at port property to ensure military readiness and so we outlined certain goals.

- Estimate the Port's capacity and ability to meet the projected demand and tenant requirements;
- Identify long-term port improvement efforts targeted towards continuing operational and economic sustainability;
- Establish optimal requirements for operations, maintenance and repair, and capital improvement projects;
- Validate the efficient and effective use of the Port's resources and assets;
- Present commercial strategies for PAG to diversify its revenue base and enhance its financial self-sufficiency including a completed tariff adjustment/PUC petition and associated benefits to the PAG and port users;
- Assess the impact of the recommended strategies on Guam's economic conditions; and
- Prepare an implementation program to support a coordinated approach of continuous Port improvements, balanced with sustainability.

MP Accomplishments:

- 2007 (Initial Master Plan)
  - Military Buildup Driven PMP
- 2013 (Master Plan Update)
  - Military Buildup Update
- 2025 Master Plan
  - PMP to PIP

- Near-term focus with long-term goals
- Resiliency/Readiness
  - Crane Replacement
  - Comprehensive Infrastructure Hardening
  - Equipment R&R
  - TOS/IT Improvements
- Resiliency and Sustainability Plan
- Clean Ports Program
- Updated Infrastructure Condition Assessments – including Port Typhoon Mawar damages

Modernization Program – Build Back Better:

- Repair and Improve Existing Infrastructure to Increase Resiliency
  - Wharves
  - Fuel Piers
  - Marinas
  - Buildings
  - Utilities
  - Pavement
- Equipment Needs
  - STS Gantry Cranes
  - Top Picks
  - Tractors
  - Forklifts
  - Reefer Generators/Outlets

Guam Customs Inspection Facility:

One of the things that we also wanted to do in cooperation with Customs and Quarantine is they've embarked on a Container Freight Station Facility and at the time this Administration started there was some debate on where the 4 acres of property were going to go. We committed to identifying the 4 acres of property which is by the Transfer Weight Station. You could see as part of this 2025 Master Plan there's actually Guam Customs Inspection Facility component in this plan. Because we assisted Customs with their inspection facility feasibility study, this is what they were able to socialize and collect the $2M that they are working towards to get an A/E to design and build that facility. That's part of this master plan. I say this to underscore that even though we started this journey in 2019 to develop the 2023 Master Plan, we didn't miss a beat because we felt we don't really require legislative authority to do everything in the span that we're already been doing - in terms of repositioning our messaging, in terms of looking at the Department of War came and made investments in port property, and also requires some gantry crane replacements. Even though this Guam Customs Inspection Facility is embedded in this master plan, we authorized Customs to take this plan and socialize and they were able to secure a $2M grant. I believe through the efforts of Congressman Underwood where he's talked about that.

Solar Power Study – Opportunity:

- Can offset over 90% of annual power consumption.
- GPA Net-Metering program only allows for 500kW per meter.
- GPA may consider a partnership arrangement to develop, procure, install, and maintain PV systems with the Port.

Tariff Simplification:

The PAG's tariff has been restructured to be:

- Revenue Neutral – Ensure the revisions will result in neither a material increase nor decrease in Port revenues.
- User-friendly – Present schedule of rates table in front of tariff to allow customers to quickly and easily calculate fees.
- Transparent – Itemize details, rules and regulations associated with combined rates via hyperlink in latter sections of tariff.
- Streamlined – Consolidate charges to align with all-inclusive port services and performance reports.
- Modernized – Support the integration of the Port's NAVIS Terminal Operating System and JDE Financial System.
- Time-saving – Minimize/eliminate manual data entry of charges and provide invoices to users expeditiously.
- Cost-effective – Reduce administrative costs, manual entry errors, disputes, and delayed payments.

Information Technology (Study):

- Infrastructure – network, server, wireless, IP management
- Cyber Security – investigate weak points, network hardening, develop cyber security roadmap
- TOS Upgrade – identify features not being used (current TOS), evaluate TOS options, establish decision criteria, develop TOS roadmap
- Study Team – PAG-IT, RVE Management, Ledge Light Technologies (LLT), Cargo Velocity.

PUGG Initiative for System Integration:

- Port Community System – long term goal to share digital data in a secure manner.
- Customs – from paper to paperless.
- Freight Forwarder – from paper to paperless.
- Agents, consignee's – from paper to paperless.
- Shipping Lines – full digitized information transfers.

Port Assets and Resources:

- Apra Harbor
- Marinas - Agat Small Boat Marina, Gregorio D. Perez Marina in Hagatna
- Land Use Designations (family beach, dog leg pier, hotel wharf, outhouse beach, golf pier, seaplane ramp, Guam Customs and Quarantine Marine Interdiction Task Force, pier F1, Area A, berths F2 to F6, Guam Customs and Quarantine weigh station, Harbor of Refuge, Port Beach, Marianas Yacht Club)

This slide talks about our land use designations. We also want to be clear that we're not proposing to change any current land use designation here in Cabras Island. This is what makes this plan not controversial at all because we're not asking for any changes in any land use designations that's currently occurring. Every activity that you see here on this side of the island, throughout Cabras Island, all of these markings reflect the current land use activity right now. Nobody will be displaced. Nobody will have to worry about any current activity whether its commercial, private, recreational – its going to be status quo.

Facility Assessments:

- Area A – deemed critical
- Seaplane ramp – condition is fair
- F1 Pier – condition is serious
- F2 Pier – condition is poor
- F3 Pier & F4 Pier – condition is fair
- F5 Pier & F6 Pier – condition is satisfactory
- Harbor of Refuge – condition is serious
- Family Beach – condition is satisfactory
- Dog Leg Pier – currently under construction
- Hotel Wharf – currently Black Construction lease with tremendous improvements from the 2023 Master Plan to now.
- Outhouse Beach – condition is fair
- Golf Pier – condition is critical, inoperable
- Gregorio D. Perez Marina – condition was poor, now fair, solar lighting install
- Agat Small Boat Marina – condition was fair, now satisfactory – docks upgraded
- Warehouse I – condition is poor, undergoing rehabilitation work
- EQMR Building – condition is good, rehabilitation work were made
- Welding Shop – condition is fair
- CFS Warehouse – condition is marginal
- Administration Building – condition is poor

Recent Building Improvements:

- Administration Building – building envelope (spalled and cracked concrete) – repaired/removed/painted; HVAC – maintaining split units; plumbing aged but being maintained; electrical aged but being maintained; communication system – upgrade of VOIP systems.

- EQMR Building – wall/column concrete damage: completed repair/patching/painting; damaged/weather roofing membrane completed.
- Warehouse I – damaged concrete: on-going crack repair and removal of loose concrete; damaged fire protection system/mold – repair project under design.
- CFS – wall/column concrete damage: completed repair/patching/painting.
- Welding Shop – damaged concrete: completed repair/patching/painting; roll up doors – currently being installed; electrical systems – on-going upgrades performed to bring to code.

Forecast Overview:
When we sat down with our consultants and Planning – we were very clear – we don't want a 30-year plan and just put it on the shelf and think about what the Port would look like 30 years from now. Our instructions to everybody and to ourselves is that we wanted something that would take us to 7 to 10 years. If we don't make strategic decisions now and start planning the funding, start doing the work to address all these critical areas immediately – we might not have a Port Authority of Guam in the next 7 to 10 years. That's why you see the plan is very timely and there's not any concern that we're expressing why this 2023 Master Plan, now 2025 Master Plan hasn't been pushed or adopted because we still kept moving forward despite the Legislature's having to approve it.

- Organic – historical analysis: cannot separate effects of local, tourism, military, and construction.
- Transshipment – highly variable based on carrier decisions.
- Military Buildup – 20008 forecast adjusted for inflation and current NAVFAC projections, peak characteristics, historical data inconsistent.
- Steady State Post Buildup – population and activity increase with larger military presence.
- Total Throughput – forecasts 1 to 4 combined (containers, bulk, ro-ro, liquid bulk)

Market Analysis and Cargo Demand:
- Military building construction spending profile (DoD Construction workload in Guam - USMC, USN, USAF)
- Container Forecast
- Breakbulk History and Forecast
- 2022 Weekly General Cargo Area Requirement
- 2024 Weekly General Cargo Storage Requirement
- Current Container Capacity and High Demand

Existing to Build-Up to Organic:
We had to pay attention to what are the Port's layout requirements, equipment needs requirements and just different scenarios. The different scenarios that the consultants and the Team looked at, based on the data – what would a ramp up look like, what would a ramp down look like, and if there's enough terminal space in the yard to accommodate even the most

conservative projections military cargo wise and civilian cargo wise. This plan concludes that we have enough terminal space given the recent $50M terminal expansion project.

STS Crane Replacement Importance:
We also forecast, with all the projected throughput, terminal space, three working cranes – what would that look like. This graph shows that the three existing cranes can meet the forecasted demand. And we put this in our master plan because at the time when we were developing this, we had a meeting in Hawaii, Indo Pacific, INDOPACOM, they told us – we saw Port's analysis, we have our own analysis – we concur there's enough terminal space and with three working gantry cranes you're not going to have a problem with getting our cargo out because you've been saying the cranes at that time are 39 years old, now there 42 years old. We really have to replace all three gantry cranes. We asked them – can you give us some time to work with our consultants, to work with our Planning Team, and just do a forecast of what it would look like with one gantry crane goes down. Within a couple weeks, we went back, we were able to go back to the Pacific Coast and also the Joint Region Marianas leadership and through this data set, we showed that if one crane goes out its going to set back the whole military readiness program by up to about four years which kind of gave us some traction in having to get these gantry cranes replaced. And then, we showed that if two gantry cranes go out of service, that's not going to meet the commercial demand or DoD's mission. Based on this data that we provided, we kind of got everybody to focus on why its so critically important to replace the three STS gantry cranes.

Capital Plan:
To sum it up, generally we have identified about $600M worth of capital improvement projects, those include the three STS gantry cranes, rehabilitation of hotel wharf, full replacement of fuel pier 1, golf pier and also Area A which is a fuel storage facility. We outlined what this capital plan looks like. We presented it so that its fluid and we're not bound by anything the master plan is adopted – we're not bound by being restricted to either this or anything else because we have to keep pivoting to whatever the ongoing demands are.

Port Improvement Plan – Capital Improvement Projects:
- Installation of canopy fronting building maintenance bay – completed
- Devanning concrete ramp – completed
- LC3 genset, tank, AST, slab extension – completed
- Agat Small Boat Marina design build bathroom and showers – completed
- Golf pier replacement – bond/grants funding authority
- Golf pier near-term repairs – port/grants funding authority
- EnterpriseOne financial management system – completed
- Replacement of 3 metal gate booths – completed
- STS crane demolition project – 95% completed
- Waterline replacement – 90% completed
- Welding shop (phase 1 and 2) – 90% completed
- Radar intrusion and vessel tracking system – completed

- Rehabilitation of Hotel Wharf and Access Road – our tenant arrangement with Black Construction, its not rehabilitated to the point that our plan calls for, but its certainly a usable wharf. Now they can discharge their aggregate that they're putting over for their Glass Breakwater project. This access road through the dollar-for-dollar lease credit offset, Black Construction on the Port's dime, they are going to pave the road all the way down to Family Beach to include a bathroom and shelter facility at Family Beach.

You could see that some of the projects contained in the 2023 Master Plan, now 2025 Master Plan, their either completed or near completed. Again, we didn't wait for the Legislature to fully adopt the plan. We understand that we have the ability to move forward. Additional projects: various IT projects, yard equipment, installation of pavilion and new restrooms at Port Beach, WH1 building repair/upgrade, seawall improvements, typhoon Mawar building repair projects, seawall solar project, WH1 demolition, old Horizon building roof repair and full building repair, crane office renovation, replacement of LCS metering cabinet, Operations Division office renovation, Gregorio D. Perez Marina renovation and rehabilitation, Agat Small Boat Marina renovation and rehabilitation.

We really outlined in detail what our Port Readiness Projects and provided an indicator on percentage on how much we are able to do realistically and when we plan to accomplish it.

Key Master Plan Elements:

- STS gantry cranes replacement – since 2023, we have submitted a grant to MARAD. For the first two years we got denied because of the Buy American requirement. Then this time around they finally provided a waiver for the Buy American requirement for us to be able to access this MARAD grant. We're just kind of waiting for a decision from MARAD to see if we got approved.
- Wharves rehabilitation – we have $22M grant from MARAD called the RAISE grant to rehabilitate F2 to F6 and they're currently developing the scope of work for that project.
- Crane rail system and tie-downs, improvements – this is going to be required to be done prior to the three gantry cranes being installed.
- Golf pier replacement
- F1 pier replacement
- Area A fuel tank facility replacement – since 2023, our Board, our resolution authorize us to explore a public-private partnership for the piers and Area A, but we have not let that one out yet because there's also some potential grant funding opportunities through MARAD and other federal agencies.

With respect to F1, we were recently awarded a $6M grant from the Office of Economic Adjustment, OLDCC and we noticed that during the grant application and when they made the announcement, so OLDCC, this is the office that was put together to address any mitigation needs from the community regarding the military buildup, so that's their purpose. We got the $6M grant from them, it was a 80/20 match, about $2M, we noticed that on their own – they renamed the F1 pier – the Joint Region Marianas Fuel Piers. We said, go ahead rename it the Joint Region Marianas Fuel Piers and while you're at it – why don't you name the three gantry

cranes – Joint Region Marianas Gantry Cranes, and replace that as well. They kind of liked that, just to show that they're actively engaged in trying to address our Port Readiness for the military readiness and the community needs, so we obviously appreciate that.

- TOS upgrade
- Cybersecurity upgrade
- Capital and maintenance dredging

Diversification:
To really understand from the very beginning the Port Authority's responsibilities to our community and to our region as our economic driver, creator of jobs because 90% of the goods coming into the island come through the Port, 30% of those are military goods. There's no option but for the Port to remain operational, for the Port to remain sufficient. We couldn't just rely on the regular throughput for our revenue. We looked at some of the opportunities that could be presented to the Port if the Department of Wars is willing to be an investor in our port property.

- Strategic Port with port planning orders
- Guaranteed area for a specified amount of time
- Staging military cargo on port and vessel loading
- Identify facility needs to accommodate deployment operations

New Land Uses:
- Transshipment initiative (Public law 36-23)
- Value added assembly facilities
- Dry dock/ship repair
- LNG facilities
- Cruise port-of-call
- Marine Highway RO/RO
- Recycling Enterprise Zone Identification

Successful Partnership with the Office of the Governor & OLDCC:
In this master plan update and throughout this process, we always recognize the different partnership that we have throughout the community, outside of the community, outside of Guam. We keep getting support from the Office of the Governor and the Lt. Governor of Guam, our Board, and all the different stakeholders, the Port Users Group. They are totally understanding of what this master plan calls for and what the Port's doing to make sure that they are able to maintain their operations.

- 2025 Master Plan – identified and prioritized resiliency and sustainability needs including hardening of major operating infrastructure such as piers, wharves and terminal buildings.
- Wharf Service Life Extension – evaluated existing conditions of Pier F1 and Berths F2 – F6, prepared conceptual cost estimate, resulting in the PAG receiving a $16.9M grant for 80% of the needed repairs.

- Ship-to-Shore (STS) Gantry Crane Program – completed the demolition and removal of two obsolete gantry STS cranes, two RTG cranes, and one mobile harbor crane. Develop and completed detailed procurement schedule, specifications, cost estimates, and bid documents for the eventual acquisition of new STS gantry cranes that the PAG is preparing to advertise.
- Tariff Simplification – completed the restructuring of the Port' tariff to streamline invoicing and improve integration of finance, operations, tenant and customs systems. In addition, a tariff adjustment has been completed, ready for a PUC petition.
- Information Technology (IT) Support – assisted with selecting and implementing the Terminal Operating System (TOS) and modernizing the IT department for efficiency, security and dependability.
- Hotel Wharf – the Port entered into a lease agreement with Black Construction for a five (5) year period, whereby facility improvements were completed.
- CIP Bond Support Program – prepared Consulting Engineer Report to help secure $49M in bond funding.
- Customs Inspection Facility – worked with PAG and Guam Customs to develop a site plan for the future Customs Inspection Facility.
- PUGG Initiative for System Integration – worked with PAG and the PUGG to evaluate current process and provide recommendations to transition from paper processes to digital.
- Solar Power Study – completed study to evaluate the potential for installing photovoltaic panels on existing building roofs to reduce power costs.

Although we're presenting to you a document, we also hope to have demonstrated to use this process to update our master plan. To think about what our vulnerabilities are today, and how we address those vulnerabilities today, so that we make those decisions, we take action and we have a service life extension for about 7 to 10 years and then we can breathe a little and just try to figure out what the next steps are.

This is our guiding principle and absent legislative approval, we could definitely communicate that we have not missed a beat and we're still moving forward. But certainly we would like this document to be blessed by Bureau of Statistics and Plans, the Governor, the Lt. Governor and transmitted to the Legislature. And when we ask the Legislature to adopt this, this is something that would institutionalize all our efforts over the last 7 years here at the Port. That, in a nutshell is our presentation of this Master Plan of 2025.

IV. PUBLIC COMMENT PERIOD

Lola Leon Guerrero: Thank you. Now if anyone has any comments they can address their comments. Just state your name.

Rory Respicio: For the record, our Port Oversight Chairman Jesse Lujan is here.

Lola Leon Guerrero: So does anyone want to present any comments because what we would do is once we get, after tomorrow (26th), the 27th, we have 30 days to compile the summaries and the comments, and then we'll work together and we'll submit to the Governor.

Joseph Cruz: Good afternoon. My name is Joseph Cruz. I represent the Port Users Group. Some are here in this room and we just want to rise in support of this master plan. We do have some comments to make through internal consideration. Understanding your timeline, we hope to have this to you by tomorrow. But in the event that we aren't, are we able to get an extension.

Lola Leon Guerrero: The deadline for submission is tomorrow. Now we would need to make recommendation to the Governor to extend the comment period.

Joseph Cruz: We just want to formalize our comments and meet as a group and hope to submit it as soon as possible. But we rise in support of the contents, we just want to add a few items.

Lola Leon Guerrero: Ok. Thank you. Does anyone else want to provide comments? So written comments or verbal can be submitted. If you're going to provide written comments, just submit your comments to gcmp@bsp.guam.gov or you could mail it or deliver to BSP down at Adelup.

Rory Respicio: I saw that there was a comment from a member of the public. BSP forwarded to us in support of the master plan, recognizing that the Port Authority is diversifying its revenue base, but also leaning toward Port Readiness and military readiness commitment that we have.

Lola Leon Guerrero: Christian, do you want to point out that one comment - that CNMI route. We did receive another comment yesterday, the marine highway.

Matthew Santos: I have the one from Julian Reyes.

Lola Leon Guerrero: Yea it's that one. Do you want to state that one?

Matthew Santos: Yea. Testimony by Julian Reyes:

Hafa Adai

To the Bureau of Statistics and Plans and Port Authority of Guam:

I support the Port of Guam 2025 Master Plan and its goals for modernization, efficiency, and strategic growth.

As the Plan looks to the future, I encourage the Port to consider how the Guam-Saipan channel might support long-term maritime activity. The channel offers deep water and protected anchorage that could complement shore-side facilities, particularly as the region considers expanded transshipment and regional connectivity.

The U.S. Department of Transportation's January 2026 designation of the Guam-CNMI Route as a Marine Highway Project already recognizes the importance of this corridor. Including the channel's potential in the Master Plan's long-term vision would align with that federal designation.

Thank you for the opportunity to comment.

Lola Leon Guerrero: If no one else has comments, we can conclude this public hearing. Thank you.

V. ADJOURNEMNT

The public hearing was adjourned at 3:51pm.

BOARD OF DIRECTORS
Dorothy P. Harris, Vice Chairperson
Dr. Judith P. Guthertz, Board Secretary
Conchita S.N. Taitano, Member

PORT OF GUAM

Resolution No. 2023-04

RELATIVE TO AFFIRMING THAT THE ATTACHED DOCUMENT ENTITLED, "THE 2023 MASTER PLAN FOR THE JOSE D. LEON GUERRERO COMMERCIAL PORT OF GUAM," SHALL BE THE VERSION THAT WILL BE PUT FORTH PUBLICLY AND ADVANCED THEREAFTER TO THE GOVERNOR THROUGH THE BUREAU OF STATISTICS AND PLANS AND THE GUAM LEGISLATURE PURSUANT TO SECTIONS 1205 AND 1206, ARTICLE 2, CHAPTER 1 OF TITLE 5, GUAM CODE ANNOTATED

BE IT RESOLVED BY BOARD OF DIRECTORS OF THE JOSE D. LEON GUERRERO COMMERCIAL PORT:

WHEREAS, the Port Authority of Guam (Port) was established as a public corporation and autonomous government agency on October 31, 1975 through Public Law 13-87; and

WHEREAS, the Port is charged with the responsibility of providing for the needs of ocean commerce, shipping, recreational and commercial boating, and navigation within the Territory and its waters; and

WHEREAS, with the anticipated military build-up, the Port is vested with the responsibility of overseeing the development of its assets and the implementation of policies and strategies to facilitate a smooth transition to the new population base; and

WHEREAS, additionally, to provide continued support for the diversification of Guam's economy and positioning the island to participate in the growth of seaborne commerce and international trade that is expected to occur in the new millennium; and

WHEREAS, in October 2022, the Port contracted the consulting services of WSP as its Owner/Agent Engineer (OAE) to update the 2013 Port Master Plan funded through a grant from the Office of Local Defense Community Cooperation (OLDCC); and

WHEREAS, the finalization of the updated Master Plan is a momentous occasion and marks a significant continuation in the Port's efforts in modernizing its infrastructure into a first-class facility in the region and providing cargo handling services in a safe, efficient and sustainable manner; and

WHEREAS, the fine efforts and hard work of all who contributed to the update of the Port Master Plan are appreciated and acknowledged, with special thanks for the collaborative efforts of the Port staff and WSP, including OLDCC; now therefore be it

RESOLVED, the Board of Directors affirms that the attached document entitled, "The 2023 Master Plan for the Jose D. Leon Guerrero Commercial Port of Guam" shall be the version that will be put forth publicly and advanced thereafter to the Governor through the Bureau of Statistics and Plans and the Guam Legislature pursuant to Sections 1205 and 1206, Article 2, Chapter 1 of Title 5, Guam Code Annotated; and be it further

RESOLVED, the Chairperson certify to, and the Secretary attest to, the adoption hereof, and that a copy of this resolution be transmitted to the Honorable Governor of Guam, Port Oversight Chair of the 37th Guam Legislature and Secretary of the U.S. Navy.

PASSED AND ADOPTED UNANIMOUSLY BY THE BOARD OF DIRECTORS THIS 6th DAY OF APRIL, 2023.

DOROTHY P. HARRIS
Acting Chairperson, Board of Directors
Port Authority of Guam

DR. JUDITH P. GUTHERTZ
Secretary, Board of Directors
Port Authority of Guam

PORT AUTHORITY OF GUAM • GOVERNMENT OF GUAM

BOARD OF DIRECTORS
Dorothy P. Harris, Chairperson
Conchita S.N. Taitano, Vice Chairperson
Fe R. Valencia-Ovalles, Board Secretary

Resolution No. 2024-18

RELATIVE TO ADOPTING THE ZERO-EMISSION AND ZERO-WASTE (ZEZW) RESILIENCY AND SUSTAINABILITY GOALS DEVELOPED BY JACOBS AND WSP USA INC. FOR THE PORT OF GUAM AND INTEGRATING THESE GOALS AND OBJECTIVES INTO THE SUSTAINABILITY COMPONENT OF THE 2023 MASTER PLAN FOR THE PORT AUTHORITY OF GUAM.

BE IT RESOLVED BY BOARD OF DIRECTORS OF THE JOSE D. LEON GUERRERO COMMERCIAL PORT:

WHEREAS, the Port Authority of Guam (the Port) is committed to advancing sustainability and resiliency as core pillars of its operations, ensuring long-term environmental stewardship, operational efficiency, and alignment with local, regional, and global sustainability initiatives; and

WHEREAS, the Port recognizes the importance of adopting innovative strategies to reduce its carbon footprint and achieve zero-emission and zero-waste goals; and

WHEREAS, the Port acknowledges the need for continuous improvement and adaption to address emerging environmental sustainability and resiliency challenges; and

WHEREAS, the Port has been awarded $2,410,415 through the U.S. Environmental Protection Agency's (EPA) Clean Ports Program under the Climate and Air Quality Planning Competition, a prestigious and highly competitive grant program funding only 55 projects across 27 states and territories; and

WHEREAS, the EPA grant reflects the collective efforts of the Port Team, with WSP serving as the Port's Owner Agent, Jacobs as its Subcontractor, and the leadership of Vice Chairperson Conchita S.N. Taitano, whose 30-plus years with Guam EPA and public service uniquely position her to advance the Port's sustainability goals; and

WHEREAS, Vice Chairperson Taitano's contributions, including her certification through the Massachusetts Institute of Technology (MIT) Sustainability Program and her collaboration with First Gentleman Jeff Cook on Guam's Zero Waste Task Force, have been instrumental in shaping the Port's Sustainability and Resiliency Plan and aligning it with Guam's broader environmental initiatives; and

WHEREAS, the Port's Strategic Planning Division, led by Chief Planner Joe Javellana III, played a critical role in advancing the ZEZW goals by collectively leveraging their expertise and aligning the initiatives with the Port's long-term strategic vision; and

WHEREAS, the Port acknowledges the vision and leadership of Governor Lou Leon Guerrero and Lt. Governor Joshua Tenorio, whose appointment of Vice Chairperson Taitano and steadfast support for sustainability initiatives have laid the foundation for the Port's success in securing this grant; and

WHEREAS, Guam EPA Administrator Michelle Lastimoza and her Team have provided invaluable collaboration and support, reinforcing the shared goal of creating a sustainable and resilient Port for Guam's future; and

WHEREAS, the Clean Ports Program funding will directly support the Port's Net Zero Emissions Strategy Update and Implementation Plan, which aligns with the ZEZW Plan and includes the following key objectives:

1. Conducting a mobile emissions inventory to quantify and address emissions sources;
2. Updating the Net Zero Emissions Strategy to reflect current priorities and opportunities;
3. Preparing a workforce development plan to equip the Port's staff for a sustainable future;
4. Developing a resiliency strategy to assess climate risks and vulnerabilities; and
5. Creating an implementation plan to outline actionable steps for decarbonizing and electrifying Port operations; and

WHEREAS, the ZEZW Plan and the EPA-funded initiatives are integral to achieving the Port's sustainability goals and improving air quality, climate resilience, and operational efficiency, all of which align with the 2023 Master Plan's sustainability component and the "Look Ahead 2024" framework; and

WHEREAS, the Port's efforts are rooted in collaboration with key stakeholders, including Guam EPA, the Bureau of Statistics and Plans (BSP), Guam Power Authority (GPA), Department of Public Works (DPW), private industry, and non-profits, to ensure the successful integration of these initiatives; and

WHEREAS, the Port is dedicated to fostering a culture of environmental responsibility through community engagement, which is a fundamental aspect of the Port's approach, reinforcing a shared vision for a cleaner and more sustainable Guam;

NOW, THEREFORE, BE IT RESOLVED, that the Board of Directors of the Port Authority of Guam hereby adopts the zero-emission and zero-waste resiliency and sustainability goals developed by Jacobs and WSP USA Inc., integrates these goals into the sustainability component of the 2023 Master Plan, and incorporates the initiatives funded by the EPA Clean Ports Program; and

BE IT FURTHER RESOLVED, that the General Manager is directed to oversee the implementation of the ZEZW Plan and the EPA-funded initiatives, ensuring progress is tracked, reported to the Board, and aligned with emerging technologies, funding opportunities, and best practices; and

BE IT FURTHER RESOLVED, that the Board of Directors requests the support of the Governor of Guam and the Bureau of Statistics and Plans in incorporating the zero-emission and zero-waste (ZEZW) resiliency and sustainability goals developed by Jacobs and WSP USA Inc. into the 2023 Master Plan prior to its official transmittal to the Guam Legislature for review and approval; and

BE IT FURTHER RESOLVED, that the Chairperson certify to, and the Secretary attest to, the adoption hereof; and that copies of this resolution shall be transmitted to the Governor of Guam, the Speaker of the Guam Legislature, the Director of the Bureau of Statistics and Plans, and other relevant stakeholders.

PASSED AND ADOPTED UNANIMOUSLY BY THE BOARD OF DIRECTORS THIS 27th DAY OF NOVEMBER, 2024.

DOROTHY P. HARRIS
CHAIRPERSON, BOARD OF DIRECTORS
PORT AUTHORITY OF GUAM

FE R. VALENCIA-OVALLES
BOARD SECRETARY, BOARD OF DIRECTORS
PORT AUTHORITY OF GUAM

BOARD OF DIRECTORS
Dorothy P. Harris, Chairperson
Conchita S.N. Taitano, Vice Chairperson
Fe R. Valencia-Ovalles, Board Secretary
Mark B. Mendiola, Board Member

PORT OF GUAM

Resolution No. 2025-24

RELATIVE TO REQUESTING THE HONORABLE *I MAGA'HÅGA* LOU LEON GUERRERO, GOVERNOR OF GUAM, AND THE BUREAU OF STATISTICS AND PLANS TO OFFICIALLY AMEND THE TITLE OF THE PORT AUTHORITY OF GUAM MASTER PLAN FROM "2023" TO "2025," SOLELY AS A CHANGE TO THE TITLE, WITHOUT ALTERING THE SUBSTANCE OF THE DOCUMENT AS ADOPTED IN RESOLUTION NO. 2023-04, RELATIVE TO ADOPTING THE PORT AUTHORITY OF GUAM MASTER PLAN 2023 AS THE OFFICIAL PLANNING DOCUMENT FOR THE PORT AUTHORITY OF GUAM, AND AS AMENDED BY RESOLUTION NO. 2024-18, RELATIVE TO ADOPTING ZERO-EMISSION AND ZERO-WASTE GOALS AS PART OF THE PORT AUTHORITY OF GUAM'S SUSTAINABILITY COMPONENT OF THE PORT MASTER PLAN 2023. THE NEW TITLE SHALL READ: "PORT AUTHORITY OF GUAM MASTER PLAN 2025."

BE IT RESOLVED BY BOARD OF DIRECTORS OF THE JOSE D. LEON GUERRERO COMMERCIAL PORT:

WHEREAS, the Port Authority of Guam Board of Directors adopted the Port Authority of Guam Master Plan 2023 as the official planning document for the Port Authority of Guam pursuant to Resolution No. 2023-04; and

WHEREAS, Resolution No. 2024-18 further amended the Port Master Plan 2023 by adopting zero-emission and zero-waste goals as part of the Port Authority's sustainability commitments under the same plan; and

WHEREAS, the Master Plan outlines a comprehensive strategy for modernization, sustainability, and resiliency at the Jose D. Leon Guerrero Commercial Port, including phased capital investments in wharf expansion and rehabilitation, gantry crane replacements, fuel pier upgrades, digital transformation, sustainability measures, and climate adaptation projects. These improvements are designed to support long-term commercial growth, national defense readiness, and environmental responsibility; and

WHEREAS, the Port Authority of Guam is actively working to diversify its revenue base beyond container and breakbulk throughput by maximizing commercial land use, modernizing facilities, and attracting long-term federal and military partnerships. This approach positions the Port to serve as a critical dual-use facility, with the U.S. military projected to become the Port's largest customer. Early indicators of this shift are already evident through expanded military cargo movements, project staging agreements, and sustained federal investments tied to strategic operations at Apra Harbor; and

WHEREAS, the substance, projects, and strategic direction of the Port Master Plan remain unchanged, but the year reflected in the title no longer accurately reflects the date of the plan's final adoption and active implementation; and

WHEREAS, updating the title from "Port Authority of Guam Master Plan 2023" to "Port Authority of Guam Master Plan 2025" will better reflect the current implementation timeline without revising the content or priorities of the adopted planning document; and

WHEREAS, despite not being able to officially transmit the Master Plan to the Honorable Members of *I Liheslaturan Guåhan* through the Plan Adoption process pursuant to Section 1206, Article 2, Chapter 1 of Title 5, Guam Code Annotated for justifiable reasons, the Port Authority of Guam has not missed a beat in executing its strategic priorities. The Port has demonstrated compliance, discipline, and measurable accomplishments in line with the course laid out in the Port Authority of Guam Master Plan 2023, including progress in gantry crane replacement, facility rehabilitation, sustainability initiatives, and federal funding alignment; and

WHEREAS, updating the title requires coordination with the Honorable *I Maga'håga* Lou Leon Guerrero, Governor of Guam, and the Bureau of Statistics and Plans, consistent with established protocols for official government planning documents; and

WHEREAS, the Port Authority of Guam affirms its preparedness to comply with any timelines and requirements imposed under Article 2, Chapter 1 of Title 5, Guam Code Annotated prior to the Master Plan being ripe for transmittal to *I Liheslaturan Guåhan* for formal adjudication;

NOW, THEREFORE, BE IT RESOLVED, that the Board of Directors of the Port Authority of Guam hereby requests the Honorable *I Maga'håga* Lou Leon Guerrero, Governor of Guam, and the Bureau of Statistics and Plans to officially amend the title of the Port Authority of Guam Master Plan from "2023" to "2025," solely to reflect the current year of formal use and adoption, without altering the substance of the document as previously approved by the Port Authority of Guam's Board of Director's; and

BE IT FURTHER RESOLVED, that the new title shall read: "Port Authority of Guam Master Plan 2025," inclusive of the zero-emission and zero-waste goals adopted in Resolution No. 2024-18 as part of the Port Authority of Guam's sustainability component; and

BE IT FURTHER RESOLVED, that the Chairperson certify to, and the Secretary attest to, the adoption hereof.

PASSED AND ADOPTED UNANIMOUSLY BY THE BOARD OF DIRECTORS THIS 14th DAY OF JULY, 2025.

DOROTHY P. HARRIS
Chairperson, Board of Directors
Port Authority of Guam

FE R. VALENCIA-OVALLES
Secretary, Board of Directors
Port Authority of Guam

Port Authority of Guam

2025 Master Plan Presentation

wsp

PORT OF GUAM PORT AUTHORITY OF GUAM

Purpose and Goals

- Purpose
  - The purpose of the 2025 Port of Guam Master Plan is to assist the PAG define its near-term and long-term approach to improving the Port by maintaining fiscally sustainable operations and promoting increased awareness and consensus on its approach among all affected stakeholders and the rate payers of Guam.
- Goals
  - Provide a comprehensive overview of the Port's current conditions including governance, financial, operational, and physical attributes;
  - Assess the current and projected cargo opportunities based on Guam's market drivers, which consist of military realignments, tourism, transshipment and organic growth;
  - Determine near-term resiliency and sustainability improvements and operational adjustments to accommodate the peak of the military build-up, support Indo-Pacific Command's Pacific Deterrence initiative (PDI) and ensure maritime posture for future deployments of military assets;

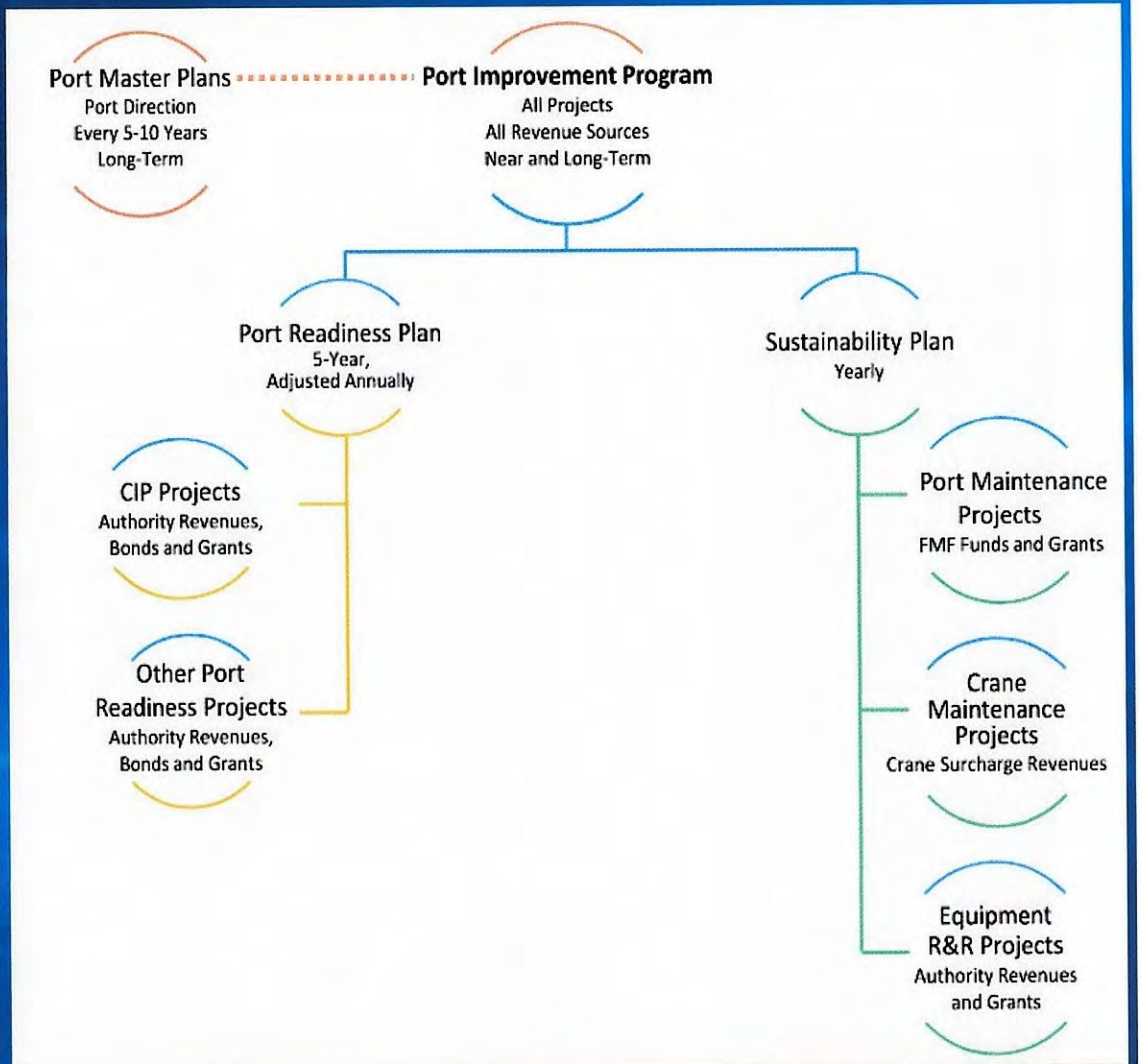
Purpose and Goals

- Goals Continued
  - Estimate the Port's capacity and ability to meet the projected demand and tenant requirements;
  - Identify long-term port improvement efforts targeted towards continuing operational and economic sustainability;
  - Establish optimal requirements for operations, maintenance and repair, and capital improvement projects;
  - Validate the efficient and effective use of the Port's resources and assets;
  - Present commercial strategies for PAG to diversify its revenue base and enhance its financial self-sufficiency including a completed tariff adjustment/PUC petition and associated benefits to the PAG and port users;
  - Assess the impact of the recommended strategies on Guam's economic conditions; and
  - Prepare an implementation program to support a coordinated approach of continuous Port improvements, balanced with sustainability.

Doc. No. 38GL-26-2386.*

MP Accomplishments

- 2007 (Initial Master Plan)
  - Military Buildup Driven PMP
- 2013 (Master Plan Update)
  - Military Buildup Update
- 2025 Master Plan
  - PMP to PIP
  - Near-term focus with long-term goals
  - Resiliency/Readiness
    - Crane Replacement
    - Comprehensive Infrastructure Hardening
    - Equipment R&R
    - TOS/IT Improvements
  - Resiliency and Sustainability Plan
  - Clean Ports Program
  - Updated Infrastructure Condition Assessments – including Port Typhoon Mawar damages



Modernization Program – Build Back Better

- Repair and Improve Existing Infrastructure to Increase Resiliency
  - Wharves
  - Fuel Piers
  - Marinas
  - Buildings
  - Utilities
  - Pavement
- Equipment Needs
  - STS Gantry Cranes
  - Top Picks
  - Tractors
  - Forklifts
  - Reefer Generators/Outlets

WSP

PORT OF GUAM

PORT AUTHORITY OF GUAM

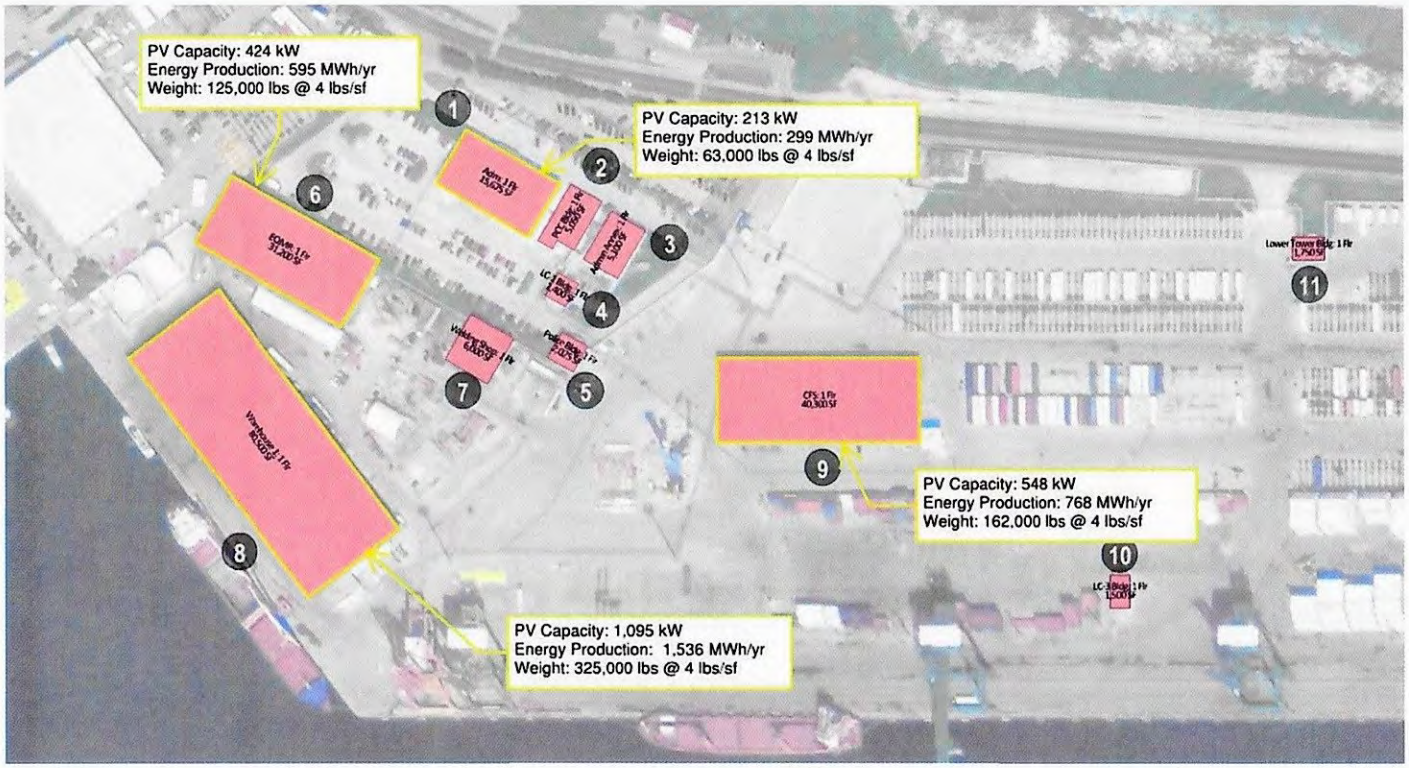
Guam Customs Inspection Facility

Final Approved Layout

Scanning & Visual Inspection

Customs Cargo Management system ➔ ASYCUDA Automated System for Customs Data

Solar Power Study



Building Rooftops

Solar Power Opportunity

- Can offset over 90% of annual power consumption
- GPA Net-Metering program allows for up to 500kW per meter
- GPA may consider a partnership arrangement to develop, procure, install, and maintain PV systems with the Port

Tariff Simplification

The PAG's tariff has been restructured to be:

Revenue Neutral	Ensure the revisions will result in neither a material increase nor decrease in Port revenues
User-friendly	Present schedule of rates table in front of tariff to allow customers to quickly and easily calculate fees
Transparent	Itemize details, rules and regulations associated with combined rates via hyperlink in latter sections of tariff
Streamlined	Consolidate charges to align with all-inclusive port services and performance reports
Modernized	Support the integration of the Port's NAVIS Terminal Operating System and JDE Financial System
Time-saving	Minimize/eliminate manual data entry of charges and provide invoices to users expeditiously
Cost-effective	Reduce administrative costs, manual entry errors, disputes, and delayed payments

- Reorganize tariff for clarity
- Provide summary tables of charges at front of tariff
- Determine flat rates for certain itemized items while maintaining revenue neutrality
- Reviewing changes with carriers to incorporate any feedback
- Tariff adjustment

Information Technology (IT) Study

- Infrastructure
  - Network, Server, Wireless, IP Management
- Cyber Security
  - Investigate weak points
  - Network hardening
  - Develop Cyber Security Roadmap
- TOS Upgrade
  - Identify features not being used (current TOS)
  - Evaluate TOS options
  - Establish decision criteria
  - Develop TOS Roadmap
- Study Team
  - PAG-IT
  - RVE Management
  - Ledge Light Technologies (LLT)
  - Cargo Velocity

PUGG Initiative for System Integration

PORT COMMUNITY SYSTEM (PCS):
Long term goal to share digital data in a secure manner

CUSTOMS:
From paper to paperless

Freight Forwarder:
From paper to paperless

Agents, consignee's:
From paper to paperless

Shipping Lines:
Full digitized information transfers

All partners in the Port community have to invest in modernizing, digitizing their internal systems, and upgrading their standard operating procedures.

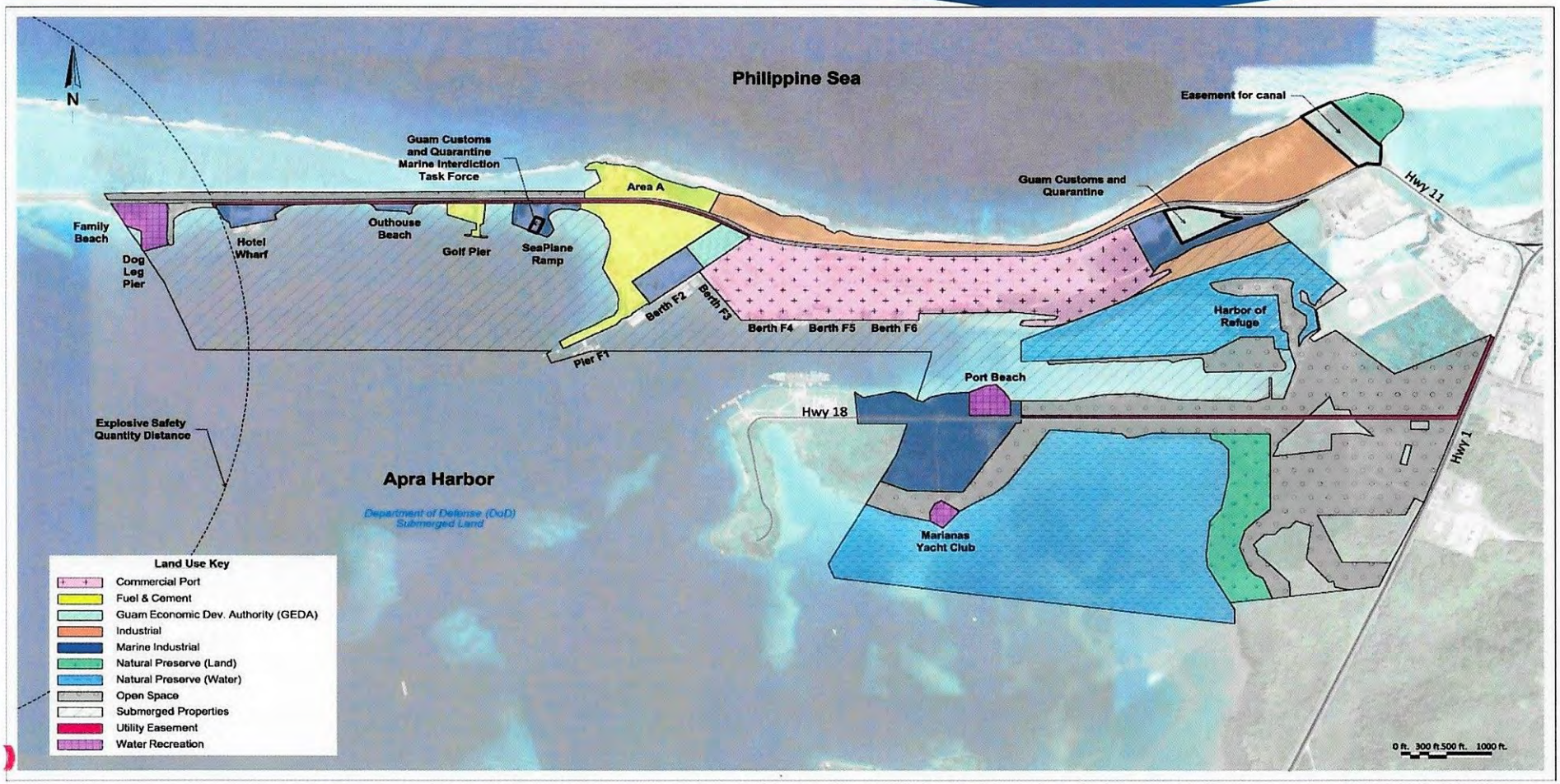
Port Assets and Resources – Apra Harbor

Port Assets and Resources - Marinas

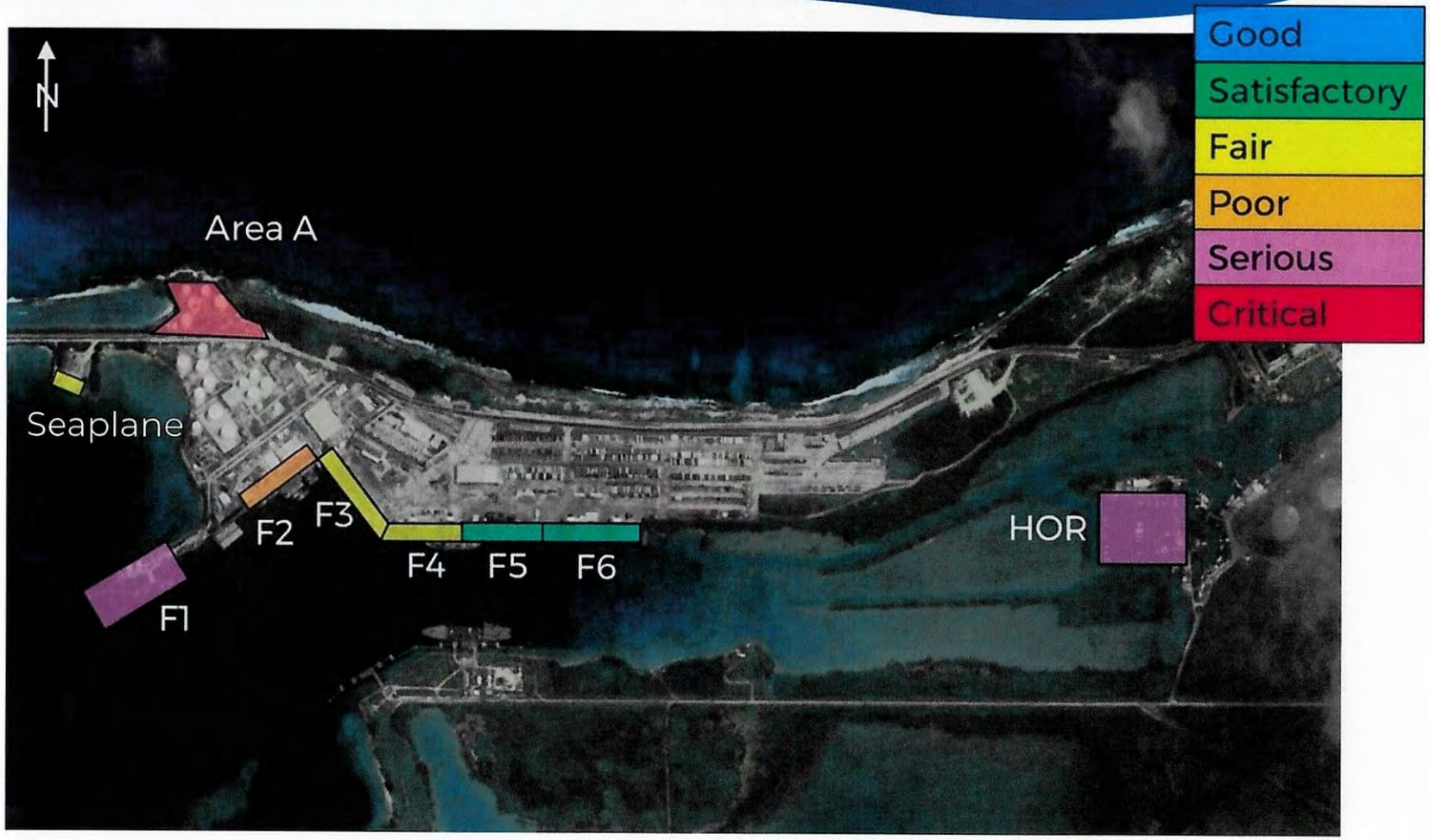
Agat Small Boat Marina

Gregorio D. Perez Marina

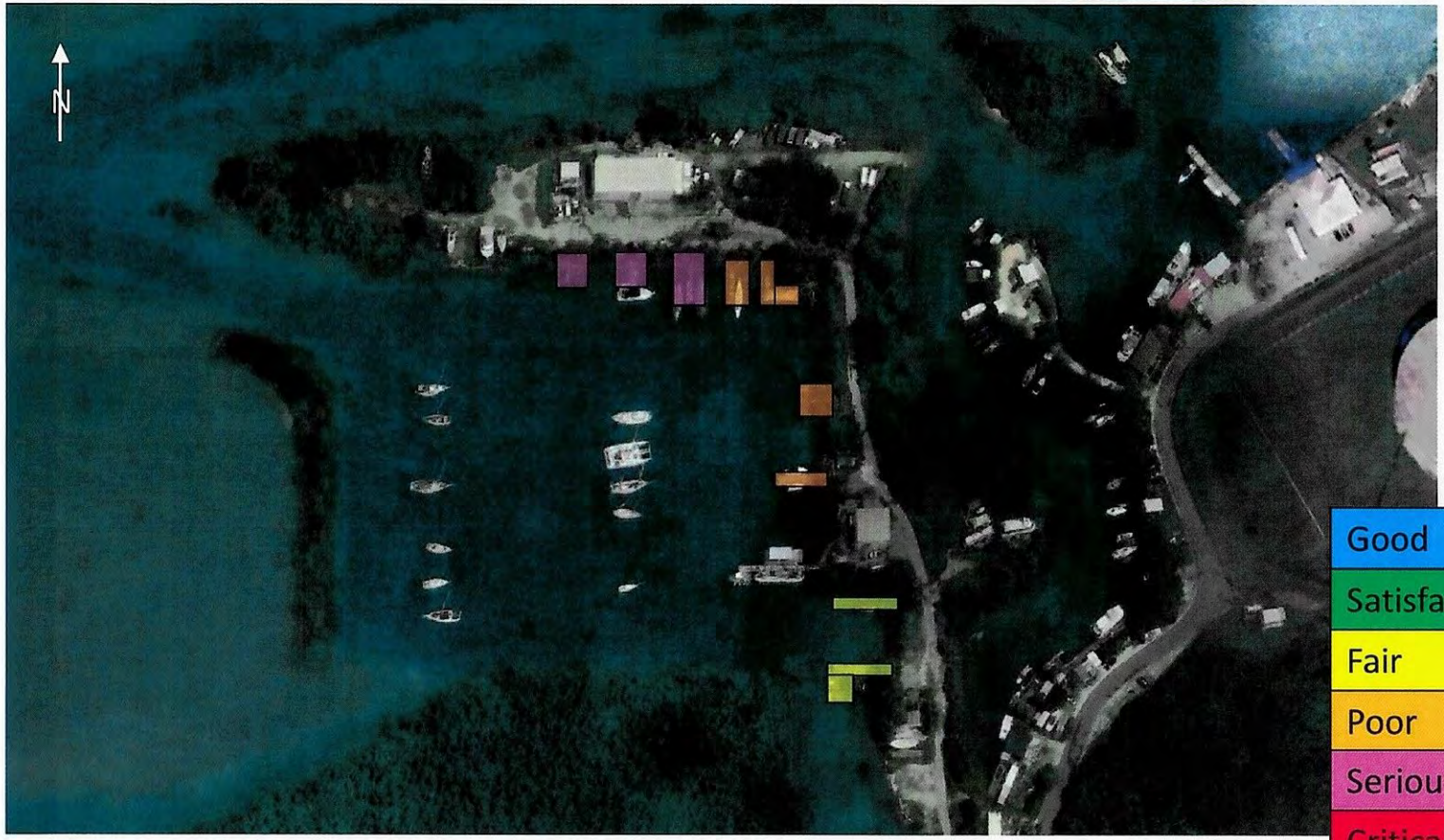
Port Assets and Resources – Land Use Designations



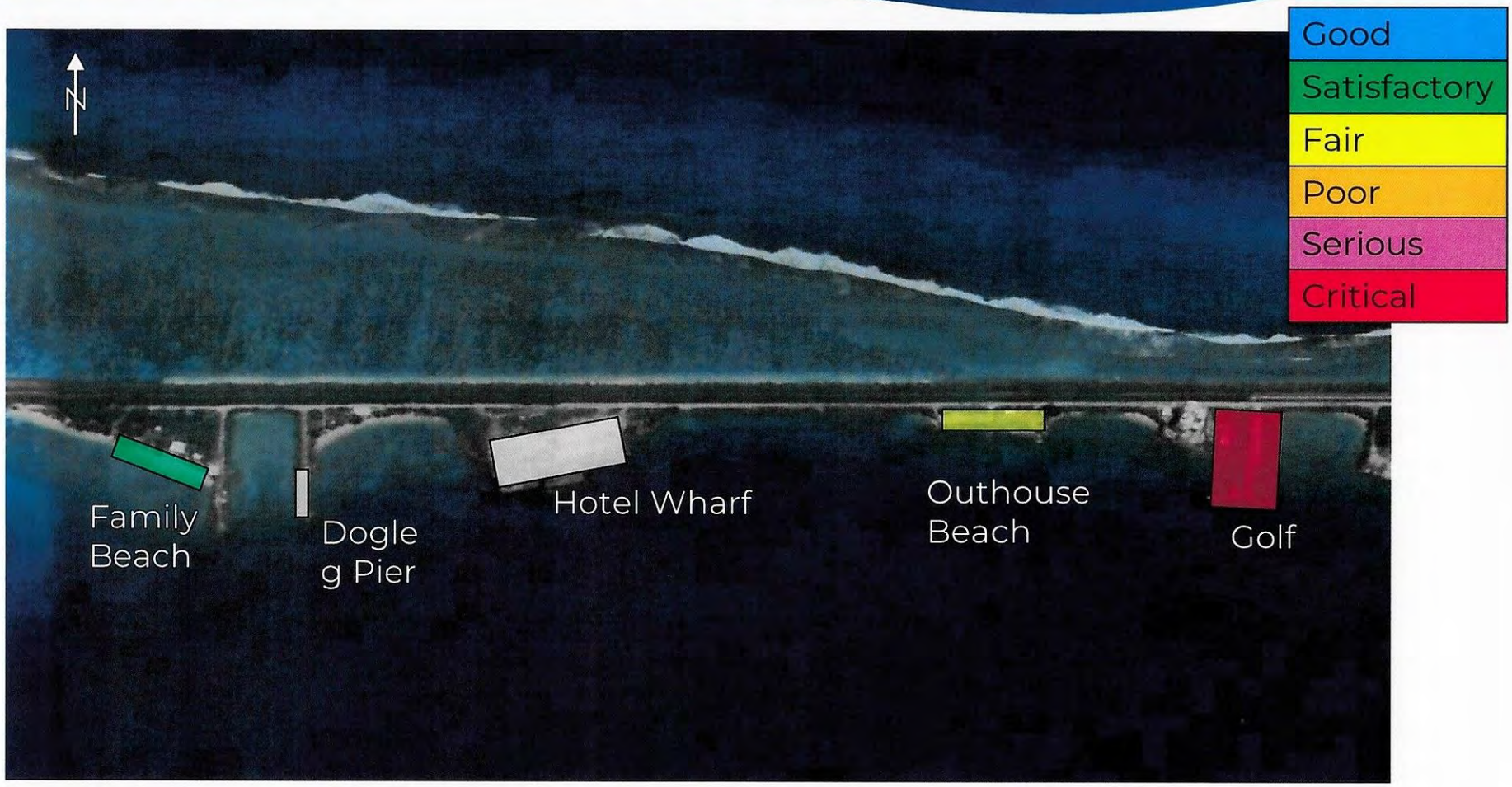
Facility Assessments – Marine Structures (Com Port & MI)



Facility Assessments – Harbor of Refuge



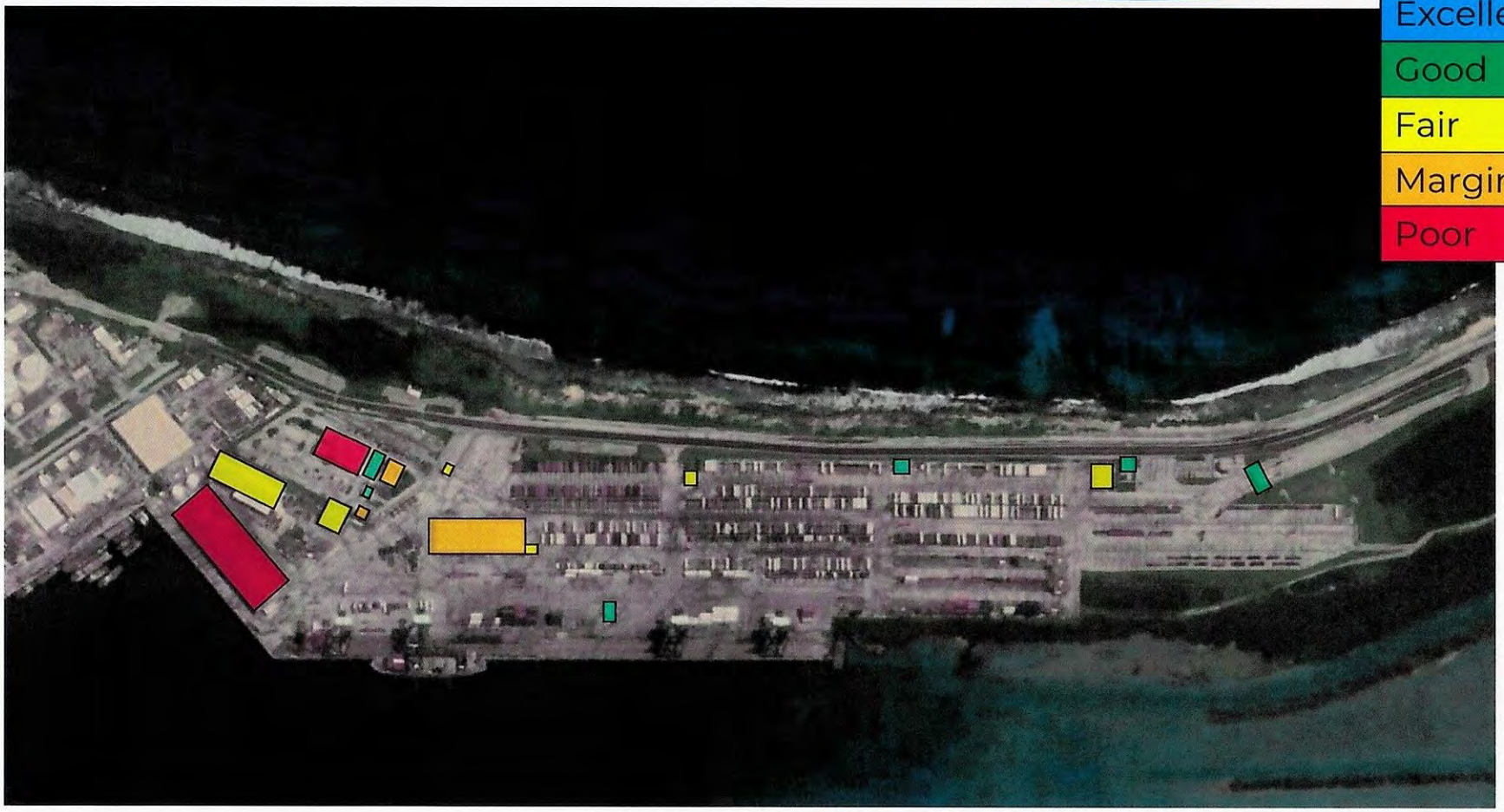
Facility Assessments – Marine Structures (Glass Breakwater)



Facility Assessments – Marine Structures (Marinas)

Good
Satisfactory
Fair
Poor
Serious
Critical

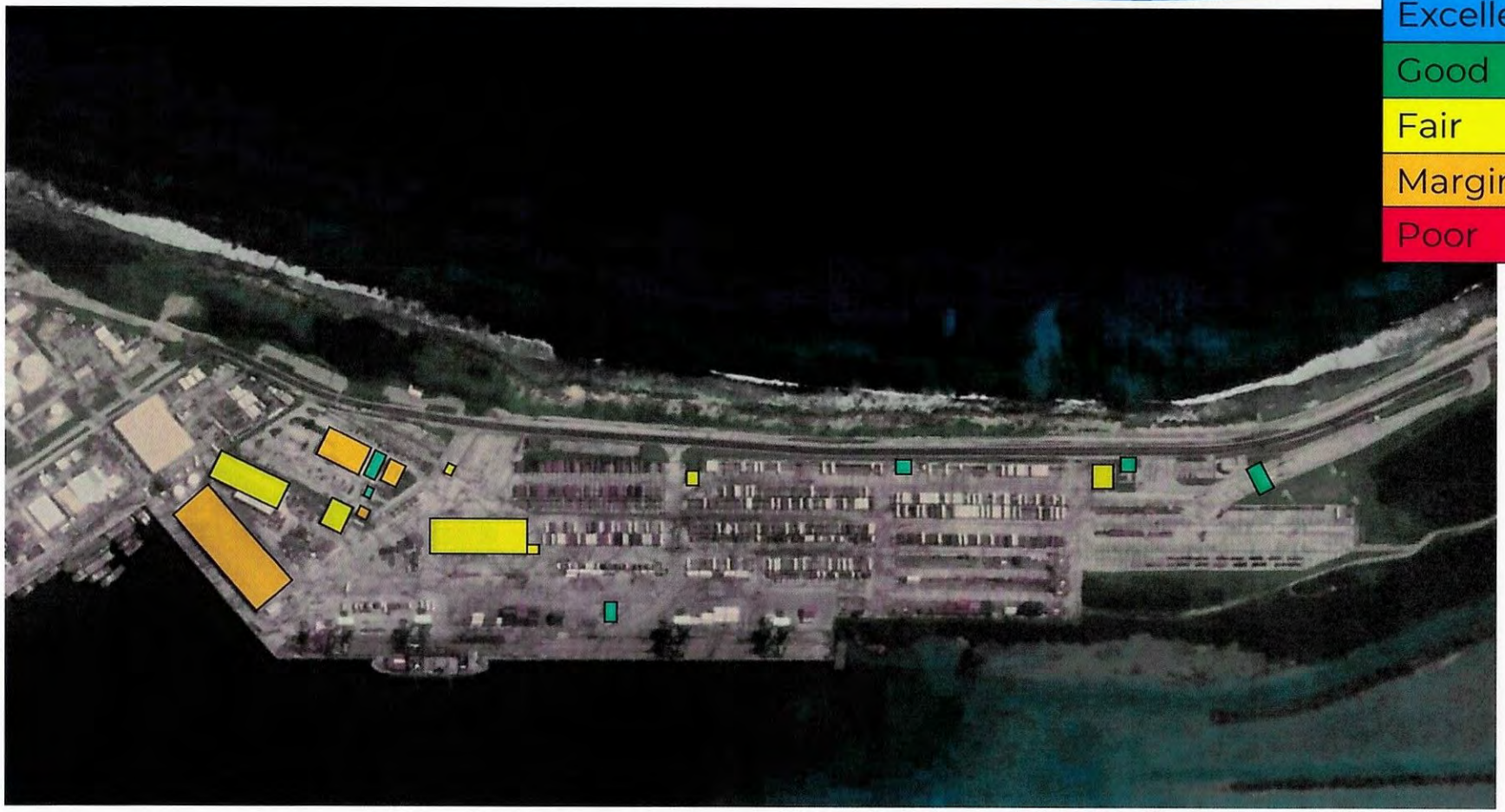
Facility Assessments – Upland Buildings



Recent Building Improvements

- Administration Building
  - Building Envelope (Spalled and Cracked Concrete) – Repaired/Removed/Painted
  - HVAC – Maintaining Split Units
  - Plumbing – Aged but being maintained
  - Electrical – Aged but being maintained
  - Communication System – Upgrade of VOIP System
- EQMR Building
  - Wall/Column Concrete Damage – Completed Repair/Patching/Painting
  - Damaged/Weather Roofing Membrane – Completed
- Warehouse 1
  - Damaged Concrete – On-going Crack repair and removal of loose concrete
  - Damaged Fire Protection System/Mold – Repair project under design
- CFS
  - Wall/Column Concrete Damage – Completed Repair/Patching/Painting
- Welding Shop
  - Damaged Concrete – Completed Repair/Patching/Painting
  - Roll Up Doors – currently being installed
  - Electrical Systems – On-going upgrades performed to bring to code

Facility Assessments – Upland Buildings

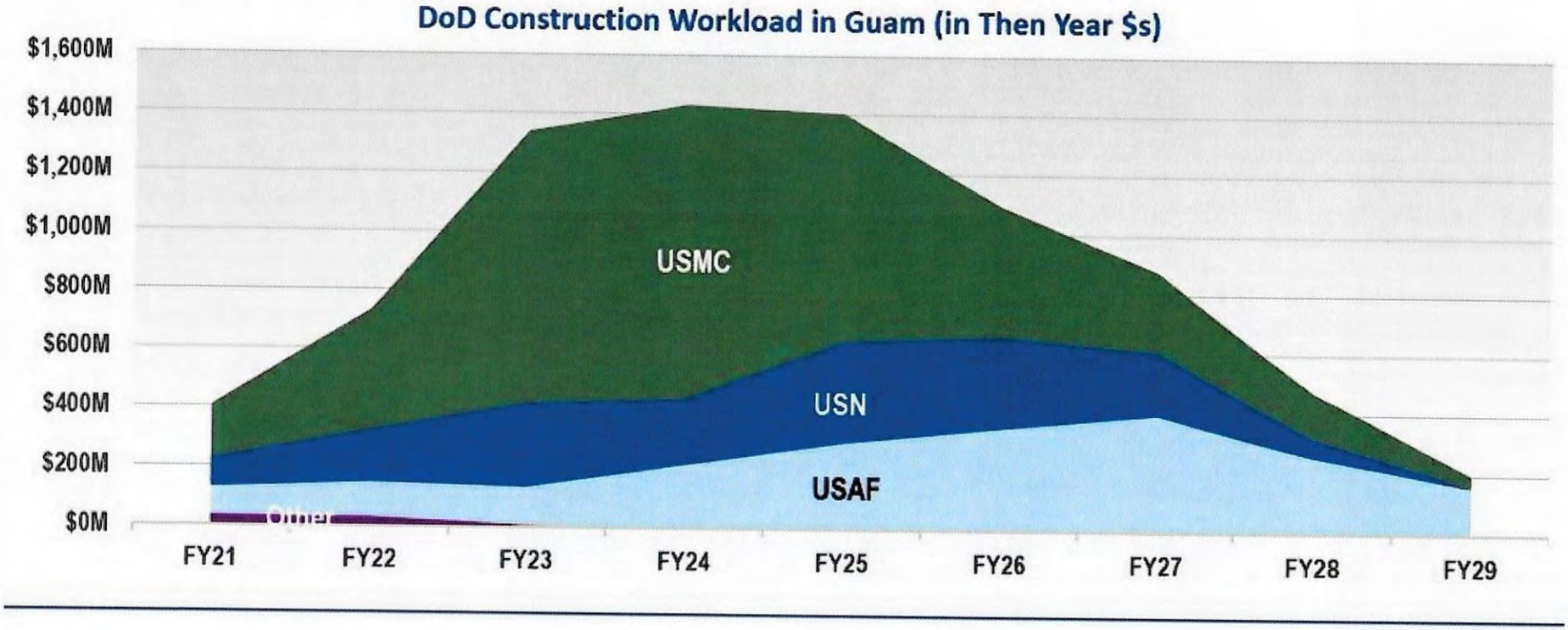


Forecast Overview

FORECAST	BASIS	CARGOS
1. Organic	Historical analysis - Cannot separate effects of local, tourism, military, and construction	
2. Transshipment	Highly variable based on carrier decisions	1. Containers 2. Bulk 3. Ro-Ro 4. Liquid bulk
3. Military Buildup	- 2008 forecast adjusted for inflation and current NAVFAC projections - Peak characteristics - Historical data inconsistent	
4. Steady State Post Buildup	Population and activity increase with larger military presence	
Total Throughput: Forecasts 1 to 4 combined	High: Tourism recovers, strong military peak, 50% transshipment returns	
	Base: 50% increase due to offsetting factors, 25% transshipment returns	
	Low: Offsetting factors limit growth to historical percentages	

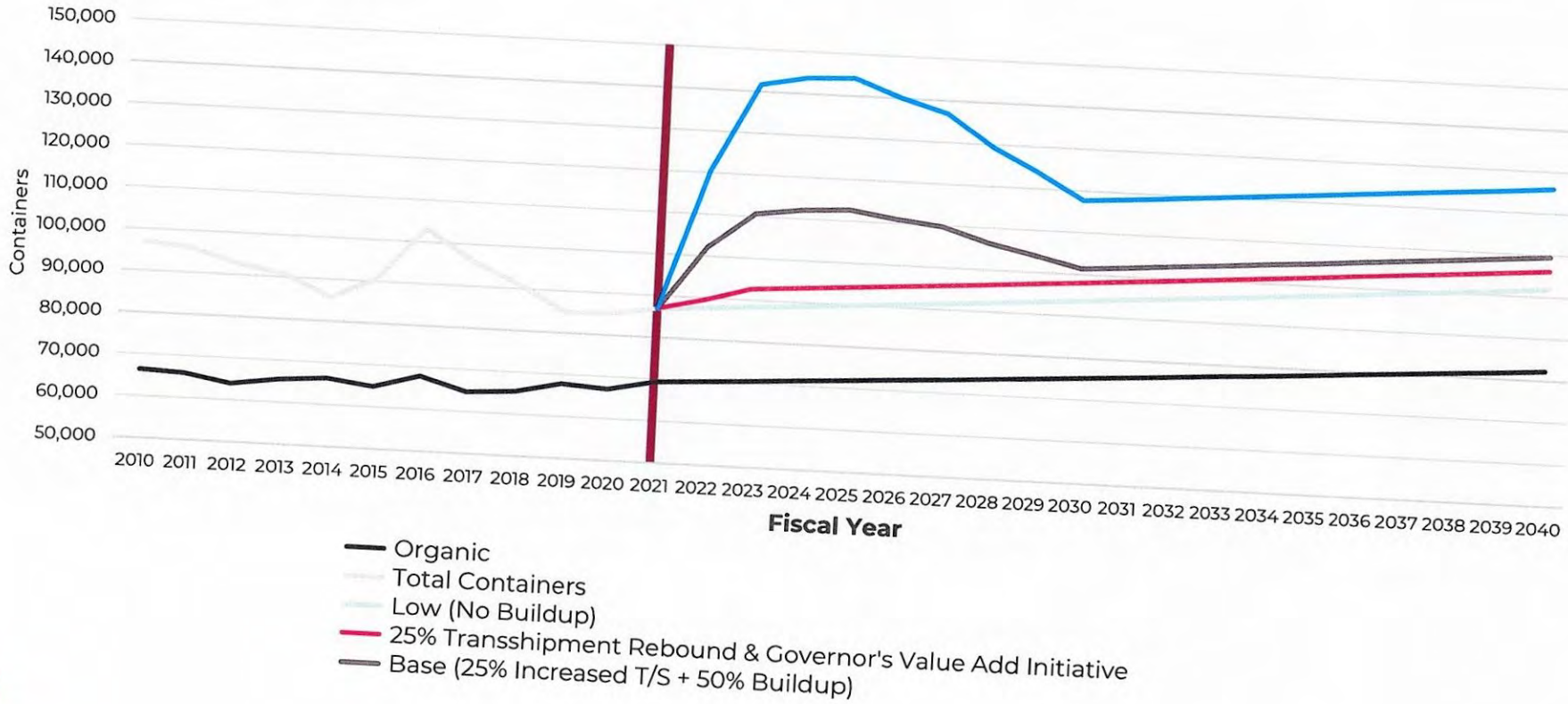
Market Analysis and Cargo Demand

- Military Building Construction Spending Profile



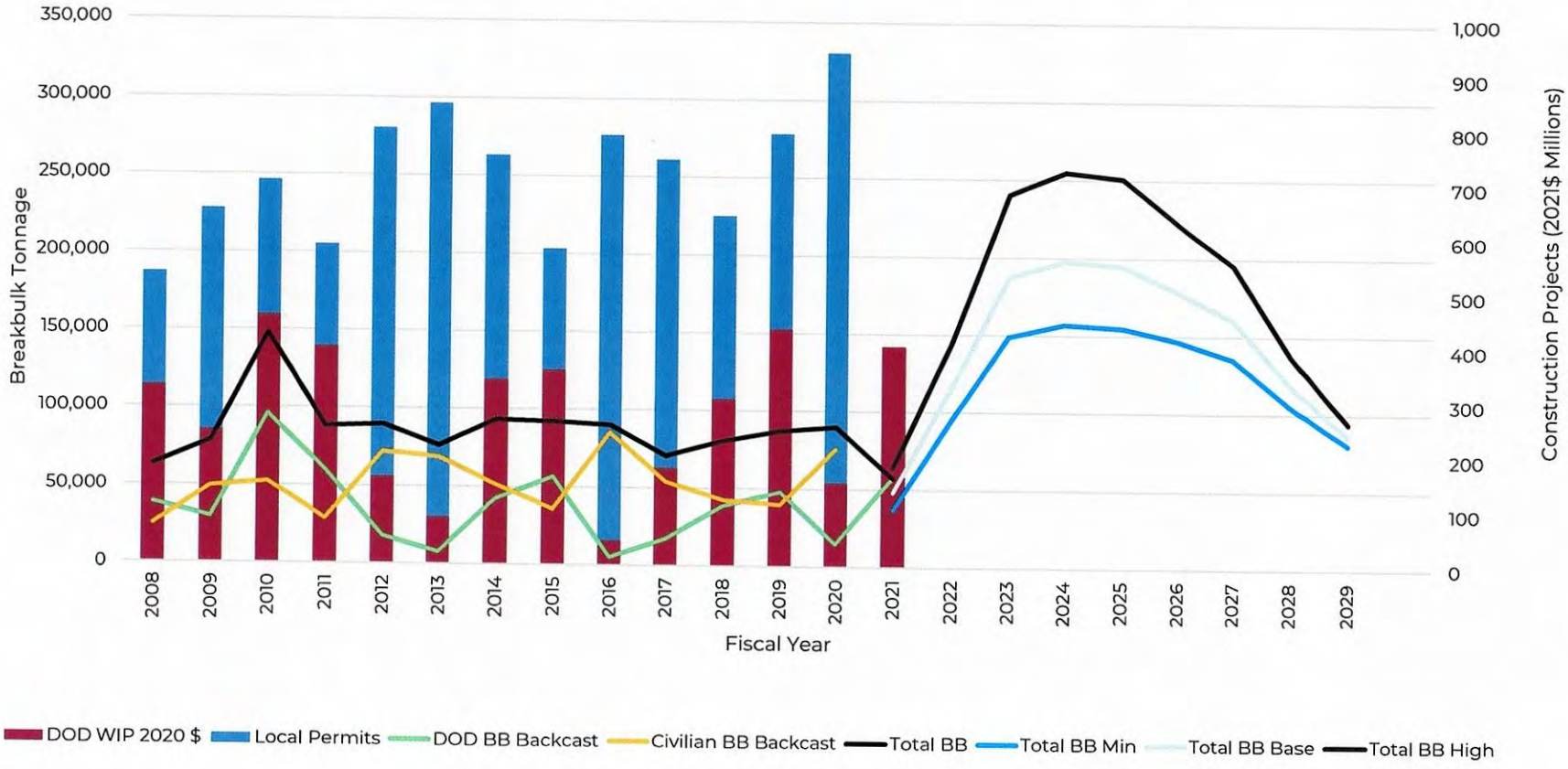
Market Analysis and Cargo Demand

- Container Forecast



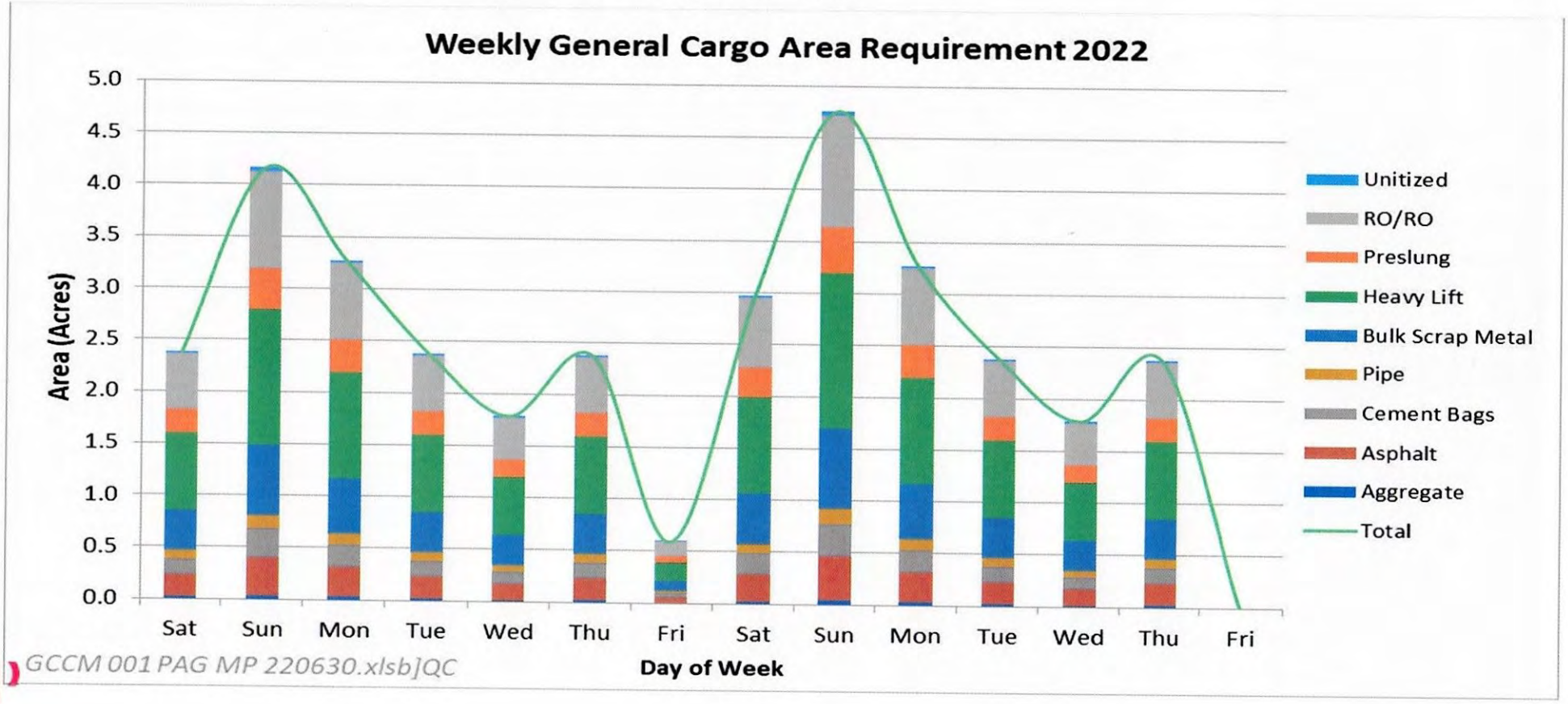
Market Analysis and Cargo Demand

- Breakbulk History and Forecast



Market Analysis and Cargo Demand

- 2022 Weekly General Cargo Area Requirement



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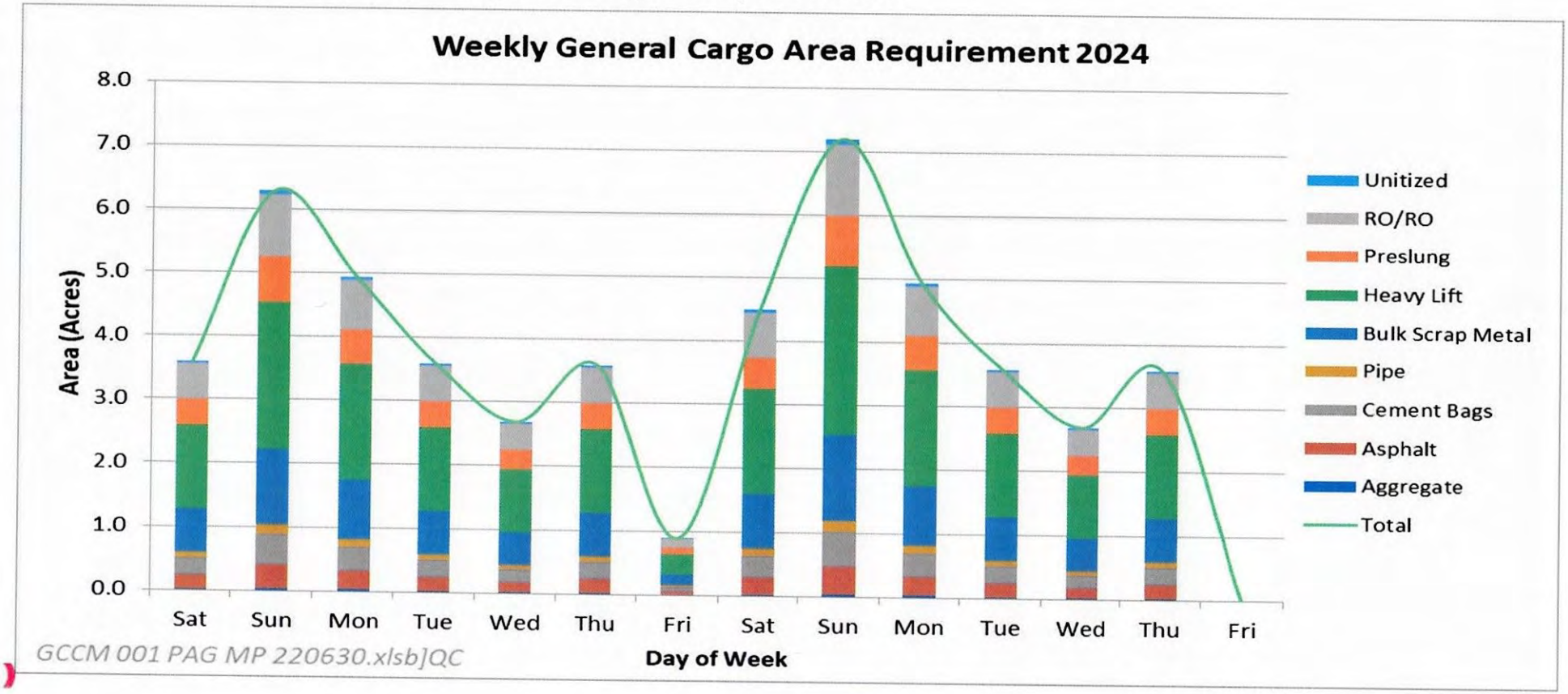
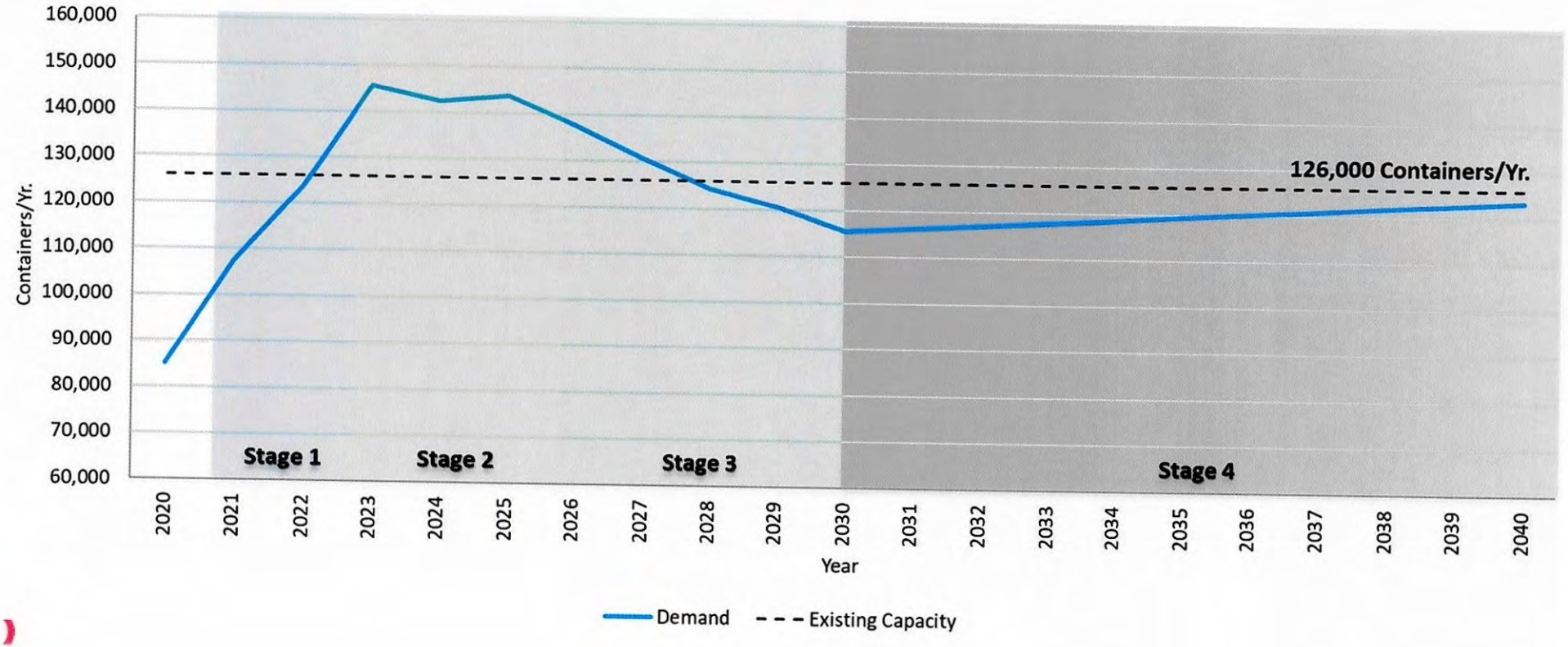
Market Analysis and Cargo Demand

- 2024 Weekly General Cargo Storage Requirement



Market Analysis and Cargo Demand

- Current Container Capacity and High Demand



Existing to Build-up to Organic

- Five layouts including existing
- Plan numbering
  - A10 – Existing
  - A11 – Ramp up (ground containers + additional general cargo area)
  - A12 – Build-up (ground more containers, same general cargo area)
  - A13 – Ramp down (less grounding, small general cargo area)
  - A14 – Organic (back to existing conditions)

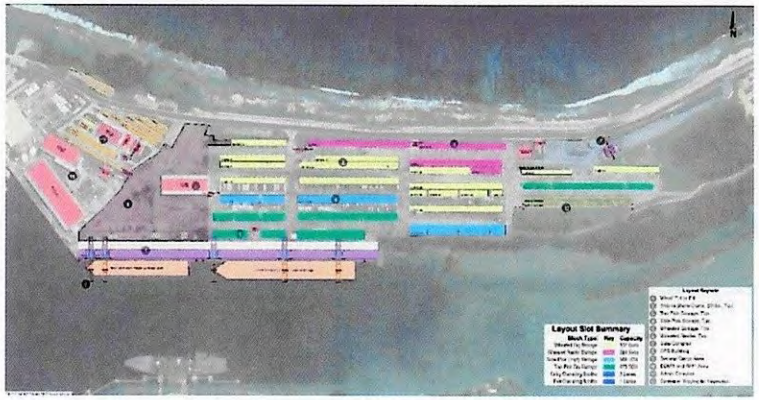
Parameters	Existing	Ramp Up	Full Build-up	Ramp Down	Organic
Layout Number	A10	A11	A12	A13	A14
T'put Capacity (Lifts/Yr.)	126,000	137,000	149,000	137,000	126,000
Slot Availability (TGS)	1,920	2,001	2,114	2,022	1,942
Containers Stacked (%)	46%	70%	78%	65%	46%
General Cargo Area (Acres)	5.9	9.8	9.8	8.4	6.1

Cargo Terminal Phasing

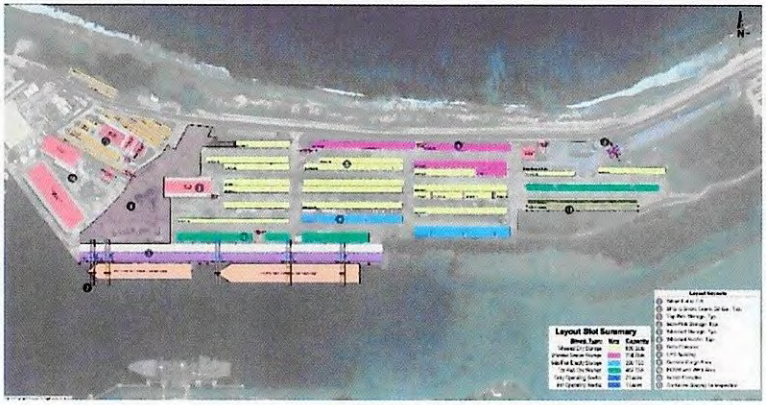
Ramp Up (A11)

Build Up (A12)

Ramp Down (A13)

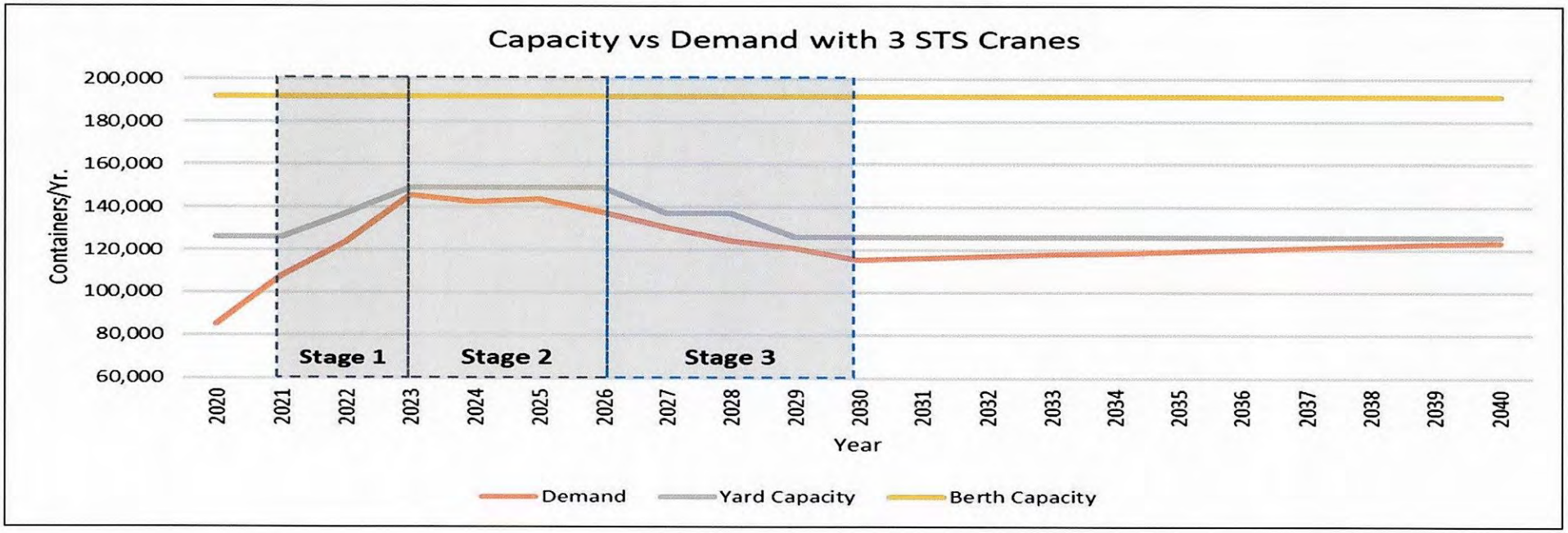


Organic (A14)



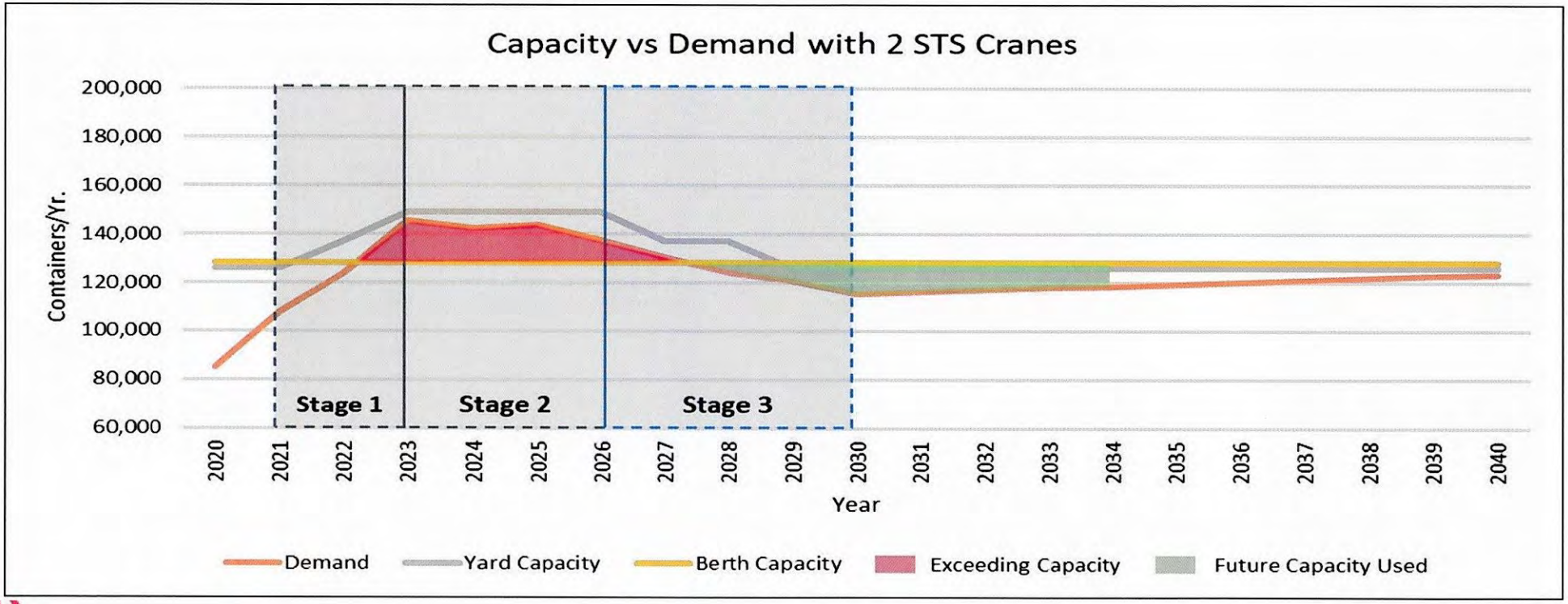
STS Crane Replacement Importance

- Existing 3 Cranes
  - Meets forecasted demand



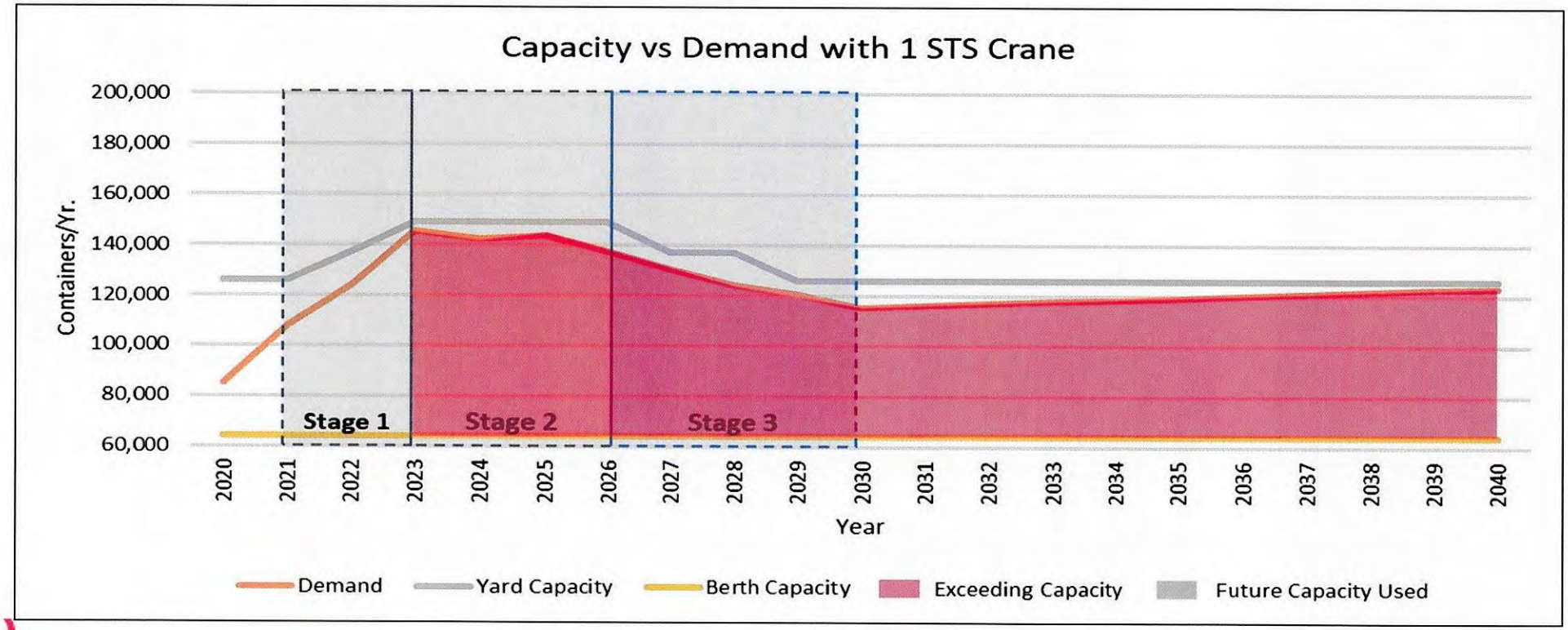
STS Crane Replacement Importance

- 1 Crane out of service
  - DoD build-up delayed up to 4 years



STS Crane Replacement Importance

- 2 Cranes out of service
  - Does not meet commercial demand or DoD mission



Capital Plan

2022 - 2032

Capital Plan 2022 Through 2032 ($000,000s)

PIP ITEM	FY22	FY23	FY24	FY25	FY26	FY27	FY28	FY29	FY30	FY31	FY32	TOTAL
CIP	$2.6	$7.3	$35.2	$49.9	$9.8	$69.4	$9.4	$8.0	$0.0	$0.0	$0.0	**$191.6**
PRP	$0.0	$0.0	$23.5	$56.3	$64.8	$44.5	$40.0	$45.5	$184.5	$15.0	$15.0	**$489.1**
SUST	$2.4	$4.6	$4.1	$0.4	$0.4	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	**$11.9**
TOTAL	**$5.0**	**$11.9**	**$62.8**	**$106.6**	**$75.0**	**$113.9**	**$49.4**	**$53.5**	**$184.5**	**$15.0**	**$15.0**	

Projected Direct & Indirect Jobs Through 2032

JOBS	FY22	FY23	FY24	FY25	FY26	FY27	FY28	FY29	FY30	FY31	FY31	TOTAL
Direct	28	52	296	464	301	611	213	265	1,036	84	84	**3,435**
Indirect Induced	10	19	105	165	107	217	76	94	369	30	30	**1,222**
Total Jobs	**39**	**71**	**402**	**629**	**408**	**828**	**289**	**359**	**1,405**	**114**	**114**	**4,657**

Port Improvement Plan – Capital Improvement Projects

ID NO.	PROJECT TITLE/DESCRIPTION	FUNDING AUTHORITY	SCHEDULE									
			2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
1	Installation of Canopy Fronting Building Maintenance Bay	Port		CPLT								
2	Devanning Concrete Ramp	Port		CPLT								
3	LC3 Genset + Tank + AST + Slab Extension	PSGP/Port		CPLT								
4	Agat Small Boat Marina Design Build Bathroom and Showers	Port				CPLT						
5	Golf Pier Replacement	Bonds/ Grants										100%
6	Golf Pier Near-Term Repairs	Port/ Grants									40%	60%
7	Enterprise One Financial Management System	Bonds			CPLT							
8	Replacement of (3) Metal Gate Booths	Port		CPLT								
9	STS Crane Demolition Project	Port		50%	25%	5%		20%				
10	Waterline Replacement	Bonds		10%	25%	35%	10%	20%				
11	Welding Shop – Phases 1 and 2	OIA/Port				10%	70%	20%				

Port Improvement Plan – Capital Improvement Projects

ID NO.	PROJECT TITLE/DESCRIPTION	FUNDING AUTHORITY	SCHEDULE									
			2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
12	Radar Intrusion and Vessel Tracking System	PSGP/Port			CPLT							
13	Rehabilitation of Hotel Wharf and Access Road	Bonds/ MARAD/ Port							40%	60%		
14	Lighting: Replace all Fluorescent Lights in All Buildings with LED Lights	Port							100%			
15	Gate Operating System	Grants/Port								50%	50%	
16	Inbound/Outbound OCR Portals	Grants/Port								50%	50%	
17	Northside Catwalk for the Agat Small Boat Marina Boat Ramp	Grants/Port		CPLT								
18	OWS at Berth F2	Port							100%			
19	PUGG Secured Digital Framework	Grants/Port						50%	50%			

Port Improvement Plan – Capital Improvement Projects

ID NO.	PROJECT TITLE/DESCRIPTION	FUNDING AUTHORITY	SCHEDULE									
			2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
20	Various IT Projects (WiFi, RRM, VMT)	Grants/Port						50%	50%			
21	Various Yard Equipment	Grants/Port					60%	40%				
22	Installation of Pavilion and New Restrooms at Port Beach	Port						50%	50%			
23	WH-1 Building Repair/Upgrade	Bonds					10%	90%				
24	Seawall Improvement	Grants							20%	80%		
25	Typhoon Mawar Building Repair Projects							30%	70%			

Port Improvement Plan – Capital Improvement Projects

ID NO.	PROJECT TITLE/DESCRIPTION	FUNDING AUTHORITY	SCHEDULE									
			2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
26	Seawall Solar Project							50%	50%			
27	Warehouse 1 Demolition											
28	Old Horizon Building Roof Repair								50%	50%		
29	Old Horizon Building Full Building Repair									50%	50%	
30	Crane Office Renovation							100%				
31	Replacement of LC5 Metering Cabinet							100%				

Port Improvement Plan – Capital Improvement Projects

ID NO.	PROJECT TITLE/DESCRIPTION	FUNDING AUTHORITY	SCHEDULE									
			2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
32	Operations Division Office Renovation							100%				
33	Gregorio D. Perez Marina Renovation and Rehabilitation	Grants/Port					20%	20%	20%	20%	20%	
34	Agat Small Boat Marina Renovation and Rehabilitation	Grants/Port					20%	20%	20%	20%	20%	

Total Estimated Cost = $191,600,000

Port Improvement Plan – Other Port Readiness Projects

ID NO.	PROJECT TITLE/DESCRIPTION	FUNDING AUTHORITY	SCHEDULE									
			2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
1	Purchase Container Handling Equipment	Grants/Port				20%	20%	20%	20%	20%		
2	TOS Upgrade	Grants/Port				10%	90%					
3	Fuel Connectivity Pipeline (F1 to Golf Pier)	Grants/Port				20%	20%	60%				
4	Wharf Upgrades for New Cranes						65%	30%	5%			
5	Three New STS Gantry Cranes	Grants/ Loans/Port						100%		100%		100%
6	Wharf SLE Berths F2-F6	Grants/Port				30%	45%	25%				
7	Container Yard Repavement Projects					20%	60%	20%				
8	Solar Energy Project					10%	30%	40%	20%			

Port Improvement Plan – Other Port Readiness Projects

ID NO.	PROJECT TITLE/DESCRIPTION	FUNDING AUTHORITY	SCHEDULE									
			2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
9	JRM Pier Infrastructure (Pier F1 Near-Term Repairs)	Grant/Port				10%	30%	30%	25%	5%		
10	Cyber Security Initiative	Grants/Port				30%	70%					
11	F4 to F6 Ground Improvements	Grants/Port					50%	25%	25%			
12	Redevelopment of Area A	Grants/Port					20%	40%	40%			
13	Pier F1 Wharf Renovation/Reconstruction	Grants/Port						25%	50%	25%		
14	Dredging (Hotel Wharf, Fuel Piers, etc.)	Grants/Port								100%		
15	Berth F3/F4/F6 Wharf Renovation/Reconstruction	Grants/Port						10%	10%	30%	25%	25%
16	Admin Bldg Annex	Port/Loans					20%	30%	30%	20%		
17	Building Demolition	Grants/Port										

Total Estimated Cost = $489,100,000

Port Improvement Plan – Sustainability/Maintenance Projects

ID NO.	PROJECT TITLE/DESCRIPTION	FUNDING AUTHORITY	SCHEDULE									
			2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
1	Repair All Concrete Spalling at CFS Building			CPLT								
2	EQMR Building Maintenance				40%	50%	10%					
3	Hagatna Marina Clean OWS and Retrofit Check Valves								30%	70%		
4	F3 – F6 Fender Repair Project (Typhoon Mangkhut PA)	PA/Port		CPLT								
5	Supply and Install Arch Fenders at F4 – F6 (Typhoon Mangkhut)	HMGP/Port					CPLT					
6	Supply and Install Arch Fenders at F4 – F6 (Typhoon Mawar)								50%	50%		
7	Admin Building Concrete Repairs							100%				
8	Harbor of Refuge Renovation and Repairs (Mooring Blocks Only)				CPLT							

Port Improvement Plan – Sustainability/Maintenance Projects

ID NO.	PROJECT TITLE/DESCRIPTION	FUNDING AUTHORITY	SCHEDULE									
			2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
9	F3 – F6 Bullrail Repairs						50%	50%				
10	Concrete Striping and Numbering (F4 – F6)							50%	50%			
11	Concrete Tire Stopper Project							100%				
12	LC1 Metering Cabinet							100%				
13	LC2 and LC3 Switch Gear Replacement							100%				
14	Replace Metal Halide and High-Pressure Sodium Lights							60%	40%			
15	Harbor of Refuge Pump Out Boat and Dock							50%	50%			
16	F3 Bulkhead Repairs							10%	70%	20%		
17	F3 Cylindrical Fenders (Typhoon Mawar)							20%	50%	30%		

Port Improvement Plan – Sustainability/Maintenance Projects

ID NO.	PROJECT TITLE/DESCRIPTION	FUNDING AUTHORITY	SCHEDULE									
			2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
18	OAE Services											
19	Annual Maintenance of Mobil Pipeline and Golf Pier Maintenance	Port										
20	Golf Pier Concrete Slab Repair & 3 Motorized Valves	Grants/Port										
21	Harbor Master Misc Roof Related Items	Port		CPLT								
22	Installation of 2 Gates at Dock A and Dock B. Dry Dock Repair at Perez Marina	Port		CPLT								
23	Replacement of 125 Reefer Outlet Receptacles	Port			CPLT							
24	Service the ICCP System at Berth F5											
25	Agat Small Boat Marina Dock B Replacement	DOI/USFW/ DAWR										

Port Improvement Plan – Sustainability/Maintenance Projects

ID NO.	PROJECT TITLE/DESCRIPTION	FUNDING AUTHORITY	SCHEDULE									
			2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
26	Broken Grating Drainage Replacement	Port										
27	Electrical Work for 61 Reefer Outlets	Port			20%	80%						
28	Harbor of Refuge Renovations and Repair Phase 2-5 (Mooring Blocks Only)	Grants/Port			CPLT							
29	Storm Drain Channel Repairs	Port										
30	WH-1 Hardening (Roll Up Doors)	HMGP/Port				CPLT						

Total Estimated Cost = $11,900,000

Key Master Plan Elements

PROJECTS	POTENTIAL FUNDING AUTHORITY	ESTIMATED COST
STS GANTRY CRANES REPLACEMENT	Grants/Bonds/Port	$75M±
WHARVES REHABILITATION	Grants/Port	$25M±
CRANE RAIL SYSTEM AND TIE-DOWNS IMPROVEMENTS	Grants/Ports	$35M±
GOLF PIER REPLACEMENT	Grants/Port/P3	$84M±
F1 PIER REPLACEMENT	Grants/Port/P3	$84M±
AREA A FUEL TANK FACILITY REPLACEMENT	Grants/Port/P3	$155M±
TOS UPGRADE	Grants/Bond	$5M±
CYBERSECURITY UPGRADES	Grants/Port	$12M±
CAPITAL AND MAINTENANCE DREDGING	Grants/Portal	$50M±
TOTAL		**$525M±**

Diversification

- Military Exercise and Deployment Cargo (TRANSCOM/SDDC)
  - Strategic Port with Port Planning Orders
  - Guaranteed area for a specified amount of time (21 days?)
  - Staging military cargo on port and vessel loading
  - Identify facility needs to accommodate deployment operations (equipment tag interrogators, gate modifications, operations building, ….)

- New Land Uses
  - Transshipment Initiative (Public Law No. 36-23)
  - Value added assembly facilities
  - Dry dock/ship repair
  - LNG facilities
  - Cruise port-of-call
  - Marine Highway RO/RO (Guam↔CNMI)
  - Recycling Enterprise Zone Identification

Successful Partnership with the Office of the Governor & OLDCC

OLDCC Funded Efforts	Benefits to PAG and Guam
2025 Master Plan	Identified and prioritized resiliency and sustainability needs including hardening of major operating infrastructure such as piers, wharves and terminal buildings
Wharf Service Life Extension	Evaluated existing conditions of Pier F1 and Berths F2 – F6, prepared conceptual cost estimate, resulting in the PAG receiving a $16.9M MARAD grant for 80% of the needed repairs
Ship-to-Shore (STS) Gantry Crane Program	* Completed the demolition and removal of two obsolete gantry STS cranes, two RTG cranes, and one mobile harbor crane. * Developed and completed detailed procurement schedule, specifications, cost estimates, and bid documents for the eventual acquisition of new STS gantry cranes, should the Port be successful in its grant application to MARAD's FY2025 Port Infrastructure Development Program (PIDP)
Tariff Simplification	Completed the restructuring of the Port's tariff to streamline invoicing and improve integration of finance, operations, tenant and customs systems. In addition, a tariff adjustment has been completed, ready for a PUC petition.
Information Technology (IT) Support	Assisted with selecting and implementing the Terminal Operating System (TOS) and modernizing the IT department for efficiency, security and dependability

Successful Partnership with the Office of the Governor & OLDCC

OLDCC Funded Efforts	Benefits to PAG and Guam
Hotel Wharf	The Port entered into a lease agreement with Black Construction for a five (5) year period, whereby facility improvements were completed
CIP Bond Support Program	Prepared Consulting Engineer Report to help secure bond funding
Customs Inspection Facility	Worked with PAG and Guam Customs to develop a site plan for the future Customs Inspection Facility
PUGG Initiative for System Integration	Worked with PAG and the PUGG to evaluate current process and provide recommendations to transition from paper processes to digital
Solar Power Study	Completed study to evaluate the potential for installing photovoltaic panels on existing building roofs to reduce power costs

Thank You

wsp

PORT OF GUAM PORT AUTHORITY OF GUAM

PUBLIC HEARING - 2025 Master Plan

Wednesday, March 25, 2026

Port Authority Board Conference Room

3:00 P.M.

ATTENDANCE SHEET

NO.	PRINT NAME	SIGNATURE	AGENCY / Contact Number	Presenting Testimony	
				Yes	No
1	Junior Topasna		PAG		✓
2	JACOB D AQUINO JR		PAG		✓
3	Wilma Lem Meanes		BSP		—
4	Matt Santos		DJP		
5	Christian Benitez		BSP		✓
6	ANNETTE MAENAS		PAG		✓
7	Annie Sablan		PAG		✓
8	Dennis Perez		PAG		✓
9	Roseanna Stone		PAG		✓
10	Jesse Mendiola		PAG		✓
11	Frances Candoleta		PAG		✓
12	Consea Untalan		AM Insurance		
13	Charles Emsley		APL		✓
14	Pacifico Martin		PAG		
15	April Trinidad		DSP		

PUBLIC HEARING - 2025 Master Plan

Wednesday, March 25, 2026

Port Authority Board Conference Room

3:00 P.M.

ATTENDANCE SHEET

NO.	PRINT NAME	SIGNATURE	AGENCY / Contact Number	Presenting Testimony: Yes	Presenting Testimony: No
16	EDWARD T. CRUZ		MCLL		
17	JACOB TAREYAMA		AMBYTH		
18	Dominic Muna		PAG		
19	JOSE GUEVARA		PAG		
20	Paul Sagg		PAG		—
21	Jayson Farley		Hanson Consult		✓
22	Clarence Lagutang		PAG		
23	Rory Respicio		PAG	✓	
24	CHRIS FLORES		PAG		✓
25	Joe Jaullano		PAG		
26	Shim San Agustin		PAG		
27	LEO ESPIA		PAG		
28	Jamie Flores		PAG		
29	SHAWN CORODA		PAG		✓
30	Jonah Benavente		POST		

PUBLIC HEARING - 2025 Master Plan

Wednesday, March 25, 2026

Port Authority Board Conference Room

3:00 P.M.

ATTENDANCE SHEET

NO.	PRINT NAME	SIGNATURE	AGENCY / Contact Number	Presenting Testimony	
				Yes	No
31	John Afflejo		Tristar 688-4633		
32	~~Alex Aflague~~		~~PAG~~		
33	Donna Lizama-Acosta		PAG		✓
34	Chris Aguon		PAG		✓
35	Joseph Cruz		PUGG		
36	Jared Perez	GNCP	PAG		✓
37	Jamie Cano		PAR		
38	Alex Aflague		PAG		
39	Jesse Lujan		Legislature		—
40	MARVIN CRISOSTOMO		LEGISLATURE		
41	PATRICK BLAZON		MATSON		✓
42	Uriah Aguon		DN		
43	Alexis Morton		DPC		
44					
45					

Attachment E:

Written Testimonies and Comments on the Port Authority of Guam (PAG) Master Plan 2025

PORT OF GUAM
ATURIDAT I PUETTON GUAHAN
Jose D. Leon Guerrero Commercial Port
1026 Cabras Highway, Suite 201, Piti, Guam 96915
Telephone: 671-477-5931/35 Facsimile: 671-477-2689/4445
Website: www.portguam.com

Lourdes A. Leon Guerrero
Governor of Guam
Joshua F. Tenorio
Lieutenant Governor

Port Authority of Guam – Written Testimony to the Guam Bureau of Statistics and Plans on the 2025 Port of Guam Master Plan

Hafa Adai Director Lola Leon Guerrero!

The Port Authority of Guam respectfully submits this testimony in support of the 2025 Port Master Plan, which serves as the Port's guiding framework for sustaining operations, strengthening resiliency, and ensuring Guam's readiness to support both commercial and military activities. The purpose of the Master Plan is to define the Port's near-term and long-term approach to modernization while maintaining fiscally sustainable operations and promoting stakeholder awareness and consensus.

The Master Plan provides a full assessment of the Port's current governance, financial condition, operational capacity, physical infrastructure, and projected cargo demand. It identifies the improvements necessary to accommodate organic growth, transshipment opportunities, and the significant military realignment activities that will continue to influence Guam's economy. It also outlines the resiliency and sustainability measures required to support Indo-Pacific Command's (INDOPACOM) Pacific Deterrence Initiative (PDI) and to ensure the Port's ability to meet future deployment needs.

Foundational Authority and Planning History

The document now presented as the "2025 Port Master Plan" is not a new planning document, but the continuation of a formally adopted planning framework approved by the Port Authority of Guam Board of Directors through a series of official resolutions.

By Resolution No. 2023-04, the Board formally affirmed and adopted the 2023 Master Plan as the Port's official planning document for public advancement and transmittal pursuant to Sections 1205 and 1206, Article 2, Chapter 1 of Title 5, Guam Code Annotated.

By Resolution No. 2024-18, the Board further amended the Master Plan to incorporate the Port's zero-emission and zero-waste resiliency and sustainability goals as part of the Port's long-term strategic direction.

Most recently, by Resolution No. 2025-24, the Board requested that the title of the document be updated from "2023" to "2025" solely to reflect the current implementation timeline and formal use of the document, without altering the substance, strategic direction, or priority projects previously adopted.

Accordingly, the 2025 Port Master Plan reflects a continuous, Board-authorized planning framework that has remained active, relevant, and in implementation.

Transparency and Implementation Record

In the interest of transparency and to assist in BSP's review, the Port is also submitting the 49-page presentation that was publicly presented during the Master Plan hearing process. That presentation reflects the working updates and revisions made to the Master Plan and, in the interest of openness and public clarity, those edits were consciously retained in red so that all changes could be readily identified rather than obscured.

This approach was intentional. The Port has sought to ensure that the evolution of the Master Plan remained visible, understandable, and traceable to stakeholders, rather than presented as a static or closed planning document.

Importantly, while the Master Plan has not yet been fully adjudicated through the formal process contemplated under Guam law, the Port has not stood still. A number of the priority projects and strategic initiatives identified in the original 2023 Master Plan have already been completed, substantially advanced, or are currently being addressed through active implementation, funding pursuits, procurement actions, infrastructure planning, sustainability initiatives, and operational reforms.

This reflects the Port's continued commitment to disciplined execution, long-term planning, and responsible stewardship of critical infrastructure. The planning process has remained active in practice, even as formal adjudication has continued.

Key Elements of the Master Plan
The Master Plan highlights several critical components essential to the Port's modernization and long-term viability, including:

- Replacement of aging cargo-handling equipment, including STS gantry cranes, top picks, tractors, forklifts, and reefer power systems.
- Infrastructure hardening of wharves, fuel piers, buildings, utilities, and pavements
- Terminal Operating System (TOS) and IT modernization to improve cargo velocity, cybersecurity, and system integration across the port community.
- Updated facility condition assessments, including damages sustained during Typhoon Mawar.
- A comprehensive capital plan outlining over $525 million in priority improvements.

Strategic Importance to the Department of Defense (DOD) and the Indo- Pacific Command (INDOPACOM)
The Port of Guam is the primary logistics gateway for DOD in the Western Pacific. The Master Plan directly supports DOD and INDOPACOM by:

- Ensuring the Port can accommodate the peak of the military buildup and sustain increased throughput associated with Pacific Deterrence Initiative (PDI).

- Maintaining a maritime posture capable of supporting future deployments, force flow requirements, and contingency operations.
- Hardening critical infrastructure to withstand natural disasters and ensure continuity of operations during regional crises.
- Enhancing cargo velocity, digital integration, and operational reliability—key factors in maintaining a resilient supply chain for military readiness.

These improvements directly contribute to national security by ensuring that Guam remains a dependable logistics hub for U.S. forces operating across the Indo-Pacific region. Just as importantly, the Master Plan should serve as a framework for measurable progress, including improved cargo efficiency, greater equipment reliability, reduced operational downtime, stronger continuity during emergencies and disruptions, and enhanced readiness to support both commercial and defense-related demand.

Economic Viability and Regional Stability
The Master Plan also reinforces Guam's economic stability by:

- Supporting commercial cargo growth and ensuring the Port can meet projected demand through 2040.
- Diversifying revenue streams through tariff modernization and operational efficiencies.
- Creating thousands of direct and indirect jobs through the Port Improvement Program.
- Strengthening the island's ability to support tourism, construction, and private-sector development.

A resilient and modernized Port is essential not only for military readiness but also for sustaining Guam's civilian economy and ensuring long-term economic resilience.

Priority Projects
The Port emphasizes the following priority projects identified in the Master Plan as essential to sustaining Guam's economic stability, supporting military readiness, and ensuring long-term operational resilience:

- **Ship-to-Shore (STS) Gantry Crane Replacement** – $75M±
  The Port's existing cranes are beyond their service life. The Master Plan shows that losing even one crane delays DoD buildup by up to four years, and losing two cranes prevents the Port from meeting commercial or military demand. Replacing the cranes is the single most critical investment for Guam's supply chain.
- **Wharf Rehabilitation** – $25M±
  Structural assessments show several berths in poor to critical condition. Rehabilitation is required to maintain safe operations and support new cranes.
- **Crane Rail System and Tie-Down Improvements** – $35M±
  Upgrades are necessary to support the weight and operational requirements of modern STS cranes and to ensure safe operations during typhoons.
- **Golf Pier Replacement** – $84M±
  Golf Pier is a vital fuel and cargo facility. Replacement is required to maintain continuity of operations and support maritime fuel logistics.

- **F1 Pier Replacement** – $84M±
  Pier F1 is essential for both commercial and military operations. Its replacement ensures long-term structural integrity and operational capacity.
- **Area A Fuel Tank Facility Replacement** – $155M±
  This project addresses aging fuel infrastructure and supports Guam's energy security and maritime logistics.
- **Terminal Operating System (TOS) Upgrade** – $5M±
  Modernizing the TOS is critical to improving cargo flow, reducing manual processes, and integrating with Customs, carriers, and freight forwarders.
- **Cybersecurity Upgrades** – $12M±
  The Port must harden its network, servers, and digital systems to protect critical infrastructure and maintain operational continuity.
- **Capital and Maintenance Dredging** – $50M±
  Dredging is required to maintain navigable depths for commercial vessels and military assets, ensuring safe and efficient harbor operations.

Collectively, these projects represent the core of the Port's modernization strategy and are essential to maintaining Guam's role as a strategic hub for commerce, defense, and regional connectivity.

Conclusion
The Port Authority of Guam respectfully requests the continued support of the Bureau of Statistics and Plans as we advance the implementation of the 2025 Master Plan. The priority initiatives outlined are not simply capital projects. They are strategic investments that reinforce Guam's economic stability, safeguard the island's supply chain resilience, and strengthen the nation's forward defense posture in the Indo-Pacific.

We value BSP's partnership and oversight in guiding these efforts and ensuring that Guam's primary seaport remains robust, modern, and capable of meeting the evolving demands of commerce, defense, and the broader Indo-Pacific region. Your continued collaboration is essential to sustaining the Port's role as a critical national asset and a cornerstone of Guam's future prosperity.

Rory J. Respicio, General Manager

Gmail

April Trinidad <april.trinidad@bsp.guam.gov>

Re: Public Comment — Port of Guam 2025 Master Plan

Christian Paul Benitez <christianpaul.benitez@bsp.guam.gov> Tue, Mar 24, 2026 at 11:43 AM
To: Julian Reyes <julianreyes89@yahoo.com>
Cc: "gcmp@bsp.guam.gov" <gcmp@bsp.guam.gov>, Lola Leon Guerrero <lolalg@bsp.guam.gov>, Margret Duenas <mduenas@portofguam.com>, "Rory J. Respicio" <rjrespicio@portofguam.com>, "Joe G. Javellana III" <jgjavellana@portofguam.com>, Edwin Reyes <edwin.reyes@bsp.guam.gov>, Matthew Santos <matthew.santos@bsp.guam.gov>, April Trinidad <april.trinidad@bsp.guam.gov>, strategicplanning <strategicplanning@portofguam.com>

Hafa Adai Mr. Reyes,

Thank you for providing your comments on the Jose D. Leon Guerrero Commercial Port of Guam 2025 Master Plan.

Your input will be officially recorded as part of the public record and provided to the Port Authority of Guam (PAG) to ensure that your comments are reviewed and addressed appropriately.

Si Yu'os Ma'åse',

Christian Benitez
Planner
Guam Coastal Management Program
Bureau of Statistics and Plans
P.O. Box 2950
Hagatna, Guam 96932
671-475-4468
www.bsp.guam.gov

"To preserve, protect, develop, and where possible, to restore or enhance, the resources of the Nation's coastal zone for this and succeeding generations." - Sec. 303(1) of the Coastal Zone Management Act of 1972

On Fri, Mar 20, 2026 at 7:16 PM 'Julian Reyes' via BSP Guam Coastal Management Program <gcmp@bsp.guam.gov> wrote:

Hafa Adai

To the Bureau of Statistics and Plans and Port Authority of Guam:

I support the Port of Guam 2025 Master Plan and its goals for modernization, efficiency, and strategic growth.

As the Plan looks to the future, I encourage the Port to consider how the Guam-Saipan channel might support long-term maritime activity. The channel offers deep water and protected anchorage that could complement shore-side facilities, particularly as the region considers expanded transshipment and regional connectivity.

The U.S. Department of Transportation's January 2026 designation of the Guam-CNMI Route as a Marine Highway Project already recognizes the importance of this corridor. Including the channel's potential in the Master Plan's long-term vision would align with that federal designation.

Thank you for the opportunity to comment.

Name: Julian Reyes
Phone: 671 483-6680

Doc. No. 38GL-26-2386.*

GUAM WATERWORKS AUTHORITY
Gloria B. Nelson Public Service Building | 688 Route 15, Mangilao, Guam 96913
P.O. Box 3010, Hagåtña, Guam 96932
Tel. No. (671) 300-6846/47 Fax No. (671) 648-3290

March 30, 2026

Ms. Lola Leon Guerrero
Director
Bureau of Statistics and Plans
Sagan Planu Siha Yan Emfotmasion
P.O. Box 2950
Hagåtña, Guam 96932

Subject: Written Testimony to the Port Authority of Guam (PAG) 2025 Master Plan

Dear Ms. Leon Guerrero,

The Guam Waterworks Authority is submitting this written testimony for the Port Authority of Guam (PAG) 2025 Master Plan. During our review of the PAG Master Plan, we identified several water and wastewater infrastructure concerns that we respectfully urge the PAG to incorporate into its planning and capital improvement program.

GWA currently provides water and wastewater services to the Jose D. Leon Guerrero Commercial Port of Guam through a combination of infrastructure that is either owned by GWA or PAG with no clear or proper delineation of responsibility and risk. This includes the primary water supply mains feeding the Port, the water metering infrastructure at the Port entrance, and two sewer pump stations (SPS) that collect and convey wastewater generated exclusively within PAG's property. As the Master Plan correctly notes, water supply to the Port terminal is provided through a 16-inch main supply line from GWA, and the sewage system flows by gravity to a GWA-operated sewage pump station with a capacity of 150 gallons per minute (GPM) located near the main gate, which then pumps to the gravity line in Marine Drive flowing to the Hagåtña Treatment Plant.

While this arrangement has functioned for decades, it has produced operational inefficiencies, billing complexities, and jurisdictional ambiguities that are unsustainable as the Port embarks on a major, decade-long, $692 million capital improvement program. GWA submits this testimony to formally request that the PAG's 2025 Master Plan, and its Port Improvement Program (PIP) explicitly address the transfer of water and wastewater infrastructure ownership, responsibility, and management to the PAG for all facilities located on PAG-controlled property.

Issue 1 - Transfer of Water Infrastructure Ownership and Billing Responsibility

The Current Billing Arrangement Is Operationally Unsustainable

GWA currently meters water supply to the Port through two (2) six-inch (6") primary master meters located at the entrance of the Port property, in the public right-of-way, as required under GWA's operating rules and regulations. However, the existing arrangement is more complex than a simple master-metered account. A "deduct meter" is installed downstream of the two master meters on the PAG private distribution line. This deduct meter captures consumption attributable to approximately 17 individual PAG tenants connected to the PAG's private internal water system — tenants that GWA has historically billed directly.

Each billing cycle, GWA's Finance division must manually subtract the consumption recorded on the deduct meter from the total recorded on the two master meters to correctly calculate PAG's

bill. This labor-intensive reconciliation process is error-prone and creates ongoing risk of billing disputes. More fundamentally, the tenants connected to PAG's private internal distribution system, who include major commercial and government entities such as fuel terminal operators, the Guam Power Authority, Cabras Marine, Aqua World, and others are customers on PAG's private line, and their water usage should be PAG's responsibility to track and bill.

Current tenants billed directly by GWA through the deduct meter arrangement include:

Account Name	Service Address
Mobil Oil Guam Inc.	1186 Cabras Dr.
Mobil Oil Guam Inc.	Mobil Oil Cabras Terminal
Mobil Oil Guam	1186 Cabras Dr. – Fire Line
South Pacific Petroleum	Cabras Terminal 267
Tristar Terminals Guam	Cabras Piti
Hanson Permanente Cement	Cabras Highway, Piti
Cabras Marine Corporation	178 Industrial Ave.
Guam United Warehouse	1052 Cabras Highway
Guam Power Authority	Cabras 5 Power Plant
Guam Power Authority	Cabras 3 & 4, Piti
Guam Power Authority	Cabras Plant 1 & 2
Dept. of Public Works	Rt. 11 Cabras Island
Aqua World	Aqua World, Cabras Island
Supreme Group Guam LLC	GPA Bulk Fuel Storage
OSROCO LLC	220 Harbor of Refuge
Port Authority of Guam	Port Authority – Port
Marianas Yacht Club	Route 18 Sasa Bay

GWA requests that the PAG's 2025 Master Plan include a commitment to assume full ownership and billing responsibility for all water consumption through PAG's private distribution lines recorded on the two primary master meters at the Port entrance.

Under this arrangement:

1. GWA would bill PAG as a single master-metered account based solely on the consumption recorded at the two primary entrance meters.
2. The deduct meter arrangement would be eliminated, ending the need for monthly manual reconciliation by GWA Finance staff.
3. PAG may, if it chooses, install submeters to track and bill its tenants for their respective water usage from PAG's internal private distribution system.
4. GWA would cease direct billing to the approximately 17 tenant accounts that does not serve directly, but who are currently on PAG's private line, as they would become PAG's responsibility to manage.

This transition is consistent with standard utility practice and the PAG Master Plan's own stated goal of defining asset ownership and responsibility. Furthermore, because GWA is not always informed of new lease arrangements PAG enters into with tenants, there is a risk that some tenants connected to PAG's private line may not have applied for separate water accounts with GWA, meaning their consumption is captured on the master meter but not on the deduct meter. This gap is a further reason why billing responsibility must be transferred entirely to PAG.

Issue 2 - Aging Water Infrastructure within Port Property

Existing Conditions and Infrastructure Risk

The 2025 Master Plan acknowledges in Section 4.2.4 (Terminal Utilities) that the Port's primary water supply is a 16-inch main from GWA that is over 50 years old. The Master Plan further notes that the existing 16-inch and 10-inch waterlines run diagonally through the active container yard, and that the existing waterlines have multiple leaks. GWA concurs with this assessment and wishes to underscore the severity of the risk this presents.

The routing of the primary water main through the active container terminal yard is a critical operational vulnerability. A significant water main break requiring excavation for repair would directly disrupt Port container operations. Additionally, the pipe materials used in the 1970s-era system may include Asbestos Concrete Pipe (ACP), as acknowledged in the Master Plan, which is beyond its useful service life and will continue to require repairs at a significant cost and disruption. Since GWA has been frequently requested by PAG to provide such repairs on their behalf, the disruptions are not just PAG's operations, but also adversely affect GWA's operations as well.

While GWA notes that the PAG issued an Invitation for Bids (IFB) in August 2021 for waterline relocation and replacement, it is unclear from the Master Plan whether this project has been completed or whether the scope includes the relocation of the main outside of the container yard, so that it runs in a more accessible corridor for PAG operation and maintenance up until connecting to PAG's metered service point.

GWA's Requests Regarding Water Main Infrastructure

1. The PAG Master Plan and PIP should include a specific project to relocate and replace the primary PAG water supply main so that it runs outside of the PAG container yard to the metered service connection point at the Port boundary. This removes water infrastructure from the active operational footprint of the Port and eliminates the risk of terminal disruptions from private water main repair work.
2. The Master Plan PIP should formally include water main replacement as a priority capital project, reflecting the 50+ year age of the existing infrastructure and the multiple documented leaks. GWA recommends that PAG plan for the full replacement of internal distribution mains as well.
3. The Master Plan is notably silent on water demand projections. Given the anticipated military buildup and the potential expansion of port operations including fuel storage and transshipment activities, GWA requests that PAG include projected water demand estimates in its Master Plan to ensure that supply infrastructure is appropriately sized and that GWA can plan for adequate supply capacity.

Issue 3 - Wastewater Pump Station Ownership and Jurisdiction

Current Situation

GWA operates two (2) sewer pump stations (SPS) that collect and convey wastewater generated solely within the PAG's property. Through the execution of GWA's 1997 Grant Deed, the land beneath these pre-existing (existed to serve the Port prior to GWA's formation as an autonomous authority) sewer pump stations, GWA has title to the property on which they are located, but there are questions about the ownership of related force mains and gravity sewer located within the PAG property boundaries. As noted in the Master Plan, the sewage system at the Port operates

as a gravity-fall system discharging to a GWA-operated lift station near the main gate, which then pumps sewage to the gravity line in Marine Drive and on to the Hagåtña Treatment Plant.

GWA has determined that both sewer pump stations serve only PAG-owned facilities or facilities leased by PAG to their tenants and located within PAG property boundaries. The pump stations do not provide capacity or service to any other GWA customers (or the public). GWA has been operating and maintaining these pump stations and associated infrastructure on PAG property for many years, but the lack of any additional customer capacity and a formal property or easement agreement creates legal, operational, and long-term planning uncertainty for both agencies.

GWA requests that the PAG 2025 Master Plan directly address the jurisdictional status of the two sewer pump stations and commit to Transfer of SPS Ownership and Responsibility to PAG - PAG assumes full ownership and maintenance responsibility for the two sewer pump stations as Port infrastructure. Under this operational scenario, GWA would (1) work with PAG and other relevant authorities to transfer the sewer pump stations to PAG, and (2) receive wastewater at the point where it enters the public sewer system in Marine Drive ROW. PAG would subsequently be responsible for the internal collection and pumping system within its property and could ensure that the system could be reconfigured efficiently to work within its long-term development objectives within PAG property in accordance with its Master Plan.

This requires formal coordination between PAG and GWA and should be reflected in the Master Plan as a specific action item with a defined timeline. GWA also notes that the Master Plan is silent on wastewater generation projections. Similar to water demand, GWA requests that PAG include estimates of wastewater flows under various growth and military buildup scenarios to ensure that the pump station capacity of 150 GPM remains adequate or is planned for upgrade.

Issue 4 - Lack of Utility Coordination in Master Plan

The 2025 Master Plan is comprehensive in its treatment of port operations, cargo capacity, crane infrastructure, wharf conditions, and financial planning. However, it provides only a brief and descriptive inventory of water and wastewater infrastructure (Section 4.2.4) without projections, condition assessments of GWA-operated assets, or inter-agency coordination commitments. GWA finds this to be a significant gap given the scale of the planned Port Improvement Program.

The PAG's capital plan totals nearly $692.6 million over the FY2022–FY2032 period and will involve extensive subsurface work including wharf reconstruction, container yard repaving, and area redevelopment projects. These activities will inevitably interact with underground water and wastewater infrastructure.

GWA requests that the Master Plan include a formal utility coordination framework, including:

1. A requirement to notify and coordinate with GWA prior to any excavation or construction that may impact GWA's existing water or sewer infrastructure.
2. Identification of all GWA-operated infrastructure on PAG property in the Master Plan's utility inventory, with accurate as-built information shared between both agencies.
3. A commitment to include water demand and wastewater generation projections as part of any future updates to the Master Plan.

In summary, GWA respectfully recommends that the Port Authority of Guam's 2025 Master Plan be revised or supplemented to include the following specific commitments:

#	Issue	GWA Request
1	Water Billing & Master Meter Responsibility	PAG assumes full billing responsibility for all consumption of the two primary master meters; PAG installs submeters for tenant billing; deduct meter arrangement eliminated; GWA ceases direct billing of ~17 PAG-property tenants.
2	Water Main Relocation	PAG plans and funds relocation of primary water main from the active container yard to an accessible corridor for PAG operation and maintenance, to the existing service connection at the Port boundary.
3	Water Main Replacement	PAG includes main water replacement as a formal capital project in the PIP, reflecting 50+ year infrastructure age and documented leaks.
4	Water Demand Projections	Master Plan includes water demand and fire flow projections under organic growth and military buildup scenarios.
5	Sewer Pump Station Jurisdiction	PAG assumes full ownership and O&M responsibility for the pump stations as Port infrastructure.
6	Wastewater Projections	Master Plan includes wastewater generation projections and evaluation of pump station capacity adequacy under growth scenarios.
7	Utility Coordination Framework	Master Plan establishes formal GWA–PAG coordination protocols for construction, excavation, and future planning activities affecting GWA utility infrastructure.

The Port Authority of Guam's 2025 Master Plan represents a critical roadmap for one of Guam's most essential pieces of public infrastructure. GWA is fully committed to being a collaborative and cooperative partner in the Port's modernization and resilience efforts. The water and wastewater infrastructure concerns raised in this testimony are not adversarial but reflect GWA's sincere interest in ensuring that both agencies have clear roles, adequate resources, and a sustainable long-term framework for managing the utility infrastructure that underpins the Port's operations.

GWA respectfully urges the PAG Board and management team to engage directly with GWA to address these issues in the context of the Master Plan and the upcoming PIP implementation. We are prepared to resolve the metering, infrastructure ownership, and easement questions raised herein in a timely and mutually beneficial manner.

Thank you for the opportunity to testify. Should you have any questions or require additional information, please contact Thomas A. Cruz, P.E., Assistant General Manager of Operations, at thomas@guamwaterworks.org or (671) 647-7800.

Sincerely,

Brett E Rai

For
MIGUEL C. BORDALLO, P. E.
General Manager

cc: Thomas A. Cruz, P.E. AGM Operations
Chris Budasi, AGM Administration and Support
Brett Railey, AGM Engineering
MCB/tfc/cb

DIPÅTTAMENTON MINANEHAN TÅNO'
(Department of Land Management)
GUBETNAMENTON GUÅHAN
(Government of Guam)

LOURDES A. LEON GUERRERO
MAGA'HÅGA • GOVERNOR

JOSHUA F. TENORIO
SIGUNDO MAGA'LÅHI • LIEUTENANT GOVERNOR

JOSEPH M. BORJA
Director

ROSSANA SAN MIGUEL TISTON
Deputy Director

Street Address:
90 S. Marine Corps Drive
Suite 733 ITC Building
Tamuning, GU 96913

Mailing Address:
P.O. Box 2950
Hagåtña, GU 96932

Website:
http://dlm.guam.gov

E-mail Address:
dlmdir@land.guam.gov

Telephone:
671-649-LAND (5263)

Facsimile:
671-649-5383

March 25, 2026

MEMORANDUM

TO: Director, Bureau of Statistics and Plans

FROM: Director, Department of Land Management

SUBJECT: Comments on the Notice of Public Review and Public Hearing for the Adoption of the Port Authority of Guam (PAG) 2025 Master Plan

The Department of Land Management (DLM) appreciates the opportunity to review and provide comments on the Port Authority of Guam (PAG) 2025 Master Plan, as noticed for public review and public hearing.

Our review focused on Section 4.2.2 – Land Use Designations, and we commend the PAG for updating land use designations to reflect current conditions and anticipated future needs. These updates are particularly valuable to DLM, as the land use designation map is a key reference in our review of development proposals, business license applications, and related permitting processes. The clear designations and accompanying tables describing existing uses strengthen our ability to conduct accurate and consistent permit reviews in alignment with adopted plans.

As the administrative staff to the Guam Seashore Protection Commission, DLM also notes the importance of shoreline-related considerations within the Master Plan. While Cabras Island is exempt from the provisions of the Territorial Seashore Protection Act of 1974, it remains the primary land asset of the Port Authority of Guam. We therefore appreciate the attention given to land use and shoreline protection within the 2025 Master Plan, which supports responsible management of this critical coastal area.

We appreciate the PAG's continued coordination with partner agencies and look forward to supporting the advancement of this planning effort.

Senseramente,

JOSEPH M. BORJA
Director

PORT AUTHORITY OF GUAM

2025 Master Plan

Final Report (Subject to Approval Pursuant To 5 GCA, Chapter 1, Article 2, §1205 and §1206)

January 29, 2026

This study was prepared under contract with the Port Authority of Guam (PAG), with financial support from the Office of Local Defense Community Cooperation (OLDCC). The content reflects the views of the PAG and does not necessarily reflect the views of the OLDCC.

Jose D. Leon Guerrero Commercial Port of Guam

2025 Master Plan

FINAL REPORT (SUBJECT TO APPROVAL PURSUANT TO 5 GCA, CHAPTER 1, ARTICLE 2, §1205 AND §1206)

Prepared by:
WSP
Guam International Trade Center
590 South Marine Corps Drive, Suite 421
Tamuning, Guam 96913
Telephone: 671-646-6872

Submitted Pursuant to Consultant Agreement No. PAG 015-003 between Jose D. Leon Guerrero Commercial Port (Port Authority of Guam) and WSP acting as Owner's Agent and Engineer.

Doc. No. 38GL-26-2386.*

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List of Acronyms

A/C	Air Conditioning
ARRA	American Recovery and Reinvestment Act
ATS	Automatic Transfer Switch
CAGR	Compound Annual Growth Rate
CBP	Customs and Border Protection
CC	Corrosion Control
CFS	Container Freight Station
CIA	Central Intelligence Agency
CIP	Capital Improvement Plan
CM	Crane Maintenance
CMU	Concrete Masonry Unit
CNMI	Commonwealth of the Northern Mariana Islands
CPI	Consumer Price Index
CTCM	Container Terminal Capacity Model
DAR	Defense Access Roads
DGM	Deputy General Manager
DHS	Department of Homeland Security
DOD	Department of Defense
DPRI	Defense Policy Review Initiative
DPW	Department of Public Works
DWT	Deadweight Tonnage
EDI	Electronic Data Interchange
EOC	Emergency Operations Center
ESQD	Explosive Safety Quantity Distance
EQMR	Equipment Maintenance and Repair
FMS	Financial Management System
FSM	Federated States of Micronesia
FY	Fiscal Year
GCA	Guam Code Annotated
GCPI	Guam Commercial Port Improvement
GEDA	Guam Economic Development Authority
GEPA	Guam Environmental Protection Agency
GHPO	Guam Historic Resources Division
GM	General Manager
GOS	Gate Operating System
GPA	Guam Power Authority
GRT	Gross Register Tonnage
GWA	Guam Waterworks Authority
HP	Horsepower
HR	High Roof

IP&E	Isla Petroleum and Energy
ISPS	International Ship and Port Facility Security
JGPO	Joint Guam Program Office
LAN	Local Area Network
LC	Load Center
LOA	Length Overall
LPG	Liquefied Petroleum Gas
LR	Low Roof
MARAD	U.S. Maritime Administration
MARSEC	Maritime Security
MELL	Marianas Express Lines Limited
MEP	Mechanical, Electrical and Plumbing
MLLW	Mean Lower Low Water
MOA	Memorandum of Agreement
MP	Master Plan
MPC	Maximum Practical Capacity
MPH	Miles per hour
MSA	Marianas Steamship Agencies
MT	Metric Tons
MTSA	Maritime Transportation Security Act of 2002
NEPA	National Environmental Policy Act
NM	Nautical miles
NOAA	National Oceanic and Atmospheric Administration
OAE	Owner's Agent/Engineer
OCR	Optical Character Recognition
OOG	Oversized (Out-of-Gauge) Containers
PAG	Port Authority of Guam
PCE	Personal Consumer Expenditures
PCS	Permanent Change of Station
PFSP	Port Facility Security Plan
PL	Public Law
PM	Preventative Maintenance
PMC	Performance Management Contractor
PMP	Port Modernization Program
PMT	Program Management Team
POLA	Port of Los Angeles
PSF	Pounds per square foot
PSGP	Port Security Grant Program
PSI	Pounds Per Square Inch
PUC	Public Utilities Commission
PUGG	Port Users Group Guam
RC	Reinforced Concrete
RFID	Radio Frequency Identification

RO/RO	Roll-on/Roll-off
ROD	Record of Decision
RTG	Rubber-Tired Gantry Cranes
SDDC	Surface Deployment and Distribution Command
SHPO	State Historic Preservation Office
SIAS	Socioeconomic Impact Assessment Study
SLE	Service Life Extension
SPC	Sustainable Practical Capacity
SPPC	South Pacific Petroleum Corporation
STS	Ship to Shore Crane
TBD	To Be Determined
TEU	Twenty-foot Equivalency Unit
TGS	Terminal Ground Slot
TIGER	Transportation Investment Generating Economic Recovery Grants
TLT	Terminal Layout Tool
TOS	Terminal Operating System
TGS	Twenty-foot Ground Slot
TWIC	Transportation Worker Identification Credential
UBC	Uniform Building Code
USCBP	U.S. Customs and Border Protection
USCG	U.S. Coast Guard
USDA	U.S. Department of Agriculture
USWC	U.S. West Coast
VHF	Very High Frequency
WAMS	Waterway Analysis and Management System
WH	Warehouse
WIM	Weigh-In-Motion
WYE	3-Phase Electrical Power Wiring Configuration

EXECUTIVE SUMMARY

PURPOSE AND BACKGROUND

The Jose D. Leon Guerrero Commercial Port Authority of Guam (PAG) is the largest deep-water seaport in the Western Pacific Region. As the only commercial port on the island, it provides marine transportation services to local, private, federal, and military customers. In addition, it is the primary transshipment hub for neighboring islands in the region serving a population of over 400,000.

With over 90% of containerized and breakbulk commodities passing through its wharves and the lifeline between Guam, the region, and the rest of the world, it is critically important that the Port Authority of Guam (PAG) invests in initiatives that will upgrade its infrastructure, facilities, and equipment to achieve resiliency, ensure supply chain sustainability, and enhance operational capacity and services.

Over the past decade, the Port has grown and evolved into a world-class commercial port and has successfully implemented past master plans, evidenced with the recent completion of the $50 Million Port Modernization Program, ground-breaking for the Hotel Wharf Rehabilitation Project, federal funding to repair Golf Pier and F1 – F6 wharves, and bond funding for several critically important capital improvement projects. Looking forward, the Port continues to develop its maintenance and capital improvement projects and further develop the strong partnership with the Department of Defense's Indo-Pacific Strategy and the Pacific Deterrence Initiatives.

Shifting from a modernization mode to a now more pronounced resiliency and readiness mode of management, infrastructure hardening and operation, the Port has established improved relationships with key stakeholders. This aggressive networking direction that the Port has undertaken since 2019 has allowed current Management to capitalize on past successes while vocalizing the Port of Guam's challenges in its efforts to replace aged Ship-To-Shore (STS) Gantry Cranes, upgrade revenue generating wharves that are in dire need of repair, replace facilities and equipment that have exceeded their useful life, and increase capacity in areas that will better serve its commercial customers and the DOD's readiness plans in the Indo-Pacific theater.

In upgrading and replacing aging infrastructure and equipment, the PAG proactively supports not only local but also federal policy goals, such as Executive Orders 13985 and 14008, Advancing Racial Equity and Support for Underserved Communities Through the Federal Government and Tackling the Climate Crisis at Home and Abroad, respectively. Repairing and maintaining the facilities at the Port of Guam is essential in ensuring that all residents and indigenous population of the island and region continue to have access to the services it provides.

Additionally, the resiliency upgrades allow for the implementation of environmentally sustainable equipment and infrastructure, such as cargo handling equipment with emission reduction technology and vapor recovery systems at the island's two (2) fuel facilities – Golf Pier and Pier F1, which will dramatically improve air quality as a result of cleaner operations.

Because the Port receives about 90% of all goods imported for the island's residents, military personnel, and travelers visiting the island, these initiatives are critical to ensuring the cost of living in Guam is not unnecessarily or further elevated due to supply chain issues caused by loss of functions at the island's only commercial seaport.

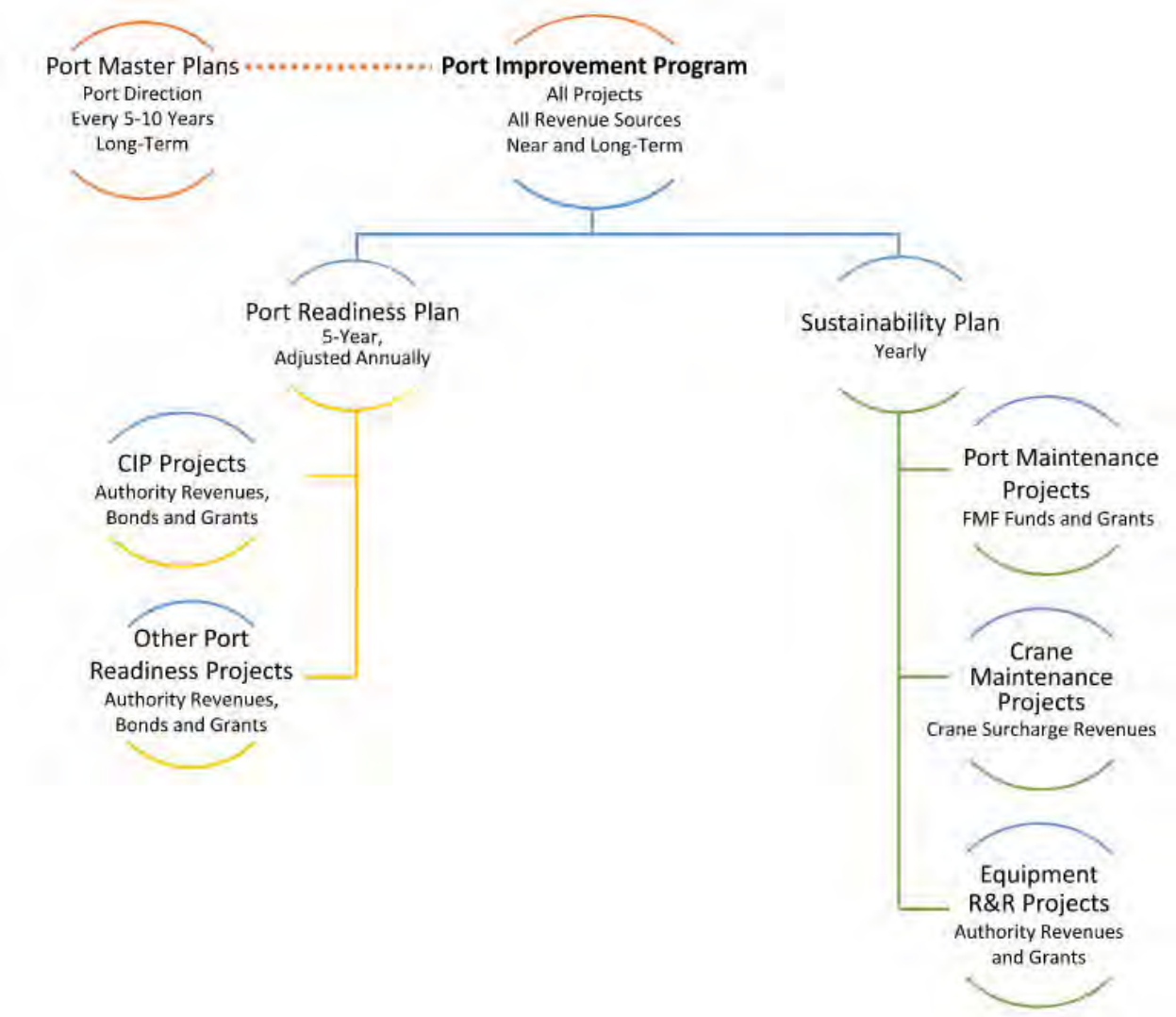
The Master Plan includes four elements of validation, review and coordination:

1. Analyze and update, as appropriate, the assumptions and criteria that underlie the previous Master Plan Update 2013 Report;
2. Validate and integrate key elements of the following reports that were developed since the previous Master Plan was released.
    - Master Plan Approval Documents
    - Cargo Forecast Updates
    - Terminal Development and Operations Plans
    - Terminal Operating System and Gate Operating System Reports
    - The 2016 PUC Tariff Report
    - The 2018 Consulting Engineer's Report in support of the CIP Revenue Bond issuance
3. Expand the scope of the Master Plan to include an implementation strategy based on restructured facilities, updated cargo and revenue projections, planned staffing adjustments, and a coordinated funding approach involving a potential combination of grants, bonds and self-financing; and
4. Validate and incorporate decisions and outcomes of various initiatives and policy changes that have occurred over the past nine years that include the following:
    - The Military Buildup Program and schedule has been delayed and resized
    - The Port responded to the PUC in 2016 by issuing a new 5-Year Tariff, which will be reviewed and updated as appropriate
    - A simplified tariff structure is being developed to facilitate more efficient electronic Terminal Operating System (TOS) data interfacing and invoicing with stakeholders
    - TOS improvements are being incorporated to improve operational efficiencies, data accuracy, and facilitate electronic data sharing
    - A new Performance Maintenance Contractor (PMC) contract has been issued to improve equipment maintenance
    - A new Information Technology Consulting Firm (ITCF) contract is being issued to augment port TOS/IT development and improve terminal operations and improve security
    - The Port is developing a more structured Maintenance Program for Facilities and Equipment

- The Port is planning on procuring three new STS container cranes to replace older equipment and to increase operating efficiencies
- The MARAD funded H-Wharf upgrade program is commencing
- The Revenue Bond Projects are moving ahead and will become part of the Port's infrastructure over the next three years
- Guam Customs has a feasibility study to assist in the development of a new inspection facility adjacent to the terminal gate which will be integrated with the cargo operations

Consequently, this Master Plan culminates with a Port Improvement Program (PIP) comprised of two categories: The Port Readiness Plan (PRP) and the Sustainability Plan (SP). The Port Readiness Plan is subdivided into Capital Improvement Projects and Other Port Readiness Projects while the Sustainability Plan addresses continued professional and technical services oversight and support to address port sustainability and resiliency, environmental initiatives to reduce the port's carbon footprint and reduce its greenhouse effects, and strategic goals toward zero waste improvements. The PIP is focused on ensuring the future readiness and resiliency of a modernized facility through the hardening of Port of Guam assets and resources to address national security concerns from the current and anticipated geopolitical environment. See Figure ES- 1.

Figure ES- 1: Port Improvement Program and Associated Plans



Source: PAG and WSP Analysis

To achieve an enhanced level of content in the Master Plan, the PAG directed WSP to perform the following supporting planning studies:

- Customs Inspection Facility Study
- Cargo Terminal Study
- Assessment of Agat Marina
- Assessment of Gregorio D. Perez Marina
- Proposed LNG Facility Study
- Area A Feasibility Study
- Solar Power Study
- PUGG Initiative for System Integration Study

- Various Supporting Financial Analyses
- Cyber Security Study

The results of these studies are integrated into this 2025 Master Plan along with strategies to complement the Governor's Transshipment Initiative and the Port's Sustainability Strategy.

ASSETS AND RESOURCES

The PAG's assets and resources are comprised of landside and waterside infrastructure, upland facilities, marine facilities, equipment, port security, operations, environmental health and safety programs, and IT initiatives. These elements play a fundamental role in development and execution of the Port Improvement Plan (PIP). For reference, Port assets and resources are located within Apra Harbor, along the southwestern shoreline, and in the capital city of Hagåtña. See Figure ES- 2, Figure ES- 3, Table ES- 1, and Table ES- 2

Figure ES- 2: PAG Apra Harbor Assets

Source: Google Earth and WSP

Figure ES- 3: Agat Small Boat Marina and Gregorio D. Perez Marina Assets

Source: Google Earth and WSP

Table ES- 1: Port Owned Cranes

Name or Designation	Age	Capacity	Height Above WS Rail
Gantry 4 (POLA 1)	1983 Re-powered and strengthened in 2009	40 LT	85 feet
Gantry 5 (POLA 2)	1983 Re-powered and strengthened in 2009	40 LT	93 feet
Gantry 6 (POLA 3)	1983 Re-powered and strengthened in 2009	40 LT	93 feet

Source: The PAG

Table ES- 2: Port Owned Cargo Handling Equipment

Equipment	No.	Year	Make/Model	Capacity
Top Picks	3	2009	Hyster H50.00XM	40 Short Ton – 5 High
	4	2016	Hyster 1150CH	40 Short Ton – 5 High
	2	2019	Taylor XLC97E	40 Short Ton – 5 High
Yard Tractor	9	2010	Kalmar/Ottowa	YT-50
	16	2017	Kalmar	T2 4x2
Forklift	4	2008	Hyster H5.00DX	5.5 Short Ton
	4	2016	Doosan D50SC-5	5.5 Short Ton
	2	2017	Hyundai 180D-7E	20 Short Ton
	4	2017	Hyundai 110D-7E	10 Short Ton

Source: The PAG

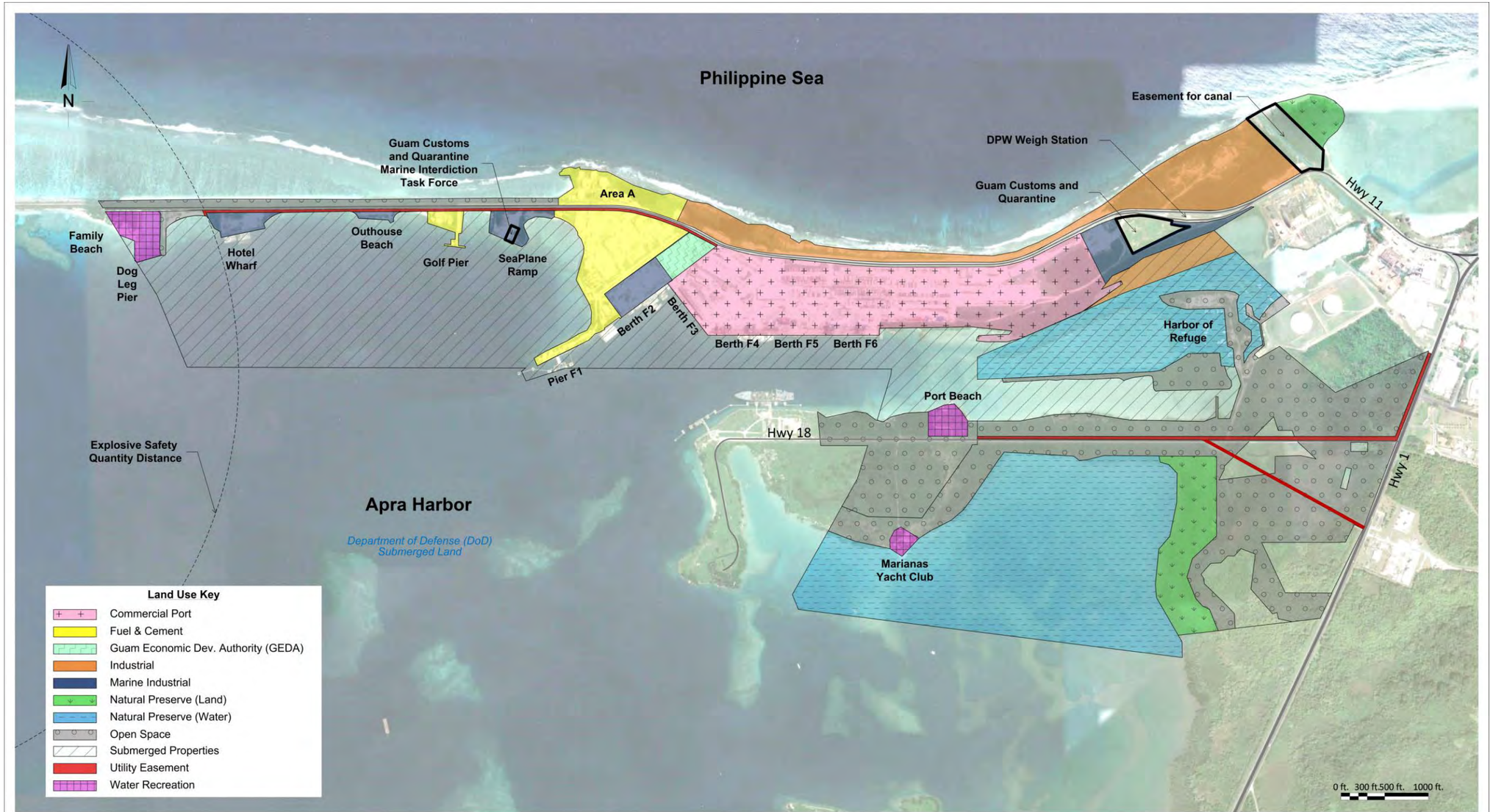
PAG assets and resources evaluated and addressed in this Master Plan include:

- Access channels and vessel berths
- Safety Zones
- Navigation Aids
- Hwy 11 roadway access
- Diversified land uses
- Cargo handling equipment
- Operations
- Marine Industrial Facilities
- Security
- Environmental Health & Safety

These items are depicted and summarized in the PIP figures and tables below. A comprehensive assessment of the current condition of all the port's assets and resources is included in this Master Plan. Results of the assessments were used to identify and define the critical elements of the PIP. Therefore, the PIP is focused on hardening the existing infrastructure, equipment and operations of the port to ensure near- and long-term sustained success.

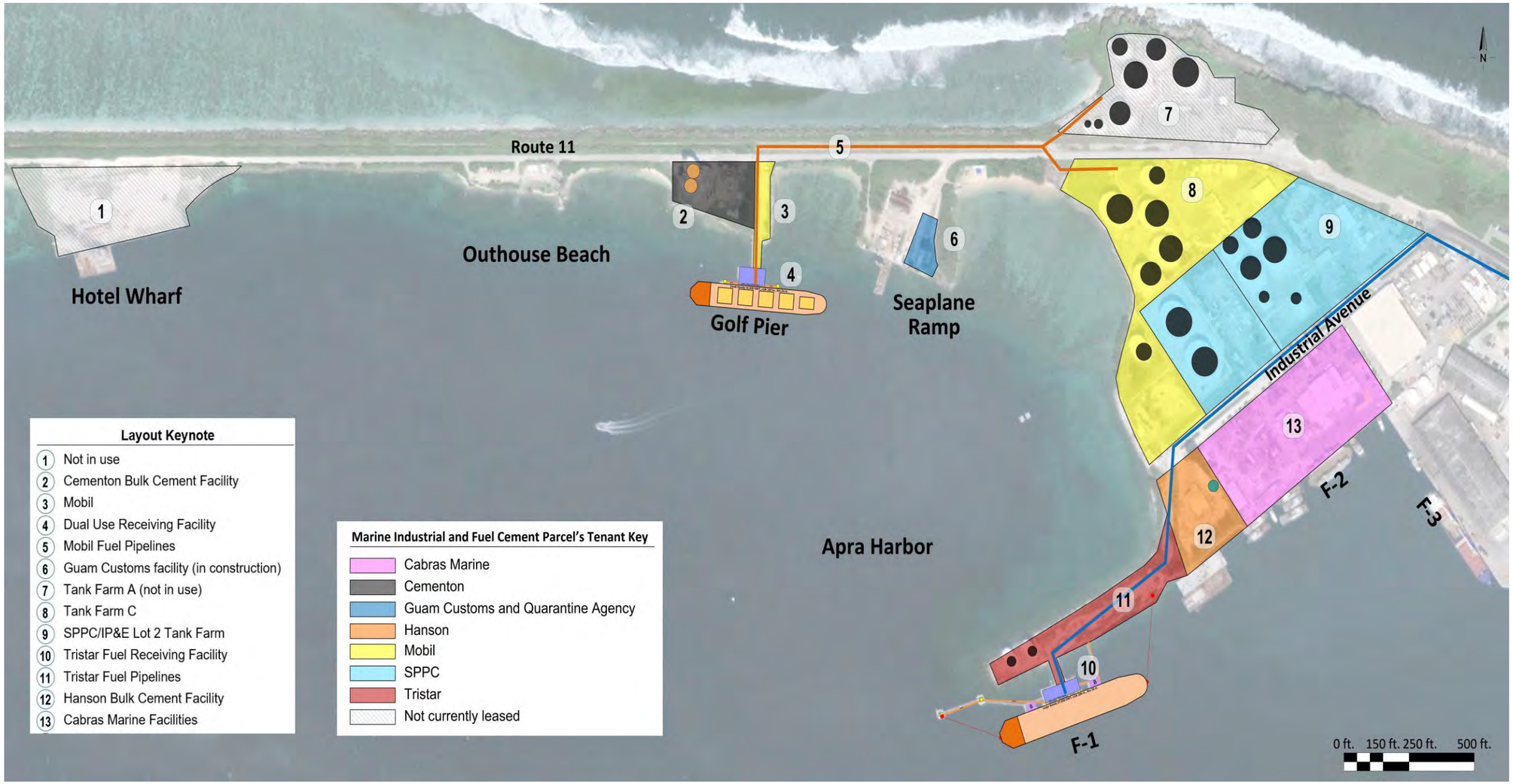
Included in this Master Plan and shown in Figure ES-4 is a land use plan. The land uses in this plan provide the ability for PAG to develop and/or to engage PPP arrangements to develop and operate port related uses on under-utilized port property. Value added facilities that complement the Governor's transshipment initiative and the port's sustainability strategy can be accommodated on these identified parcels.

Figure ES- 4: Land Use Designations



Source: Google Earth and WSP Analysis of PAG Data

Figure ES- 5: Marine Industrial Complex and Fuel/Cement Facilities



Source: Google Earth and WSP Analysis of PAG Data

MARKET ANALYSIS & CARGO DEMAND

The relationship between the Guam economy and historical port cargo throughput provides the basis for forecasting future cargo volumes. Market factors include economic trends that affect cargo throughput such as Guam's population and economic growth, as well as a forward look at expected development in the coming years. The factors informed an analysis of historical cargo throughput at the PAG to forecast port volumes by cargo type.

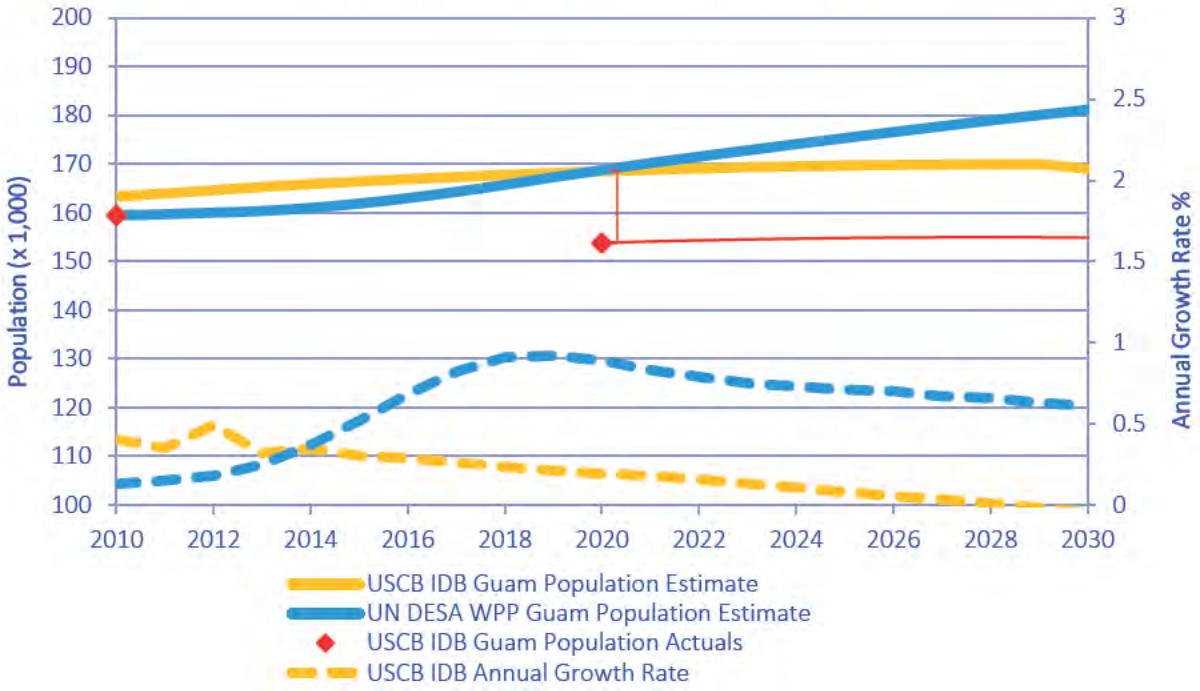
Following several decades of double-digit growth, Guam's population growth slowed to 2.9% between 2000 and the 2010 according to the U.S. Census Bureau (USCB). During the 2020 decennial census (years 2010 through 2020), the USCB reported that Guam's population decreased by 3.5% during the decade to a figure slightly below 2000 levels - an unexpected result given that USCB and the United Nations Department of Economic and Social Affairs (UN DESA) had previously estimated moderate growth during the decade. There is a similar but inverted difference between the two forecasts to 2030. A summary of Guam's population over the past 50 years is provided in Table ES- 3.

Table ES- 3: Guam's Historical Population

Year	1970	1980	1990	2000	2010	2020
Guam Population	84,996	105,979	133,152	154,805	159,358	153,836
% Growth from Previous Census	26.8%	24.7%	25.6%	16.3%	2.9%	-3.5%

Source: U.S. Census Bureau, 2020

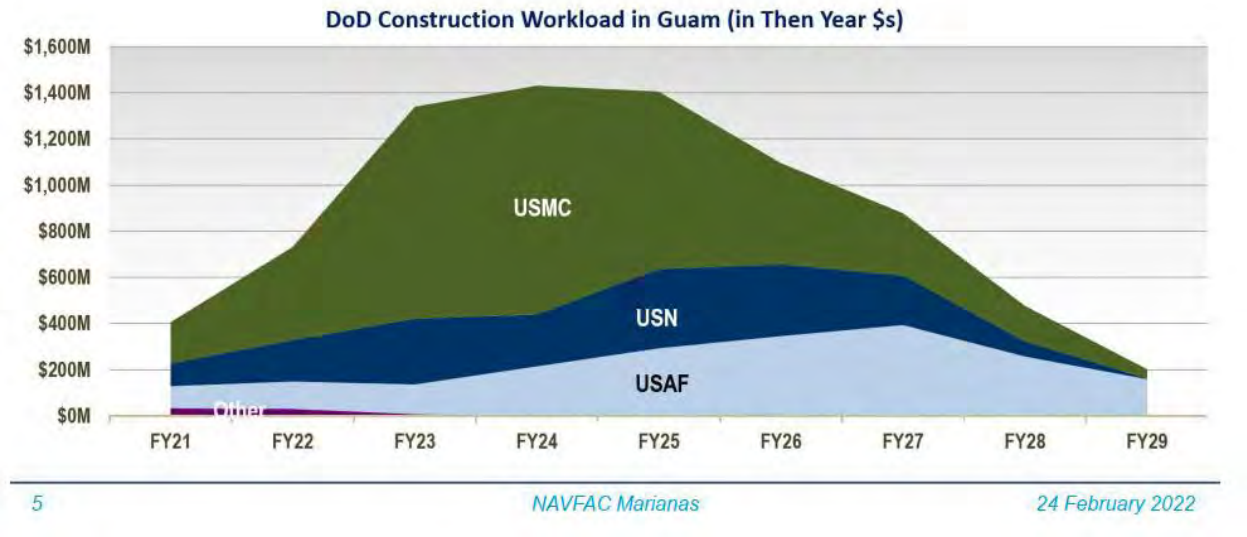
Figure ES- 6: Guam's Estimated and Projected Population and Growth Rates



Source: U.S. Census Bureau IDB; UN DESA Population Division WPP

Approximately 30% of total current cargo moving through the Port is military related. During the peak of the military build-up between FY 2022 and FY 2029, the additional imported military equipment, supplies, and construction related materials are expected to nearly double the Port's military cargo volumes for the Marine Corp, Navy and Air Force construction projects. See Figure ES- 7.

Figure ES- 7: U.S. Marine Corps Build-up Construction Spending Profile, FY 2021-FY2029



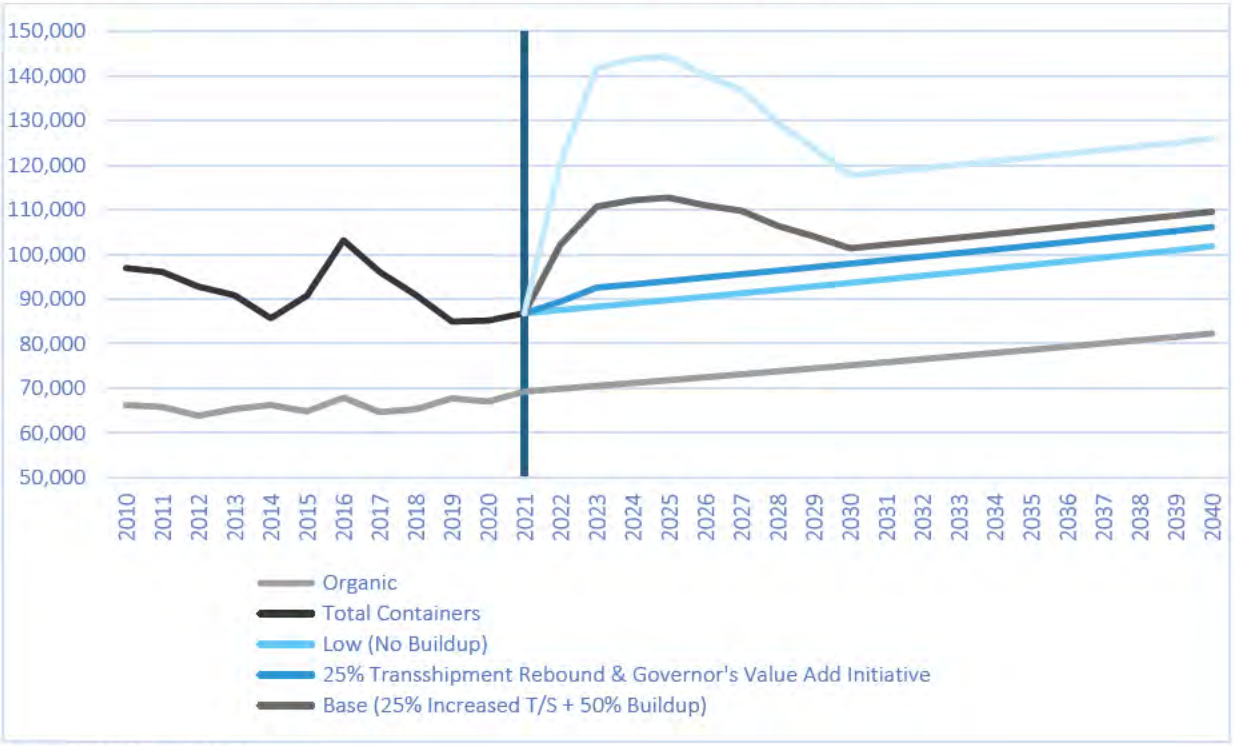
Source: NAVFAC Marianas

The growth of Guam's economy has been, and is expected to continue to be, driven by a combination of the needs of a growing population and military presence, continued expansion and diversification in the tourism industry, and private and public investment in construction projects for the civilian and defense sectors.

Forecasts of expected volumes of containerized, breakbulk and petroleum cargos to be shipped through the Port over the next 20 years are used as the foundation for this update to the Master Plan. Forecasting involves benchmarking against historical trends and performing sensitivity analyses looking forward.

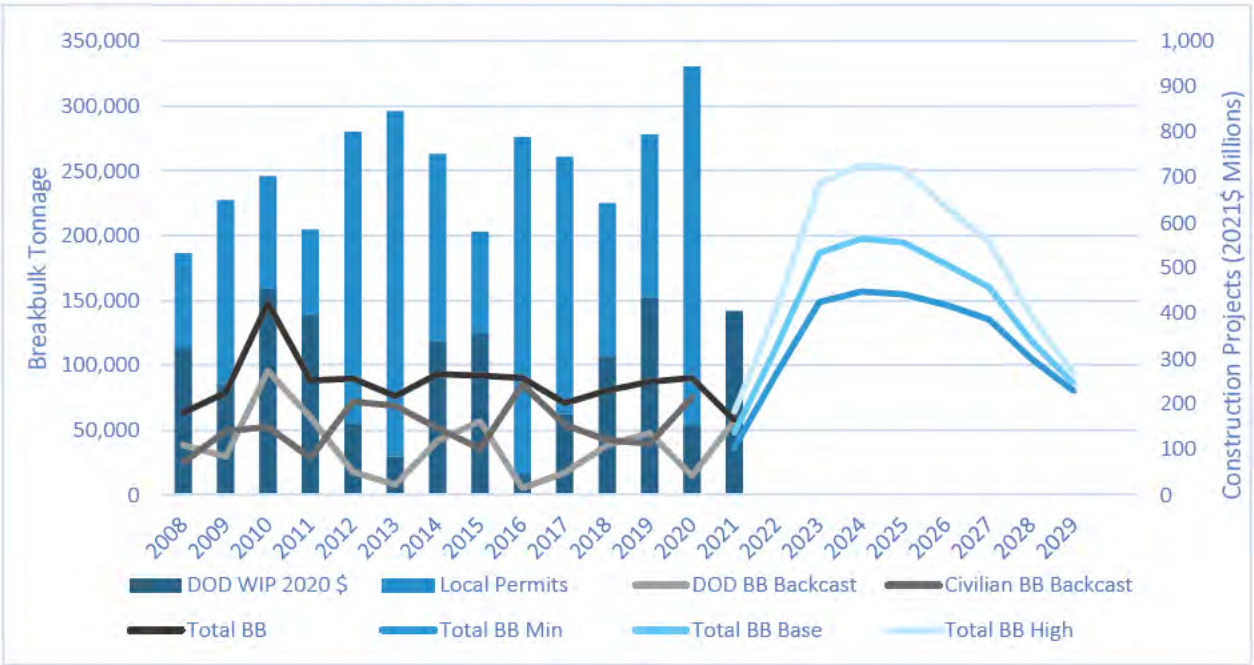
The cargo volumes were forecast based on sustained increases under the Organic Growth Scenario for the anticipated population on Guam and the Micronesian region and supporting three separate scenarios (Organic, Mid Build-up, and Full Build-up) for the proposed military realignment and expansion program on Guam. See Figure ES- 8 through Figure ES- 12 for container, breakbulk, liquid bulk, RO/RO, and cement forecasts.

Figure ES- 8: Container Forecast – Comparison of Growth Scenarios



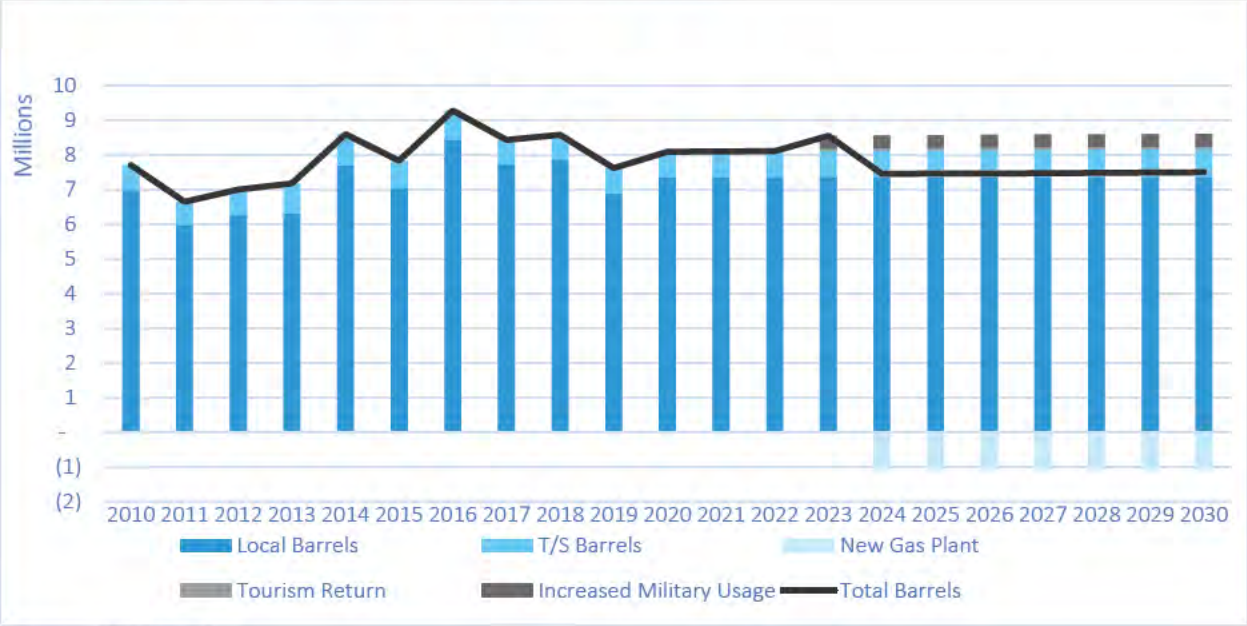
Source: WSP analysis

Figure ES- 9: Breakbulk History and Forecast



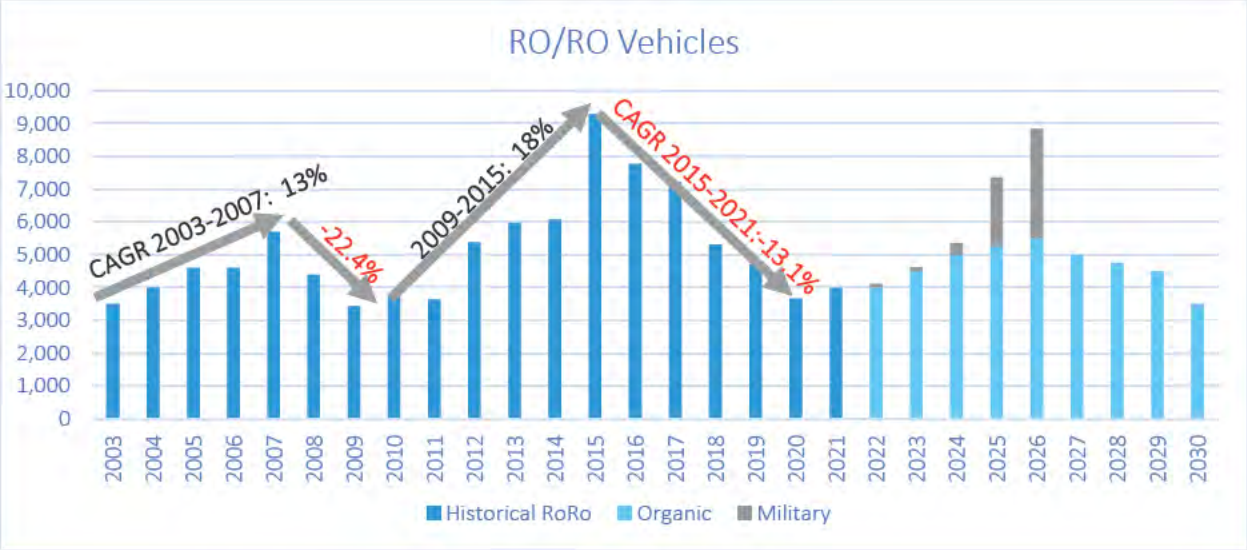
Source: WSP analysis

Figure ES- 10: Liquid Bulk History and Forecast (Barrels)



Source: WSP analysis

Figure ES- 11: RO/RO Vehicle Forecast



Source: WSP analysis

Figure ES- 12: Cement Forecast

Source: WSP analysis

CAPACITY & DEMAND

Using the forecasted cargo volumes, a capacity vs. demand analysis was performed for the PAG commercial cargo terminals. To perform this comparison, a capacity analysis was performed using WSP's proprietary Port Rail Intermodal Modeling Environment (PRIME) tool.

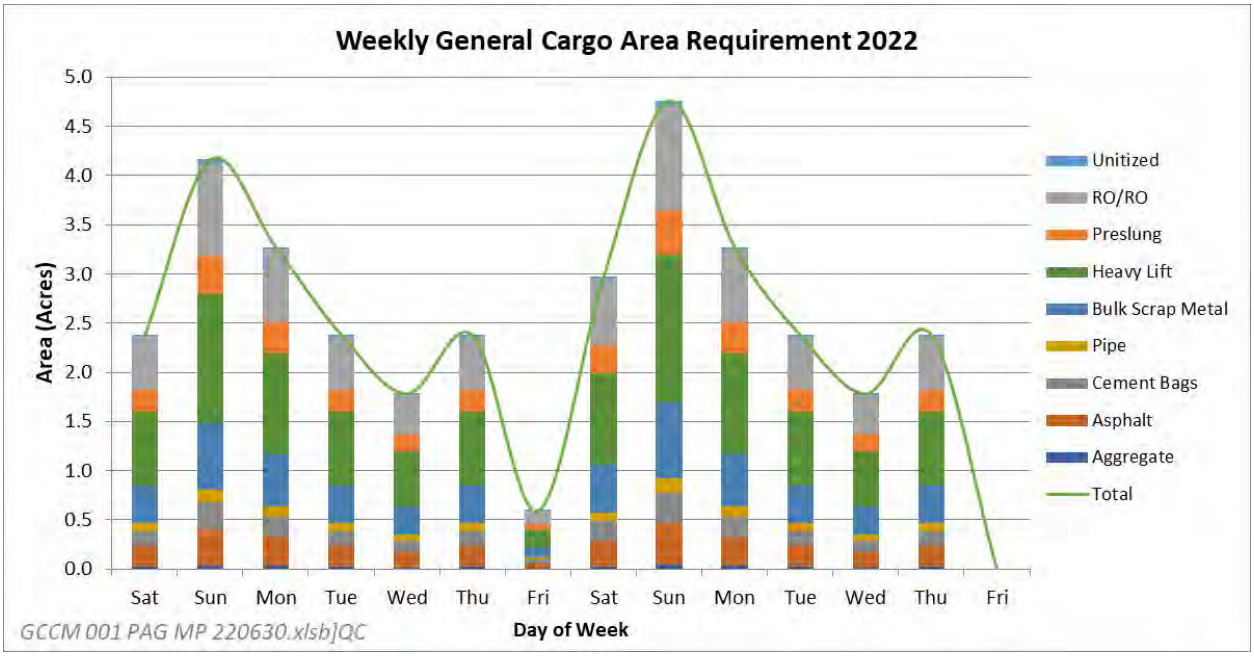
WSP collected operational data for cargo moving in and out of the commercial port. This data was used to perform a vessel movement analysis, container movement analysis and gate movement analysis to identify key inputs into the throughput analysis. Throughput capacity was estimated for the existing container and general cargo facilities. See Table ES- 4.

Table ES- 4: PAG Existing Container Throughput Capacity

Throughput Type	TEU/Yr	Container/Yr
Berth Throughput Capacity	341,000	192,000
Yard Throughput Capacity	225,000	126,000

Source: WSP analysis

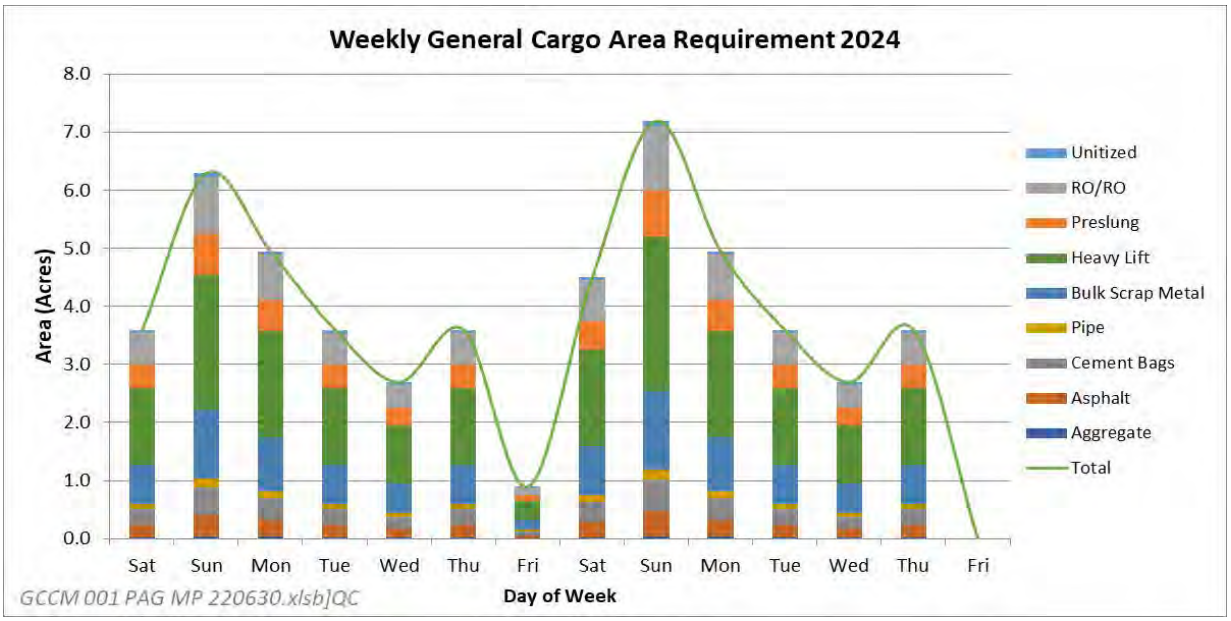
Figure ES- 13: Current General Cargo Storage Requirement



Source: WSP analysis

The Port's cargo facilities are limited to 126,000 containers/yr under the current conditions and operations. This assumes that the required 5 acres of general cargo storage area is maintained in the terminal. General cargo will peak in 2024 at about 251,000 tons. See Figure ES- 14. Approximately 7.2 acres of storage area will be needed during this year. The current 5-acre general cargo storage area will not be sufficient to handle this projected demand. A densified container storage yard with a higher amount of grounded containers will enable to port to accommodate this peak.

Figure ES- 14: General Cargo Storage Requirements - 2024

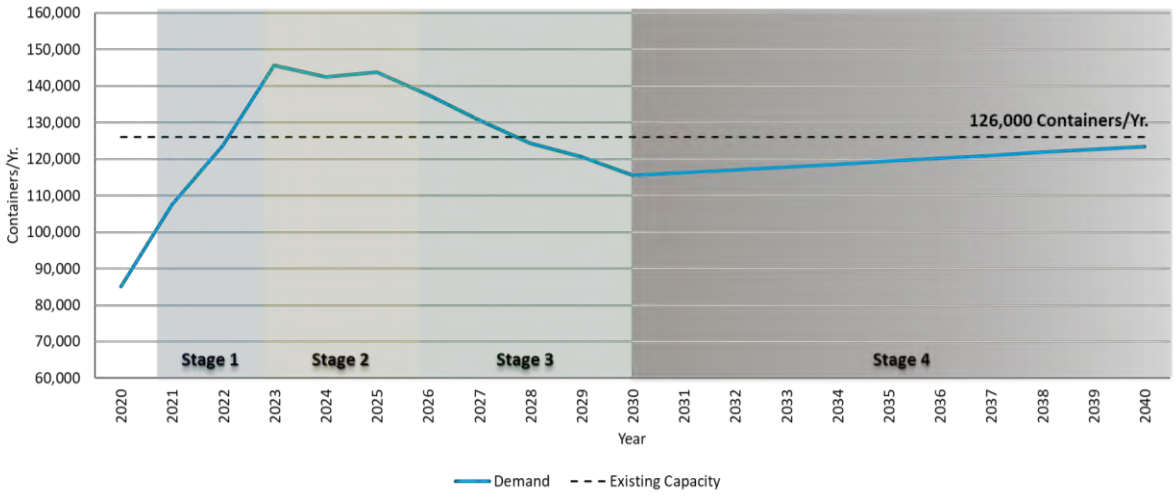


Source: WSP analysis

In 2029, general cargo volume will return to pre-buildup numbers at about 94,000 tons and approximately 4-acres of storage area will be needed that year. The current general cargo storage area will be sufficient to handle this projected demand.

Existing container throughput capacity vs demand for the high growth scenario will exceed capacity around 2023. The container cargo demand is estimated to stay above 140,000 containers per year until 2026, before it starts to normalize to organic growth through 2030. See Figure ES- 15.

Figure ES- 15: PAG Existing Container Capacity vs High Demand



Source: WSP analysis

During peak years when the port's container cargo volume exceeds the 126,000 container/yr capacity, a greater quantity of containers will be grounded in the storage yard to accommodate the excess volumes and provide more area for general cargo. This operational change will require additional equipment but will not require additional infrastructure. The port's recently completed modernization plan resulted in the highest level of efficient capital investment in the container yard and will accommodate the forecasted peak container and general cargo volumes. Therefore, this Master Plan is focused on implementing a Port Improvement Program (PIP) that builds off the successful completion of the Port Modernization Plan (PMP) included in the last Master Plan.

PORT IMPROVEMENT PROGRAM (PIP)

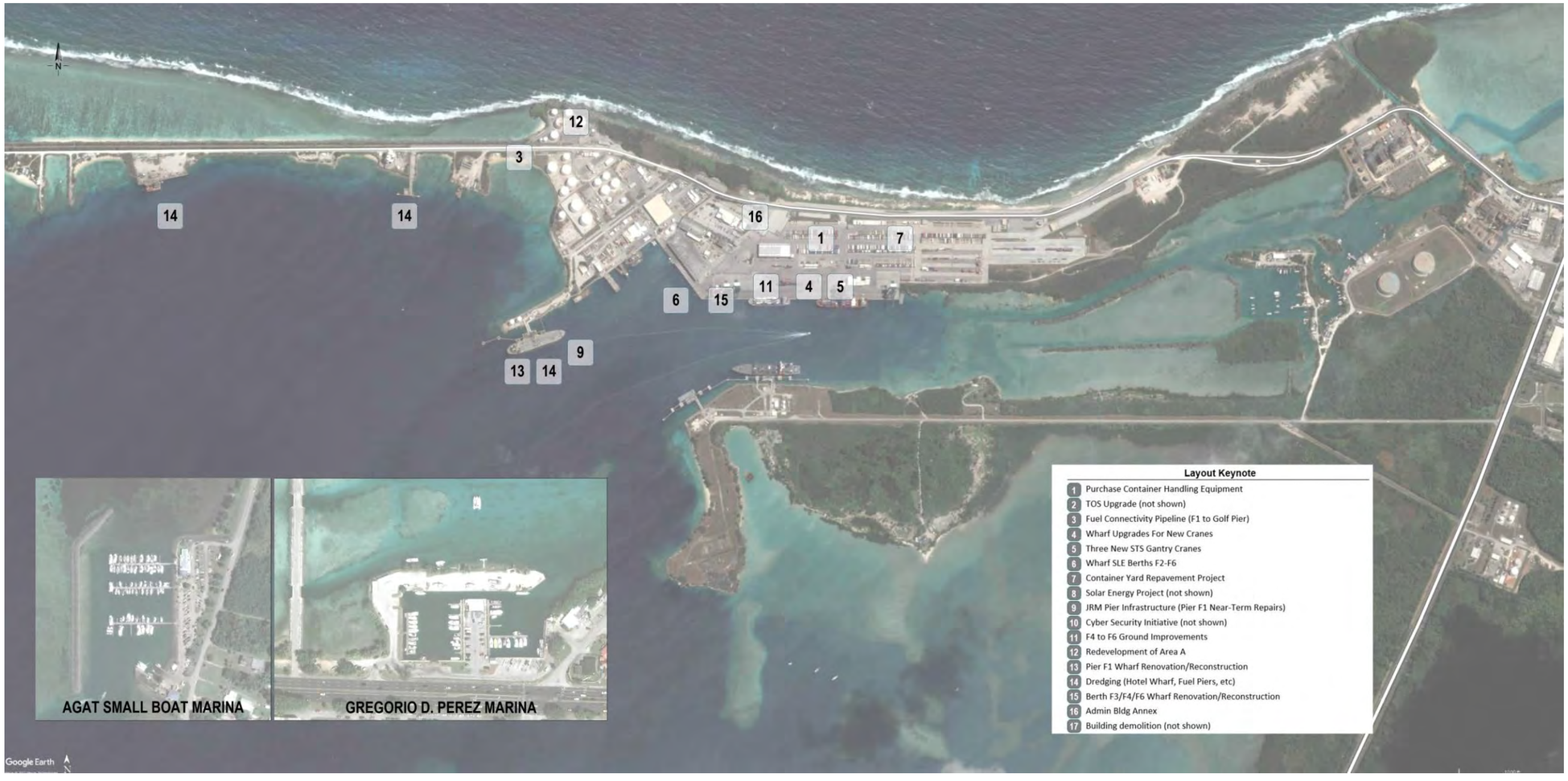
A comparison of the market demand forecast to the throughput capacity estimates verified that the PAGs past PMP has successfully expanded the port's infrastructure to accommodate the anticipated military build-up and long-range cargo growth. The analysis also identify additional equipment needs required to accommodate the future cargo demands. Facility condition assessments were performed and have identified infrastructure and equipment maintenance and replacement needs that comprise the primary recommendations of this Master Plan.

The PIP is a summary of the Master Plan recommendations which are focused on hardening port infrastructure to ensure resiliency, reliability, and supply chain sustainability for all Port users, the DOD mission on Guam, and the local community. The PIP includes a Port Readiness Plan (PRP) comprised of Capital Improvement Projects (CIPs) for maintaining existing facilities and a Port Readiness Projects (PRPs) for hardening the port's existing facilities and equipment. The Sustainability Plan includes projects that enable the port to sustain the current level of operations.

Figure ES- 16: PAG Capital Improvement Project Locations

Source: Google Earth and WSP

Figure ES- 17: PAG Port Readiness Project Locations



Source: Google Earth and WSP

Figure ES- 18: PAG Sustainability Project Locations

Source: Google Earth and WSP

FINANCIAL

The PAG's total FY 21 operating revenue was $55 million, a modest increase compared to FY 2020 and on par with pre-COVID income in FY2019.

Table ES- 5: PAG Operating Revenues and Expenses (2017 – 2021)

Operating Revenue Category	FY 2017 ($000s)	FY 2018 ($000s)	FY 2019 ($000s)	FY 2020 ($000s)	FY 2021 ($000s)
Total Operating Revenues	**$50,894**	**$54,168**	**$55,092**	**$54,686**	**$55,254**
Change from Prior Year	*-2.5%*	*6.4%*	*1.7%*	*-0.7%*	*1.0%*
Total Operating Expenses	**$46,047**	**$44,534**	**$41,588**	**$49,330**	**$52,007**
Change from Prior Year	*17.5%*	*-3.3%*	*-6.6%*	*18.6%*	*5.4%*

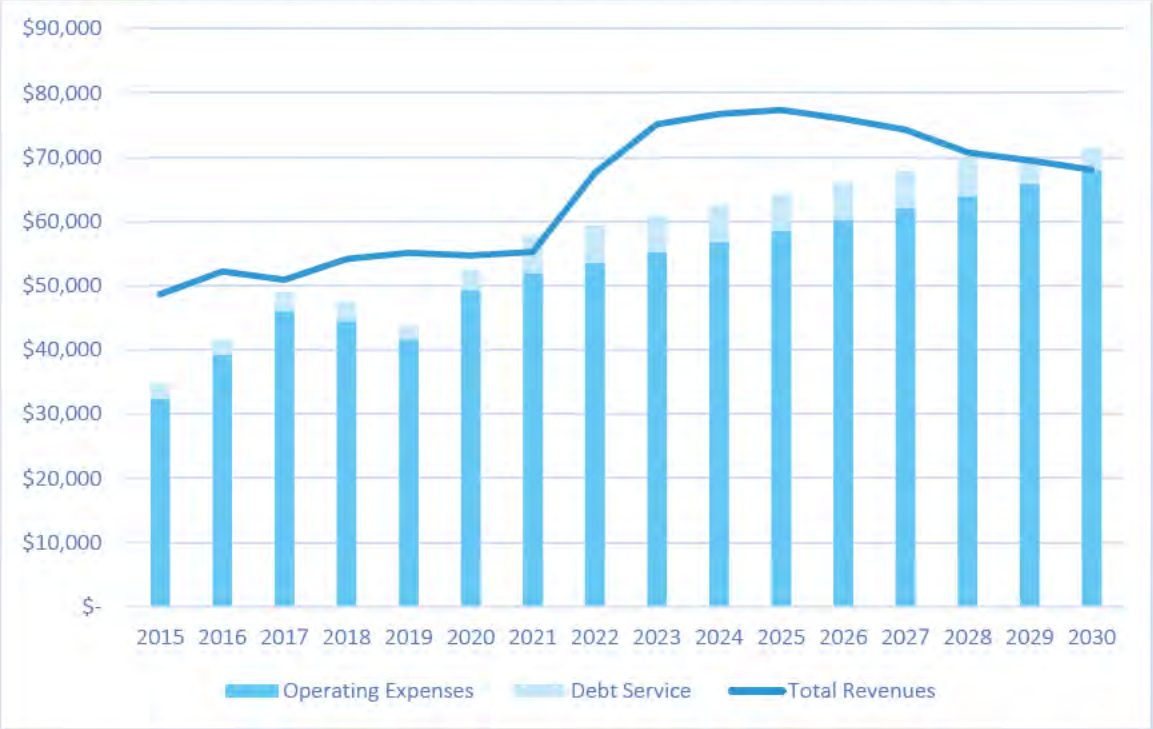
Source: WSP Analysis of PAG Data

The PAG's operating expenses include the cost of operating and maintaining Port facilities and equipment, providing cargo services to shippers and managing and administering the Port's business. Cash operating expenditures (excluding depreciation and other non-cash items) in FY 2021 were approximately $52 million.

Historical and projected revenues, operating expenditures, and debt service comprise the Port's Cash Flows. See Figure ES- 19. The revenue projection assumes the Base Case throughput forecast, with the military buildup growing cargo throughput substantially in 2022-2024 before tapering. Operating expenses are assumed to grow 3% per year. No tariff increase is included in this projection.

Doc. No. 38GL-26-2386.*

Figure ES- 19: Historical and Projected Revenues and Expenditures ($000s)



Source: WSP analysis of PAG data

The PIP provided in Section 7 of this Master Plan details the projects and timing of improvements in the coming years. Any costs not covered by awarded grants or the 2018 bond funds fall to PAG/to determine financing and/or funding. It is expected that future grants and loans may cover portions of these costs to complement the use of the PAG's operating revenues.

Doc. No. 38GL-26-2386.*

Table ES- 6: Capital Plan 2022 – 2032 ($000,000s)

PIP ITEM	FY22	FY23	FY24	FY25	FY26	FY27	FY28	FY29	FY30	FY31	FY32	TOTAL
CIP	$2.6	$7.3	$35.2	$49.9	$9.8	$69.4	$9.4	$8.0	$0.0	$0.0	$0.0	$191.6
PRP	$0.0	$0.0	$23.5	$56.3	$64.8	$44.5	$40.0	$45.5	$184.5	$15.0	$15.0	$489.1
SUST	$2.4	$4.6	$4.1	$0.4	$0.4	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$11.9
TOTAL	$5.0	$11.9	$62.8	$106.6	$75.0	$113.9	$49.4	$53.5	$184.5	$15.0	$15.0	

Source: WSP analysis of PAG data

The investment schedule shown in Table ES-6 represents the entire PIP. These improvements to PAG's infrastructure, equipment and operations will increase the already essential economic value the port provides to Guam and other West Pacific islands.

The primary economic impact of the PIP is to the construction industry. The Master Plan projects largely focus on ensuring the Port is in a state of good repair for the long term. In other words, the Master Plan projects will not increase port throughput, though certain projects, notably Hotel Wharf reconstruction will facilitate both improved efficiency and the ability to handle military deployments. Therefore, the economic impact focuses on job creation and activity generated by capital expenditures. A summary of the projected direct and indirect jobs through 2032 as a result of the construction industry and military buildup is shown in Table ES-7.

Table ES- 7: Projected Direct and Indirect Jobs Through 2032

Total Jobs	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	Total
Direct Jobs	28	52	296	464	301	611	213	265	1,036	84	84	3,435
Indirect/ Induced Jobs	10	19	105	165	107	217	76	94	369	30	30	1,222
Total Jobs	39	71	402	629	408	828	289	359	1,405	114	114	4,657

Source: WSP analysis of PAG data

As the PAG proceeds with the Governor's transshipment initiative and future resiliency initiatives, additional revenue generating land uses could increase the economic impact the port has on Guam.

SUSTAINABILITY AND RESILIENCY

In support of hardening the Port's infrastructure, the Port has prioritized its commitment to environmental stewardship through the development of a Port-wide Sustainability & Resiliency Plan. With a primary focus on reducing the Port's carbon footprint and reducing greenhouse gas effects, the Port's Sustainability and Resiliency Plan (SRP) represents a pivotal step towards ensuring a more sustainable and resilient future for the Port Authority of Guam and neighboring communities. The SRP embodies the Port's commitment to environmental stewardship and responsible resource management, building on a strong foundation of existing sustainable policies and initiatives including Resolution No. 2024-02 and Resolution No. 2022-15 of Guam's Priority Climate Action Plan and Zero Waste Guam, among others. The SRP was developed in alignment with this 2025 Master Plan and is included as an additional element of this plan. See Appendix G.

1 INTRODUCTION

1.1 PURPOSE AND GOALS

The purpose of the 2025 Port of Guam Master Plan (Master Plan) is to assist the Port Authority of Guam (PAG) to define a near-term and long-term approach to modernize, maintain fiscally sustainable operations, and promote increased awareness and consensus of the plan among all affected stakeholders and the rate payers of Guam. Assets contained within the Master Plan and managed by the PAG include the Jose D. Leon Guerrero Commercial Port of Guam (Port), Marine Industrial Complex, public beaches, marinas, upland properties, submerged properties, and various buildings and equipment.

The goals of this Master Plan include:

- Provide a comprehensive overview of the Port's current conditions including governance, financial, operational, and physical attributes;
- Assess the current and projected cargo opportunities based on Guam's market drivers, which consist of military realignments, tourism, transshipment and organic growth;
- Determine near-term improvements and operational adjustments to accommodate the peak of the military build-up cargo and future deployments of military assets;
- Estimate the Port's capacity and ability to meet the projected demand and tenant requirements;
- Identify long-term modernization efforts targeted towards continuing operational and economic sustainability;
- Establish optimal requirements for operations, maintenance and repair, and capital improvement budgets;
- Validate the efficient and effective use of the Port's resources and assets;
- Present commercial strategies for PAG to diversify revenue base and enhance its financial self-sufficiency including a comprehensive tariff assessment and its economic impact thereof;
- Assess the impact of the recommended strategies on Guam's economic conditions; and
- Prepare an implementation program to support a coordinated approach of continuous Port improvement balanced with sustainability.

The Master Plan involves four elements of validation, review and coordination:

1. Analyze and update, as appropriate, the assumptions and criteria that underlie the previous Master Plan Update 2013 Report;
2. Validate and integrate key elements of the following reports that were developed since the previous Master Plan was released.
    - Master Plan Approval Documents
    - Cargo Forecast Updates
    - Terminal Development and Operations Plans

- Terminal Operating System and Gate Operating System Reports
- The 2016 PUC Tariff Report
- The 2018 Consulting Engineer's Report in support of the CIP Revenue Bond issuance

3. Expand the scope of the Master Plan to include an implementation strategy based on restructured facilities, updated cargo and revenue projections, planned staffing adjustments, and a coordinated funding approach involving a potential combination of grants, bonds and self-financing; and
4. Validate and incorporate decisions and outcomes of various initiatives and policy changes that have occurred over the past nine years that include the following:
   - The Military Buildup Program and schedule has been delayed and resized
   - The Port responded to the PUC in 2016 by issuing a new 5-Year Tariff, which will be reviewed and updated as appropriate
   - A simplified tariff structure is being developed to facilitate more efficient electronic Terminal Operating System (TOS) data interfacing and invoicing with stakeholders
   - TOS improvements are being incorporated to improve operational efficiencies, data accuracy, and facilitate electronic data sharing
   - A new Performance Maintenance Contractor (PMC) contract has been issued to improve equipment maintenance
   - A new Information Technology Consulting Firm (ITCF) contract is being issued to augment port TOS/IT development and improve terminal operations and improve security
   - The Port is developing a more structured Maintenance Program for Facilities and Equipment
   - The Port is planning on procuring three new STS container cranes to replace older equipment and to increase operating efficiencies
   - The MARAD funded H-Wharf upgrade program is commencing
   - The Revenue Bond Projects are moving ahead and will become part of the Port's infrastructure over the next three years
   - Guam Customs is developing a new inspection facility adjacent to the terminal gate which will be integrated with the cargo operations

The original Scope of Work for the execution of this Master Plan Update is presented in Appendix A.

1.2 BACKGROUND

As the only commercial port on the island of Guam, Guam's citizens depend on the Port to provide import and transshipment of essential goods, most notably food products, building materials, and fuel. In addition, the U.S. military relies on the Port to handle nearly all the military cargo and equipment moving in and out of Guam. Currently, more than 90 percent of the total volume of goods and supplies needed to support activities on Guam flows through the Port.

Since its construction in 1969, the Port had remained largely unchanged until 2008. Initiated by the 2007 Master Plan, the PAG began to modernize its facilities to address the forecasted increase in cargo to support anticipated military growth in Guam and throughout the Micronesian region.

The 2007 Master Plan was focused on a U.S. Department of Defense (DOD) realignment of a full Marine Corp Brigade from Okinawa, Japan to Guam (the "military build-up"), which was subsequently delayed, reevaluated, and reduced in scope. The current military build-up is expected to occur over a 9-year period, during which approximately 5,000 Marines and 1,300 dependents are to be relocated to Guam, with an expected peak of about 10,000 additional military and temporary construction personnel in 2024/2025. Refer to Section 5 for further details.

In response to changes in the military build-up, the PAG set its focus on updating its master plan in late 2012, focusing on phasing of Port improvements, budget allocation, and investment priorities. The *2013 Master Plan* included strategic recommendations, a high-level implementation plan, a financial feasibility assessment, and an economic impact assessment, from which the following were specifically recommended.

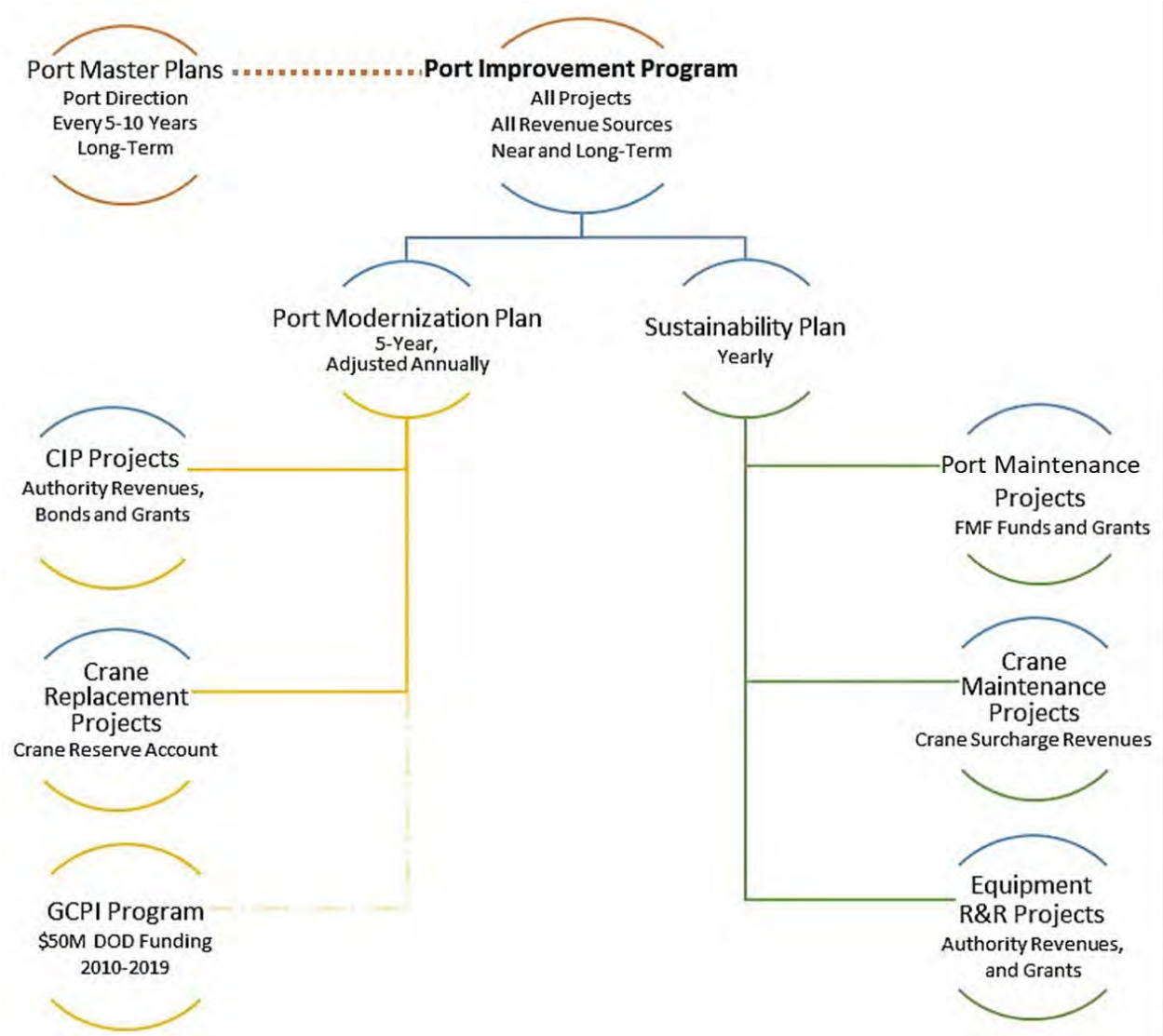
- 5-year near-term improvements to increase Port efficiency and create additional cargo handling capacity to accommodate the future military build-up;
- 20-year long-term focus on additional improvements targeted towards continuing operational and financial sustainability in an organic growth scenario;
- Increased financial self-sufficiency through tariff adjustments to enhance Port opportunities, while continuing to receive complementary or partnering federal assistance (e.g. grants with matching requirements); and
- Issue revenue bonds to take advantage of low-cost financing and compatible alignment of debt service and tariff generated revenues.

Based on the *2013 Master Plan*, the PAG implemented a formalized Port Improvement Program (PIP), which designated projects into the following two categories:

1) Port Modernization Plan: 5-year Capital Improvement Plan (CIP) projects; crane replacement projects funded from the Crane Reserve Account (the "CR Account"); and the Guam Commercial Port Improvement (GCPI) Program projects.
2) Sustainability Plan: Port maintenance projects primarily funded with the Facility Maintenance Fee (FMF) revenues; crane maintenance projects funded from the crane surcharge revenues; and equipment replacement and renewal (R&R) projects.

The structure and relationship of the PAG's 2013 PIP elements and related plans and projects are depicted in Figure 1-1.

Figure 1-1 : The PAG's Improvement Program and Plans



Source: The PAG and WSP

The DOD provided $50 million to PAG in 2010 to implement the GCPI Program. The program was significantly funded by the DoD to increase Port efficiency and create additional cargo handling areas to accommodate the military build-up, as recommended in the 2007 and 2013 Master Plans. In addition to the $50 million, the Port funded through federal grants and Port revenues approximately $18 million of the modernization projects. With the completion of the GCPI Program projects, the Port's cargo handling facilities have surplus capacity to accommodate the forecasted cargo from an increasing population and tourism industry as well as the military build-up.

1.3 STAKEHOLDER OUTREACH AND DATA COLLECTION

Numerous outreach meetings and interviews provided a means for the project team to engage stakeholders to understand their concerns, perspectives and to obtain data critical to updating the Master Plan. Over the past three years, the project team interviewed and met with numerous individuals, Port tenants, and Port stakeholders. See Table 1-1 and Table 1-2.

Table 1-1: 2020 Stakeholder and Data Collection Meetings

Stakeholder	2020 Meeting Date(s)
Ambyth	Aug. 20
APL	Aug. 13
Cabras Marine / Seabridge	Aug. 20
Commercial	Nov. 5
CTSI / MEL Lines	Aug. 21
Engineering	Sept. 1, Oct. 13
Finance	Sept. 3, Oct. 30, Nov. 5
Guam Contractors Association	Aug. 28
Guam Customs	Aug. 14, Nov. 5, Nov. 19, Dec. 3, Dec. 10
Guam Department of Agriculture	Sept. 9
Guam Economic Development Authority	Sept. 23
Guam Fishermen's Cooperative Assoc.	Aug. 25
Guam Industrial Services dba Guam Shipyard	Sept. 4
Guam Military Buildup Office	Aug. 13
Guam Power Authority	Sept. 1, Dec. 11
Guam Visitors Bureau	Sept. 22
Harbor Master and Port Pilot	Sept. 3
IPE/Shell	Aug. 20
IT	Aug. 31, Nov. 5
Joint Region Marianas (Navy) (USAF)	Aug. 18
Legislative Oversight Chair	Sept. 10
Maintenance	Sept. 1, Sept. 9
Matson	Aug. 18
Mayor's Council - Piti Mayor	Aug. 13
Mobil	Sept. 15
MSA	Aug. 20

Stakeholder	2020 Meeting Date(s)
NAVFAC Marianas	Aug. 14
Norton Lilly	Sept. 11
Office of Economic Adjustment	Jul. 28
Office of Governor/Lt. Governor	Jul. 28, Oct. 19
Operations	Sept. 2, Oct. 27, Dec. 24
Planning	Sept. 4
Police	Aug. 31
Port Board of Directors (3)	Sept. 10-11
Procurement	Sept. 2
South Pacific Petroleum Corporation	Aug. 18
Tidewater Distributors, Inc.	Aug. 21
Tristar Terminals	Aug. 12
U.S. Coast Guard	Aug. 14
U.S. Customs & Border Protection	Sept. 11
USDA, APHIS, PPQ	Sept. 17

Source: WSP and the PAG

Table 1-2: 2021 Stakeholder and Data Collection Meetings

Stakeholder	2021 Meeting Date(s)
APL	Aug. 3
Black Construction	May 27
Cabras Marine / Seabridge	Aug. 3
Commercial	Aug. 2
Engineering	Aug. 4
Environmental, Health and Safety	Aug. 3
Finance	Aug. 3
Guam Bureau of Statistics & Plans	Aug. 3
Guam Economic Development Authority	Aug. 2
Guam International Airport Authority	Jan. 14
Guam Power Authority	Oct. 8
Harbor Master and Port Pilot	Aug. 4
IPE/Shell	Aug. 2
IT	Aug. 4
Maintenance	Aug. 4

Stakeholder	2021 Meeting Date(s)
Matson	Jan. 14, Aug. 3
Mobil	Aug. 2
NAVFAC Marianas	Mar. 5, Apr. 28, Aug. 3
Office of Governor/Lt. Governor	Aug. 5, Dec. 3
Office of Local Defense Community Cooperation	Aug. 5, Dec. 3
Operations	Aug. 2
Planning	Aug. 3
Police	Aug. 4
Port Board of Directors (3)	Dec. 23
Port Users Group Guam (PUGG)	Aug. 4
SDDC	Dec. 15
Smithbridge	May 27
Tristar Terminals	Aug. 2

Source: WSP and the PAG

In 2022, two site visits occurred; the first in February and the second in May. Prior to the site visits, the project team had weekly conference calls with PAG management and staff (terminal operations, planning, etc) and project stakeholders. The purpose of the visits was to update stakeholders and get feedback and confirmation of the initial master planning analyses and findings from PAG management. See Table 1-3 and Table 1-4.

Table 1-3: February 2022 Stakeholder and Data Collection Meetings

Meeting Topic	February 2022 Meeting Date(s)
Management In-Brief	Feb 21
EH&S Status	
IT Master Plan	
Tariff Simplification	Feb 22
Customs Container Facility Plans/Funding Status	
Capital Improvement Plan	
Land Use Plans	
Facility and Equipment Maintenance	
Master Plan Update	Feb 23
Military Buildup Update	

Meeting Topic	February 2022 Meeting Date(s)
Tourism Update	
Tariff Simplification	
Marianas and Harbor of Refuge	
IT Master Plan	
Fuel Pier Status	
Solar Power	
STS Gantry Crane Procurement	
Fuel Pier Status	
Prelim Cement Cargo Forecast	Feb 24
Cargo Forecasts	
Navigation/Dredging	
Office of Local Defense Briefing	
Military Buildup Update	
Tariff Simplification	Feb 25
IT Master Plan	
Military Buildup Update	

Source: WSP and the PAG

Table 1-4: May 2022 Stakeholder and Data Collection Meetings

Meeting Topic	May 2022 Meeting Date(s)
Solar Power	
Engineering	
EH&S Status	
Continuous Improvement Plan	May 16
Management In Brief	
Facility Maintenance	
Golf Pier	
Hotel Wharf	
Land Use Map and Property Map	May 17
Pier F1	
Master Plan	
Military Readiness	
STS Gantry Program	May 18
Cabras Marine	
Management Out-Brief	

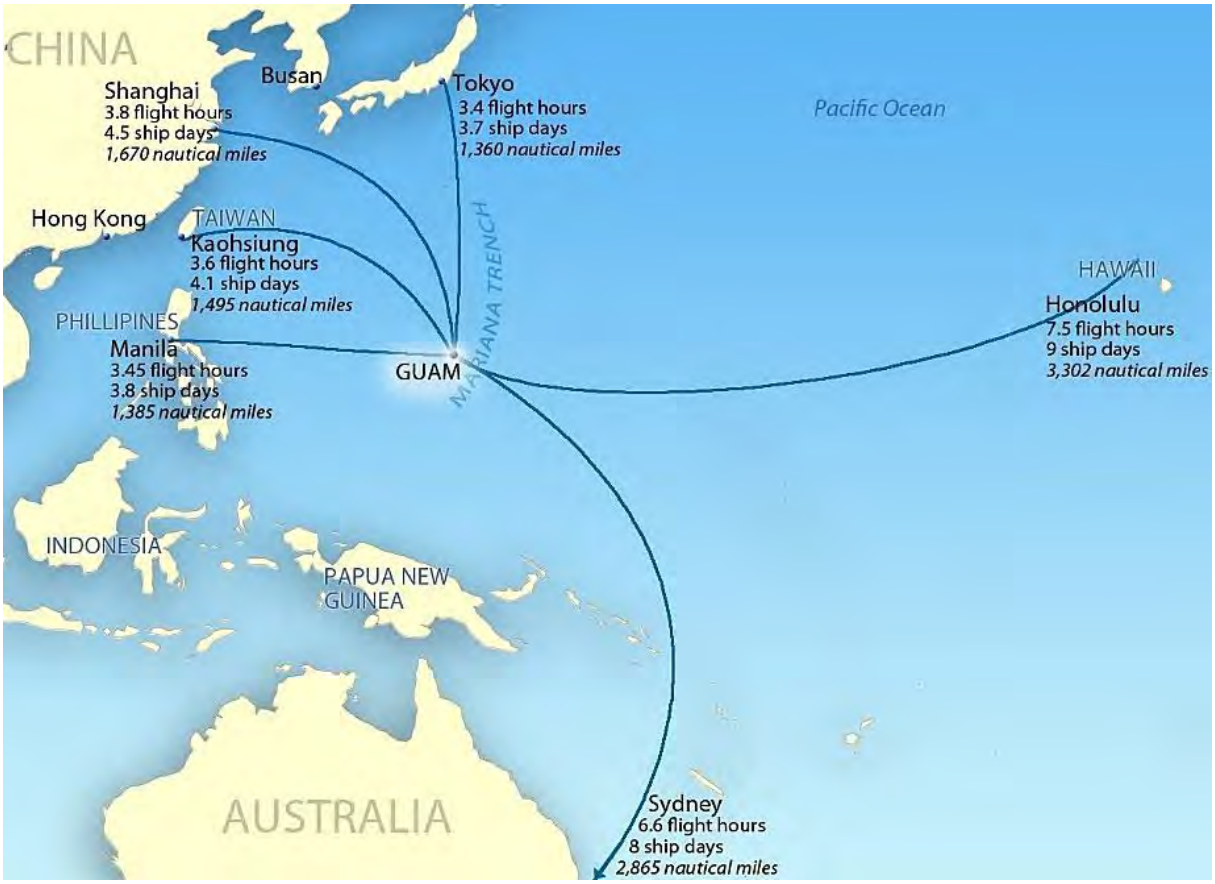
Meeting Topic	May 2022 Meeting Date(s)
Port Security	
TOS Discussions	
Trans-Shipment Initiative	May 19

Source: WSP and the PAG

2 GUAM

The island of Guam is in the western Pacific region and is the largest and southernmost island in the Marianas Archipelago. Guam is 32 miles long, varying from 4 to 12 miles wide, with a total land area of approximately 212 square miles. The island is located 3,300 nautical miles (nm) west-southwest of Hawaii; 2,865 nm north-northeast of Sydney, Australia; 1,495 nm south-southeast of Taiwan; 1,385 nm east of Manila, Philippines; and 1,360 nm south-southeast of Tokyo, Japan, as shown in Figure 2-1.

Figure 2-1: Location of the Island of Guam



Source: WSP

Guam links the expanding Far East and U.S. markets and the rest of the world with the Western Pacific islands; including the Commonwealth of the Northern Mariana Islands (CNMI) of Saipan, Tinian, Rota and other smaller islands; Republic of Palau; the Federated States of Micronesia (FSM) of Yap, Chuuk, Pohnpei and Kosrae; and the Republic of the Marshall Islands (RMI) including Majuro, Ebeye, and Kwajalein. Figure 2-2 depicts the locations of these islands in relation to Guam.

Cargo going to/from the Western Pacific region by water including the CNMI, Palau and FSM has long been moved through Guam by transshipment services. Having the largest cargo demand and population base in this region, Guam serves as a natural transshipment hub within the western Pacific region.

Figure 2-2: Western Pacific Region Islands

Source: WSP

2.1 HISTORY AND GOVERNANCE

Guam was ceded to the U.S. in 1898 under the Treaty of Paris and has remained under U.S. administration, except from 1941 to 1944 when Japanese forces occupied the island during World War II. In August 1944, U.S. forces recaptured Guam and reestablished a naval government. In 1950, the U.S. Congress passed the Organic Act of Guam granting the indigenous Chamorro people U.S. citizenship and establishing a civilian government.

Guam is an organized, unincorporated territory of the U.S. The organization and powers of the Government of Guam are determined by the Organic Act. Residents of Guam are not allowed to vote in U.S. presidential elections and their congressional representative is a non-voting member.

Guam's Government consists of three branches: executive, legislative and judicial. A governor elected at large every four years heads the executive branch. The unicameral Legislature consists of 15 senators elected at large every two years. The judiciary branch consists of the Superior Court of Guam, which is the court of general trial jurisdiction, and the Supreme Court of Guam, the court of highest appeal. Guam also has a Federal District Court and is within the jurisdiction of the Ninth Circuit U.S. Court of Appeals and the U.S. Supreme Court. Guam's one

non-voting representative in the U.S. House of Representatives is elected at large every two years.

In some cases, U.S. federal laws do not apply to Guam. For example, U.S. import tariff laws do not apply, and Guam is a duty-free port. However, federal banking and transportation laws and regulations apply to Guam, with some exemptions, to address Guam's unique political, geographical, and social circumstances.

Although Guam receives no foreign aid, it does receive large transfer payments from the general revenues of the U.S. Treasury into which residents do not pay income or excise taxes. Under the provisions of a special law of Congress, the Guam Treasury, rather than the U.S. Treasury, receives the income taxes paid by Guam's residents, as well as federal income taxes paid by military and civilian Federal employees stationed in Guam.

2.2 MILITARY PRESENCE

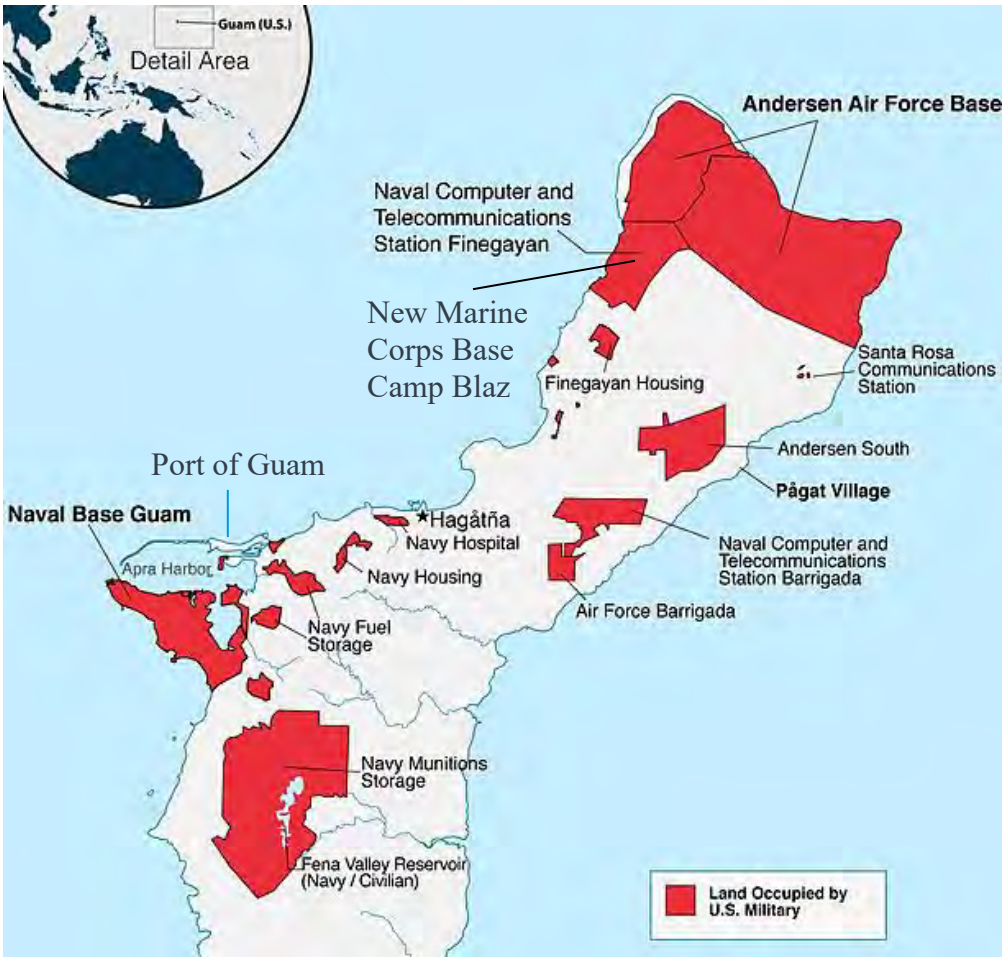
Guam has a large U.S. military presence, which includes U.S. Navy (Navy) and U.S. Air Force (Air Force) bases that occupy nearly 30 percent of Guam's land mass. These military installations are strategically significant U.S. bases in the Pacific.

The Joint Region Marianas, which includes Naval Base Guam, Andersen Air Force Base, and Marine Corps Base Camp Blaz (MCB-CB) shown in Figure 2-3, is home of Commander Naval Forces Marianas, Commander Submarine Squadron Fifteen (CSS-15), U.S. Coast Guard (USCG) Sector Guam, Naval Computer and Telecommunications Station Guam (NCTS) Guam and Naval Special Warfare Unit One. Marine Corps Base Camp Blaz was activated October 2020, becoming the first new Marine Corps facility on island since 1952. The MCB-CB will house Marines relocated from installations in Okinawa, Japan.

The Joint Region Marianas supports 28 other tenant commands and is the home base of three Los Angeles class submarines and dozens of units operating in support of U.S. Pacific Command, U.S. Pacific Fleet, 5th and 7th Fleet.

In the late 1980s, the military population including dependents exceeded 20,000 in Guam, representing approximately 18 percent of Guam's population. The military's presence decreased to range between 11,000 to 13,000 from 1998 to 2017, before increasing to its current level of approximately 21,700 active-duty personnel and their dependents, which represents approximately 14 percent of the resident population.

Figure 2-3: Map of U.S. Military Bases in Guam



Source: U.S. Navy, map designed by Johnny Harris, http://www.basenation.us/maps.html

Since 2006, the DOD has been planning to realign its military forces in the Asia-Pacific region, which involves the relocation of a sizeable contingent of marines to Guam primarily from facilities in Okinawa, Japan. The Guam and CNMI Military Relocation (per the 2012 Roadmap Adjustments) relocates approximately 5,000 marines and about 1,500 dependents from Okinawa, Japan and other locations to Guam by 2028. The first marines would move to the MCB-CB in Guam in 2025. The realignment, or military build-up on Guam, would result in an approximate 5 percent increase to Guam's current population of 169,000 (2022 est.).

3 PORT OF GUAM

Port assets include approximately 1,006 acres of upland, marine, and submerged properties within Apra Harbor. The submerged properties encompass approximately 556 acres and are comprised of both submerged and natural marine preserve lands. The upland and marine properties encompass approximately 450 acres and are comprised of cargo handling/break-bulk terminals, upland, cargo storage, general use wharves, fuel and cement import terminals, marinas, upland industrial and natural preserve land, general industrial land, open space, marinas, and water recreation areas. The PAG also owns and operates a marina in the southern municipality of Agat and the Gregorio D. Perez Marina in Guam's capital city Hagåtña. PAG properties are shown in yellow in Figure 3-1.

Sheltered within the inner reaches of the Outer Apra Harbor, the Port is Guam's only deepwater port and provides the people of Guam with ocean commerce, shipping, recreational and commercial boating as well as sea vessel navigation. It is also the 16th commercial strategic seaport in the U.S. having special consideration and the only commercial port on the island, offering facilities and services to ships of all registries. As the region's primary cargo handling facility, the Port offers four cargo handling berths, 26.5 acres of cargo storage, and repair, maintenance, and storage buildings.

Figure 3-1: Location of the PAG's Properties on Guam

Source: Bing Maps Imagery, Adapted by WSP

3.1 HISTORY AND GOVERNANCE

The island of Guam has served as a port of call since the 16th century, first catering to the ships of Spain and then, after the Spanish-American War, to American interests. Today, the Port performs a crucial and indispensable role in the lives of the civilian and military population of Guam, the military bases and neighboring islands in the region.

The PAG was established by Public Law (PL) 13-87, passed in 1975, as a legal public corporation and an autonomous agency of the Government. The PAG is mandated to provide for the needs of ocean commerce, shipping, recreational, and commercial/boating, as well as navigation of

Guam. The PAG is responsible for the development and/or operation of recreational boating facilities, public harbors, small boat marinas and other associated marine facilities in Guam.

The PAG's activities are administered by a Board of Directors (the "Authority Board") comprised of five non-salaried members, appointed for staggered three-year terms by the Governor of Guam ("the Governor") with the consent and advice of the Legislature of Guam ("the Legislature"). The Authority Board has decision-making authority over the PAG's management strategy, direction, development, construction, and operations, including the operating and financial budgets.

The Legislature approves the PAG's long-term leases (5+ years), approves and adopts the Port's master plans, authorizes the transfer of property under the jurisdiction of the PAG, and authorizes the issuance of Port debt through Public Law.

The PAG has no taxing powers. Its debts and operating costs are paid out of tariff charges, fees, and other revenues from its facilities. The PAG usually raises capital funds for construction projects by pledging its own credit through various debt instruments. Prior to the 2018 Bonds, the PAG's debt instruments were bank loans, which were retired upon the issuance of the 2018 Bonds.

In 2009, the PAG was placed under regulatory oversight of the Guam Public Utilities Commission (PUC) by PL 30-52. This law gave the PUC sole authority to approve the PAG's tariff adjustment petitions. The PUC's supervision is intended to support the PAG in effectively adjusting its tariffs to cover the cost of Port operations and to generate revenues for capital improvements.

The PUC is an independent regulatory commission created in 1984. It serves as a regulatory rate governing body for other Guam public service agencies including the Guam Waterworks Authority (GWA), Guam Power Authority (GPA) and Guam Solid Waste Authority (GSWA). The PUC is comprised of seven commissioners who serve staggered six-year terms. Each of the commissioners is appointed by the Governor and confirmed by the Legislature. In addition to supporting and approving the PAG's tariff adjustments, the PUC, as well as the Authority Board, approves the PAG's issuance of bonds such as the 2018 Bonds.

3.2 ORGANIZATION

The PAG Board's policy decisions are directed by a General Manager, Deputy General Managers and other PAG staff. The General Manager, under the general direction of the PAG Board, serves as Chief Executive Officer for the PAG. The General Manager has charge and control of the planning, organization, staffing, direction and coordination of the Port's operations and business affairs. The General Manager is hired and employed at the pleasure of the PAG's Board.

The Deputy General Manager of Operations and the Deputy General Manager of Administration and Finance are under the general supervision of the General Manager. In the absence of the General Manager, either of the Deputy General Managers serve as Acting General Manager. The positions are hired and employed under the terms and conditions fixed by and at the pleasure of the Authority Board.

The PAG has averaged 362 employees annually over the past five years and, as of July 2022, is staffed at approximately 381 full-time employees (not including Casual, Limited, and Vacant positions). The PAG is organized into four departments: Operations (Stevedoring, Terminal, and Transportation divisions); Maintenance (Equipment Maintenance and Facility Maintenance Divisions); Administration and Finance (Corporate, Finance, Information Technology, Human Resources, General Administration, Commercial, Marketing, and Procurement Supply Divisions); and Compliance and Control (Harbor Master, Occupational Health and Safety, Port Police, Strategic Planning, and Engineering Divisions).

3.3 PARTNERS AND TENANTS

The PAG maintains leases and agreements with more than 40 tenants within the Port's facilities as of June 2022. Many companies hold multiple leases for the use of separate Port facilities. The PAG also receives revenue from more than 140 tenants at its two public marinas. The PAG's total revenues in the past five years from leases has averaged approximately $3 million each year, or approximately 6 percent of total revenue. Table 3-1 includes details on the PAG's major tenants in 2022.

Table 3-1: Summary of the PAG's Major Tenants and Lease Statistics

Lessee	Operation/Facility	Area (sf)	Term of Lease (years)	Lease From/To	Years as Port tenant
[1]Tristar	Marine Industrial Complex, Dogleg Pipeline, GEDA Pumpline Easement, and Main Pipeline	349,955	3 – 5	From: 11/6/2006 To: Pending	11
	F1 Fingertip	78,651	3 – 5	From: 4/1/2014 To: 3/31/2019	3
[1]South Pacific Petroleum	Marine Industrial Complex, Lots 2 and 3A, Associated Pipeline	405,718	20	From: 11/30/2000 To: 10/31/2020	46
Mobil	Marine Industrial Complex, Lot 1	248,873	10	From: 3/20/2020 To: 3/20/2030	47
	Marine Industrial, Lot 3B	82,763	10	From: 3/4/2021 To: 3/4/2031	46
Cabras Marine	Marine Industrial Complex, Lot 5	223,898	10	From: 8/1/2011 To: 4/1/2030	28

Lessee	Operation/Facility	Area (sf)	Term of Lease (years)	Lease From/To	Years as Port tenant
IP&E	New-GEDA easement, F3 Bunker Pits	75,347	25	From: 5/20/2010 To: Pending	7
Hanson Permanente Cement	Marine Industrial Complex	71,874	10	From: 1/14/2021 To: 1/14/2031	46
Aqua World	Tour operator, Harbor of Refuge	65,430	1	From: 1/1/1985 To: present	33
Cementon	Golf Pier	49,290	30	From: 12/1/2009 To: 12/1/2039	8
Marianas Yacht Club	Parcel 1	43,055	TBD	TBD	
	Hotel Wharf	20,000	Month-to-Month	From: 5/5/2017 To: 12/1/2017	<1
Subcom	Warehouse space, Bay 5/6	7,200	1	From: 1/1/2022 To: 12/31/2022	7
	Warehouse space, Bay 7/8	7,200	1	From: 1/1/2022 To: 12/31/2022	9
OSROCO	Oil Spill Response, Harbor of Refuge	4,000	1	From: 1/1/2022 To: 12/31/2022	
Atlantis Guam	Submarine Tour Facility, Harbor of Refuge	4,000	1	From: 1/1/2022 To: 12/31/2022	29
CTSI Logistics	Office space, Administration Building, Rms 108 and 109	557	1	From: 1/1/2022 To: 12/31/2022	8
	Truckers Lot	2,000	1	From: 1/1/2022 To: 12/31/2022	
Guam Dolphin Marine Sports Club	Water Sports, Family Beach	2,514	1	From: 1/1/2022 To: 12/31/2022	8
Brand Inc.	Hazardous Waste / Parcel 1	2,449	5	From: 9/24/2007 To: present	14
Kals Corp.	Restaurant / Agat Small Boat Marina	2,449	TBD	TBD	2
Charles Marine Sports Club	Family Beach	2,208	1	From: 1/1/2022 To: 12/31/2022	
Ride the Duck LLC	SeaPlane Ramp	2,152	1	From: 1/1/2022 To: 12/31/2022	

Lessee	Operation/Facility	Area (sf)	Term of Lease (years)	Lease From/To	Years as Port tenant
Micronesia Divers Association	Outhouse Beach	2,000	1	From: 7/1/2021 To: 7/1/2022	
V. Angoco	Truckers Parking	2,000	1	From: 1/1/2022 To: 12/31/2022	
Ambyth Shipping	Office space, Administration Building, Rm 205	1,204	1	From: 1/1/2022 To: 12/31/2022	22
	Truckers Lot	700	1	From: 1/1/2022 To: 12/31/2022	22
PSV Corp.	Family Beach / Route 11	1,820	1	From: 7/1/2021 To: 7/1/2022	
Apra Dive and Marine	Family Beach / Parcel 2	1,800	1	From: 10/1/2021 To: 9/30/2022	2
Gently Blue	Outhouse Beach	1,680	1	From: 1/1/2022 To: 12/31/2022	
Axe Murderer Tours	Family Beach / Route 11	1,350	1	From: 1/1/2022 To: 12/31/2022	
Guam Transport and Warehouse	Truckers Parking	1,000	1	From: 1/1/2022 To: 12/31/2022	
Isla Trucking	Truckers Parking	1,000	1	From: 1/1/2022 To: 12/31/2022	
J.L. Baker and Sons	Truckers Parking	1,000	1	From: 1/1/2022 To: 12/31/2022	
Tasi Tours	Harbor of Refuge	990	1	From: 1/1/2022 To: 12/31/2022	
Real World Diving	Family Beach / Dog Leg Pier	870	1	From: 1/1/2022 To: 12/31/2022	
Norton Lilly Int'l	Office space, Administration Building, Rm 115	800	1	From: 1/1/2022 To: 12/31/2022	1
Tropical Island Marine Sports	Adjacent to SeaPlane Ramp	800	1	From: 1/1/2022 To: 12/31/2022	
Paradise Aqua	Family Beach / Echo Pier	720	1	From: 1/1/2022 To: 12/31/2022	
DGX	Truckers Lot	700	1	From: 1/1/2022 To: 12/31/2022	

Lessee	Operation/Facility	Area (sf)	Term of Lease (years)	Lease From/To	Years as Port tenant
Guam Ocean Adventures	Family Beach / Parcel 3	680	1	From: 1/1/2022 To: 12/31/2022	
Unitek Env	Adjacent to Truckers Parking	600	Month-to-Month	From: 5/1/2009 To: present	13
Salt Shaker	Harbor of Refuge	458	1	From: 1/1/2022 To: 12/31/2022	
Churchill	Harbor of Refuge	450	1	From: 1/1/2022 To: 12/31/2022	
Guam Sungwoo Ferry	Harbor of Refuge	400	1	From: 1/1/2022 To: 12/31/2022	
Skoocumchuck	Harbor of Refuge	320	1	From: 1/1/2022 To: 12/31/2022	
Endeavour Inspection	Adjacent to Area A	320	1	From: 1/1/2022 To: 12/31/2022	
Teleguam Com	Admin Bldg	3 Ant	1	From: 1/1/2022 To: 12/31/2022	

Note 1: Leases for Tristar and South Pacific Petroleum are under negotiation
Source: The PAG

Considering tenants where total years as a PAG tenant is known, approximately 50 percent of the Port's major tenants have maintained leases with the PAG for a decade or longer. Guam law requires legislative approval for any lease agreements that exceed a five-year term. As of 2011, PUC approval is required for a lease agreement with the PAG in which the revenue of the total term exceeds $1 million.

The last long-term lease agreement approved by the Guam Legislature and Governor was Cementon Micronesia, LLC in 2010. In 2020 and 2021, PAG extended the option provisions for lease agreements with South Pacific Petroleum Corporation, Hanson Permanente Cement of Guam, Inc,. Mobil Oil, Tristar Agility, IP&E, and Cabras Marine Corporation. Negotiations are ongoing for land leases with Marianas Yacht Club and KALS Corporation.

4 PORT ASSETS AND RESOURCES

This section includes a summary of the PAG's landside and waterside infrastructure, upland facilities, marine facilities, equipment, Port Security operations, environmental health and safety programs, and IT initiatives. This information plays a fundamental role in development and execution of the Port Improvement Plan, further described in Section 7. For reference, Port assets and resources are located within Apra Harbor, along the southwestern shoreline, and in the capital city of Hagåtña. See Figure 4-1 and Figure 4-2.

Figure 4-1: PAG Assets

Source: Google Earth and WSP

Figure 4-2: Agat Small Boat Marina and Gregorio D. Perez Marina

Source: Google Earth and WSP

4.1 ACCESS

Apra Harbor is divided into an outer and inner harbor. The outer harbor is a natural lagoon enclosed by a submerged coral bank and a barrier reef enhanced with a breakwater. The Commercial Port facilities, Marine Industrial terminals, fuel and cement facilities, and various water recreation facilities are located on the south shoreline of Cabras Island within Outer Apra Harbor. See Figure 4-3.

Figure 4-3: Outer Apra Harbor

Source: Google Earth and WSP

4.1.1 WATERSIDE ACCESS

The main navigation channel, anchorages, the commercial port facilities, marinas, other marine industrial facilities and the Navy's Delta, Echo and Kilo wharves are located in Outer Apra Harbor. Other Navy facilities including the Navy Dry Docks are located within Inner Apra Harbor.

Additional detailed information on the navigational infrastructure around the Island of Guam and Apra Harbor are described in the following National Oceanic and Atmospheric Administration (NOAA) and British Admiralty nautical charts.

- NOAA 81048 Guam
- NOAA 81054 Apra Harbor
- British Admiralty 1109 Apra Harbor

Public Law 26-72 "Harbor Rules and Regulations of the Port Authority of Guam" governs Harbor use. Operations within Outer Apra Harbor are controlled by the PAG through the office of the Harbor Master. The Navy controls all operations in inner Apra Harbor, which is a restricted area.

4.1.1.1 Apra Harbor and Navigation

The main access channel in the Outer Apra Harbor is aligned at 83° (Figure 4-3) from the harbor channel entrance, which is 705 feet wide between Orote Island and Spanish Rocks. Inbound traffic has priority and access is restricted when winds exceed 35 knots. General harbor navigation statistics are provided below.

- Cargo and Vessel Traffic — Approximately 2 million tons of cargo and 530 vessels handled annually
- Maximum Vessel Size — 100,000 DWT
- Maximum Vessel Draft — 51.8 feet
- Pilotage — Compulsory for vessels over 500 GRT and available 24 hours per day

Once inside the harbor, vessels can access the Commercial Port facilities by traveling east through the Cabras Island Channel.

4.1.1.2 Safety Zones

In February 2015, the USCG revised the regulated navigation areas within and approaching Apra Harbor. A safety zone around Hotel Wharf was removed since the facility is not used for explosives cargo handling. Kilo Wharf, located near the entrance to the Harbor, is the DOD's only dedicated ammunition wharf in the Western Pacific Region. The 680-yard permanent safety zone associated with Kilo Wharf was expanded and re-designated as intermittent Safety Zones A and B, with explosive safe distance arcs of 1,000 and 1,400 yard radii respectively. The safety zones shown in Figure 4-4 provide a buffer between explosives regularly handled on Kilo Wharf and the general public and maritime operators. Traffic is still permitted to pass through these zones with the permission of the Captain of the Port (USCG). Six anchorage points are available in Guam as shown in Table 4-1.

Table 4-1: Anchorage Points in Outer Apra Harbor

Number	Latitude	Longitude	Depth (ft)	Notes
501	13°27.2'N	144°37.6'E	141	General anchorage
701	13°26.6'N	144°37.5'E	143	Military explosive anchorage
702	13°27.4'N	144°28.1'E	128	Military explosive anchorage
703	13°27.3'N	144°38.3'E	113	General anchorage
704	13°28.6'N	144°38.5'E	120	Navy anchorage

951	13°26.5'N	144°38.2'E	292	Navy anchorage

Source: Fairplay

Data for tugs available in the harbor from the service provider Cabras Marine are shown in Table 4-2.

Table 4-2: Cabras Marine Tugs

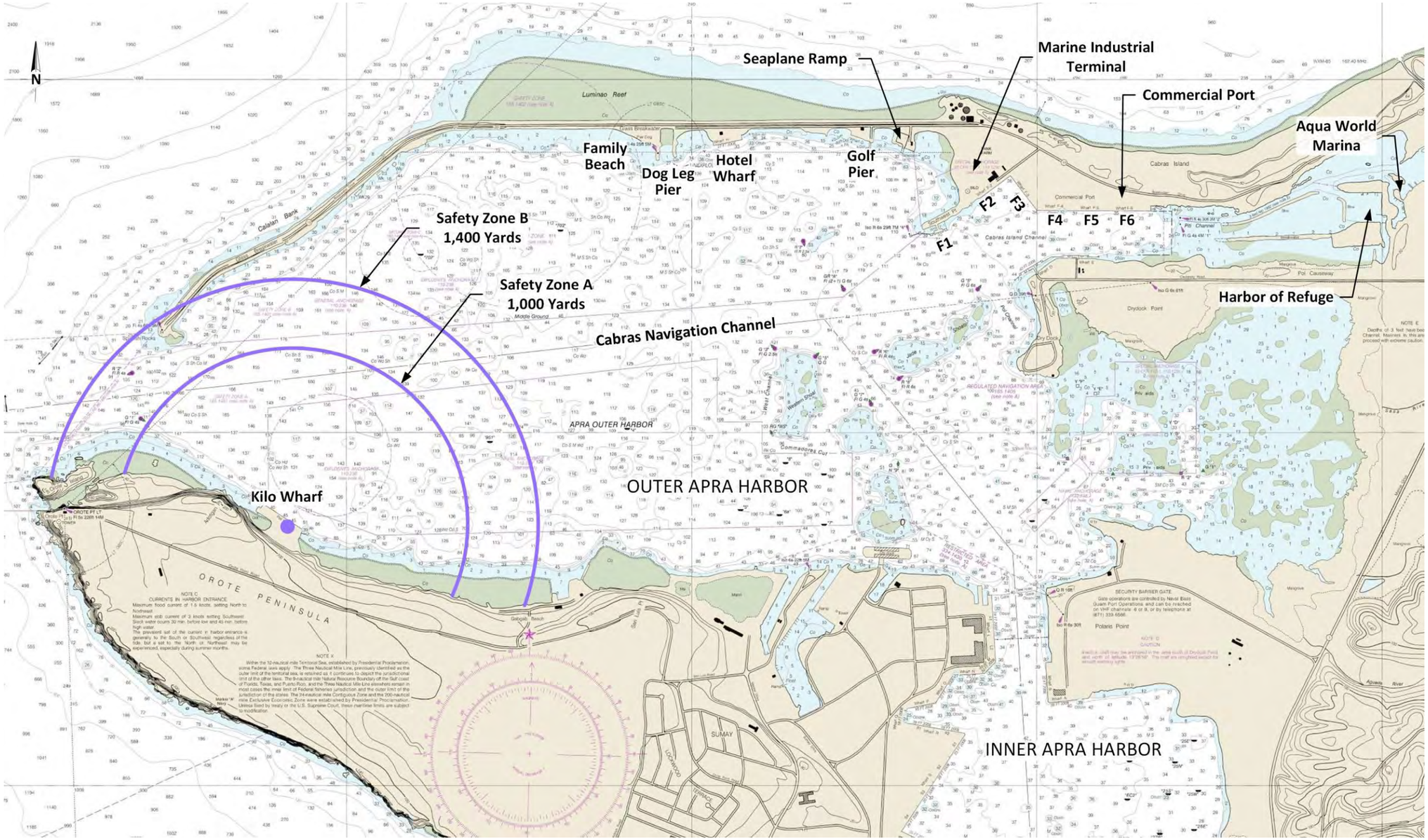
Name	Length (ft)	Breadth (ft)	Horsepower	Gross Tonnage
M.T. Agility	86.2	32.2	3,600	291
M.T. Chamorro	105	30		180
M.T. Endeavor	110		4,300	
M.T. Endurance	89.2	33.2	4,000	292
M.T. Goliath	96	31.2	3,600	264
M.T Hurao	89.2	33.2	4,000	292
M.T. Matua	86.2	32.2	3,600	291
M.T. Talofofo	106	30.2	3,750	295
M.T. Tamaraw	134.5	33.1		191
M.T. Quipuha	96	31.2	3,600	264

Source: Cabas Marine

According to the Harbor Master, two tugs are generally used for navigation of most vessels within the harbor and four tugs for aircraft carrier vessels.

PORT AUTHORITY OF GUAM

Figure 4-4: Apra Harbor NOAA Chart



Source: WSP modification of NOAA Chart 81054

4.1.1.3 Navigational Aids

The Federal aids to navigation are identified on the nautical charts described in Section 4.1.1.2. The USCG Cutter Sequoia, home-ported in Inner Apra Harbor, is the only vessel responsible for maintenance of navigational aids on Guam and throughout the Marianas Islands and Kwajalein Atoll in the Marshall Islands. Therefore, response times to correct damaged or extinguished navigation aids on Guam may be delayed due to other priorities. The USCG also maintains other navigational aids located at Agat Small Boat Marina, Gregorio D. Perez Marina, and the Harbor of Refuge. Guam Police Department maintains navigational pilings at Agat Small Boat Marina. Other entities such as the Marianas Yacht Club and Aqua World Marina maintain their own navigational aids.

The Fourteenth USCG District, located in Honolulu, Hawaii, publishes a Weekly Notice to Mariners. This publication is distributed via mail, e-mail and internet and advises mariners of navigation matters that may be of immediate concern. Additionally, the USCG broadcasts a Notice to Mariners over Very High Frequency (VHF) radio on navigational issues that are of immediate and local importance.

4.1.1.4 Tidal Elevation and Flow

Station ID 1630000, Apra Harbor, Guam for the 1983 – 2001 Epoch.

- MHHW: 2.34 feet
- MSL: 1.367 feet
- MLLW: 0.00 feet

Flow: At the entrance to Apra Harbor, the flood stream sets between north and northeast and the ebb stream southwest, slack water occurring at 30 minutes before low water and 45 minutes before high water. When combined with the southwest-going current associated with the northeast trade winds, which is greatly affected by the force of the wind and may be sufficient to overcome the northeast-going stream, the resultant flow has maximum rates of 1.5 knots traveling northeast and 3 knots traveling southwest. Strong rip tides may also be encountered.

Swell: Heavy swells from the west can last for several days and result in dangerous operation for small-craft vessels within the harbor. These conditions typically occur from developing typhoons traveling northwest.

4.1.1.5 Condition Assessment

Approximately once every five years the USCG conducts a Waterway Analysis and Management System (WAMS) study for the waters around Guam. Due to other operational commitments, the USCG has been unable to complete the WAMS study in recent years. However, changes to the current aids to navigation system are not expected.

With regard to Apra Harbor, the WAMS study may receive a higher priority in the coming years due to military build-up on the island and additional Naval and commercial vessels that are likely to call on Port facilities. Similarly, home-porting additional vessels on Guam and the construction of new wharves or deepening the channel may also affect the navigation system. Once the WAMS study is performed, it is recommended that the PAG provide input to the USCG on their in-water infrastructure improvements.

4.1.2 LANDSIDE ACCESS

Route 1, also known as Marine Corps Drive, is a four-lane arterial that provides landside access to the Port from Tamuning and other urban areas. From the Port, Route 1 runs southwesterly towards Piti. Access to the Port from Piti is via an intersecting two-lane road, Route 11. On Cabras Island, Route 11 runs west past GPA's Cabras Power Plant Complex, through vacant lands set aside for the Cabras Island Industrial Park, north of the Commercial Port area and dead ends on Glass Breakwater, which forms the northern breakwater for Outer Apra Harbor. The Northern barrier along the Route 11 consists of a low seawall and armored breakwater protection facing the Philippine Sea. See Figure 4-5.

Landside access to the Navy's facilities is via a two-lane road, Route 18 (accessed via Route 1), which is south of the Port and runs parallel to Route 11.

Figure 4-5: Commercial Port Location and Access

Source: Google Earth and WSP

4.1.2.1 Route 11

Route 11 is a two-lane road with 12-foot travel lanes and 8-foot shoulders (both directions) within the 100-foot-wide right-of-way corridor. See Photo 1. It has provision for turning pockets to the existing entrance to the container yard and the truck gate.

Photo 1: Highway 11 Seawall

Route 11 was originally paved with an 8-inch thick base course and a 2-inch thick wearing surface, having a typical 2 percent drain slope outward; double bituminous surface treatment for shoulders with typical five percent drain slope outward. The DOD Defense Access Roads (DAR) program overlaid the road in 2012 with 5 inches of asphalt and maintained the 2 percent crown in the roadway and reinforced the shoulder to 7 inches of asphalt over an 8-inch thick base course. The travel lanes and turn lanes have a 1-inch thick friction course. The traffic flow at the interchange of Route 1 and 11 is controlled by a spanwire traffic signal complete with two left turn lanes from Route 11 onto Route 1, a dedicated right turn lane from Route 11 onto Route 1. Route 11 also includes 2 large culverts that carry Route 11 over the Piti and Tepungan Channel near the GPA Cabras Powerplant that were not improved with the Route 11 road paving project.

Condition Assessment

According to the analysis revealed in the Guam 2010/2020 Highway Master Plan by Department of Public Works (DPW), the capacity to handle anticipated traffic flow will be adequate up to

2020. No short-term or long-term capacity expansion was recommended. With the delay in the military buildup, it is likely that Route 11 traffic capacity will be sufficient well into the future.

According to the 2030 Guam Transportation Plan issued in 2008, the pavement condition for Route 11 is considered acceptable. No planned improvements were identified in the report except for the intersection of Route 11 and Route 1.

There are revisions being considered to increase Guam's maximum weight and height requirements for vehicles. The maximum weights are planned to be increased based on impact to the trucking and construction industry. Route 11 pavement, utilities and culverts should be analyzed based on weight increases and the effect it would have on the service life.

Maintenance and Operational Improvements

Although striping is normally required every two to five years, DPW has not programmed any work on Route 11 through 2030. Pavement preventative maintenance should be performed by at least 2023 to preserve and extend the service life of the pavement.

There is an existing enclosed storm drain system along Route 11 between the Port and the Truck Enforcement Screening Station facility which DPW has not maintained. It is recommended that the storm drain system is cleaned and debris removed to prevent flooding during storm events.

The above referenced study by DPW revealed a large amount of rocks/coral rubble piled up in front of the existing seawall. Some of this has since been cleared, but a substantial portion (from the existing gate to the west end of the container yard) still remains. This poses a continuing threat of increased wave run-up and renders the seawall ineffective against overtopping during large storms/typhoons. Overtopping of the seawall in the future may cause rocks/coral rubble to be deposited on Route 11, resulting in temporary road closures, possible road damage and flooding of the cargo terminal yard.

4.2 LANDSIDE AND MARINE ASSETS

Management and operation of the majority of the Port facilities on Cabras Island was transferred from the Government of Guam to the PAG between 1979 and 1985. GEDA assigned the management of the remaining 32 acres within the site of the existing Marine Industrial Complex to the PAG in 1988. Currently, the eastern end of Cabras Island is under the administrative jurisdiction of the PAG, with the exception of the GPA's Cabras Power Plant Complex and a small parcel of land adjacent to Berths F2 and F3 which is owned by GEDA.

Overall, the PAG has jurisdiction over more than 1,000 acres of land on Guam including 515 acres of submerged land parcels. The PAG's marine and landside assets on Cabras Island include the Harbor of Refuge (East and West Basins), Piti Channel, Cargo Terminal, Marine Industrial Complex, Hotel Wharf, Dog Leg Pier, Seaplane Ramp, Golf Pier, Outhouse Beach, and Family

Beach. Figure 4-6 shows an overview of the PAG's properties and adjacent property owners. The PAG's facilities have been categorized by physical location and, to some extent, function, as shown in Table 4-3 and Table 4-4. The cargo berths are identified by the letter "F" and the corresponding number 1, 2, and so on.

4.2.1 FACILITIES

Table 4-3: Marine Assets and Characteristics

Marine Asset	Length (Ft)	Depth (Ft)	Location	Current Use
Family Beach and Dog Leg Pier	NA	NA	Cabras Island Glass Breakwater	Portions of these assets are leased for water recreation activities (diving, snorkeling, and jet skiing)
Hotel Wharf	500	26	Cabras Island Glass Breakwater	Hotel Wharf and access road scheduled for reconstruction
Golf Pier	370*	40	Cabras Island Glass Breakwater	Managed by Mobil Oil for discharging and bunkering of liquid bulk fuel and discharging of bulk cement products via pipeline
Outhouse Beach	NA	NA	Cabras Island Glass Breakwater	Portions of these assets are leased for water

Marine Asset	Length (Ft)	Depth (Ft)	Location	Current Use
				recreation activities (diving and snorkeling)
Seaplane Ramp	111	10	Cabras Island Glass Breakwater	Leased facility for Guam Customs and Quarantine (MITF). Under construction in August 2021
F1	550	70	Marine Industrial Complex	Managed by Tristar Agility for discharging of liquid bulk fuel and liquefied petroleum gas (LPG) and bunkering of fuel
F2	670	24-26	Marine Industrial Complex	Upland leased to Cabras Marine Corporation. Dock utilized for dry-dock repair activities, discharging of bulk cement products via a pipeline, and berthing of tug boats

Marine Asset	Length (Ft)	Depth (Ft)	Location	Current Use
F3	750	28-30	Cargo Terminal	General cargo, passenger vessels, fishing vessels
F4	665	37	Cargo Terminal	Container, cruise ships and general cargo
F5	665	37	Cargo Terminal	Container, cruise ships and general cargo
F6	665	37	Cargo Terminal	Container and general cargo
Harbor of Refuge	NA	NA	Apra Harbor Piti Channel	Safe harbor for small craft in the event of storms and long-term moorage for vessels unable to berth at Agat Small Boat Marina or Gregorio D. Perez Marina
Aqua World Marina	NA	NA	Apra Harbor Piti Channel	Leased by Aqua World for boat slips and landside facilities
Gregorio D. Perez Marina	NA	NA	Hagåtña	Vessel moorage, boat ramps, and floating slips. Mooring slips leased to

Marine Asset	Length (Ft)	Depth (Ft)	Location	Current Use
				various tenants
Agat Small Boat Marina	NA	NA	Agat	Boat ramp and floating slip. Mooring slips leased to various tenants
Port Beach	NA	NA	Apra Harbor Piti Channel	Water recreation activities
Marians Yacht Club	NA	NA	Sasa Bay	Water recreation activities

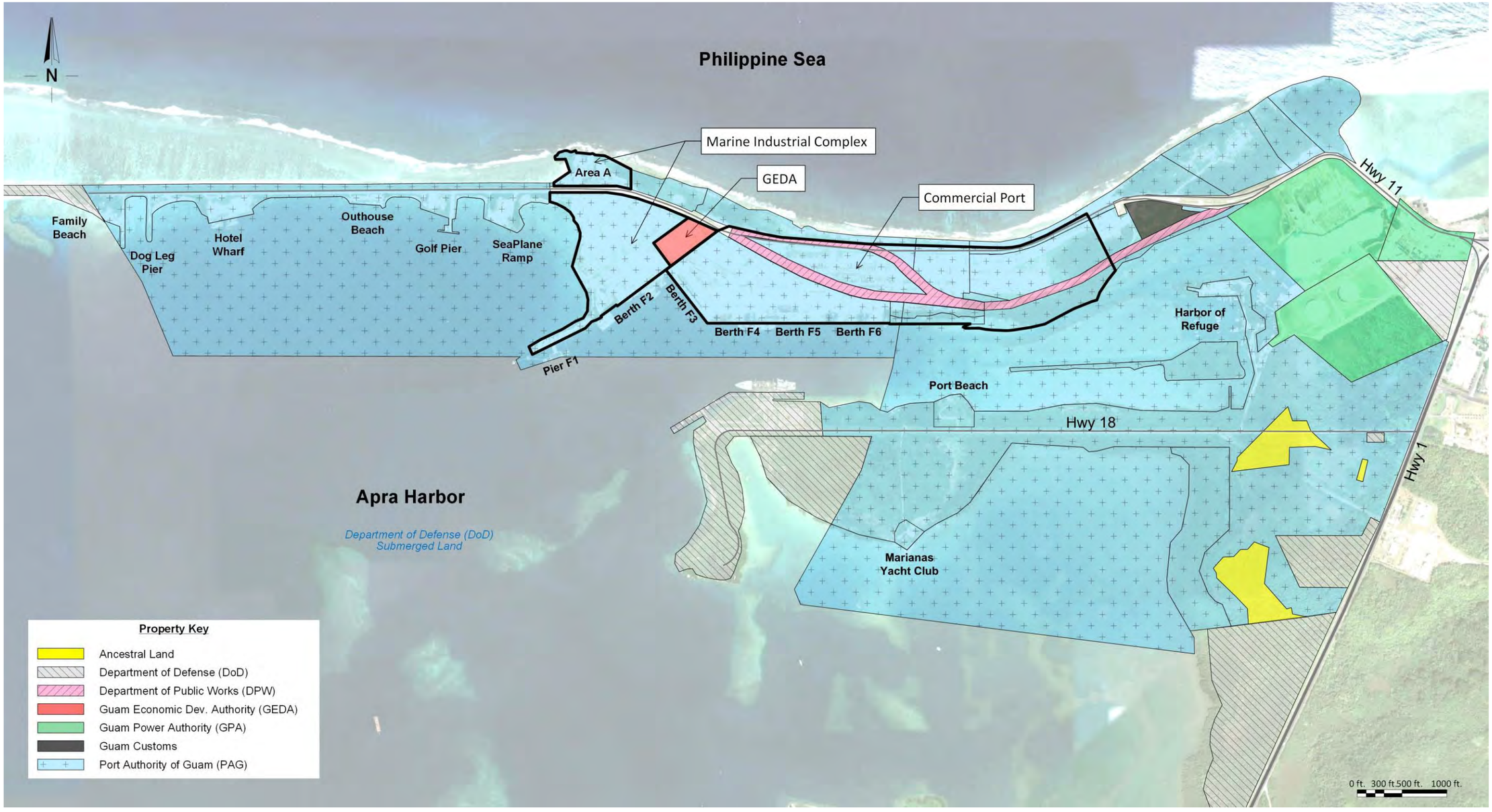
Source: The PAG and WSP

Table 4-4: Commercial Port Cargo Areas

Commercial Port Cargo Areas	Acres	Marine Area	Location	Current Use
Cargo Terminal	91	F3 to F6	Cabras Island	Cargo operations
Marine Industrial Complex	35	F1, F2	Cabras Island, west of Cargo Terminal	Leased to private companies for storage of liquid fuel, cement, and marine industry use
Cabras Island Industrial Park	42	N/A	Cabras Island, east of Cargo Terminal	Undeveloped area where portions are leased to private entities for recycling and parking of container chasis

Source: The PAG and WSP

Figure 4-6: Property Map



Source: Google Earth and WSP

4.2.2 LAND USE DESIGNATIONS

The Guam Legislature approved the 2013 Master Plan Update which contained the current land use designations for properties under the jurisdiction of the Port. Such land use designation map is posted on the Port's website. Using this designation map as a baseline, it is recommended that the land use designation map is revised as described below and shown in Figure 4-7.

4.2.2.1 Industrial

The segment of land nestled between the cargo terminal, the Mobil Tank Farm and the Seawall to the north and the area adjacent to the Route 11 Approach Road is designated for "Industrial" use.

4.2.2.2 Commercial Terminal

This tract designated "Commercial Port" consists of the existing cargo terminal areas and the expansion areas located to the east of the terminal. It consists of approximately 91 acres of land with access to deep navigable waters of the Cabras Navigation Channel in Apra Harbor. This area includes Berth F3 and the adjacent upland area. This tract includes fuel tanks and several bays within Warehouse 1 that are occupied by Port Police, Port Maintenance staff, and leased to private entities.

4.2.2.3 Natural Preserve – Water

These tracts consist of the Piti Channel that flows from the Philippine Sea under the Route 11 bridge past the Harbor of Refuge and into Apra Harbor via the Cabras Island Navigation Channel and Port berths and the submerged property within Sasa Bay and south of Route 18.

4.2.2.4 Open Space Tracts

- The area parallel to Route 11 extending from Seaplane Ramp to Family Beach. Fuel pipelines run partly along this tract between Golf Pier and the western end of the Area A Tank Farm.

- Several tracts north and south of Route 18 and west of Route 1. While a specific use has not been identified for the open space tract that fronts the north side of Route 18 and the west side of Route 1, it may be in the Port's best interest to designate this area as Marine Industrial. This would provide potential development opportunities, both private and public, that would be compatible with marine and Port operations and be a potential source of revenue in the future.

4.2.2.5 Marine Industrial

The various tenant facilities described under "Marine Industrial" include Berth F2, Seaplane Ramp, an upland storage area northeast of Berth F2, Outhouse Beach, Hotel Wharf, and approximately 12.5 acres of land east of the Commercial Port. Hotel Wharf is slated to undergo

rehabilitation to support an alternative laydown area for bulk cargo, RO/RO operations, and cruise ship operations.

4.2.2.6 Fuel and Cement

These tracts designated as “Fuel and Cement” include Pier F1, the Hanson cement unloading dock, Area A Tank Farm, Area C Tank Farm, Golf Pier, the Cementon cement unloading dock, and various upland storage facilities. Golf Pier is managed by Mobil Oil Guam as a fueling pier and is also used by Cementon for offloading bulk cement.

4.2.2.7 Water Recreation

These tracts consist of Dog Leg Pier, Family Beach, Port Beach, and the Marianas Yacht Club. Dog Leg Pier and a portion of Family Beach are leased to tenants for water recreational activities, i.e., jet skiing, banana boat rentals, snorkeling, and scuba diving. Other areas of Family Beach are used by local residents and tourists for picnic and swimming activities. A portion of the north-east Family Beach property is under the jurisdiction of the Navy. Similarly, Port Beach and the Marianas Yacht Club provide water recreation activities to the local community.

4.2.2.8 Fishing Facilities

There are no tracts designated as “Fishing Facilities”.

4.2.2.9 Submerged Properties

These tracts designated as “Submerged Properties” consist of submerged land from the western end of Family Beach extending to the east shoreline adjacent to Guam Power Authority and the area within Sasa Bay and south of Route 18.

4.2.2.10 Natural Preserve Land

These tracts identified as “Natural Preserve Land” consist of two areas. The southern -most area is located along the western shoreline of Sasa Bay. The northern area (previously designated as Open Space) is located northeast of the Industrial tract.

4.2.2.11 Utility Easement

These tracts consist of land north of Route 18 between Route 1 and Port Beach and land north of Route 11 from Hotel Wharf extending to the east side of the Fuel and Cement tract.

4.2.2.12 Explosive Safety Quantity Distance (ESQD)

The military has designated a number of hazard zones called the “Explosive Safety Quantity Zone” in Apra Harbor. Most ESQD zones are in Inner Apra Harbor, which does not seem to impact Port activities and is not shown on the Port website. However, there is one zone in Outer Apra Harbor, which is demarcated as a circumferential boundary at a specific radius from the source of shipboard ordinance and other explosive material stored. The boundary runs through Outhouse Beach between Dog Leg Pier and Hotel Wharf. In general, the following rules apply to areas within an ESQD arc:

- ESQD arc radii are determined by the military based on the extent and nature of the ordinance stored.
- Inhabited Buildings are prohibited within the designated arc.
- Structures that can collapse onto people and endanger lives are also not permitted.
- Recreational facilities (except facilities for large crowds such as grandstands) are allowed within the outer 40 percent of the ESQD arc.
- Ship anchorages and wharves (which moor ships) are generally not allowed within the arc.
- The above restrictions would apply to Family Beach and Pier Dog, which are within the arc.

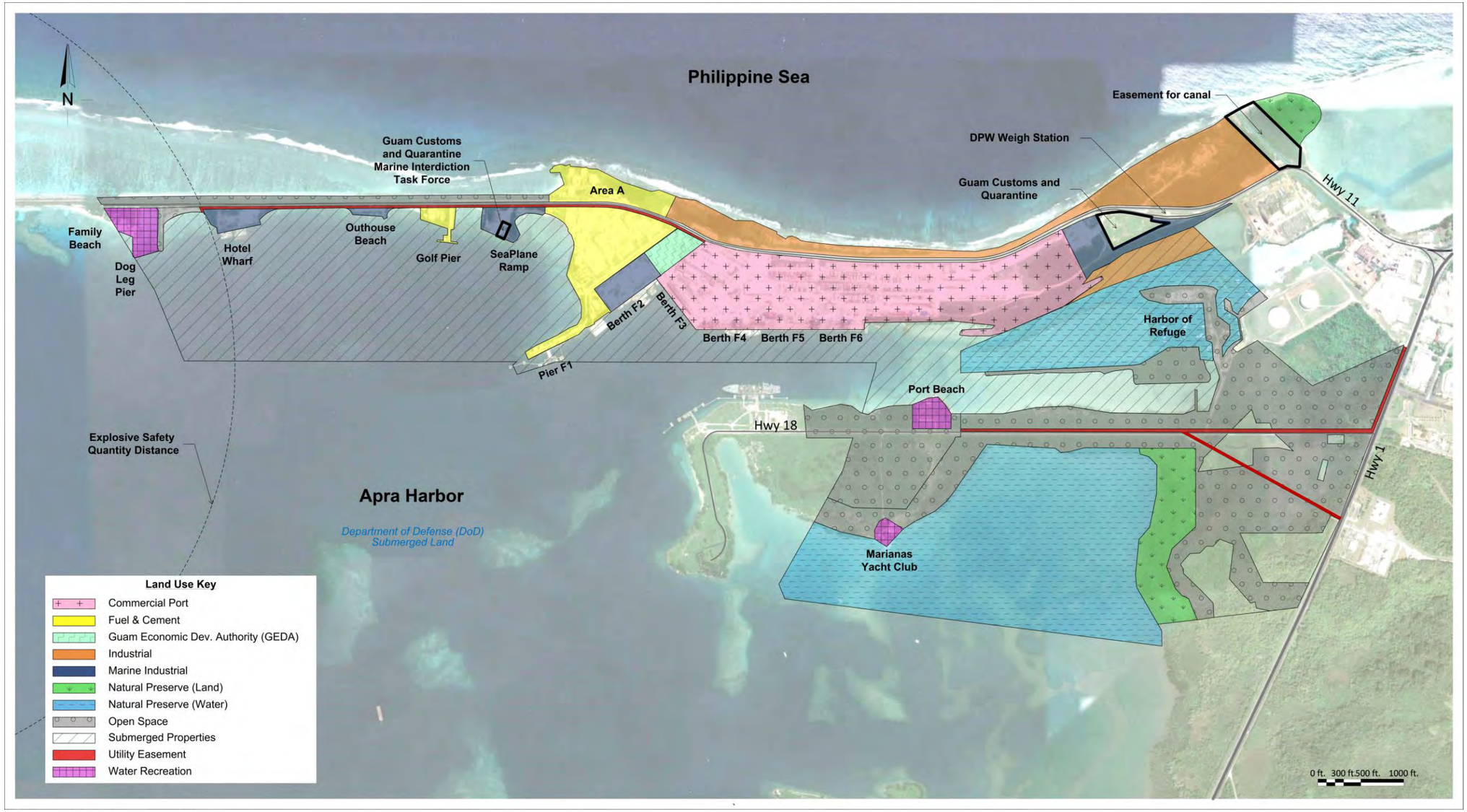
4.2.2.13 Historic Preservation

The Guam Historic Resources Division, also known as the State Historic Preservation Office (SHPO) is responsible for record keeping, monitoring and enforcement of Guam's regulations regarding development at historic sites.

Project activity related to the Hotel Wharf and Access Road Maintenance and Repair project was described to SHPO as part of a requested Section 106 review and consultation. The SHPO responded that an underwater archeological survey was required at Hotel Wharf to confirm there were no archeological items present. The survey was completed by Dr. William Jefferey, and the report was accepted by SHPO in September of 2020.

The PAG has a number of commercial marine facilities that support vessel service for the various types of cargo and civilian marine-industrial activities in Guam. The various users and tenants in these Port areas are described in the following sections of this report. PAG also oversees the Harbor of Refuge, Gregorio D. Perez Marina and Agat Small Boat Marina.

Figure 4-7: Updated Land Use Designations



Source: Google Earth and WSP

4.2.3 CARGO TERMINAL

The Cargo Terminal comprises a total of 91 acres made up of the following: four berths numbered F3 to F6 encompassing 4 acres; 40 acres of storage yard for containers; 9 acres of open storage for breakbulk, vehicles and general cargo; 10 acres for buildings, structures, parking and circulation; 4 acres of gates and terminal access roadways; and 24 acres of undeveloped land reserved for expansion. Containerized cargo is stored north of Berths F5 and F6. Similarly, breakbulk cargo is stored north of Berth F4. See Figure 4-8 and Figure 4-9.

The Cargo Terminal has a throughput capacity of approximately 86,800 containers per year, based on the current configuration of full containers that are predominantly wheeled. The Cargo Terminal capacity can be increased to approximately 149,000 containers per year if the full containers are stacked instead of wheeled. The existing and potential throughput capacity of these components is discussed in Section 6.

The marine facilities within the Cargo Terminal consist of four berths (F3, F4, F5, and F6) totaling approximately 2,700 linear feet. The berths are bulkhead-type structures consisting of steel sheet pile walls faced with concrete that extends several feet below mean lower-low water. A portion of Berth F5 and Berth F6 (560 feet) is a pile-supported wharf consisting of a concrete slab spanning between concrete pile caps and supported by concrete piles. The pile supported section was constructed in 1998 following an earthquake in 1993 that damaged the bulkhead wharf. Steel sheet pile bulkheads are present on the landside and waterside faces of the pile supported section. The waterside bulkhead is a toe-wall. At F3, the fender system is comprised of regularly spaced rubber tires and cylindrical fenders suspended from the bullrail. At F4, F5, and F6, the fender system is comprised of regularly spaced fender panels backed by rubber arch fenders.

Figure 4-8: Berths F3 Through F6

Source: Google Earth and WSP

Figure 4-9: Cargo Terminal

Source: Google Earth and WSP

4.2.3.1 Berths F3 to F6

Berth F3 is located in the southwest corner of the Cargo Terminal. Long-liner fishing boats with lengths ranging from 75 to 100 feet and drafts of 15 to 20 feet previously called at Berth F3. However, this service has been discontinued in recent years. Vessels calling on Berth F3 currently include cable ships to load cables from Warehouse 1 and bulk vessels for offloading general cargo, e.g. aggregate, gravel, sand, etc.

Berths F4 to F6 are located along a 1,950 foot marginal wharf with a depth of 37 feet that accommodate container ships and general cargo vessels. See Photo 2 for a typical photo of the grounded storage area.

The largest vessels currently calling at the Port are container ships with the following characteristics.

- LOA: 853 feet
- Beam: 115 feet
- Draft: 37 feet
- TEUs: 3,600

Vessel carriers calling on the Port have the option of using excess capacity on current vessels in service, deploying larger vessels and/or increasing the number of vessels in a service to accommodate increased cargo demand.

A majority of containerships currently in the global market can be serviced at Berths F4 through F6. However, the current 120-foot gauge cranes may limit the size of larger vessels. Future crane replacements should accommodate ships such as the C11 class vessels, having beams of 130 feet ± and capacities of approximately 5,100 TEUs.

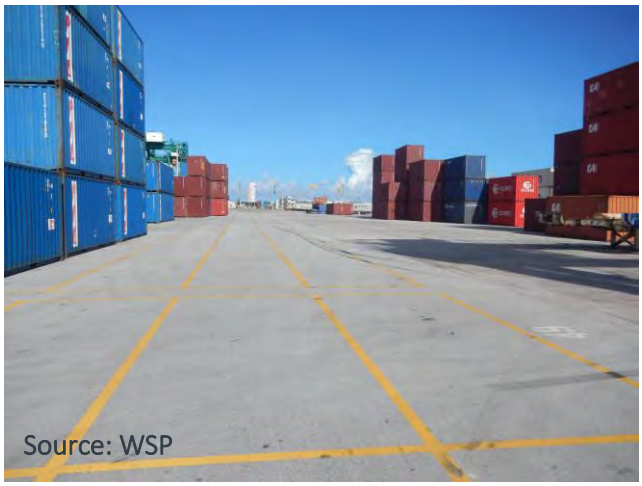


Photo 2: Grounded Storage Area in Yard

Depending on schedule and availability, cruise ships have called on Berths F3 through F6 in the past. The water depth at F3 is approximately 28 to 30 feet, which is adequate to accommodate some smaller cruise ships. In the past, Guam has received four to six cruise ships per year with approximately 800 passengers per call. More recently, there were three calls in 2018, five calls in 2019, one call in 2020, and zero in 2021. The decrease in cruise ship Port calls was due to the global COVID-19 pandemic.

Cruise vessels typically stay a partial day in Guam (i.e., arrive at 0800 and depart by 1800). The *Cruise Terminal Location Report* provided to the PAG in 2009 recommended that cruise operations be relocated to Hotel Wharf, a multipurpose marine facility located west of the Cargo Terminal, to improve the efficiency of the commercial cargo operation, and to potentially accommodate larger cruise vessels.

Berths F3 through F6 are bulkhead-type structures and have been in service in the 1960's. The wharf structures consist of tied back sheet pile walls with concrete caps (coping beams). Sheet pile walls are also used as the upland anchor (deadman) below ground level. A wearing surface consisting of asphalt concrete pavement is present on the upland portion of these facilities. Berth F5 is a pile-supported wharf and consists of a concrete slab spanning between concrete pile caps and supported by concrete piles. In addition, steel sheet pile bulkheads are present on the landside and waterside faces of F5; the waterside bulkhead being a toe wall.

The Guam earthquake of 1993 severely damaged sections of the wharf structures. Because of this damage, a 560-foot section of the wharf at Berths F5 and F6 was replaced by a pile-supported structure. Pre-stressed concrete piles were driven to support cast-in-place concrete beams and slabs. New sheet pile walls were driven at each end of the new wharf section to contain the fill laterally. The damaged sheet piles were cut near the seabed to suit the new slope under the wharf section. Rip rap was placed above the new slope. A section of the pile-supported beams that carry the crane rails was replaced after the 1993 earthquake. New pre-stressed concrete piles were driven and new sections of the beams were cast next to the existing ones.

In 2010, during an inspection of the sheet piles at Berths F4 through F6, it was discovered that the soffit of the concrete wharf at Berth F5 was experiencing an accelerated rate of deterioration. In response to this assessment, a marine Service Life Extension (SLE) project was developed. This project was completed in 2015/2016. The project addressed concrete structure and coping beam repairs, routine sheetpile maintenance, fender replacements and cathodic protection; all of which were designed to extend the service life 15-20 years. The condition of the bulkhead should be monitored and repaired as needed to prevent further damage. Preparations should be made for long-term bulkhead replacement when required to preserve this and other waterfront assets from exceeding their current useful life.

In May of 2023, the island of Guam was severely impacted by Typhoon Mawar which caused extensive damage to Port infrastructure. To determine the severity and extent of damage, the PAG performed an above-water and underwater inspection of maritime facilities in the fall of

2023 and spring of 2024, respectively. Findings from the inspection efforts identified significant damages to PAG assets and are described in the following sections.

4.2.3.2 Marine Cargo Terminal

4.2.3.2.1 Berth F3

Berth F3 is a bulkhead-type structure consisting of a steel sheet pile wall faced with concrete that extends several feet below the mean lower-low water (MLLW) level. The berth face at F3 consists of a concrete bullrail with integrated cleats and mooring bollards. The wearing surface consisting of asphalt concrete pavement is present on the upland portion.

Condition Assessment

Overall, Berth F3 is in **serious** condition. See Photo 3 and Photo 4. Holes, dents, and missing anodes are present at multiple locations. Similarly, mechanical spalling with exposed steel reinforcement (along the bullrail and soffit of the pile cap) are present at multiple locations. Along the northwest face of the bulkhead, settlement of the backfill material has occurred. The steel tabs and rubber cylindrical fenders that comprise the fender system are missing or severely damaged at multiple locations. Moderate corrosion is present at the mooring hardware. A detailed condition assessment report for Berth F3 is provided in Appendix B.

Photo 3: Berth F3 Damaged/Dented Bulkhead

Photo 4: Berth F3 Settlement and Damaged Bullrail

Maintenance and Operational Improvements

The following are repair recommendations for Berth F3:

- Repair Holes in the Sheet Pile Wall: This repair consists of installing steel patches over existing holes and displacing water by pumping cementitious grout into the voids. Due to the age of the structure and severity of damage observed, this repair procedure should be considered a temporary means to extend the life of the sheet pile wall.
- Concrete Bullrail Repairs: At locations where closed- and open-corrosion spalls are present, sawcut and remove concrete. Where steel reinforcement is exposed, remove corrosion from reinforcement, add supplemental reinforcement as necessary, and remove/replace damage concrete to restore the original thickness.
- Bulkhead Repair: Repair the damaged/underwater sections of concrete by placing formwork and installing embed bolts, reinforcement, and a cementitious repair material on the waterside and landside of the bulkhead wall. To strengthen the dented bulkhead, install a relieving platform consisting of pipe piles, concrete pile caps, and a concrete deck.
- Fender System Repair: Remove and dispose of damaged fender chains, embeds, and cylindrical fenders. Replace cylindrical fenders in-kind. At locations where embed plates are damaged, fabricate and install new hardware. It may be necessary to install new embed bolts at some locations.
- Anodes: At locations where anodes are missing or damaged, install new anodes by cleaning the surface of the steel sheet pile wall and welding on new anodes.

4.2.3.2.2 Berth F4

Berth F4 is a bulkhead-type structure consisting of a steel sheet pile wall faced with concrete that extends several feet below the mean lower-low water (MLLW) level. The berth face at F4

consists of a concrete bullrail with integrated cleats and mooring bollards. A wearing surface consisting of asphalt concrete pavement is present on the upland portion.

Condition Assessment

Overall, Berth F4 is in **poor** condition. See Photo 5. Open- and closed-corrosion spalls are present along the concrete bullrail at multiple locations. The fender system is in working condition, but in need of extensive repairs due to severely damaged and/or missing fender panels. Minor to moderate corrosion is present at the mooring hardware. A detailed condition assessment report for Berth F4 is provided in Appendix B.

Photo 5: Berth F4 Damaged Fender Panel

Maintenance and Operational Improvements

The following are repair recommendations for Berth F4:

- Concrete Bullrail Repairs: At locations where closed- and open-corrosion spalls are present, sawcut and remove concrete. Where steel reinforcement is exposed, remove corrosion from reinforcement, add supplemental reinforcement as necessary, and remove/replace damage concrete to restore the original thickness.
- Mooring Hardware Rehabilitation: Monitor the coating system at the mooring hardware. When damage to the coating system becomes significant, remove dirt, oil, debris and existing paint/coating systems and apply a high-performance coating system.
- Fender Panel Rehabilitation: Remove fender panels and discard existing chains and shackles. Similarly, remove and discard rubber fender elements with major or severe damage. Remove and salvage UHMW-PE rub strips, clean fender panels and apply a high-performance coating system. Reinstall rub strips, supply new chains shackles, and fenders and reinstall fender panels.

- Seismic Joint: At the seismic joint between F4 and F5, sawcut and remove the loose/damaged concrete. Intentionally roughen the exposed surfaces, place formwork, and install a cementitious repair material.
- Crane Rail: Continue monitoring the vertical misalignment of the crane rail at Station 12+44.

4.2.3.2.3 Berth F5

Berth F5 consists of an anchored sheet pile bulkhead and a pile-supported wharf with a concrete slab spanning between concrete pile caps and supported by concrete piles. In addition, steel sheet pile bulkheads are present on the landside and waterside faces of F5; the waterside bulkhead being a toe wall.

Condition Assessment

Overall, Berth F5 is in **poor** condition. See Photo 6. Open- and closed-corrosion spalls and cracks are present along the concrete bullrail and within the below-deck framing elements at multiple locations. The fender system is in working condition, but in need of extensive repairs due to severely damaged and/or missing fender panels. Missing fender panels are widespread. Minor to moderate corrosion is present at the mooring hardware. A detailed condition assessment report for Berth F5 is provided in Appendix B.

Photo 6: Berth F5 Missing Fender Panel

Maintenance and Operational Improvements

The following are repair recommendations for Berth F5:

- Concrete Pile Cap Repair: Sawcut and remove damaged section of concrete. Where steel reinforcement is exposed, remove corrosion from reinforcement, add supplemental

reinforcement as necessary, and remove/replace damaged concrete to restore the original thickness.

- Concrete Bullrail Repairs: At locations where closed- and open-corrosion spalls are present, sawcut and remove concrete. Where steel reinforcement is exposed, remove corrosion from reinforcement, add supplemental reinforcement as necessary, and remove/replace damaged concrete to restore the original thickness.
- Mooring Hardware Rehabilitation: Monitor the coating system at the mooring hardware. When damage to the coating system becomes significant, remove dirt, oil, debris and existing paint/coating systems and apply a high-performance coating system.
- Fender Panel Rehabilitation: Remove fender panels and discard existing chains and shackles. Similarly, remove and discard rubber fender elements with major or severe damage. Remove and salvage UHMW-PE rub strips, clean fender panels and apply a high-performance coating system. Reinstall rub strips, supply new chains shackles, and fenders and reinstall fender panels.
- Overlay Repairs: Remove and replace the damage concrete adjacent to the landside crane rail near Station 16+50. Where steel reinforcement is exposed, remove corrosion from reinforcement, add supplemental reinforcement as necessary, and remove/replace damaged concrete to restore the original thickness.

4.2.3.2.4 Berth F6

Berth F6 is similar to F5 and consists of an anchored sheet pile bulkhead and a pile-supported wharf with a concrete slab spanning between concrete pile caps and supported by concrete piles. In addition, steel sheet pile bulkheads are present on the landside and waterside faces of F5; the waterside bulkhead being a toe wall.

Condition Assessment

Overall, Berth F6 is in **poor** condition. See Photo 7. Open- and closed-corrosion spalls and cracks are present along the concrete bullrail and within the below-deck framing elements at multiple locations. The fender system is in working condition, but in need of extensive repairs due to severely damaged and/or missing fender panels. Missing fender panels are widespread. Minor to moderate corrosion is present at the mooring hardware. A detailed condition assessment report for Berth F6 is provided in Appendix B.

Photo 7: Berth F6 Typical Below-Deck Damage

Maintenance and Operational Improvements

The following are repair recommendations for Berth F6:

- Concrete Pile Cap Repair: Sawcut and remove damaged section of concrete. Where steel reinforcement is exposed, remove corrosion from reinforcement, add supplemental reinforcement as necessary, and remove/replace damaged concrete to restore the original thickness.
- Concrete Bullrail Repairs: At locations where closed- and open-corrosion spalls are present, sawcut and remove concrete. Where steel reinforcement is exposed, remove corrosion from reinforcement, add supplemental reinforcement as necessary, and remove/replace damaged concrete to restore the original thickness.
- Mooring Hardware Rehabilitation: Monitor the coating system at the mooring hardware. When damage to the coating system becomes significant, remove dirt, oil, debris and existing paint/coating systems and apply a high-performance coating system.
- Fender Panel Rehabilitation: Remove fender panels and discard existing chains and shackles. Similarly, remove and discard rubber fender elements with major or severe damage. Remove and salvage UHMW-PE rub strips, clean fender panels and apply a high-performance coating system. Reinstall rub strips, supply new chains shackles, and fenders and reinstall fender panels.

4.2.3.3 Container Crane Rails at Berths F4, F5 and F6

In 1970, a 50-foot-gauge ship-to-shore crane rail was constructed at Berths F4, F5, and F6. See Photo 8. The main crane rails, parallel to the wharf, have been documented as a CR-171 rail. In general, rail sections are typically 38-feet long and connected with 6-bolt splice connection plates. The rail is situated in a recessed trough on top of concrete pile caps and supported by grout pads and regularly spaced levelling plates.

Photo 8: Crane Rail

During the 1993 earthquake, a portion of the crane rail was damaged. The lateral movement of the wharf structure caused the crane rail to move laterally and sustain permanent (plastic) deformation. New piles were added after the earthquake in order to repair the crane rail. Additional piles were installed and spaced at nine feet on-center, staggered between existing piles. The existing concrete rail beams were widened to correct the alignment of the rails. The extent of the repair to the crane rail matched the length of the pile-supported wharf that was built to replace the damaged portion of the original 560-foot sheet pile wall. As part of the marine SLE project, connectivity to the gantry rail spur that was constructed in 1997 was removed.

The crane rails were rehabilitated in 2008 to remedy the differential movement of the gantry cranes. Repairs included replacement of rail and repair of the levelling plates.

A cursory crane rail assessment was performed in August of 2021 and identified vertical settlement of the waterside crane rail at Berth F4 (approximately 1/4 inch). This settlement was observed at an isolated location and does not appear to affect the daily use of the gantry cranes. Similarly, a follow-up evaluation was performed in 2024 and identified severe rail corrosion at F4 and failed grout pads at F5 and F6. A detailed condition assessment report for crane rail is provided in Appendix C.

4.2.3.4 Container Yard

The Port's container yard originally occupied 12 acres. Over the past three decades, the yard has been expanded several times in accordance with prior Master Plan recommendations, which has allowed the Port to sustain sufficient capacity to exceed the highest projected annual demand. Most recently, as part of the GCPI Program, an additional 7.6 acres was added to the container cargo area on the east side of the terminal and 1.3 acres to the breakbulk cargo area behind the CFS building.

Currently, empty and transshipment containers stored in the yard are stacked on the ground (grounded). Refrigerated containers are placed on chassis and stored in the designated refrigerated cargo area that includes 124 stalls equipped with reefer receptacles. Recently, new receptacles have been installed. The PAG is planning to replace the existing reefer receptacles. All other loaded containers are either placed on chassis or on the ground.

A breakdown of the existing cargo yard's total ground slots (TGS) measured in TEUs is shown in Table 4-5. The container yard as currently configured has an estimated throughput capacity of approximately 126,000 containers per year. However, the storage yard's capacity could be increased by converting wheeled slots to grounded slots. For example, if 78 percent of the wheeled slots were converted to grounded slots, the yard's capacity increases to approximately 149,000 containers due to higher stacking heights for grounded containers. Additional factors that can increase the throughput capacity of the container yard include yard configuration and layout, type and amount of equipment deployed, and capital resources invested.

Table 4-5: Port Existing Terminal Ground Slots

Storage Type	TEU TGS
Wheeled Chassis Slots	1,796
Grounded Slots	1,621

Source: The PAG

The container storage yard's existing capacity falls short of the projected demand for the military build-up forecast. Similarly, for breakbulk cargo, the 5.9 acres of open storage area falls short of the storage area requirements to accommodate the peak breakbulk forecasted cargo volumes associated with the military build-up.

4.2.3.5 Container and Cargo Storage Yard

The container and cargo storage yard area is comprised of 55 net acres used for container and breakbulk storage space, along with maintenance and repair facilities encompassing approximately 27,600 square feet (SF), and two warehouses, CFS and WH1, providing approximately 71,000 SF of floor space. The storage yard provides space for containers, automobiles, and general cargo. The container yard also includes 124 stalls equipped with receptacles to serve refrigerated containers.

The existing operation supports a combination of wheeled and grounded storage for containers. Wheeled storage is currently available for:

- Full standard containers arriving from the U.S. West Coast on Matson vessels
- Reefer containers
- Out-of-Gauge (OOG) containers
- Hazardous cargo containers
- Full standard containers arriving at the terminal for loading onto Matson vessels

Grounded storage is currently available for:

- Full standard containers arriving for transshipment
- Standard Asian service containers
- Empty containers

The first stage was constructed by the Navy in 1969 and is recognizable by the container tie downs behind Berths F4, F5 and F6. The pavement also surrounds the CFS building and continues along the waterfront to Berth F6. The pavement section for this initial phase is 3 inches of asphalt over 8 inches of compacted base material.

The second stage was constructed starting in 1984, and it filled the space between the initial container yard and the area bound by the 1980 relocation of Route 11. The pavement in this phase was constructed of 3 inches of asphalt over 8 inches of compacted base material.

The third stage was constructed starting in 1990. Chassis parking were constructed of 6 inches of asphalt on top of a 4-inch sub-base and 8-inch base course.

The existing terminal yard pavement was designed to support three block-stacked 40-foot containers, and to provide a travelling surface for Port equipment. The pavement adjacent to Berth F5 was partially modified in 1997 due to earthquake damage. This comprised an area of approximately 818 feet by 255 feet and consisted of 24-inch-thick reinforced concrete that was integrated with the beams and piles making up the pier structural system.

Condition Assessment

A condition assessment of the container yard was completed in August 2021. A majority of the yard is in serviceable condition with limited evidence of cracking, spalling, rutting, and ponding. Some areas of the yard contain asphalt pavement that have depressions due to container stacking or chassis landing legs. The trench drain grates consist of older grates that are showing signs of damage. Overall, the condition of the container yard is “Fair.” See Photo 9.

Photo 9: Container Yard Pavement

Maintenance and Operational Improvements

All yard pavement should be progressively replaced during the next 20-year planning horizon. Asphalt pavement, where it exists, should be replaced with concrete pavement to withstand the rigor of container handling equipment and container stacking. Trench drains and grates should also be progressively replaced. Maintenance and operational improvements should be accomplished through a series of projects that limit disruption to terminal operations and that integrate with the Capital Improvement Program (CIP) construction projects such as the new water line.

4.2.3.6 Buildings and Structures

The Container Terminal includes administrative facilities encompassing approximately 44,000 sf; 27,600 sf of maintenance and repair (M&R) facilities; a warehouse and container freight station providing approximately 79,000 sf of enclosed floor space; and terminal gates and circulation areas. Most of the PAG's structures on the Cargo Terminal listed in Table 4-6 were built and put into service in the late 1960's. See Figure 4-10 for the location and footprint of buildings within the Container Terminal.

Table 4-6: Major Port Buildings and Structures

Building	SF	Current Use
Administration Building	25,398	The PAG's administrative offices, Board Room, and leased shipping related port users' offices
Horizon Building (Administration Annex Building)	10,400	Port Police, Guam Customs & Quarantine, training/conference rooms, break rooms and other multi-use spaces.
Port Command Center (PCC)	5,050	Port Police, Port's video surveillance, access control, TWIC readers, and communications systems
Warehouse 1	55,144	Stevedoring, Cable Storage (Subcom), and PAG electrical equipment and supply storage
EQMR Building	24,000	Facilities, Supply, and Fleet M&R Staff
Welding Shop	3,660	Welders and equipment shed
New Operations Building (formerly Port Police Building)	2,025	Operations, U.S. Customs & Border Protection Agency
Container Freight Station (CFS)	24,000	Operations, Transportation, Dispatch, Terminal Offices, Stevedoring, Safety, and breakbulk covered storage
Terminal Gates	2,412	Secure entry into and out of the container and breakbulk terminal areas
Annex A	3,400	Engineering and Safety

Source: The PAG

The PAG is renovating several structures under the current Capital Improvement Program (CIP). The CFS Building is being renovated by repairing spalled concrete on the building exterior. Warehouse 1 is being renovated by repairing spalls on the exterior and interior of the building as well as renovating the existing engineering and safety offices. The EQMR Building is being

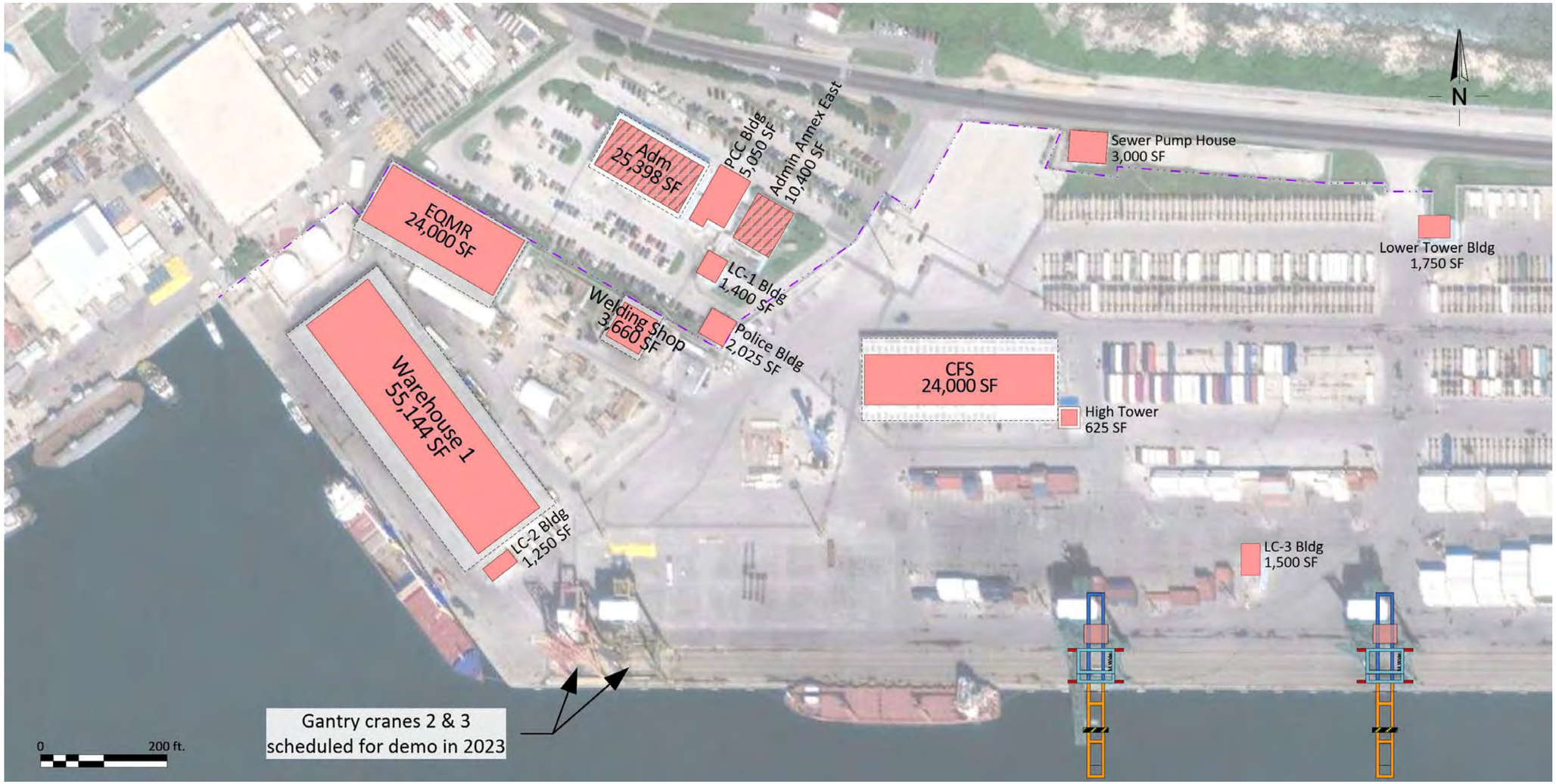
renovated by repairing concrete on the exterior of the building, cleaning and recoating the roof, and numerous interior improvements.

Most of the Port building structures were built in the late 1960's and designed to military standards to withstand the extremely high wind conditions caused by typhoons. The majority of Port buildings are reinforced concrete structures having 3,000 PSI (pounds per square inch) concrete and 20,000 PSI reinforcement steel. The lateral force design loads were dominated either by wind load (160 MPH allowable stress design/200 MPH ultimate strength design) or earthquake load (Zone 3 per the Uniform Building Code 1964 edition).

Building foundations utilize a combination of shallow strip and spread footings located 1'-6" to 3'-0" below the finish floor elevation. Allowable soil bearing pressures of 1,100 PSF were used for the design of footings 2'-6" wide and 2,500 PSF for footings greater than 10'-0" wide. Using this criteria, footings of intermediate widths were designed using straight-line interpolation.

Condition assessments for major buildings within the Container Terminal are summarized in the following sections.

Figure 4-10: Cargo Terminal Area Buildings



Source: Google Earth and WSP

4.2.3.6.1 Port Administration Building

The Port Administration Building was constructed in the 1970's and serves as headquarters for the PAG and accommodates several of the shipping lines' offices and shipping related organizations. See Table 4-7. The PAG is the landlord for these tenants.

The building is a two-story structure built with reinforced concrete arranged in a grid system. Grids 1 through 7 comprise the transverse frames and span 25 feet along an east-west axis. Grids A through D comprise the longitudinal frames and span 25 to 30 feet in the north-south axis with cantilevered eave extended 7.5 feet on four sides. The central stair-core protrudes through the roof to provide access to a small third floor observation area (Harbor Master's Office). See Photo 10.

Source: WSP

Photo 10: Port Administration Building

Table 4-7: Port Administration Building Tenants

Tenant	Room No.	Lease Start Date	Area (SF)	Purpose
Ambyth Shipping & Trading	A205	12/1995	1,204	Agent
CTSI Logistic	A108/A10	12/2009	557	Agent Administration
Norton Lilly International	115	5/2016	800	Agent/Carrier Office

Source: PAG Commercial

Condition Assessment

A condition assessment of the Administration Building was performed in 2021 and found it to be in **poor** condition. This building has reached its design-life expectancy and needs substantial retrofitting (HVAC, plumbing, communications, finishes) internally and substantial envelope repair to remedy spalling concrete and water intrusion. Similarly, major damage to the electrical, mechanical, and plumbing systems is present. See Photo 11.

Renovation of the building would be cost prohibitive due to the extent of deterioration and would be disruptive to operations, even if completed in phases. Restoration of this facility would require all modifications to meet current code requirements.

Construction of a new building adjacent to the existing building is a more practical solution. The new building could be a smaller footprint based on the current number of tenants, A programming study is recommended to determine the most effective size and layout of the building. Once completed, the existing Administration Building should be demolished to provide additional parking for the new building.

Photo 11: Administration Building Concrete Spalling

Maintenance and Operational Improvements

Maintenance activities should focus on safety and security issues and extending the service life of the Administration Building. This includes repairing spalling concrete, especially in areas that are accessible to personnel, repairing damaged or deteriorated sections of roofing and mechanical and electrical systems that are not functional.

PAG buildings such as the Administration that were constructed over 50 years ago, should undergo a detailed structural assessment is recommended to evaluate structural integrity, especially under seismic loading conditions.

4.2.3.6.2 Horizon Building (also known as the Admin Annex)

The Horizon Building was unused after the departure of Horizon Lines in 2012. The building has two sections: the high roof (HR) located on the north side and the low roof (LR) located on the south side. See Photo 12. The electrical LC1 is located behind this building. The building was occupied by Port Operations from 2014 to 2021. Currently, Customs and Port Police share space in this building. See Table 4-8.

Photo 12: Horizon Building

Table 4-8: Horizon Building Tenants

Tenant	Rm. No.	Lease Start Date	Area (SF)	Purpose
Customs	1st and 2nd Floor	N/A	4,155	Office Space
Port Police	1st Floor	N/A		Training and Dispatch Office

Source: The PAG

Condition Assessment

A condition assessment of the Horizon Building was completed in August of 2021 and found it to be in **marginal** condition. Although the building appears to be recently painted, there are areas of spalling concrete and exposed reinforcing on the exterior columns. The roofing appears to be in need of repair.

Maintenance and Operational Improvements

Maintenance of this building should include repairing spalling concrete, damaged or deteriorated portions of roofing and mechanical and electrical systems that are not functional. The maintenance activities should be focused on extending the service life of the building.

4.2.3.6.3 Container Freight Station (CFS)

The CFS is currently occupied by Transportation, Operations, Dispatch, and Stevedoring. The building provides space for storage of breakbulk cargo and a Customs holding area.

Condition Assessment

A condition assessment of the CFS Building was performed in August of 2021 and found it to be in **marginal** condition. Extensive concrete cracking and spalling was observed on the building exterior. Some interior spalling was also observed. There is evidence of prior crack and spall repairs that were completed. The fire protection system is not operational. New bathrooms were installed around 2014 on the east side of the building. New air conditioning units for the office trailers were also observed.

The PAG issued an IFB for concrete repairs in April of 2021 which will improve the exterior condition of the building. The project also includes limited interior crack and spall repairs.

Maintenance and Operational Improvements

The repairs in 2022 will extend the service life of this building. However, for such buildings constructed over 50 years ago, a more detailed structural assessment is recommended to evaluate its structural integrity, especially under seismic loading conditions.

4.2.3.6.4 Equipment Maintenance and Repair (EQMR) Building

The EQMR building is located north of Warehouse 1 and provides space for Superintendents for EQMR & Facility Maintenance, Fleet Maintenance, Supply Technicians assigned to EQMR, Maintenance Control Section, and Facility Maintenance. Also provided to employees are breakrooms, laundry rooms, restrooms and showers. The building is a reinforced concrete structure arranged in a grid system. Grids 1 through 13 comprise the transverse frames and span 20 feet along an east-west axis. Grids A through D comprise the longitudinal frames and span 30 to 40 feet along a north-south axis with a cantilevered canopy extended from the south elevation. Two small areas of mezzanine (440 SF for office and 600 SF for tool room) are located inside the building. An open yard space (100-feet by 60-feet) for equipment storage and staging is located at the east side of the EQMR building. See Photo 13.

Photo 13: EQMR Building

Condition Assessment

A condition assessment of the EQMR Building was completed in August of 2021 and found it to be in **fair** condition. Concrete spalling was observed on the exterior of the building. The roof shows signs of leaking. The interior finishes, plumbing, HVAC, and electrical systems are in fair condition.

Maintenance and Operational Improvements

The PAG issued an IFB for the EQMR Building Repair and Upgrades project in November of 2021. The intent of the project is to repair cracks and spalls along walls, roof slabs, beams, columns and other concrete members; cleaning and recoating of the roof; replacement of the HVAC system; replacement of plumbing fixtures; replacement of existing sprinkler system and a new fire alarm system; and replacement of communication and electrical components. The project came in over budget, so it will be scaled back to focus on essential improvements. Once completed, the condition of the EQMR building will be significantly improved and the service life of the EQMR Building will be extended. A new shelter is being installed in front of the building for the facilities department to work under cover.

4.2.3.6.5 Warehouse 1 (WH1)

Port Police use Bay 1 for storage, Bay 2 is used for office space, Bays 3 and 4 are used by Stevedoring, Subcom LLC uses Bays 5 through 8 for cable storage, and Bays 9 through 15 are Port occupied and used by Maintenance. The Engineering and Safety personnel recently moved out of WH1. See Photo 14.

WH1 is a reinforced concrete structure arranged in a grid system. Grids 1 through 16 comprise the transverse frames and span 30-feet along an east-west axis. Grids A through D comprise the longitudinal frames and span 40-feet along the north-south axis with a cantilevered canopy extending from the north and south elevations.

Photo 14: Warehouse 1

Condition Assessment

A condition assessment of WH1 was completed in August of 2021 and found it to be in **poor** condition. There is extensive spalling of concrete and concrete masonry units (CMU) on the building exterior and interior. The roof is leaking. Interior finishes are in poor condition, especially in the engineering and safety offices which show signs of mold. The fire protection system is not operational. The plumbing and electrical systems are in marginal condition.

WH1 appears to be acceptable for its current use. However, the building is currently underutilized as stated above. The building can continue to provide space for storage and work areas. Use of the building for office space is not ideal due to the condition of the building and its proximity to other office space such as the Administration Building.

Maintenance and Operational Improvements

The PAG issued an IFB for the Warehouse 1 Upgrades project in September of 2021. The purpose of the project is to repair damaged exterior and interior concrete and CMU, repair the roof, construct a new parts room, construct new bathrooms, and to renovate the office areas. The bid price for this project came in well over the original budget, so the project will be scaled back to focus on essential improvements.

Maintenance and repair of Warehouse 1 should focus on safety and security issues to extend the service life of this building until it is demolished or reconfigured based on future needs.

For buildings such as WH1 that were constructed over 50 years ago, a more detailed structural assessment is recommended to evaluate its structural integrity, especially under seismic loading conditions.

4.2.3.6.6 Welding Shop

The Welding Shop is located on the east side of the EQMR building. The building is a reinforced concrete structure arranged in a grid system. Grids 1 through 4 comprise the transverse frames and span 20-feet along an east-west axis. Grids A through C comprise the longitudinal frames and span 30-feet along the north-south axis with a cantilevered canopy extended from south elevation. See Photo 15.

Photo 15: Welding Shop

Condition Assessment

A condition assessment of the Welding Shop was performed in August of 2021 and found it to be in **fair** condition. Spalling of the concrete was observed at isolated locations, though not as significant as WH1 or the EQMR Building. Evidence of previous concrete patching on walls and columns was observed.

Maintenance and Operational Improvements

The building appears to be acceptable for its current use. However, for such buildings constructed over 50 years ago, a more detailed structural assessment is recommended to evaluate the structural integrity of the building, especially under seismic loading conditions.

The CIP includes two projects (Phase 1 and Phase 2) for improvements to the Welding Shop. The work includes installation of roll up doors in all three bays, repair of interior and exterior concrete cracks and spalls, interior and exterior painting, upgrading lights to LED, replace exhaust window grills, pressure washing of the roof, repairing roof cracks and spalls, coating the roof with silicon, and repair of the bathroom concrete base.

4.2.3.6.7 New Operations Building

The U.S. Customs and Border Patrol (CBP) occupies 468 square feet on the first floor. The remaining first floor and all of the second floor is occupied by Port Operations personnel. The building is a reinforced concrete structure and estimated to have been built in the 1970's or later. As-built information is not available for this building. See Photo 16.

Photo 16: New Operations Building

Condition Assessment

A condition assessment of the building was completed in August 2021 and found it to be in **marginal** condition. The building exterior exhibits cracking and spalling on columns, soffits, and

facia. The roofing has signs of standing water. Repairs and upgrades are needed to extend the service life of this building.

4.2.3.6.8 Electrical Load Centers (LC's)

Five electrical Load Center (LC) buildings are located throughout the Port complex. LC1 is located behind the Horizon Building (Admin Annex) and is the only LC outside the container yard. LC2 is attached to the east side of WH1. LC3 is located on the south side near Berth F5. LC4 is located against the fence wall at the north boundary closest to the reefer stalls. LC5 is located behind the Old Gate Building. See Photo 17 and Photo 18 for photos of LC4 and LC1. All of the LC buildings are reinforced concrete structures and are relatively new (erected between 2003-2004), except LC5 which was constructed in 2015.

Photo 17: Load Center 4

Photo 18: Load Center 1

Source: WSP

Condition Assessment

A condition assessment of the load center buildings was performed in August of 2021 and found them to be in **good** condition. No noticeable deficiencies were observed.

Maintenance and Operational Improvements

The Port initiated a program in 2019 to refurbish and harden existing Load Center Buildings 1, 2, 3, and 4. The work included cleaning the buildings, repairing cracks on roofs and ceilings, applying primer and elastomeric paint on roofs, replacing galvanized steel roll-up doors, replacing louvers, replacing aluminium entrance doors, replacing aluminium insect screens, replacing roof vents, and painting interior and exterior walls. In addition, the Primary Transformers at Load Centers 2 and 3 were replaced because they were leaking. This project was completed in 2022.

4.2.3.6.9 High Tower

The High Tower is a three-story reinforced concrete structure located on the east side of the CFS building that has been in service since 1968/1969. The building stands 33 feet tall with a roof coverage area of 31.33 feet square. An exterior stair is attached to the north side of the building. See Photo 19.

Photo 19: High Tower

Condition Assessment

A condition assessment of the High Tower was performed in August of 2021 and found it to be in **fair** condition

4.2.3.6.10 Low Tower

The Low Tower is a two-story reinforced concrete structure located on the northeast end of the Port. See Photo 20.

Condition Assessment

A condition assessment of the Low Tower was performed in August of 2021 and found it to be in **fair** condition. No visible deficiencies were observed.

Photo 20: Low Tower

4.2.3.6.11 Sewer Pump House

The Sewer Pump House is a single-story reinforced concrete structure located at the northern fence-line, near Route 11 and it is isolated by a concrete masonry unit wall/chain-link fence. This building is owned and maintained by GWA. Therefore, a condition assessment was not performed.

4.2.3.7 Gates and Fencing

4.2.3.7.1 Old Gate House

The original Port entrance (Old Gate House) gate is located at the northeast corner of the container yard and previously served as the primary check point into and out of the container terminal area. The gate was built in 1991. The gate canopy is a reinforced concrete structure, 19 feet in height, and a footprint that is 80 feet wide by 64-feet-long. This structure is currently used by Terminal Division staff. The old gate house is a single floor reinforced concrete building (10-feet-high with a footprint that is 14-feet-wide and 64-feet-long) located at the center of the canopy. Each truck lane is 15-feet-wide and has an overhead clearance of 16 feet. See Photo 21.

Photo 21: Old Gate House and Canopy

Condition Assessment

A condition assessment of the Old Gate House was performed in August of 2021 and found it to be in **fair** condition.

Maintenance and Operational Improvements

Recent upgrades including lighting, panels, internal piping, and paint have been performed.

4.2.3.7.2 New Truck Gate

A new truck gate complex was constructed in 2015. The gate consists of four lanes with a concrete canopy, and three booths under the canopy. The canopy is 67 feet wide by 36 feet

long and 6 inches thick. Two lanes are for inbound trucks, one lane is for outbound trucks, and the fourth lane is a bypass lane. The pavement consists of 10 inches of reinforced concrete pavement, See Photo 22.

Source: WSP

Photo 22: New Truck Gate

The gate complex provides off-road queuing for trucks entering and existing the terminal. The inbound gate process includes a physical inspection of containers for damages. The Terminal Operating System (TOS) supports the checking process, verifies whether the container data is correct, and confirms the owner has pre-registered the container for delivery or pickup. The Checker has a handheld terminal to perform and approve all required checks. The TOS verifies the truck and container information and provides a route plan to the driver. Once the truck is processed at the gate, the trucker is given an Equipment Interchange Report (EIR) and the TOS issues work orders to equipment. After the truck service has been completed in the container yard, the truck drives to the gate complex and exits at the outbound gate. The departure will be registered in the TOS by swiping the EIR.

The gate complex can be further automated to improve the speed and reliability of gate transactions. The main components may include inbound and outbound Optical Character Recognition (OCR) portals, chassis cameras, radiation scanners, X-ray scanners, weigh-in-motion scales, traffic stop arms, LED lighting, and a Gate Operating System (GOS), all supported by a robust computer system and hardware. The objectives are to give optimum service to truckers and to improve the turnaround time in the container yard, e.g. to a maximum of 30 minutes. The truck drivers would not be required to leave their truck cab for efficiency and safety reasons.

Condition Assessment

A condition assessment of the New Truck Gate was performed in August of 2021 and found it to be in **good** condition. In general, deficiencies were not observed. However, the three booths under the canopy are in marginal condition and are not configured properly.

Maintenance and Operational Improvements

To improve safety and security measures, the PAG is implementing an improvement project to replace the booths. The new booths will be constructed with reinforced concrete, provide additional space, and arranged so that staff have a direct line-of-sight to in-coming trucks.

4.2.3.7.3 Guard Booths

There are two guard booths on either side of the gate complex constructed with reinforced concrete. See Photo 23.

Condition Assessment

A condition assessment of the Guard Booths was performed in August of 2021 and found them to be in **fair** condition. At both booths, damage to the windows was observed.

Photo 23: Guard Booth

4.2.3.7.4 Fencing

Two types of yard fence were observed: (1) CMU wall with one side outrigger with three strands of barbed wire angled outward; and (2) chain-link fence with vinyl coated fabric and galvanized pipe posts.

Some chain-link fence gates, either for vehicles (by-parting type, w=24-60 feet) or for pedestrians (swing type, w=3’-6” feet), were observed along the north and west boundaries.

Condition Assessment

A condition assessment of the fencing was performed in August of 2021 and found them to be in **marginal** condition. Significant corrosion was observed on the metallic part of gates and fences.

Maintenance and Operational Improvements

The chain-link fencing surrounding the eastern end of the container yard were replaced as part of the MARAD program in 2015. Where practical, any remaining chain-link fencing should be replaced with CMU fencing. Future chain-link fencing should incorporate concrete posts and anticipate replacing the chain-link fencing fabric at a regular interval.

4.2.4 TERMINAL UTILITIES

Water supply is provided through a main supply line from the GWA. A dedicated fire suppression water tank with 274,000-gallon capacity and three fire service pumps, was installed at the Port in 2015. The sewage system is a gravity fall system to a GWA sewage pump station. The storm drainage system is also a gravity system. Power is supplied by GPA's 13.8kV underground lines along Route 11 outside of the terminal. Five electrical Load Centers constructed as hardened structures inside the Cargo Terminal store the PAG's seven Prime Power generators, which were installed in 2016. Other utilities such as telephone, internet and radio communications are available at the terminal.

A field survey and interviews with various departments of PAG were conducted in order to obtain the following information and inventory of site utilities at the Port. Findings on the current major site mechanical, electrical, and plumbing (MEP) facilities are listed in Table 4-8 for easy reference. Details of each system are discussed in the following section.

Table 4-8: Major Site Utilities

CONTAINER YARD LIGHTING			
Equipment Details		**Current Capacity**	**Remarks / Comments**
50-foot Steel Pole			In general, 1,000 to 1,500 watt Metal Halide Lamps
5 x Lamps		17 Ea.	
4 x Lamps		11 Ea.	
50-foot Concrete Pole			
5 x Lamps		1 Ea.	
4 x Lamps		2 Ea.	
3 x Lamps		1 Ea.	
2 x Lamps		1 Ea.	
1 x Lamps		1 Ea.	
80-foot Pole			
4 x Lamps		1 Ea.	
3 x Lamps		2 Ea.	
2 x Lamps		1 Ea.	
100-foot Pole			1,000W High Pressure Sodium
30 x Lamps		2 Ea.	
25 x Lamps		1 Ea.	
20 x Lamps		1 Ea.	
15 x Lamps		1 Ea.	
ELECTRICAL SUPPLY			
Equipment Details		**Current Capacity**	**Remarks / Comments**
GPA Supply		13.8kV	Limited by the underground line supplying PAG.
LC1	Tx.	2000kVA 13.8kVDelta 480 v / 277-volt 3ph/4wire wye	
	Gen.	750kVA 480 v / 277-volt 3ph/4wire wye	New Generator installed as part of the Refurbishment and Hardening of Load Centers 1, 2, 3, and 4 project. With separate fuel tank (500Gal) outside LC-1

LC2	Tx.	1000kVA 13.8kVDelta-480 v / 277-volt 3ph/4wire wye	Transformer replaced as part of the Refurbishment and Hardening of Load Centers 1, 2, 3, and 4 project.
	Gen	344kVA 480 v / 277-volt 3ph/4wire wye	
LC3	Tx.	750kVA 13.8kVDelta-480 v / 277-volt 3ph/4wire wye	Transformer replaced as part of the Refurbishment and Hardening of Load Centers 1, 2, 3, and 4 project.
	Gen.	455KVA 480 v / 277-volt 3ph/4wire wye	Installation of new 455KVA generator, automatic transfer switch and AST completed in July FY2022
LC4	Tx1	2000kVA 13.8kVDelta-480 v / 277-volt 3ph/4wire wye	Supplied by GPA
	Tx2	1500kVA 13.8kVDelta-240Volt/3ph./3wire Delta	Supplied by GPA
	Gen1	625kVA 480 v / 277-volt 3ph/4wire wye	At 55% with 280kVA avail. Backup only loads connected to GPA supplied Tx1. load. With separate fuel tank (600 Gal) next to Gen. Only runs the 480V Reefers/ Gate house/ Yard lighting
LC5	Tx1	2000kVA 13.8kVDelta-480 v / 277-volt 3ph/4wire wye	Installed in 2015 as part of the MARAD project.
	Tx2	1500kVA 13.8kVDelta-240Volt/3ph./3wire Delta	Installed in 2015 as part of the MARAD project.
	Gen1	625kVA 480 v / 277-volt 3ph/4wire wye	With separate fuel tank (600 Gal) next to Gen. Runs the new Truck Gate, Guard Shacks, and Yard lighting

LIGHTNING PROTECTION SYSTEM		
No lightning protection system provided to buildings, cranes or lamp poles.		
WATER SUPPLY		
Equipment Details	**Current Capacity**	**Remarks / Comments**
Main Supply Water Pipe from GWA	16 inches	The existing main water lines are over 50 years old. The 16-inch main line distributes to other waterlines throughout the container yard. Existing 16-inch and 10-inch water lines run diagonally though the container yard and return to Route 11. There is a 10-inch looped system that covers the waterfront which feed buildings on the west side of the terminal. The existing waterlines have multiple leaks.
FIRE SERVICES		
Equipment Details	**Current Capacity**	**Remarks / Comments**
Fire Hydrant, Sprinkler and Fire Alarm	Fire Hydrant and Sprinkler systems are direct fed from the GWA water pipe	A new reservoir and pump station was installed as part of the MARAD program in 2015. The system provides service to hydrants in the east expansion area. Remaining hydrants and sprinkler systems are direct fed from the GWA water supply main There is no direct link between the fire alarm system and the local fire station.
Air Conditioning System		
Both air-cooled chiller systems for Administration and former Horizon Buildings are not operational. Current air-conditioning systems for the buildings are split units.		
Sewage System		
Gravity fall system is used and no sewage pumps have been installed. The sewer is fall by gravity to a sewage pump house with the capacity of 150gpm provided by GWA near the main gate.		

Note: This matrix is a compilation of current equipment based on information received from PAG.

4.2.4.1 Electrical Service and Load Centers

The power supply to the Port originates from the GPA 13.8kV line along Route 11 outside of the Port, and this line also feeds the other piers and facilities along the road. The line is radial fed and without ring arrangement.

There are two incoming feeders originating from the GPA line to feed the primary electrical substations (Load Centers) of the Port. There are five Load Centers namely LC1 to LC5 installed in and servicing the entire Port. Each Load Center has an emergency diesel generator to back-up the essential loads. Figure 4-11 shows the GPA power supply schematic for PAG.

Incoming Service

PAG receives power by GPA distribution feeder P-003 with a radial fed 13.8kV line routed through an underground system from PITI Substation to the GPA Cabras Facility then to an underground system built in 2012 under Route 11.

Switchgear – Primary Distribution

LC1 is fed from a GPA 600amp, 13.8kV, 15kV manual switchgear and then connected to one un-fused incoming disconnect switch and three fused disconnect switches with one feeding LC1 distribution transformers and the other two switches feeding LC2 and LC3.

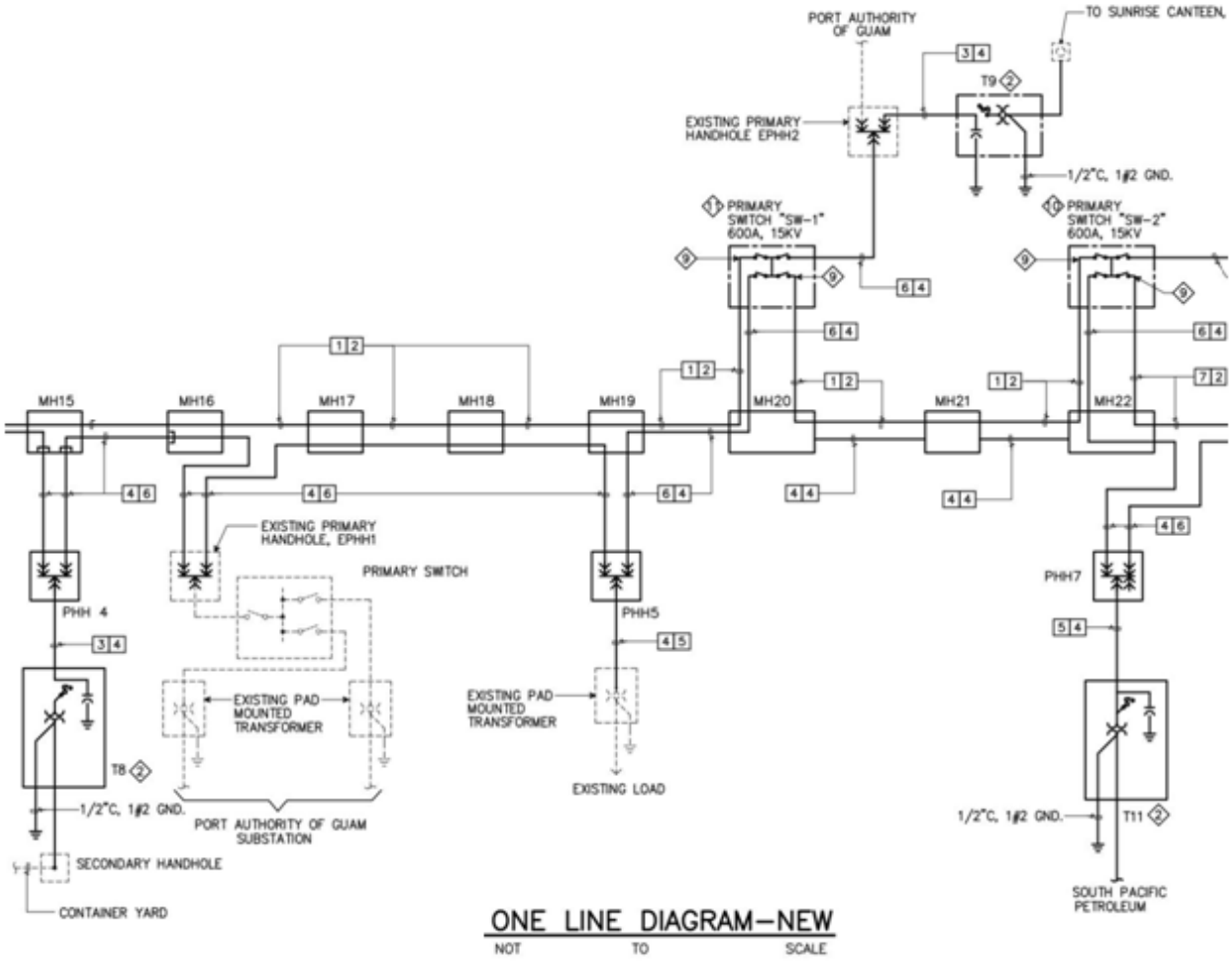
LC2 contains one fused disconnect switch

LC3 contains one fused disconnect switch

LC4 is fed from a GPA 600amp, 13.8kV, 15kV manual switchgear

LC5 is fed from Guam Power Authority

Figure 4-11: GPA Power Supply Schematic for PAG



Source: The PAG

Switchgear – Secondary Distribution

LC1 secondary distribution switchgear contains one 1,200-amp, 480 v/277 volt, 3ph./ 4 wire wye distribution panel completed with one 4-Pole 1,200-amp Automatic Transfer Switch (ATS) connected to the emergency generator. LC1 supplies power to the Administration Building and the vicinity areas including the Port Police Building, the Admin Annex, EQMR parking lightings, etc.

LC2 secondary distribution switchgear contains one 1,200-amp, 480 v/277 volt, 3ph./ 4 wire wye distribution panel completed with one 4-Pole 1,200-amp ATS for the connection of the emergency generator. LC2 supplies power to WH1 and WH2 and vicinity including the service outlets along F3 and F4.

LC3 secondary distribution switchgear contains one 1,200-amp, 480 v/277 volt, 3ph./ 4 wire wye distribution panel completed with one 4-Pole 1,200-amp ATS for the connection of emergency generator. LC3 supplies power to the CFS Building, Low Tower, High Tower and vicinity including the service outlets along F5 and F6 and the container yard lighting.

LC4 secondary distribution switchgear contains one 2,000-amp, 480 v/277 volt, 3ph./ 4 wire wye distribution panel completed with one 4-Pole 2,000-amp ATS for the connection of an emergency generator and one 3,000-amp, 240 volt, 3ph./ 3 wire Delta distribution panel. LC4 is to be upgraded with ATS for 3,000-amp service with 937 kVA, 240 Delta under the current generator set procurement.

LC4 supplies power to the Gate house Building and vicinity including the reefer outlets and container yard lighting.

LC5 supplies power to the Truck Gate complex, guard shacks (2), and future reefer outlets.

Transformers

The transformers in the load centers include the following:

LC1 – one 2,000kVA, 13.8kV Delta-480v/277-volt, 3ph/4 wire wye

LC2 – one 1,000kVA, 13.8kV Delta-480v/277-volt, 3ph/4 wire wye

LC3 – one 750kVA, 13.8kV Delta-480v/277-volt, 3ph/4 wire wye

LC4 – one 2,000kVA, 13.8kV Delta-480v/277-volt, 3ph/4 wire wye and one 3200kVA, Delta/Delta 13.8kV/240-volt.

LC5 - one 2,000kVA, 13.8kV Delta-480v/277-volt, 3ph/4 wire wye

Emergency Generators

Emergency diesel generators are installed in each LC to back-up and maintain the essential service in each LC. The details for generators in the LCs are provided below.

LC1 – one 750 kVA generator.

LC2 – one 344kVA, 480v/277-volt, 3ph./4 wire wye with one set of integral diesel fuel tank. The transformer was replaced in 2022.

LC3 – one 455kVA, 480v/277-volt, 3ph./4 wire wye, with one separate diesel fuel tank in LC3.

LC4 – one 625kVA, 480v/277 volt, 3ph./4 wire wye, with one separate diesel fuel tank (600 Gal) in LC4. It is planned that a 937kVa-240-volt service will be added to the building to accommodate the 240-volt reefers and to replace the current generator set with a 750 kVa-

480-volt generator. The current LC4 generator will move to LC2 when the new generator sets arrive.

LC5 – one 2000kVA 480V/277-volt, 3ph./4 wire, with one separate diesel fuel tank (600 Gal) in LC5.

Generator upgrades were completed in 2022.

Condition Assessment

A condition assessment of Load Centers 1, 2, 3 and 4 was performed in August of 2021 and found them to be in **good** condition. This is a result of the Refurbishment and Hardening project that was completed in 2022. With the upgrade of LC4 and the reduction in demand for LC2 and LC3, a substantial amount of spare capacity in the secondary distribution voltage level (i.e., 480/277 volt) should be available.

4.2.4.2 Yard Lighting

Yard lighting consists of (34) 50-foot and (4) 80-foot-tall pole-mounted flood lights with 1,000W metal halide lamps are installed to luminate the majority of the container yard. See Photo 24. The numbers and configuration of the flood lights on each pole are different to suit the location. Five 100-foot-tall poles were added in 2015; three in the breakbulk area and two in the small container yard expansion area. See Table 4-8 for additional information.

Lighting poles inside the yard are supported by reinforced concrete spread footings measuring 7’-0” square x 1’-6” deep with 28- x 28-inch pedestals. The bottom elevation of the footings is located 6 feet below finished grade. The 100-foot light poles are supported by a drilled shaft (4’-6” foot diameter x 25-feet long). The top of the drilled shafts sit one foot above finished grade.

The Port replaced the 50-foot and 80-foot existing container yard light poles and lights in 2012 as part of a security grant project. These were replaced in their original locations. With the addition of these new poles, all high mast lights (50, 80 and 100 feet) will likely remain where placed for the 20-year planning horizon unless the Port acts to make minor adjustments associated with future pavement replacement.

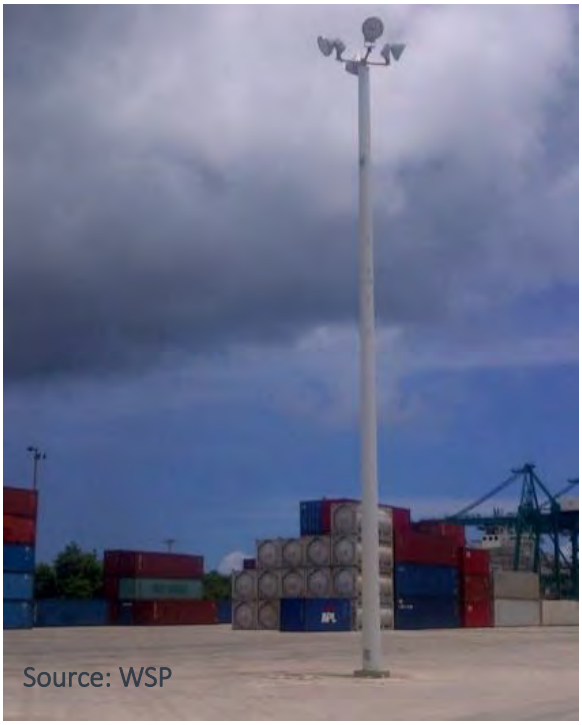


Photo 24: Container Yard Light Pole

Condition Assessment

A condition assessment of light poles was performed in August of 2021 and found them to be in **good** condition.

Maintenance and Operational Improvements

Yard reconfiguration and systems upgrades accomplished over the past several years are expected to address cargo capacity handling demands for the next 20 years. However, the Port will have the option, as it progressively replaces yard pavement, to add flexibility where containers are stacked. In the process of doing that, selected high-mast lighting could be raised to 100 feet to allow higher stacking of containers in selected areas.

4.2.4.3 Storm Water Drainage System

The storm water gravity drainage system consists of 12-inch to 30-inch diameter RCP underground pipes, sump pits, and surface drain channels (36 x 34 inches) which are provided to collect storm water and direct discharge coalescing plate oil water separators that were installed during the MARAD project in 2015 along with flow splitters and manholes at each location. The oil water separators vary in dimension based on the design flow rate of water to be treated. There are two outfalls at Berth F3, four outfalls between Berths F4 and F6 and two in the Piti Channel area. One outfall was constructed as part of the Port Modernization Program south of the expansion area. Four ponding basins were also constructed as part of the 2015

MARAD project; one at the truck gate area and three along Route 11 north of the Administration Building.

Trench drains are used at selected areas of the container yard to capture surface runoff. See Photo 25.

Condition Assessment

The trench drain grates are in **poor** condition.

Maintenance and Operational Improvements

PAG is selectively replacing deficient grates with heavier duty grates.

Photo 25: Container Yard Trench Drains

4.2.4.4 Sanitary Sewer System

The Port is currently served by a gravity sewer system which consists of underground pipes (-2 to -11 feet from grade elevation) and sump pits. The sewage is collected at the central lift station (pump house) provided by GWA, which is located near the main gate. The GWA lift station pumps sewage to the gravity line in Marine Drive which flows to the Hagåtña Treatment Plant. The existing GWA lift station system is designed for a capacity of 150gpm. Port maintenance staff indicated that blockage of the sewage is rare.

4.2.4.5 Domestic Water System

There is one 16-inch main water supply pipe from GWA located at the eastern end of the Port to provide water supply for the Port and properties west of the Port terminal. The 16-inch mainline is reduced to 12 inches and continues to the parking area in front of the Administration Building. After the abandoned water meter chamber located in the southeast corner of the yard, a 12-inch pipe is tapped off from the 16-inch pipe to supply the tenants outside the Port in the Industrial Park and on the Breakwater. It is unknown if the two 12-inch lines connect at the point of convergence west of the Port Administration Building parking area.

The water system included with the original Port buildings in 1970 contained a 10-inch looped system that covered the waterfront and the Port buildings on the west end of the terminal. Six-inch lines were connected from the 10-inch lines to fire suppression systems within the buildings and hydrants in the container yard. Smaller lines were connected to the buildings for potable water service. The previous Master Plan identified that Port maintenance staff stated the piping in the terminal contains asbestos. The pipe materials for this are unknown from drawings reviewed but Asbestos Concrete Pipe were commonly used in the 1970s.

As part of the 2015 MARAD-funded port modernization efforts, domestic waterlines were installed to Warehouse 1, the Administration Building and Berths F3 to F6 in a looped system connecting to the waterline along Route 11. An additional domestic waterline was installed to the Low Tower Building. These waterlines resulted in an upgraded system built to today's drinking water standards.

Condition Assessment

N/A

Maintenance and Operational Improvements

The Port issued an IFB in August of 2021 to relocate the main service feed to a new alignment along Route 11 and adding water lines within the container terminal to replace failing water lines. The new water line network is intended to provide redundancy and improve water pressures to meet local building codes, National Fire Protection Association (NFP) requirements and USCG requirements for firefighting.

4.2.4.6 Fire Protection System

Fire hydrants and sprinklers were originally tapped off the main water supply pipe network (mixed with the domestic water supply system) within the Port. This was rectified in 2015 under the Port Modernization Program where a storage tank and pump station were constructed adjacent to the new truck gate. The tank has an inside diameter of 45-feet and a wall height of 25'-9". This system upgrade brings pressures and flows up to an acceptable level to achieve required fire water capability.

Fire water lines were installed from the new storage task to hydrants in the expansion area. In addition, fire water lines were installed in various locations throughout the yard to improve

fire-fighting capabilities. The potable water service was separated from the fire water system under the Port Modernization Program as well.

There is no direct link between the Port fire alarm systems and the local fire station. A Fire alarm raised in the Port would need to be reported to the fire station by telephone. The closest fire station in Piti is approximately 2 miles away.

4.2.4.7 Other Building Services

No lightning protection devices were found in the Port buildings, lamp poles, or cranes. Suitable lightning protection devices should be considered to protect Port facilities and the operators. However, lightning protection was installed on the new high mast light poles in 2015 under the Port Modernization Program.

A central air conditioning (A/C) system with an air-cooled chiller serves the Administration Building and the Admin Annex. Other small buildings are served by split A/C or window A/C systems, many of which were recently replaced based on the August 2021 assessment. This combination of equipment is considered suitable for the current facilities and avoids the need to run extensive services underground to serve isolated small buildings.

4.2.4.8 Container & Cargo Handling Equipment

Cargo is moved between the port and vessels by three rail-mounted ship-to-shore (STS) Gantry cranes (Gantry 4, 5 and 6) or ship gears. Gantry Cranes 2 and 3 will be demolished and removed from Port property in 2023. When completed, additional space will be available at Berth F4. This project also includes demolition and disposal of two RTG cranes and one Mobile Harbor crane.

PAG has instituted a structured maintenance program to ensure that the remaining cranes and cargo handling equipment (CHE) are in good operating condition. PAG awarded a Performance Management Contract (PMC) for the existing STS Gantry cranes in 2022. The objective of the PMC contract is for training of Port crane mechanic staff and performance, operation, maintenance emergency response, trouble shooting, diagnostic and repairs to the gantry cranes on an as-needed basis. The service contract includes performance monitoring and preventative maintenance of equipment and facilities associated with the gantry cranes.

On occasion, selected vessels will use ship's gear to load and off-load cargo. Roll-on/Roll-off (Ro/Ro) vessels load and offload vehicles using vessel ramps down to the wharf.

Once off the vessel, grounded storage containers are handled by yard tractors/bomb carts and toplifters. Wheeled container cargo is handled by 28-yard tractors and chassis (carrier-supplied). Breakbulk cargo is currently handled using forklifts varying in capacity from 5 to 20 tons.

The maximum reach of the STS cranes from the waterside rail is 115 feet. For additional information regarding cranes and CHE's, see Table 4-9 and Table 4-10.

Table 4-9: Port Owned Cranes

Name or Designation	Age	Capacity	Height Above WS Rail
Gantry 4 (POLA 1)	1983 Re-powered and strengthened in 2009	40 LT	85 feet
Gantry 5 (POLA 2)	1983 Re-powered and strengthened in 2009	40 LT	93 feet
Gantry 6 (POLA 3)	1983 Re-powered and strengthened in 2009	40 LT	93 feet

Source: The PAG

Table 4-10: Port Owned Cargo Handling Equipment

Equipment	No.	Year	Make/Model	Capacity
Top Picks	3	2009	Hyster H50.00XM	40 Short Ton – 5 High
	4	2016	Hyster 1150CH	40 Short Ton – 5 High
	2	2019	Taylor XLC97E	40 Short Ton – 5 High
Yard Tractor	9	2010	Kalmar/Ottowa	YT-50
	16	2017	Kalmar	T2 4x2
Forklift	4	2008	Hyster H5.00DX	5.5 Short Ton
	4	2016	Doosan D50SC-5	5.5 Short Ton
	2	2017	Hyundai 180D-7E	20 Short Ton
	4	2017	Hyundai 110D-7E	10 Short Ton

Source: The PAG

Cranes are numbered in sequential order based on purchase history. See Table 4-11. As a result, the designation does not represent the number of cranes the Port currently owns. Gantry Cranes 4, 5, and 6 were upgraded to "as new" condition in 2009 with an estimated remaining service life of 20 years (2029) assuming regular preventative maintenance is performed. Periodic upgrades and parts replacement can extend the useful life of the cranes.

Currently, PAG is in the process of acquiring new STS Gantry cranes to replace the current cranes which are expected to expire in 2029. The IFB is anticipated to be issued in 2023 for acquisition of three new cranes. Currently, Gantry Cranes 2 and 3 are being demolished.

Table 4-11: PAG's STS Gantry Cranes

Name or Designation	Year Built/Upgraded	Capacity	Height Above WS Rail	Remaining Estimated Useful Life
Gantry #4	1983/2009 In Service at the Port in 2023	40 LT	85 feet	4 Years (2026)
Gantry #5			93 feet	4 Years (2026)
Gantry #6			93 feet	4 Years (2026)

Source: WSP analysis. Data provided by the PAG.

While the Port's three gantry cranes can handle the forecasted container volumes associated with the military build-up, there is limited capacity to accommodate additional breakbulk volumes, as well as minimal flexibility for downtime to address crane breakdowns and crane maintenance.

4.2.5 MARINE INDUSTRIAL COMPLEX AND FUEL/CEMENT FACILITIES

Assets within the Marine Industrial Complex and Fuel/Cement include oil tanks and pipelines, warehouses, cement silos, multiple light-gauge sheds, and several marine facilities consisting of piers, wharves, beaches, and a Seaplane ramp. See Figure 4-12. The Marine Industrial and Fuel/Cement areas have been leased to private companies since 1969/1970.

Bulk fuels from Mobil Oil and Tristar Agility are delivered to their storage tanks from the adjacent Golf Pier marine transfer facility or from Pier F1 through terminal piping within the South Pacific Petroleum Corporation (SPPC) facility. Typically, liquid bulk products are delivered in bulk to marine facilities via tanker vessel every 20 days. These products are then distributed by pipeline from their storage tanks to their loading racks, where the products are loaded into tank trucks and distributed to service stations, as well as commercial and government accounts throughout Guam. A portion of the bulk fuels are reloaded at the pier to coastal tankers for distribution to the FSM and CNMI.

The facilities, including the Oil Tank Farm north of Route 11 (Area A), are located in an area to the northwest of the commercial terminal on about 45 acres of land. The tank farm located on Area A has been abandoned and is no longer in use.

Table 4-12: Marine Industrial and Fuel/Cement Tenants

Tenant	Lot No.	Lease Start Date	Area ± (SF)	Purpose
Mobil Oil Guam	1	3/20/1970	248,873	Oil Company[1]
South Pacific Petroleum	2	10/1/1969	217,800	Oil Company
South Pacific Petroleum	3A	1/8/1971	140,002	Oil Company
Mobil Oil Guam	3B	1971/03/04	82,799	Oil Company
Guam United Warehouse	4		173,217	GEDA-owned area
Cabras Marine Guam	5	4/1/1970	223,865	Small boat dry-dock facility
Hanson Cement Inc.	6	1/4/1971	71,773	Cement Supplier
Tristar Agility	7 / F1 Fingertip	6/13/1969	78,651	Oil Company[1]
Cementon Micronesia	3-1	12/1/2009	78,364	Cement Storage
Guam Customs and Quarantine Agency				

[1] Management Agreement

Source: WSP analysis. Data provided by PAG

Figure 4-12: Marine Industrial Complex and Fuel Cement Facilities

Source: Google Earth and WSP

4.2.5.1 Pier F1 Marine Structures

Pier F1 is located in the Marine Industrial Complex and serves as the primary fuel pier for handling crude oil and liquefied petroleum gas (LPG). The pier is comprised of a main pier, approach trestle, and mooring and breasting dolphins. The main pier is approximately 135 feet long by 45 feet wide and is constructed with a cast-in-place concrete deck supported by concrete pile caps on steel pipe piles. A trestle of similar construction is present north of the main pier and provides direct access to the pier. See Figure 4-13. Mooring Dolphins A and B are located northwest of the main pier and consist of concrete pile caps supported by steel piles. Breasting Dolphins C, D, G and H are located on the southwest and northeast sides of the main pier and are of similar construction to the mooring dolphins. Access to the mooring dolphins is provided by pile-supported walkways that extend from the southwest breasting dolphin. Note that a pile-supported walkway is also present east of the main pier and provides an alternative means of access to the northeast breasting dolphin.

The fuel and product receiving facilities on Pier F1 consist of offloading hoses, piping, pumps, receiving tanks and distribution pipelines to various end users. Typical vessels that call on Pier F1 range in size from the Eco Galaxy at 8,000 DWT to the NS Concept at 110,000 DWT.

Products, annual offload rates and destinations are typically as follows:

- Diesel: 1,063,000 Barrels to Isla Petroleum & Energy (IP&E) and Mobil Oil Guam
- Jet Fuel: 1,428,000 Barrels to Isla Petroleum & Energy, Defense Logistics Agency, Mobil Oil Guam
- Mogas 91: 625,000 Barrels sent to IP&E, Mobil Oil Guam
- Mogas 95: 101,000 Barrels sent to IP&E
- High Sulfur Fuel Oil: 1,600,000 Barrels to Guam Power Authority
- Low Sulfur Fuel Oil: 411,000 Barrels to Guam Power Authority
- LP Gas: 68,000 Barrels to South Pacific Petroleum Corporation

Figure 4-13: Pier F1

Condition Assessment

The pier is in **serious** condition. Several elements have severe damage consisting of spalled concrete, open corrosion spalls, bent piles, sheared piles, split piles, and non-functional fender systems. At multiple locations, failed pile repairs are present at the pile to pile cap interfaces. Open- and close-corrosion spalls were also observed at the main pier and trestle. Slope protection is in fair condition. The peninsula area west of the trestle was constructed on reclaimed land and is founded on sunken barges. Along the south shoreline west of the trestle, approximately 200 feet of rip rap is missing. At this location, portions of corroded steel barges are visible. Along the north side of the peninsula, a void is present beneath the concrete slab-on-grade which has settled. See Photo 26, Photo 27, and Photo 28. A detailed condition assessment report for Berth F1 is provided in Appendix D.

Photo 26: Main Pier (Open Corrosion Spalling)

Photo 27: Breasting Dolphin H (Failed Repair and Damaged Fender System)

Photo 28: Peninsula West of Trestle (Exposed Barge Foundation)

Maintenance and Operational Improvements

Repair recommendations for structural marine components are provided below. Recommendations are based on element level damage ratings for individual elements and the effect that the damaged elements have on the overall use of the Pier. Typically, components rated as poor, serious, or critical are comprised of multiple elements having major or severe damage. For these types of structures, it is recommended that elements are repaired or replaced to avoid temporary load restrictions and to help prevent further damage which may impact the daily use of the facility.

At Pier F1, it is estimated that some components have been in service since the 1940s and are well beyond their design service life; evidenced by corrosion, spalling, breakage, and multiple repair phases. For these reasons, it is recommended that the Pier is replaced. In the near-term and to extend the service life of the structure until it can be replaced, it is recommended that deficient structural elements are repaired and/or replaced as described below.

- Repair the Main Pier and Approach Trestle: Remove damaged concrete down to sound concrete. Exposed reinforcement will be cleaned to remove excess corrosion byproducts and additional reinforcement will be added where necessary. Small repairs will be accomplished using a concrete repair mortar, while larger repairs will be accomplished using traditional concrete.

- Pile Repairs: Remove pile jackets and thoroughly clean the surface of the exposed pile. Roughen the surface of the concrete soffit. Reinforcement will be embedded into the

pile cap to create a cage around the top of the pile. Place formwork and install a cementitious repair material.

- Peninsula: Until such time that a detailed ground penetrating radar survey can be performed, reinforce the shoreline with slope armoring to help prevent further erosion and loss of material. Where soil has eroded from beneath the concrete slab-on-grade, install a concrete retaining wall and fill the void with a suitable backfill material.

- UHMW-PE Facing: Replace damaged/missing UHMW-PE facing at fender panels.

- Repair miscellaneous appurtenances as described within the condition assessment and feasibility study report (see Appendix D).

In support of replacing/repairing Pier F1, PAG's tenant (TriStar) has also performed a feasibility study to evaluate multiple repair/replacement alternatives.

4.2.5.2 Berth F2 Marine Structures

Berth F2 is located in the Port's Industrial Marine Complex. Cabras Marine (Cabras) holds a long term lease at this berth and landside property to support their Guam and Saipan based assets and operations. At this location, Cabras operates a floating dry dock for vessel repairs on ships up to 1,000 tons with drafts of 26 feet or less. The Cabras leased area, Berth F2 and their activities are separate from the cargo terminal secure areas and operations.

Berth F2 is approximately 670 feet long and is defined by a reinforced concrete pile cap located at the top of a sheet pile bulkhead. It is estimated that the top 15 feet of the sheet pile wall is faced with unreinforced concrete. The fender system consists of irregularly spaced rubber fenders and floating foam-filled fenders. See Figure 4-14.

Figure 4-14: Berth F2

Source: Google Earth and WSP

Condition Assessment

The berth is in **poor** condition. The concrete facing has delaminated and spalled from the steel sheet pile wall at several locations. At the inner tidal zone, severe corrosion is present at the sheet pile wall. Holes and dents in the sheet pile wall are present at multiple locations. Open-corrosion spalling of the longitudinal concrete pile cap is present at multiple locations along the length of the berth. In general, Berth F2 lacks a dedicated fender system. Moderate to major corrosion is present at the mooring hardware. See Photo 29. A detailed condition assessment report for Berth F2 is provided in Appendix B.

Photo 29: Berth F2

Maintenance and Operational Improvements

Repair recommendations for structural marine components are provided below. Recommendations are based on element level damage ratings for individual elements and the effect that the damaged elements have on the overall use of the Pier. Typically, components rated as poor, serious, or critical are comprised of multiple elements having major or severe damage. For these types of structures, it is recommended that elements are repaired or replaced to avoid temporary load restrictions and to help prevent further damage which may impact the daily use of the facility.

- Repair Holes in the Sheet Pile Wall: This repair consists of installing steel patches over existing holes and displacing water by pumping cementitious grout into the voids. Due to the age of the structure and severity of damage observed, this repair procedure should be considered a temporary means to extend the life of the sheet pile wall.
- Bulkhead Repair: Repair the damaged/underwater sections of concrete by placing formwork and installing embed bolts, reinforcement, and a cementitious repair material on the waterside and landside of the bulkhead wall. To strengthen the dented bulkhead, install a relieving platform consisting of pipe piles, concrete pile caps, and a concrete deck.
- Repair the void in the sheet pile wall at Station 6+76. Remove the existing rip rap and install a sheet pile wall that extends approximately 40 feet to the north. Install grout or concrete at the corner, backfill, and replace the rip rap.

- Mooring Hardware Rehabilitation: Perform coating repairs at the mooring hardware. Remove dirt, oil, debris and existing paint/coating systems and apply a high-performance coating system.
- Overlay Repairs: Remove and replace the asphalt and concrete overlay at areas with significant damage and non-uniform surfaces.
- Misaligned Sheets: Excavate soil in front of the bulkhead and install custom-fabricated steel plates to the existing steel wall.
- Concrete Pile Cap and Facing: Repair of the pile cap and removal of damaged/delaminated portions of the concrete facing may result in further damage to concrete at surrounding areas. For this reason and because the berth lacks a dedicated fender system, it is recommended that an in-depth study of Berth F2 be performed. The study should include fender system alternatives and discuss the feasibility of replacing the sheet pile bulkhead or performing a large-scale repair program.

4.2.5.3 Seaplane Ramp

Seaplane Ramp is located on the north side of Apra Harbor adjacent to Golf Pier. The structure consists of a sheet pile bulkhead, concrete pile cap, slope armoring, and a concrete loading/unloading ramp. The ramp originally served as the landing point for military boats and tracked landing vehicles. Utilities and permanent buildings are not present.

Condition Assessment

In general, the ramp is in **poor** condition. Major cracking and delamination of the concrete is present at multiple locations. Similarly, mechanical spalling and closed corrosion spalling were also observed at the top of the bulkhead and adjacent to mooring hardware. See Photo 30 and Photo 31.

Photo 30: Seaplane Ramp Bulkhead

Photo 31: Seaplane Ramp

Maintenance and Operational Improvements

Repair recommendations for structural marine elements at Seaplane Ramp are provided below. Recommendations are based on field observations from the 2021 condition assessment performed by WSP.

- At locations where open- and closed-corrosion spalling is present, remove and replace the concrete. Where exposed steel reinforced is severely deteriorated, install new steel reinforcement.
- Clean and remove corrosion from the sheet pile bulkhead and apply a high-performance coating. Similarly, remove corrosion and loose scale from the mooring hardware and apply a high-performance coating.

4.2.5.4 Golf Pier

Golf Pier is located on the northeast side of Apra Harbor and is operated by Mobil Oil Guam under a use and management agreement. The facility consists of an approach trestle, fuel pier, four breasting dolphins and a mooring dolphin northeast and northwest of the pier. Port-owned fuel lines run the length of the pier and lead to a wye between Port-owned Tank Farm A and Mobile managed Tank Farm C. The fuel lines leading up to the wye junction are in need of replacement.

Condition Assessment

Overall, Golf Pier is in **critical** condition. See Photo 32 and Photo 33. Approximately 60 percent of the structural piles within the Main Pier are severely damaged and have failed and are no longer supporting loads. These failures have resulted in partial collapse of the Main Pier. At the Trestle, the nearshore pile cap bents have also failed. Severe corrosion of steel piles and open-corrosion spalling is present at multiple locations within the Pier, Trestle, and dolphins. Moderate to major corrosion is present at multiple mooring bollards. The walkways leading to the west breasting dolphin and northeast mooring dolphin are missing. Similarly, the northwest mooring dolphin has failed and rests on the mudline. A detailed condition assessment report for Golf Pier is provided in Appendix E.

All utility service facilities including electrical, domestic water supply, and sewer within Golf Pier are ostensibly maintained on a management agreement allowance basis by Mobil Oil Guam (Mobil). In accordance with the agreement, PAG can perform regular inspection of these assets to ensure they are being maintained properly. For repair actions exceeding routine maintenance and repair, PAG works with Mobil to identify CIP projects. For example, PAG issued an IFB for Repair of Mobil Golf Fuel Pier in September of 2021. No bids were received in response to this IFB.

In regard to the fire protection system, Mobil has installed a foam fire extinguishing hydrant system. The fire water is supplied by the main water supply pipe network (mixed with the domestic water supply system) extending from the Tank Farm A and Tank Farm C areas. Three pumps in a networked configuration feed the fire protection system.

The system contains freshwater stored in Tank 8 of Tank Farm A boosted by a diesel-powered pump. If the freshwater supply is depleted, Tank Farm C has one each electric- and diesel-

powered saltwater pumps capable of drawing water from Apra Harbor. Periodic cycling of the Tank Farm A pump is done to flush the lines and maintain a ready state. If the fire pumps drawing from Apra harbor are activated, the Tank Farm A pump is used to flush the lines with freshwater.

Photo 32: Golf Pier - Post Typhoon Mawar Damage

Source: WSP

Photo 33: Golf Pier – Typical Pile Damage at Dolphins

Maintenance and Operational Improvements

Currently, the PAG is evaluating options for repair/replacement of Golf Pier. Golf Pier is suitable for use by other Port tenants and shippers for unloading liquefied petroleum gas (LPG) and cement. Discussions are underway for running a cement line down the pier and installing a motorized valve system to assure there are no safety conflicts between fueling and cement offloading operations.

4.2.5.5 Hotel Wharf

Hotel Wharf is located on the north shore of Apra Harbor and sits directly west of Dog Leg Pier. The wharf is constructed with sheet pile walls that are tied back to a sheet pile anchor wall. The waterside sheet pile wall is faced with concrete and has rubber arch fenders that provide berthing and mooring.

Condition Assessment

Overall, Hotel Wharf is in **serious** condition. Severe open- and closed-corrosion spalling of the concrete facing and longitudinal concrete pile cap are present at multiple locations. Visible from the east and west ends of the wharf, the sheet pile anchor walls are severely deteriorated. For these reasons, it has been recommended that Hotel Wharf is not used to berth large vessels and that it is demolished and replaced with a modern wharf structure. Future dredging to support deeper draft vessels should be considered as the current mudline elevation is approximately -26 feet MLLW. See **Error! Reference source not found.**, and Photo 35.

Similar to the marine structure, the building structures on the wharf are **poor** condition. Leaking and corroded potable water supply pipes were observed at multiple locations. It is recommended that the building structures are removed and replaced.

Photo 34: Hotel Wharf (Exposed Anchor Wall)

Photo 35: Hotel Wharf (Open-Corrosion Spalling)

Maintenance and Operational Improvements

Currently, the PAG is negotiating with a local contractor (following a recently awarded IFB) to rehabilitate the wharf structure with a new bulkhead, modern mooring and fendering system, utilities, and pavement. This rehabilitation project will be done in phases.

4.2.5.6 Upland Structures

4.2.5.6.1 Tank Farm A

Tank Farm A is Port-owned and was previously managed by Mobil through a use agreement. It is located on the north side of Route 11, west of Industrial Avenue and within the Marine Industrial Complex. The area is comprised of seven tanks within containment walls. A majority of the tanks date to the 1960s and 1970s and have not had preventative maintenance performed since 2003. The newest tank was installed after Typhoon Paka in 1998 and received its final painting in 2002. The salt spray and the debris that has blown off the adjacent embankment has pitted the paint and accelerated corrosion. See Photo 36.**Error! Reference source not found.**

Photo 36: Area A (Typical Tank Condition)

Condition Assessment

Assessment of Area A was performed in November of 2022 and September of 2023 (following Typhoon Mawar) and found the facility to be in **critical** condition. Severe corrosion and holes are widespread throughout the tanks. Tank No. 3 has failed. The pipes that supply the tank farm are disconnected at the wye that originates from Golf Pier. Most of the piping internal to the facility has been removed and what remains is not salvageable for use with the exception of the fire water supply lines. These lines may be salvaged for use in a new and upgraded fire protection system. A detailed condition assessment report for Tank Farm A is provided in Appendix F.

The loading rack structure is in **poor** condition with several locations of open-corrosion and mechanical spalling. All of the piping has been removed on the rack and the existing piping underground appears to be in **poor** condition. The layout of the facility allows the movement of service vehicles near to the tanks within the internal road network. See Photo 37.

Photo 37: Area A (Truck Loading Facility)

4.2.5.6.2 Tank Farm C

Tank Farm C is owned by Mobil and located on land leased from the Port across from Tank Farm A on the south side of Route 11 and west of Industrial Avenue within the area of the Marine Industrial Terminal. The area is comprised of five tanks within containment. The pipes that supply the tank farm originate from Golf Pier. The facility is able to receive fuel from F1 through cross piping in the SPPC facility. The fire protection of the facility is described above.

Condition Assessment

A cursory visual assessment of Area C was performed in August of 2021 and found the facility to be in **good** condition.

4.2.5.6.3 Cement Unloading Terminal (Cementon)

Cementon leases and operates the cement unloading terminal located at Golf Pier. The company operates a 161-foot, 9,000-ton-capacity cement silo on the 1.6-acre site. There are some imports of cement in super sacks through the Cargo Terminal, but the majority of their cement is imported through this facility. See Photo 38.

Photo 38: Cementon

4.2.5.6.4 Cement Unloading Terminal (Hanson)

Hanson Permanente Cement of Guam (Hanson) leases and operates a cement unloading facility in the Marine Industrial Complex. The company operates a warehouse and silo on the 1.9-acre site. See Photo 39.

Photo 39: Hanson

4.2.5.6.5 Outhouse Beach

Outhouse Beach is located on the north side of Apra Harbor and is situated between Hotel Wharf and Golf Pier. Outhouse Beach is a public beach and primarily used for water-recreational activities such as snorkeling and scuba diving. See Photo 40.

Condition Assessment

In general, the beach and associated structures are in **poor** condition. Moderate to severe corrosion is present at the covered pavlion's sheet metal roofing. Moderate corrosion and loss of coating is present at the upland bollard. Loss of slope armoring and erosion is present along the shoreline at isolated areas.

Maintenance and Operational Improvements

It is recommended that severely damaged sections of the pavilion roofing are replaced with in-kind repair material. Along the shoreline, it is recommended that slope armoring is installed to prevent further loss of the shoreline and adjacent pavement.

Photo 40: Outhouse Beach

4.2.6 PAG PUBLIC FACILITIES

PAG Public Facilities include Family Beach, Dog Leg Pier, Port Beach, Marianas Yacht Club, Harbor of Refuge, Aqua World Marina, Gregorio D. Perez Marina, and Agat Small Boat Marina.

4.2.6.1 Family Beach

Family Beach is located on the north side of Apra Harbor and sits east of Dog Leg Pier and Hotel Wharf. Family Beach is a public beach used for family outings, picnics, commercial water-recreational activities, and other water-related public activities. The beach is leased to several operators for picnics, jet skiing and swimming. All utility service facilities including electrical, domestic water-supply and septic options within Family Beach are provided and maintained by these operators. See Photo 41.

Photo 41: Family Beach

4.2.6.2 Dog Leg Pier

Dog Leg Pier is located on the north shore of Apra Harbor and sits directly east of Family Beach. Dog Leg Pier is comprised of two jetties that extend approximately 320 feet to the south. Marine structures at Pier Dog are no longer present but remnants of box-shaped sheet pile walls are present on the south ends of the jetties. The sheet piles are severely corroded and pose a hazard to nearby water recreational activities. It is recommended that appropriate demolition and cleanup be performed to avoid risk and injury to the public. See Photo 42.

Photo 42: Dog Leg Pier (West Jetty)

Dog Leg Pier is now leased to several operators for picnics, jet skiing and swimming. All utility service facilities including electrical, domestic water-supply and septic options within Dog Leg Pier are provided and maintained by these operators.

4.2.6.3 Port Beach

Port Beach is located on the south side of the Piti Channel and sits north of Highway 18. Port beach is used for family outings, picnics, commercial water-recreational activities, and other water-related public activities.

4.2.6.4 Marianas Yacht Club

Marianas Yacht Club (Club) is located on the north side of Sasa Bay and sits south of Highway 18. The club provides its members with vessel mooring, parking, a clubhouse, and access to the grounds.

4.2.6.5 Harbor of Refuge (West Basin)

The Harbor of Refuge, located on the eastern end of Piti Channel provides shelter to boats from wind and wave during typhoon events and is used for long-term moorage to accommodate owners who leave the island for extended periods. Long-term moorage requires a lease that is renewed on a yearly basis and requires the owner to leave their vessel in “super typhoon” ready condition. The Harbor of Refuge has moorage for approximately 52 vessels with each vessel requiring four concrete anchor blocks for moorage.

Marine concessions ring the harbor. The concessions primarily serve the tourism industry and have both in-water and on-land facilities. Sites are leased from the Port and the concessions change over time as a result of market conditions and business successes.

In 2011 and 2012, Oceaneer Enterprises performed two dive inspections and identified several deficiencies. As a result, the Port has issued a procurement solicitation to repair and rehabilitate the anchorage blocks and moorings. Once repairs have been completed, inspections should be performed on a regular interval not to exceed five years. At a minimum, anchorage blocks and marine growth should be removed from chains and attachments prior to typhoon season.

For several years, discussions of adding a boat haul and repair facility at the Harbor of Refuge were held. Currently, if a vessel needed dry dock work or inspected by the USCG, the vessel would need to travel to Gregorio D. Perez Marina, Seaplane Ramp, or to the area where the inverted “L” shaped finger area separating the eastern area and the larger western basin where they are removed from the water and inspected. It would be prudent for the Port to identify a boat haul-out and repair facility at the Harbor of Refuge. It is recommended that a user survey be conducted to collect data related to the need of such facility, the frequency of boat inspections and repairs and to understand what features are needed. The user survey should consider the potential elimination of the haul-out ramp at the Gregorio D. Perez Marina should that marina be reconfigured in the future for additional slip spaces.

Although past inspections found that ground surface where dry dock work of vessels were improperly covered to control sediment and spills of containments, the Port has minimized such environmental concerns by ensuring the vessel owner provide a dry dock work plan and inspections are conducted on a daily basis. See Figure 4-15.

Figure 4-15: Harbor of Refuge and Aqua World Marina

Source: Google Earth and WSP

In 2011 and 2012, Oceaneer Enterprises performed two dive inspections and identified several deficiencies. As a result, the Port is preparing a solicitation to address the deficiencies. Once repairs have been completed, inspections should be performed on regular intervals not to exceed five years. Detailed underwater inspections should also be performed immediately following typhoon events. At a minimum, anchorage blocks and marine growth should be removed from chains and attachments prior to typhoon season.

As observed during the 2021 inspection effort, several boats are being stored in dry dock on the north side of the L-shaped finger. See Photo 43 and Photo 44. At some locations, the ground surface is not properly covered to contain sediment and spills from boats. Improper protection of the ground surface leaves the area vulnerable to sediment runoff or contamination by paint or cleaning chemicals that may be used.

For several years, there have been discussions of adding a boat haul-out and repair facility to the harbor to accommodate inspection and repair of boats. Currently, if an inspection is needed, boats travel to Hagåtña Marina where they are removed from the water and inspected. However, repair of vessels at Hagåtña Marina is not permitted. For these reasons, it

may be prudent to install a boat haul-out and repair facility at the harbor. It is recommended that a user survey is conducted to collect data related to the need of such a facility, the frequency of boat inspections and repairs, and to understand what features are needed. The user survey should consider the potential elimination of the haul-out ramp at the Gregorio D. Perez Marina should that marina be reconfigured in the future for additional slip spaces.

Condition Assessment

In general, long-term moorage structures are in **serious/critical** condition. Listing floats, excessive deflection of framing elements, and suspect framing were observed at multiple locations. Moderate to severe corrosion of steel framing members was also observed at several locations.

Photo 43: Harbor of Refuge (Long-Term Moorage Structure)

Photo 44: Harbor of Refuge (Dry Dock Storage)

Maintenance and Operational Improvements

Currently, the PAG is evaluating the installation of additional moorings.

4.2.6.6 Aqua World Marina (East Basin)

Adjacent to the Harbor of Refuge is the Aqua World Marina, an area leased and managed by Aqua World, Inc. Aqua World manages boat slips and landside leases. Sunken vessels are present at this marina resulting from previous typhoons and should be removed to prevent further leaching of chemicals into the water and damage that may occur to passer-by vessels.

Piti Channel is subject to sedimentation from currents and erosion from the shoreline. Depending on the need to maintain small boat passage, consideration should be given to conducting a hydrographic survey and planned dredging and bank protection. See Photo 45.

Photo 45: Aqua World

4.2.6.7 Gregorio D. Perez Marina

Gregorio D. Perez Marina (also known as Hagatna Boat Basin or Hagatna Marina) is located in the village of Hagatna and is the marina nearest to Guam's downtown center. The marina basin was originally constructed prior to World War II and consists of two lagoons. Several breakwaters provide protection from offshore waves and swells as well as additional protection for the marina floats within the Southern Basin.

The U.S. Army Corps of Engineers constructed the marina and basin in 1977 under the authority of Section 107 of the Rivers and Harbors Act of 1960. It consisted of an entrance channel 860 feet long, 120 feet wide, 12 to 15 feet deep; a 1.2 acre turning basin 12 feet deep; main access channel 540 feet long, 80 feet wide, 10 feet deep; a revetted mole 1,135 feet long, an east breakwater 200 feet long, a west breakwater 525 feet long; a 250-foot-long wave absorber; 3 circulation channels; and navigation aids. The navigation aids are in place. On-shore, two range towers are in place that identify the channel into the marina. The marina contains three floating docks, two boat launches, breakwaters, bulkhead structures, a rinse down station and a small miscellaneous float to the east.

A fuel refilling facility (not owned by the PAG) is in the east basin and is configured with hose lengths that allow boaters to refill their boats while tied up to a small float. However, the PAG does own the bulkhead. The containment surrounding the fuel pump is incomplete and would be insufficient to contain a spill. A sanitary sewer pump out is located on the concrete structure near the fueling facility and is owned and operated by a private company. A functioning sewer pump out station is needed at this marina. See Figure 4-16.

Figure 4-16: Gregorio D. Perez Marina

Source: Google Earth and WSP

In accordance with Public Law 17-71, PAG has authority over the public harbors, small boat marinas and marine facilities. Language in the Public Law states that the PAG has expertise in the area of managing harbors, ship docking, and implementing harbor safety as evidenced by its success at the Port. It also stated that the PAG is financially able to take on additional responsibilities in the development of marine resources. Since that transfer, the PAG has been providing financial support for the facility.

The floating docks are constructed with timber framing, plastic floats, and composite plastic lumber decking. Each dock is equipped with several finger floats and configured to accommodate approximately 40 permanent slips. The breakwater consists of a combination of rip rap armoring, and a steel sheet pile wall. Although record drawings of the landside bulkhead were not available for review, it is estimated that the landside bulkhead consists of a steel sheet pile wall faced with concrete that extends below the water line.

Two concrete boat ramps serve the West Basin. The southern boat ramp adjacent to Marine Corps Drive is used by recreational boaters with smaller trailerable boats. Because this boat ramp does not contain mooring floats, boats dropped in the water temporarily tie up to leased slips, an adjacent boat, or the concrete bulkhead. There is inadequate amount of trailerable parking area for boaters using the facility. Some boaters park their trailers in unauthorized areas which results in operational issues. The western boat ramp serves larger trailerable boats, as well as large boats that are being pulled out for inspection or maintenance. Similar to the southern float, mooring floats are not provided at the western boat ramp.

The following projects were completed with federal assistance from the Department of the Interior US Fish and Wildlife Service, which provides Sport Fish Restoration funds to the Guam Department of Agriculture. The projects had a cost share 82.5% federal and 17.5% local (PAG).

- Dock A – Replaced with composite decking and marine-treated wood framing (Completed July 2011)
- Dock B – Replaced with composite decking and aluminum framing (Completed November 2012)
- Dock C - Replaced with composite decking and aluminum framing (Completed February 2013)
- Pile Extensions at Docks A & B –20 steel piles were extended by five feet to prevent the walkways from rising above the piles during storms (Completed December 2012)

Condition Assessment

In general, GDP Marina is in **poor** condition. Widespread corrosion of the sheet pile wall at the breakwater is present above the water line. From discussions with PAG staff, it is understood that Phase 3 repairs to replace the severely deteriorated sheet pile wall is being discussed. Erosion of the slope armoring on the north side of the breakwater is present. Failure or partial failure of this structure may impact the ability for vessels to enter/exit the marina. At several locations, floats are listing and present a safety hazard to pedestrians. See Photo 46, Photo 47, and Photo 48.

Photo 46: GDP Marina

Photo 47: GDP Marina (Deteriorated Sheet Pile Wall)

Photo 48: GDP Marina (Erosion on North Side of Breakwater)

Maintenance and Operational Improvements

Recommended maintenance items are provided below.

- Repair/Replace the severely deteriorated sheet pile wall

4.2.6.8 Agat Small Boat Marina

Agat Small Boat Marina (also known as Agat Small Boat Harbor) is located in the village of Agat on the west coast of Guam near Ga'an Point. The marina and detached breakwater were constructed in 1989 with contributions from the USACE and PAG. Shoreside facilities were completed in 1990. See Figure 4-17.

Figure 4-17: Agat Small Boat Marina

Source: Google Earth and WSP

The site consists of an entrance channel to the southwest (1,200 feet long), a detached breakwater, four floating docks (A, B, C, and D), a boat ramp, and loading pier. Note that Dock B is currently not in use and is not located on site. In total, the marina can accommodate mooring of approximately 150 boats. Upland facilities include a parking area for vehicles and vehicle/boat trailer combinations, an administration office, a restaurant/gift shop, and an office building that houses the Guam Fire Rescue Marine Unit.

The floats at docks A, C, and D appear to be recently replaced and are constructed with composite plastic decking and polyethylene flotation tubs. It is unclear whether framing consists of timber, aluminum, or a composite plastic material. At each float, a series of steel guide piles are used to secure the floats in position. Previous assessments state that guide piles are not tall enough to prevent the docks from floating above the piles and breaking free during a typhoon event. Access to the floats is provided by aluminum gangways topped with composite plastic decking. Potable water and electrical power are present at all floats.

In regard to the detached breakwater, wind-driven wave surges result in strong current flow into the marina near Dock D resulting in non-desired movement of vessels and excessive sediment deposits. It is understood that a study performed by USACE has been performed and discusses the causes and potential solutions to these issues.

Condition Assessment

In general, Agat Marina is in **fair** condition. With exception of minor corrosion of the steel guide piles, damage at docks A, C, and D was not observed. Similarly, the breakwater and slope armoring to the east are in satisfactory to good condition with no noticeable defects. The northern pier at the boat ramp has major to severe damage. At several locations, vertical timber framing is missing and has been replaced with rubber tires suspended from the facing. The boat ramp is in satisfactory condition with only minor cracking observed. At the loading pier, severe damage consisting of cracking, and open- and closed-corrosion spalling are present at multiple locations. Due to the severe nature and extent of damage present, it is understood that this facility closed to pedestrian and vehicular use. A sanitary sewer pump-out is located adjacent to the boat ramp but is non-functional. See Photo 49, Photo 50, and Photo 51.

Photo 49: Agat Small Boat Marina

Photo 50: Agat Small Boat Marina (Loading Pier)

Photo 51: Agat Small Boat Marina (Boat Ramp North Pier)

Maintenance and Operational Improvements

Recommended maintenance items are provided below.

- Modify the height of the guide piles to accommodate storm surges.
- Remove and replace the sanitary sewer pump-out.
- Provide additional warning signs and measures to prevent vessels that exceed the marina size and weight limit from mooring. To accommodate larger vessels, consideration should be given to replacing Dock A with a heavy-duty concrete float system.
- Evaluate the USACE study regarding the detached breakwater. Meet with stakeholders to discuss the study and determine if modification to the breakwater is needed.

4.3 SECURITY AND RESILIENCY

The Port security staff polices the Port, Agat Small Boat Marina, Gregorio D. Perez Marina, Aqua World, Port Beach, Family Beach, Outhouse Beach, Marianas Yacht Club, and Harbor of Refuge over three 8-hour shifts per day. The existing functional areas within the Port include:

- Oil Tank Farm
- Office and Warehouses
- Container Yard
- Berths
- Other properties
- Family Beach
- Hotel Wharf
- Golf Pier
- Marinas (Gregorio D. Perez, Agat Small Boat Marina, Aqua World, Harbor of Refuge)
- Cruise Ship Facilities

4.3.1 SECURITY CONDITION

Harbor and Terminal Security comprise the security functional divisions at the PAG. Harbor Security uses several long-range cameras to monitor the harbor. Additionally, there are separate Harbor Masters for the PAG and Navy controlled inner Apra Harbor. This Master Plan will focus on the terminal security needs for the PAG.

Existing buildings and perimeter gates have locks where padlocks and keys are changed out periodically. Port Police personnel must be present when any perimeter gate is opened. Existing perimeter gates have locks where padlocks and keys are changed out periodically. The Police must be present when any perimeter gate is opened.

There is no permanently assigned K-9 unit. If one is needed at the Port, a unit can be borrowed from Guam airport or Guam Customs and Quarantine Agency.

Cruise ship calls at the Port have declined since 2019 due to the pandemic with only one scheduled for 2022, although the PAG would like to increase the number of cruise ships that call on the Port in the future. Providing cruise ship security is difficult, labor intensive and slow at Berths F3 to F5. Once the Hotel Wharf reconstruction is completed, the PAG will be able to offer a better facility with more efficient security operations.

4.3.2 PORT FACILITY SECURITY PLAN REQUIREMENTS

The Port Facility Security Plan (PFSP) was updated and submitted and approved by the USCG in 2021. The PFSP is a working document and is subject to change as needed. The annual inspection was completed in March of 2022 and there were no exceptions.

Compliance with the Maritime Transportation Security Act of 2002 (MTSA) regulations satisfies the International Ship and Port Facility Security (ISPS) code for U.S. ports. The PFSP for the PAG meets those requirements. The ISPS code addresses both operational and physical requirements. Ultimately, it will be the PAG's responsibility to create the processes and procedures to meet the operational and physical requirements of the ISPS Code.

4.3.2.1 Maritime Security Levels

Port security currently follows the Maritime Security (MARSEC) system. Security level 1 is the minimum appropriate protective security measures maintained at all times under normal security conditions.

Security level 2 entails additional specific protective security measures maintained for a period of time as a result of a heightened risk of a security incident. This is the heightened level of security.

Security level 3 entails further specific protective security measures maintained for a limited period of time when a security incident is probable or imminent. This is the exceptional level of security.

4.3.2.2 Port Operations Security Requirements

The PAG must address Port operations including securing cargo handling, unaccompanied baggage, and ship's stores. The security of the Port must be monitored, access to the Port facility should be limited, and restricted areas within the Port must be designated. The USCG recommends use of Title 33, Code of Federal Regulations, Part 6 as an applicable regulatory reference for the PAG.

Cargo Handling

Secure cargo handling must ensure cargo tampering does not occur and that the correct cargo is accepted and loaded onto vessels.

Methods of securing cargo include checking of seals or other methods to prevent tampering and using scanning/detection equipment, mechanical devices, or dogs.

Monitoring the Security of the Port Facility

Monitoring methods include lighting, security guards (foot, vehicle, and waterborne patrols), automatic intrusion detection devices and surveillance equipment, and audible and/or visual alarms.

Limiting Access to the Port Facility

Methods to limit access to the Port facility might include restricting areas by fencing or other barriers, inspecting vehicles used by those seeking entry to the Port, and verifying the identity of all Port personnel and their vehicles. Valid TWIC cards are required for unescorted access to the facility, provided that person has an appointment or reason to be on the terminal. Individuals who do not have a valid TWIC card must be escorted by a Port employee or tenant who possess a valid TWIC card.

Designating Restricted Areas within the Port Facility

Restricted areas are established and have been identified in the PFSP. Methods to restrict access to areas within the Port include providing barriers and/or fencing to surround restricted areas, access points where access can be controlled by Port Police Officers, and automatic intrusion detection devices and surveillance equipment or systems to detect unauthorized access into or movement within restricted areas.

4.3.2.3 Security Improvements

In order to secure the Port facility and ships, personnel, cargo, cargo transport units and ship's stores, the following security recommendations should be considered as part of the PAG 2025 Master Plan and PFSP.

Fencing and Barriers

The perimeter must be secured, which would entail fencing (at least 10-feet in height) with potentially barbed and/or razor wire on the top of it and barriers built with materials that will provide a useful lifespan in the Port's corrosive environment. The fencing should be designed with a minimum of access points. Any secondary entrance or exit facilities should be locked at all times when not being used and have barriers at the gates. The barriers would be moved when the secondary entrance or exit facilities are required. The primary exit and entrance facility should be appropriately sized to meet the peak traffic demands of trucks and personnel entering and exiting the facility without excessive queuing.

The exterior fencing should have cameras installed near it and sensors installed on it to monitor any activity near the perimeter. These devices should be wired back to a central security

monitoring and control facility at the Port. As the Port operates 24-hours a day, there should be security staff on site and within the monitoring and controlled facility at all times.

Within the terminal, nested perimeters should be established to separate restricted areas, military operations, cargo handling areas, cargo storage areas, cruise ship areas, and utility (power and telecommunications) entrances with fencing and/or barriers. Again, this fencing may have barbed and/or razor wire on top. This interior fencing should also have cameras and sensors installed to monitor a breach in security.

There is a turn-around areas immediately after the gate complex and before the vehicle enters the terminal for all three operations should a vehicle need to be detained or turned away. The vehicle entry areas should have cameras with OCR software to be used to verify container numbers, license plates and other markings on vehicles.

Lighting

The entire facility must have lighting, to serve as a deterrent, improve visibility of cameras, and aid security officers. Lighting should be installed around the exterior perimeter, interior perimeters, and within the facility.

Additionally, if it is contemplated that security devices will be installed on lighting poles, the poles must have continuous power. Energy saving devices that only turn the power on to the poles when the light level drops to a level where the lights are activated should not be installed on those light poles. The security devices will need a permanent power source.

Scanning Devices

Scanning devices may be used for ship stores, container seal verification, and radiation monitoring. Within the entrance/exit facilities, stores handling, vehicle/documentation inspection area, and cargo handling and storage areas, scanning devices should be installed to ensure the security of stores and cargo. Even if these devices are not installed initially, it is important to set aside space for these devices and develop the power and communications infrastructure to support operation of these devices. Ultimately, these devices will be wired back to the central security monitoring and control facility.

These devices may include X-ray machines, RFID readers, mobile gamma ray imaging, and fixed radiation portal monitors.

Cameras

Cameras (both fixed and pan-tilt-zoom) should be installed along fence lines, within restricted areas, on and within restricted access buildings. Additionally, cameras should be installed at all entrance and exit facilities. An image of all license plates and transport vehicles and container markings entering and exiting the facility should be recorded and verified. This can be

accomplished via cameras aimed at license plates and vehicle marking areas, and OCR software. Cameras will be a combination of visual, thermal and infra-red. All cameras will be wired back to the central security monitoring and control facility.

The PAG is installing Closed Circuit Television (CCTV) cameras throughout the cargo terminal, primarily on high mast light poles. Cameras are also being installed at the Administration Building and Horizon Building. This project was completed in 2022.

Camera height is dependent on how high the containers are stacked. Since the high mast lights in the terminal yards vary between 50 feet, 80 feet and 100 feet, mounting heights for cameras will vary. When pavement is replaced, the Port may choose to create higher density (go from 3-high to 4-high or 5-high) stacking. At that time, high-mast lights may be selectively replaced and camera mounting heights adjusted accordingly. Typically, a camera height over 80' would be required to deal with containers stacked 5 high. But this can also be impacted by aisle width and the number of stacking rows involved. It is recommended that if pavement is replaced and stacking locations and heights are adjusted, that a lighting study be conducted to confirm high-mast lighting requirements and security camera mounting heights.

Sensors

Sensors should be placed along fences, within restricted areas and buildings to detect security breaches. Sensors can detect the change of temperature, light, and heat. Sensors can also detect motion. These sensors would be wired back to the central security monitoring and control facility.

Access Control

Any restricted access to buildings or areas should have access controlled by electromagnetic locks, position switches, card readers (possibly with personal identification numbers and/or biometric input), and cameras. In case of a power failure, the doors with electromagnetic locks should have a mechanical key and access must be limited for those keys. Under this type of system, mechanical keys are the backup procedure. Currently, the mechanical locks are changed every three months at the Port. With mechanical keys as a backup mechanism, it will be easier to institute a security program where it is known who has access keys to selected areas.

The access control system is part of the CCTV project referenced above.

Audible/Visible Alarm System

As part of the alarm system, an audible and/or visual alarm system may be included so that responders on the property would know where the security breach had occurred. The audible system would add loudspeakers and a paging system, and the visible system would add flashing

lights to the alarm system. Of course, personnel in the central security monitoring and control facility would know where the security breach had occurred via the electronic alarm system. The audible and visible alarm systems would be wired back to the central monitoring and control facility. Currently there is no port-wide alarm system in place.

Utilities

The site will be served by exterior power (electrical and gas) and communications (telephone, Internet, radio communications) utilities. The utility entrance onto the facility must be secured and, optimally, there would be redundant and diverse feeds for these services. This utility entrance should be one of the restricted access facilities within the Port property.

Within the site, these utilities must be distributed to the central security monitoring and control facility, buildings within the facility and, ultimately, to the electronic security devices.

A duct bank system will distribute power and communications within the Port. The duct bank system may be encased in concrete and the manholes should have locking and tamper-proof covers.

There should be redundant and back-up utility services throughout the Port. For example, there should be back-up/generator power for all necessary devices including some security devices. There should be both wire-line and wireless communications. Data should be distributed through a self-healing network topology.

Central Security Monitoring and Control Facility

The Port central security monitoring and control facility is located at the Port Command Center (PCC). The PCC is typically staffed with five police and two civilians during the day. This serves as a communications link between Port Police, first responders, emergency operations staff, and military security staff.

This is also the place where the cameras are recorded. Decisions will need to be made regarding the compression rate of the video streams and how long to store the video locally. The consequences of full motion recording and length of storage are requirements that will determine the number and size of storage devices. A final decision will need to be made regarding long-term storage of video images off-site.

The control room has space for officers on duty with desks/consoles, monitors appropriate task lighting. Also, the security officers must be able to see alarm notification and easily search stored video images.

It is recognized that the military operations will likely have a separate security monitoring facility. However, the military and terminal facilities should be linked electronically in order to

inform each other of existing situations and possibly act as a secondary operations center in case the monitoring facilities goes down.

Staffing

Staffing is required to take these electronic security devices and security measures from MARSEC level 1 to level 2 to level 3. The devices, alone, will not meet the increasing demands of the security levels. Even security level 1 requires staffing and an operational plan. This facility will not operate properly without local security officers.

From the initial interview with the Port Police Chief, it is clear that there is not enough security staff to manage security at the current facility. Under the proposed Master Plan, and with the ever-increasing international security requirements, it will be crucial to fully fund the security program. This includes not only security devices, but also security staff to operate, maintain, and monitor the security devices.

Cyber-Security

The PAG commissioned a more in-depth Cyber Security study in 2022. The study will review previous security assessments (conducted in 2017), analyze cyber security policies within the Cyber Security Annex and Maritime Transportation Security Act (MTSA), assess the security gap, develop a roadmap for implementing recommendations, and perform a risk assessment.

Wired vs. Wireless Communications

For the security devices at this facility, it is recommended that a wired communications network be installed. Wireless networks are less expensive to install, but wired networks provide a greater level of security and dependability. It is more difficult to intercept a signal on a wired network than on a wireless network. Additionally, wireless networks will be installed for Port communication systems, and it may become difficult to eliminate interference between these systems that will need to coordinate their frequency plans.

Most security devices will require power; therefore, extending a wired communications network to them will be of nominal additional cost.

Electronic Manifests

The PAG had developed its own electronic manifest system; however, the PAG does not require its operators, consignees, and shippers to use electronic manifests. The PAG staff enters data, from paper records, from several of its shippers into their electronic system. Some terminal operators at the Port use a graphical system to place and then locate a container. Currently, Shippers submit an electronic data interface to PAG 24-hours prior to the arrival of the vessel. PAG downloads the information into the Terminal Operating System and verify data with the hard copy of vessel plan provided by the Shipping Agent for accuracy.

Going forward, the PAG should work with its shippers, consignees and operators to develop an electronic system that meets the user's needs and find ways to show its customers the value of migrating to an electronic system from a paper system.

Finally, it is recommended that the PAG develop a data infrastructure to support its own electronic operations as well as its shippers, terminal operators and Customs officials. Ultimately, all entities involved in the supply chain will migrate to an electronic manifest system, so it will be crucial for the PAG to have the infrastructure in place to accommodate this change. The infrastructure includes sizing the duct banks adequately for substantial growth, as well as constructing their own data network to grow over time.

Security Operational Plans

The PFSP should include a section covering the security operational plans. First responders should be identified, and their incident management plans should be reviewed or developed. Working with the first responders, the PAG security staff should cooperatively maintain a security operational plan. That plan should identify who should respond to what type of incident and in what manner.

Additionally, there needs to be communications links (clear, redundant, and reliable communications paths) between the responding and responsible agencies, both in terms of person-to-person communications and data communications as addressed in maritime security regulations.

Finally, interoperability must also be addressed in the security operational plan. Interoperability includes policies and protocols, and equipment that work together. In developing an interoperable communications system, the following factors should be considered:

- Training and familiarization with the facility
- Joint table-top and full-scale exercises with all the first responders and appropriate security personnel
- Clear lines of communications and responsibility with agencies and individuals (both primary and secondary)
- Compatible radio communications between agencies
- Development of underwater surveillance protocols with other relevant security agencies

Cruise Ship Operations

Providing security for the cruise ship dockings currently requires a large amount of security planning and staffing. As there is a desire to increase the number of cruise ship dockings, it will be crucial to streamline the security process. There needs to be a process improvement for scanning ship's stores, scanning baggage, and faster movement of passengers and staff on and off the ships. Some of this improvement can be achieved through electronic equipment, ready

access to K-9 units, and temporarily dedicated lanes for entry/exit of vehicles serving the cruise ship docking. Much of this improvement can be achieved through operational process improvements.

4.4 ENVIRONMENTAL, HEALTH, AND SAFETY

4.4.1 ENVIORNMENTAL, HEALTH AND SAFETY (EH&S) PROGRAMS

The PAG is engaged in several initiatives to advance their EH&S programs for the safety and well-being of employees and to ensure compliance with local and federal regulations. These programs include the following.

4.4.1.1 EH&S Plan and Manual + Documentation

PAG is developing several OSHA-required written safety programs (e.g., hazard communication, machine guarding, hot work, etc.) as well as an environmental compliance program.

4.4.1.2 Job Hazard Analyses

A Job Hazard Analysis (JHA) is a technique to identify the dangers of specific tasks in order to reduce the risk of injury to workers. PAG is developing JHAs for port activities, ultimately to reduce risk to PAG personnel. PAG developed a master training spreadsheet that identifies several port activities, which will be used to assist with the JHA development. Onsite visit by a safety professional will be required as part of the development of the JHAs.

4.4.1.3 LOTO Procedures

PAG is required by OSHA to have lock-out/tag-out (LOTO) safety procedures in-place to control hazardous energy from moving equipment. These procedures have been implemented and are periodically reviewed by a safety professional to ensure compliance.

4.4.1.4 EH&S Training

PAG has engaged a safety professional with providing environmental, health, and safety (EHS) training to PAG personnel. This includes several training topics required by OSHA and the EPA based on the port's activities.

4.4.1.5 SWPPP's

A new Multi-Sector General Permit (MSGP) was issued by the EPA during 2021, which required additional notifications and updates to the SWPPPs. As a result, PAG has developed and put into place Stormwater Pollution Prevention Plans (SWPPP) for the cargo terminal, Gregorio D. Perez Marina, and the Harbor of Refuge (West Basin).

4.4.1.6 SPCC Plan

PAG prepared an inventory of oil-containing equipment throughout the port that is included in the required Spill Prevention, Control, and Countermeasure (SPCC) Plan. The final draft of the SPCC Plan was prepared in December 2021.

4.4.1.7 RCRA

As a large quantity generator (LQG) of hazardous waste, PAG is required to have a Resource Conservation and Recovery Act (RCRA) Contingency Plan, which outlines how PAG will address emergency situations related to hazardous waste incidents. The Contingency Plan was finalized in early 2023.

4.4.1.8 EPCRA

PAG stores hazardous materials onsite and thus, may be subject to annual reporting under the Emergency Planning and Community Right to Know Act (EPCRA).For this reason, PAG developed a list of chemicals, summarized in a Tier II Emergency and Hazardous Chemical Inventory Report.

4.4.1.9 Facility Emergency Response Plan

PAG has prepared a port-wide emergency response plan which develops a response organization and ensures the availability of response resources (i.e., response equipment, trained personnel, etc) in the unlikely event of any unplanned sudden or non-sudden release of chemical constituents to the air, soil, or surface water. This plan is reviewed and updated on a regular interval.

4.4.2 FEDERAL AND LOCAL PERMIT AND APPROVAL REQUIREMENTS

Projects previously identified in the 2013 Master Plan and the Implementation Plan executed for PAG by MARAD have mostly been completed. These projects are components of Phase I and in particular Phase I-A of the Port Modernization Plan (PMP) as approved by the Guam Legislature and enacted into Public Law. These projects include:

- Container Freight Station Renovation
- Breakbulk Yard Reconfiguration and Expansion
- Warehouse 2 Demolition
- Container Yard Expansion
- Reconfigured and Expanded Gate Complex
- Additional Load Center (LC-5)
- Stormwater System Improvements
- Firewater System Improvements
- Miscellaneous Demolition Projects

These projects were federally funded, are located within 200 feet of the shoreline, and required programmatic review under the National Environmental Policy Act (NEPA). Accordingly, prior to commencing construction, the U.S. Maritime Administration, acting as federal overseer of the NEPA process, completed an Environmental Impact Assessment, consulted with federal and local regulatory agencies, and issued a finding of No Significant Impact. The PAG also completed Environmental Site Assessments, Phases I and II, and established environmental protection protocols relevant to the planned construction.

Any deferred projects initially included in the proposed action and deemed to be a future continuation of that action (the original full-size PMP program) would be covered by the NEPA documentation already completed. Such projects can be advanced by a sudden increase in the pace or scale of the Military Alignment on Guam. Examples of such projects include:

- Optical Character Recognition Portals and Canopies
- Radiation Portal Monitors
- Further Yard Expansion
- Additional Pavement Replacement with new Hi-Mast Lighting in Existing Terminal Yards

Projects that were not part of the PMP will have their own permitting requirements that address project specific environmental concerns. These projects are funded by a variety of sources including 2018 Bonds, Federal Government Grants and PAG revenues. These projects include:

- Hotel Wharf and Access Road Maintenance and Repair
- New Administration Building (now viewed as an annex or smaller building, deferred several years)
- Waterline Replacement
- EQMR Building Repairs and Upgrades
- Warehouse 1 Repairs and Upgrades
- F1 Fuel Pier Upgrades
- Golf Pier Repairs
- Terminal Operating System (TOS)
- Gate Operating System (GOS)
- Perez Marina Phase III
- Agat Small Boat Marina Loading Dock Structural Repair
- Agat Small Boat Marina Dock B Repairs
- Harbor of Refuge Renovation
- Pre-Disaster Mitigation Hardening of Port Facilities
- Load Center Refurbishment and Hardening
- Maintenance and Sustainment of Prime Power Generators

- Data Warehousing Systems
- LAN Infrastructure Upgrades
- Port Police Security Upgrades

In addition to the projects list above, this Master Plan identifies additional long range Capital Improvement Projects (CIP) that will be implemented over the next several years. These include:

- Acquisition of new STS Gantry Cranes (up to three)
- Replace reefer receptacles (60 each)
- Purchase container yard equipment
- Fuel connectivity pipeline, Pier F1 to Golf Pier
- Pier F1 Repair/Replacement
- Berths F2 through F6 Renovation/Reconstruction
- Solar Photovoltaic (PV) Energy Project
- Demolition/Renovation of fuel tanks at Area A
- Redevelopment of Sea Plane Ramp
- Replacement of existing hi-mast light fixtures with LED

4.4.2.1 List of Anticipated Federal & Local Permits

It is anticipated that the following environmental permits and approvals may be required to implement certain sections of the recommended near-term and long-term development.

Federal Permits and Approvals

- NEPA (completed for Phase I-A of PMP by MARAD)
- USACE Section 10/404 Permit (needed for Pier F1 and Berths F2 through F6). Port would work directly with USACE to obtain this.

Local Permits and Approvals

Some local permits and approvals are needed for ongoing projects, while some will be needed for future individual maintenance and repair or sustainability projects.

- Guam Environmental Protection Agency (GEPA) administered Section 401 Water Quality Certification
- Guam Bureau of Statistics and Plans - Coastal Zone Management Federal Consistency Program
- Guam Development Permit (if dredging seaward of the mean high-water line)
- GEPA Erosion Control Plan Approval/Permit
- GEPA Environmental Protection Plan (EPP) Approval

- GEPA administered National Pollution Discharge Elimination System (NPDES) storm water general permit for construction activities
- GEPA Test Boring Permit (needed for Hotel Wharf and Access Road). Contractor permit.
- GEPA Dewatering Permit (if needed)

Federal Regulations Governing the Recommended Development

Some of the following permits have been completed during the existing NEPA documentation for the PMP components that are underway or will be completed within the next few years. Others will be completed when future projects are defined and budgeted during the 20-year planning horizon.

- Clean Water Act (Sections 401, 402, 404)
- Rivers and Harbors Act (Section 10)
- Coastal Zone Management Act (Section 307)
- Endangered Species Act (Section 7)
- Fish and Wildlife Coordination Act
- Magnuson Stevens Act
- National Historic Preservation Act (Section 106)
- Federal Clean Air Act
- Migratory Bird Act

If contaminated soil, sediment, or groundwater will be encountered during construction of the recommended development, the following federal regulations may be applicable depending on the characterization of the materials:

- Resource Conservation and Recovery Act
- Comprehensive Environmental Response Compensation and Liability Act
- Toxic Substances Control Act

Local Regulations Governing the Recommended Development

Construction of the Recommended Development will require compliance with the following local regulations:

- Guam Water Quality Standards
- Guam Coastal Zone Management Program Policies
- Guam Environmental Protection Act (Public Law 11-191)
- GEPA Soil Erosion and Sedimentation Control Regulations
- Chapter 49, Title 10 of the Guam Code Annotated, Air Pollution Control Act (P.L. 10-74)

4.5 INFORMATION TECHNOLOGY

The PAG's PMP from the 2013 Master Plan program included several key IT initiatives. The following list includes the ongoing IT initiatives from the 2013 plan and new initiatives identified for this 2025 Master Plan's Port Readiness Plan:

- Terminal Operating System (TOS) upgrade to allow for automated invoicing, cargo and container tracking, financial management and maintenance management.
- Implementation of TOS satellite systems to optimize TOS functionality, such as Remote Reefer Monitoring, Vehicle Mounted Terminals, Truck Appointment System, Terminal Control Center and Cargo Planning.
- Implementation of a Gate Operating System (GOS)
- Implementation of a TOS General Cargo module/app
- Implementation of systems to support further digitization in the logistic supply chains in Guam
- Selection and implementation of a Harbor Master Port Management Information System (MIS)
- Building a fully integrated systems landscape by connecting the new financial management system (FMS) with the new TOS.
- Digitization of data flows between the Port and its Stakeholders, leading to the Port Community System (PCS).
- Acquisition of gantry cranes equipped with OCR cameras to automatically read container data, damage detection and installment of weigh sensors in spreaders.
- A new customs facility inclusive of a cargo scanner and a customs cargo management system connected to the TOS.
- Implementation of measures, procedures, infrastructure and refurbishment of buildings to ensure cyber security, making the network robust.
- Installing a closed-circuit television (CCTV) system and voice over internet provider (VOIP) phone system
- Selection and contracting an Information Technology Support Partner (ITS)

These IT improvements will increase capacity to ensure that Guam's only commercial port is developed and operated to adequately accommodate the rapid expansion expected to occur over the next decade.

As the PAG modernizes and readies for the military buildup, the IT improvements will enable the efficient management of new systems, functions, and services that the Port supports. To accomplish this effectively, the PAG will need to migrate its IT Division from its current structure to a new structure that accommodates the future application of new technologies.

Most of the required IT changes are focused on cargo terminal operations, gate operations, and their connections with financial operations. With implementation of these new systems, more information will be tracked and shared across all PAG functions. The changes are expected to result in more efficient information processing and management, along with improved cargo handling services and seamless data flows.

The current structure of the Operations Department was developed based on the modes of operation, vision, culture, tools, support systems, types of equipment and administrative demands that were standard business practices at that time developed. The new Operating and IT systems will require a new structure for the Operations Department and operating procedures will change. The new Customs Inspection Facility will also lead to adaptations of current standard operational procedures (SOP) in Port facilities.

Setting the stage for the future:

An observation of the current state of the PAG's IT capabilities, future operations and IT improvements leads to the following three main areas of concern:

1. IT Infrastructure is outdated
   - Older equipment is risky
   - A new / migrated TOS will require modern infrastructure
2. Cyber Security is inadequate
   - TOS, FMS and IT infrastructure require increased cyber security
3. Current TOS has reached its use life and is out of support in October of 2023

An IT Study is underway to address the core capabilities of the Port's Operations, Finance, and Security systems and operations. To achieve efficiency in these areas of concern, the IT Study scope is comprised of the following efforts:

- IT Infrastructure – Assess and evaluate the Port's infrastructure backbone, network, client access, servers, wireless connections and IP management functions.
- Cyber Security – Identify ways to improve protection of the Port's financial and law enforcement systems, devices, and important data from unlawful access or criminal use and thus guaranteeing confidentiality, integrity, and availability of information.
- Terminal Operating System (TOS) Upgrade – evaluate and define the modules that may or may not be required in the next TOS and provide alternate system solutions, if necessary, to enhance terminal operations and overall interoperability with all PAG stakeholders – Port, Port Users Group Guam (PUGG), and Guam Customs.

The IT Infrastructure study consists of the following activities:

- Analyze current IT environment (hardware, software, use and needs)
- Analyze existing Policies and Standard Operating Procedures (SOPs)

- Define Technical Architecture
- Define Network Architecture
- Define new applications like VOIP and CCTV
- Define robust cyber secure WIFI network(s)

The Cyber Security study elements are sensitive and confidential information:

The TOS upgrade study covers:

The development of a TOS Road Map. The work process includes a workshop to establish a definition of needs, follow-on analysis of options and delivery of a requirements document.

The TOS Requirements document will cover the following activities:

- Vessel Planning
- Yard Management
- Equipment (Container/Chassis) flows/processes
- Gate operations
- Remote reefer monitoring
- Vehicle mounted terminals
- General cargo handling (High level)
- Invoicing/Billing
- Other system interactions (Gate system, Customs, Port Community System)
- Infrastructure (cloud versus on premises)

The requirements document will support a TOS procurement process and include details of the needs PAG has for TOS functionality. The details needed to evaluate the TOS improvements will be identified.

The IT Study report will identify a set of projects, recommendations leading to the realization of a future proof, robust, secure PAG IT Landscape.

An IT policy committee should be established to decide on the projects to be implemented based on priorities, budgets and resources.

Draft plan for the next three to five years

The outcome of the IT Infrastructure and the Cyber Security studies will have impacts on current capital improvement program (CIP) projects. An integrated approach between CIP planning and IT/Cyber planning is needed for:

- Administration building

- Operations building
- EQMR building
- Harbor Master Port Control Tower
- Phone system VOIP
- Port wide CCTV system.
- Port Police
- Customs

The new/upgraded TOS will be the foundation for modernization of cargo handling in the future. The priorities and timelines will depend on availability of budgets and resources. The following list of TOS needs have been identified:

- Billing, tariff simplification, decrease groovy code in the TOS billing module, moving towards paperless electronic invoicing and outfacing cash payments.
- WIFI, robust, cyber proof, 100% coverage, wide bandwidth for future applications
- Remote Reefer Monitoring
- Vehicle Mounted Terminals
- Electronic Data Interchange (EDI), yard optimizer
- Vessel /berth planning
- Cyber security
- Automated Gate (GOS)
- Customs, cargo scanners, OCR
- Harbor master
- Cargo control center
- General cargo handling
- Upgrading finance systems, integration with the TOS
- Next steps in communications, digitization, Port Community System
- Crane OCR

Impact on organization:

- Restructure the IT Division to align with IT and operating improvements
- Restructure the Operation Department to align with IT and operating improvements

To be successful, the IT Division will need outside resources on an as needed basis. The IT partner should be engaged to answer requests for knowhow, experience, and provide hands-on IT help. This Information Technology Support partner (ITS) will be essential for the successful implementation of IT and Operating improvements.

After the projects being recommended in the IT-Study are executed, the CIP projects outlined in Section 7 can be realized.

The sequence of projects to be initiated are driven by priority, budgets, resources, impact, and timelines. The interconnections between these projects and other PAG initiatives need to be identified and aligned

5 MARKET ANALYSIS AND CARGO FORECAST

The relationship between the Guam economy and historical port cargo throughput provides the basis for forecasting future cargo volumes. This chapter's content is a primary variable of the required throughput capacity, equipment needs and capital/operating costs defined in the ensuing chapters. Market Factors includes a look at the economic trends that affect cargo throughput such as Guam's population and economic growth, as well as a forward look at expected development in the coming years. Then an analysis of historical cargo throughput at the PAG is included and finally forecasted port volumes are provided by cargo type.

5.1 MARKET FACTORS

5.1.1 POPULATION

Following several decades of double-digit growth, Guam's population growth slowed to 2.9% between 2000 and the 2010 according to the U.S. Census Bureau (USCB). The USCB provides population estimates and projections of Guam in partnership with the Government that are made available through the USCB International Data Base (IDB). The population estimates are provided for the years between each decennial census, and generally use existing data collected from various sources. In regard to the 2020 decennial census (years 2010 through 2020), the USCB reported that Guam's population decreased by 3.5% during the decade to a figure slightly below 2000 levels - an unexpected result given that USCB and the United Nations Department of Economic and Social Affairs (UN DESA) had previously estimated moderate growth during the decade. Table 5-1 includes a summary of Guam's population and percent growth.

Table 5-1: Guam's Historical Population

Year	1970	1980	1990	2000	2010	2020
Guam Population	84,996	105,979	133,152	154,805	159,358	153,836
% Growth from Previous Census	26.8%	24.7%	25.6%	16.3%	2.9%	-3.5%

Source: U.S. Census Bureau, 2020

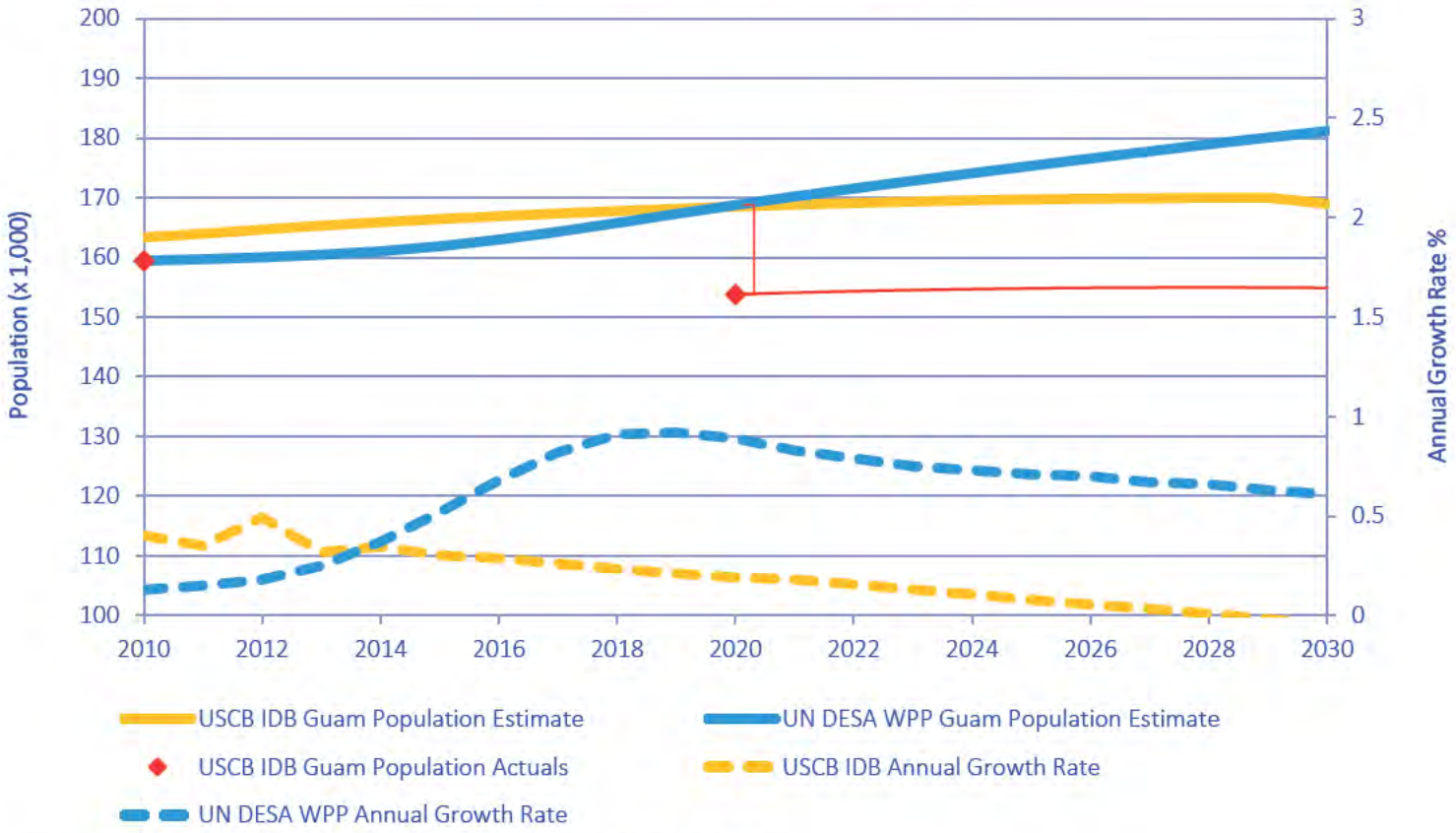
Population projections are provided by the USCB IDB for each year beyond the base census year for a 40-year forecast period. The base population is advanced each year by using projected fertility and survival rates and net international migration. The projections do not take into account the impacts of the ongoing military build-up. According to previous population projections (before the 2020 Census was taken into account) from the USCB IDB, Guam was forecast to continue to gain population at an average compound annual growth rate (CAGR) of

0.06 percent over the next 10 years, reaching a projected population of approximately 170,000 in 2030.

According to the 2019 Revision of *World Population Prospects* (WPP) prepared by the United Nations (UN), Department of Economic and Social Affairs (DESA), Population Division, Guam's projected population was forecast to grow at an average CAGR of 0.65 percent, reaching 181,000 in 2030. To date, DESA has not published an adjustment to this forecast after the 2020 Census.

Figure 5-1 displays Guam's historical estimated population and growth rates for 2010 through 2019 and projected population and CAGR from 2020 to 2030 presented by both the USCB and UN DESA Population Division. The actual population for 2010 and 2020 are shown as well. The actual population for 2020 as per the decennial census was 8.7% lower than the estimate. The growth rates do not reflect the military build-up on Guam. These population growth rates are considered in the computation of the forecast of the Port's cargo growth presented in Section 5.3 of this Report.

Figure 5-1: Guam's Estimated and Projected Population and Growth Rates



Source: U.S. Census Bureau IDB; UN DESA Population Division WPP

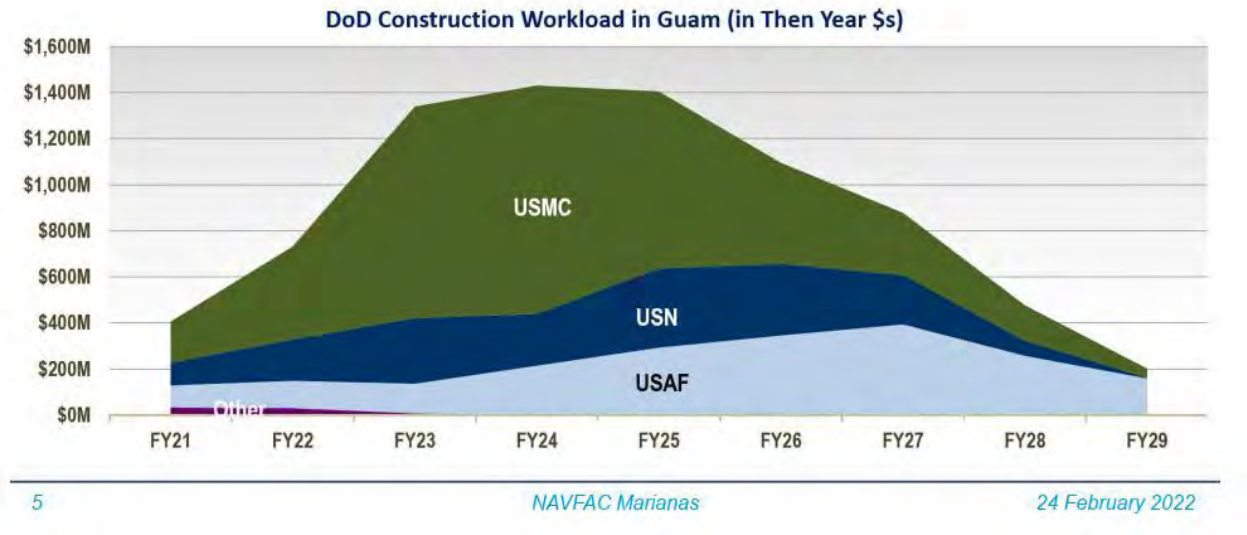
5.1.2 MILITARY PRESENCE AND BUILD-UP

Approximately 30 percent of total current cargo moving through the Port is military related. During the peak of the military build-up, the additional imported military equipment, supplies, and construction related materials are expected to nearly double the Port's military cargo volumes.

The DoD estimates approximately $8.0 billion in spending from FY 2021 through FY 2029 for the Guam military build-up and training facilities on Tinian and Pagan. Over the past eight years, the Federal Government defense spending on Guam has averaged approximately $300 million per year. In FY 2020, the DoD obligated around $530 million for military construction related to the realignment. $402 million were allocated for nine construction related projects in Guam's FY2021 defense spending bill. To date, 13 projects have been completed, 16 are in construction, and 40 are pending. The Marine Corps has reported that up to 134 projects are directly associated with the realignment efforts.

According to the GAO Report, the Marine Corps will increase the number of construction projects each year until FY 2023 when it will peak at 43 active construction projects. As shown in Figure 5-2, the DoD construction program for the Marine Corps build-up in Guam continues through FY 2029. Although COVID-19 threatened the continuity of construction, projects were paused for only two weeks and did not affect the progress of projects overall. However, the estimated construction schedule could be impacted by Federal Government actions, cultural-artifact discovery and preservation, endangered-species protection and by the process for the detection of explosive ordnance on construction worksites.

Figure 5-2: U.S. Marine Corps Build-up Construction Spending Profile, FY 2021-FY 2029



Source: NAVFAC Marianas

5.2 ECONOMY

5.2.1 ECONOMY

The growth in Guam's economy has been, and is expected to continue to be, driven by a combination of the needs of a growing population and military presence, continued expansion and diversification in the tourism industry, and private and public investment in construction projects for the civilian and defense sectors.

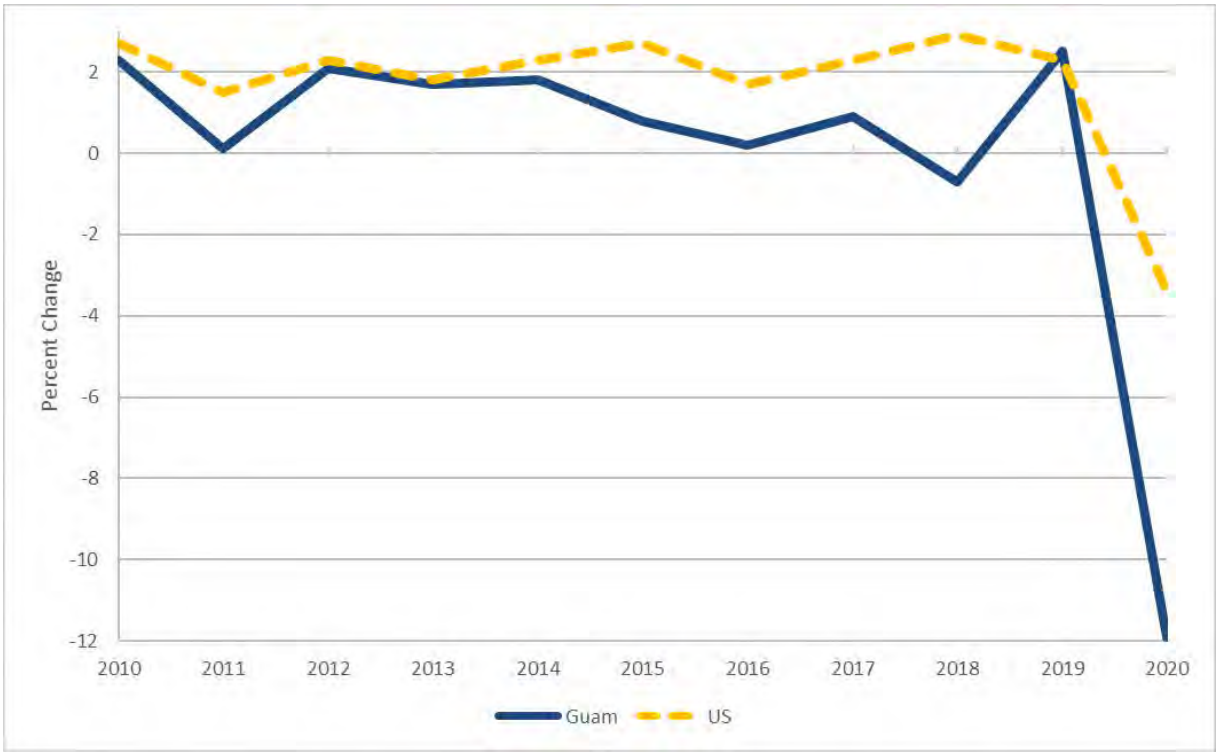
The COVID-19 pandemic resulted in depressed economies around the world. Guam's economy relies heavily on tourism, which was halted for most of 2020 and led to an approximately $1.38 billion loss in revenue. Federal recovery assistance of nearly $1.6 billion helped to offset this through unemployment assistance, Coronavirus Aid, Relief, and the Economic Security Act (CARES Act), and more.

5.2.1.1 Gross Domestic Product (GDP)

Guam's GDP has shown consistent growth in real dollars (adjusted for inflation) since Calendar Year (CY) 2006 based on statistics published by the Bureau of Economic Analysis (BEA). In CY 2019, Guam's GDP was $6.3 billion, which is roughly 0.03 percent of the U.S. mainland GDP of $21 trillion. Figure 5-3 shows that real GDP for Guam increased 2.0 percent in CY 2019 and had shown potential of increasing in CY 2020. Impacted by the COVID-19 pandemic, GDP for CY 2020 experienced an 11.9 percent decrease from the previous year. For comparison, real GDP

for the U.S. (excluding the territories) increased 2.3 percent in 2019 and decreased 3.5 percent in CY 2020. A significant impact to Guam's GDP was anticipated given the impact on tourism, income loss by unemployment, and dissipation of consumer and business spending. An estimate provided by a University of Guam study, suggested a GDP decrease ranging from 0.7 to 18.9 percent in comparison to CY 2019 GDP.

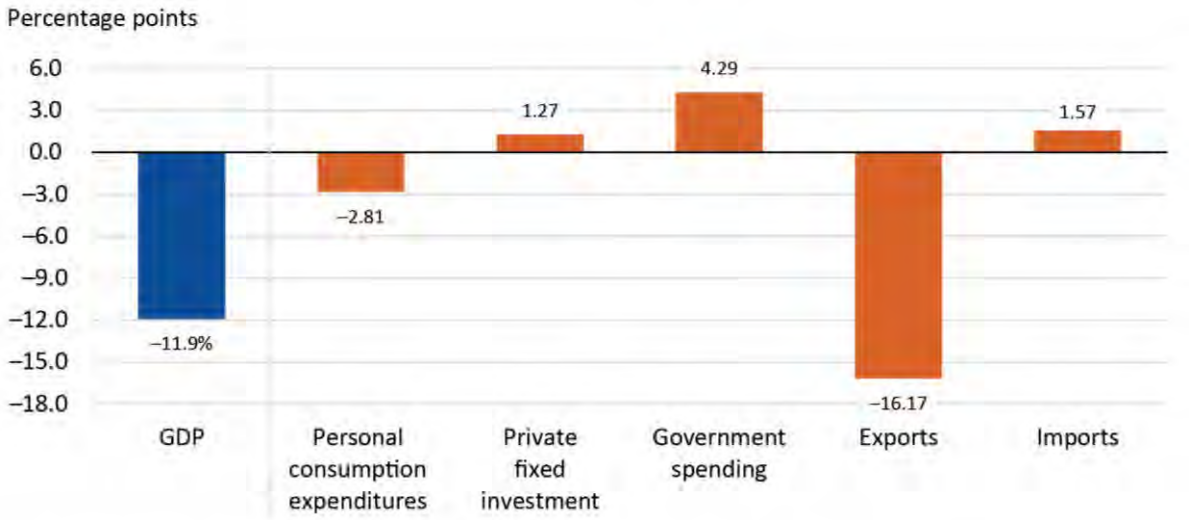
Figure 5-3: Percent Change in Guam and U.S. Real GDP CY 2010-2020



Source: U.S. Bureau of Economic Analysis

The CY 2020 GDP figure consists of approximately $3.5 billion of consumer spending, $3.9 billion of Government spending, and $1.4 billion of private fixed investment, offset by -$3 billion in net exports of goods and services. As shown in Figure 5-4 Guam's economy is highly dependent on government spending when it previously relied on imports. The current supply chain disruptions affecting the world due to labor shortages, COVID-19 restrictions, and increasing inflation have impacted Guam's economy. As of October 2021, several local businesses have noticed improvements in supply chain recovery and have turned to source from local suppliers**.** For further details on Guam's trade imbalance, see Section 5.2.1.5.

Figure 5-4: Contributions to Percent Change in Guam Real GDP for 2019



Note. Imports are a subtraction item. Thus, a decrease in imports results in a positive contribution to GDP.

Source: U.S. Bureau of Economic Analysis

Government spending also increased in CY 2020 on construction, equipment, and employee compensation. Specifically, growth in territorial government was supported by federal grant revenues, including the COVID-19 Relief Fund. For further details on Guam's construction industry, see Section 5.2.1.3.

5.2.1.2 Tourism

Tourism is the largest contributor to Guam's economy, representing 30 percent of the GDP based on data from the Guam Visitors Bureau (GVB). Guam is a preferred tourist destination for the East Asian market due to its:

- warm climate, tropical beaches, and natural beauty,
- short-haul, economical flights from/to major Asian cities,
- proximity as a U.S. territory,
- water sports such as diving and snorkeling,
- duty-free luxury shopping, and
- distinctive local Chamorro culture and food.

In CY 2019 Guam had approximately 1.67 million visitors - nearly ten times the island's population. As shown in Figure 5-5 visitation increased by more than 5 percent from the previous year, making CY 2019 Guam's best year in tourism to date. The COVID-19 pandemic had a strenuous impact on the tourism industry world-wide. In CY 2020, Guam received around 328,000 visitors, an 80% decrease when compared to CY 2019's record-high figures. For CY 2021 Guam received around 79,000 visitors. Monthly trends show a clear relationship between

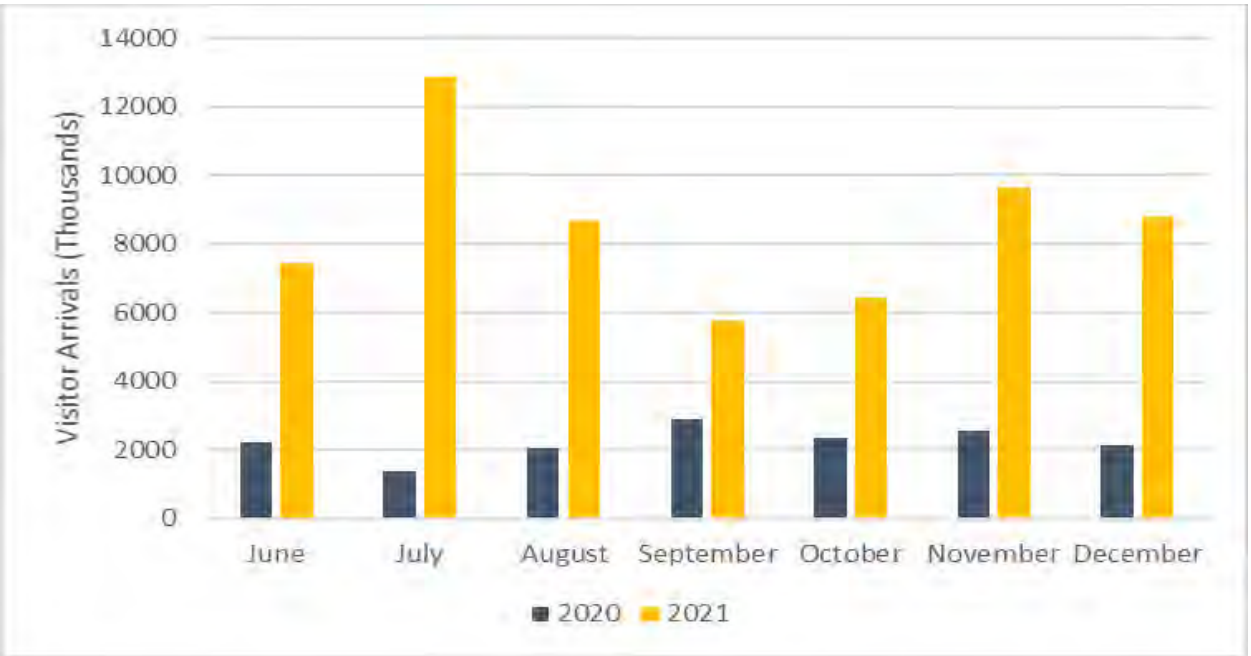
travel and COVID-19 outbreaks. Travel began to recover in summer 2021 after vaccinations became widely available, with decreases in August and again in September when the Delta and Omicron variants appeared. See Figure 5-6.

Over the past decade prior to the pandemic, tourism grew by a CAGR of 3.9 percent, and by a CAGR of 4.9 percent from 2014-2019. This section will cover historical data as it pertains to domestic and global trends before the impact of COVID-19 and plans to recover moving forward.

Figure 5-5: Guam Visitors by Origin, CY 2010-2020

Source: WSP analysis. Data provided by the GVB

Figure 5-6: Monthly Guam Visitor Arrivals in 2020 and 2021



Source: WSP analysis. Data provided by the GVB

Historically, Japanese visitors have been Guam's largest market for tourism. However, Japan visitation has decreased from over 925,000 in CY 2012 to 563,000 in 2018 before rebounding to about 684,000 in CY 2019. The decrease in Japanese tourism before COVID-19 has not been unique to Guam, according to JTB Tourism Research and Consulting, which reports a reduction in the total international outbound Japanese market. Total Japan resident visits abroad have declined in the past five years primarily due to an increase in Japanese consumption taxes, which has reduced disposable income, and the continued devaluation of the Japanese yen. As a result, air seat capacity from Japan has decreased in recent years. In January 2018, Delta Air Lines suspended service to Guam due to reduced seat demand out of Japan, network rerouting and the entry of competitive airlines in the Guam market. However, Japan Airlines began offering a second daily flight to Guam from Narita in late March 2018, which may have provided impetus for the 21.6% increase in visitors from Japan in CY 2019.

The decline in Japanese visitors to Guam has been more than offset by increasing diversification in origin of visitors from other locations, including South Korea, the U.S., Taiwan, the Philippines and Hong Kong. South Korean visitation has grown more than 250 percent in the last five years and grew by 25 percent from FY 2016 to FY 2017. The number of South Korean visitors continues to grow, surpassing Japanese visitors as of September 2017, making it the largest tourism market for Guam.

U.S. visitation represented 5 to 6 percent of all visitors to Guam between CY 2016-2019, totaling approximately 91,000 travelers in CY 2019, while Taiwan travelers totaled approximately 28,000. Philippine visitation increased by 8 percent in CY 2019, recording nearly 21,000 visitors.

Arrivals from China totaled approximately 23,000 visitors in CY 2017 but decreased to 16,275 in 2018 and just 11,496 in CY 2019.

While overshadowed by the COVID-19 pandemic, global political events also have a significant impact on international travel to Guam, and are affected by U.S. relations with China, North Korea, and even Russia.

Following the downturn in tourism due to COVID-19, Guam focused post-pandemic tourism recovery efforts to on heavy marketing campaigns and destination development initiatives that build on the improvements at the airport. Airport improvements consisted of a 12,000-foot runway, a new third level corridor for international arrivals completed in 2019, and relocation of baggage screening equipment.

Table 5-2 shows the percent growth of Guam tourism over the past decade and GVB's projected growth for the next three years, based on the most recent forecast available. As of September 2021, with 59,000 visitors Guam had not met the forecasted 82,000 visitors for FY 2021

Table 5-2: Guam's Historical Tourism Growth Rates (Pre-COVID)

CAGR	Percent	Fiscal Years
10-Year Historical CAGR	3.5%	2010-2019
5-Year Historical CAGR	3.7%	2015-2019

Source: WSP analysis, GVB, and Tourism Economics

The tourism growth rates are considered in the computation of the Base Case forecast of the Port's cargo growth presented in Section 7 of this Report.

5.2.1.3 Construction

Total construction activity on Guam has grown from approximately $500 million annually to $900 million in 2019. While construction activity on Guam was originally predicted to keep increasing due to the planned projects by commercial developers, the Government and the DoD, the COVID-19 pandemic led to a decrease in spending. As shown in Table 5-3, a steep decrease of almost 50% exists between 2019 and 2020. However, for FY 2021, the DoD reported $473 million in constructions contracts. This increase demonstrates recovery from 2020 and growth from 2019 numbers.

Table 5-3: Building Permits & Construction Contracts in Thousands, FY 2016-2020

Fiscal Year	2016	2017	2018	2019	2020	5-Year CAGR
Building Permits	$433,358	$423,015	$355,045	$487,316	$305,347	-6.8%
DoD Construction Contracts	$26,463	$167,932	$306,350	$415,878	$153,347	42.1%
Combined	$459,821	$590,947	$661,395	$903,194	$458,694	-0.05%

Source: Guam Economic Outlook for FY 2022, Department of Labor

Current major construction projects in Guam in development or under construction include:

- Guam International Airport Authority (GIAA) opened its new $130 million International Arrivals Corridor in January 2022. The new Corridor adds a third level to the airport terminal and is designed to separate arriving and departing passengers.
- Japanese retail store Don Quijote is planning to open a sizeable retail discount store as Don Don Donki. Construction is underway with a opening planned for 2023.
- Guam's largest power plant, with a construction cost of $560 million, is underway and scheduled for completion in 2024. The 200-megawatt power plant in Dededo is expected to produce 40% of Guam's power needs. GPA awarded the contract to a consortium led by Korea Electric Power Corporation as the engineering, procurement, and construction turnkey operator for the plant. The plant will replace the two Cabras power plants, located in Piti near the Jose D. Leon Guerrero Commercial Port (the "Port"), which were left inoperable by an explosion and fire in August 2015. The new facility will allow the integration of existing solar photovoltaic sources of renewable energy and an additional 120 megawatts from planned solar photovoltaic farms.
- Guam Memorial Hospital will be adding a new medical campus to its facilities. The project is set to cost $1B and will finance $600 million through bond sales. The new campus will include facilities for the Department of Public Health and Social Services.
- The Northern Wastewater Treatment Plant is a $122 million project in development under the Guam Waterworks Authority. Building permits were issued in October 2019.
- The proposed Honhui Guam Resort would be the tallest building in Guam with two towers and 900 rooms and is currently in planning stages. Demolition permits are expected to begin processing in 2023 and overall project completion within 5 years.

Since most of the major construction projects for public agencies are bond or grant funded, a leading indicator of future construction is the availability of funds realized from bonds and

other sources. Table 5-4 lists the major public agency projects from FY 2021 (excluding DoD-related projects) for which funding is planned or funding has been obtained.

Table 5-4: List of Public Agencies with Major Construction Planned Projects

Planned Projects – Funds Available	
Guam International Airport Authority	$40,610,000
Guam Solid Waste Authority	$27,610,000
Subtotal	$68,220,000
Planned Projects – Bond/Loan Financing Proposed	
Guam Waterworks Authority	$134,000,000
Department of Education	$100,000,000
Department of Public Works	$70,000,000
University of Guam	$21,000,000
Department of Land Management	$15,750,000
Subtotal	$340,750,000
TOTAL	**$408,970,000**

Source: Guam Economic Outlook for FY 2023, Department of Labor

A leading indicator of DoD construction is appropriations. Appropriations for DoD Military and Civilian Infrastructure are shown in Table 5-5.

Table 5-5: Appropriations in Thousands for DoD Military and DoD Civilian Infrastructure Projects

Fiscal Year	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
DoD Military Construction	$272,268	$248,658	$354,654	$448,500	$470,638	$571,205
DoD Civilian Infrastructure	$20,000	--	--	--	--	--
TOTAL (Combined)	**$292,268**	**$248,658**	**$354,654**	**$448,500**	**$470,638**	**$571,205**

Source: Guam Economic Outlook for FY 2018, Department of Labor; NDAA for 2018

Historically, the H-2B visa program has provided Guam with a large supply of temporary foreign labor to support the limited labor pool in Guam. Guam's previous exemption from the H-2B visa yearly quota ended Dec. 31, 2014 and most H-2B workers' visas to work in Guam expired in 2016 and early 2017. This resulted in a significant decline in construction workers during this period. See Section 5.2.1.4 for additional information.

In October 2016, 11 Guam-based companies and the Guam Contractors Association initiated a class-action lawsuit against U.S. Citizenship and Immigration Services (USCIS) and other federal agencies, alleging that, starting in 2016, USCIS began rejecting their H-2B visa petitions for work

during exceptionally busy periods at a rate approaching 99 percent compared to a prior Guam average approval rate of approximately 95 percent through 2015.

In 2016 and 2017, DoD officials and Guam construction contractors faced a construction labor shortage in Guam due to challenges in getting approvals for H-2B visas. According to data from the Guam Department of Labor, USCIS approved approximately 4 percent of H-2B visa applications for Guam between January and September 2016. In 2014 and 2015, the U.S. Citizenship and Immigration Services approved over 98 percent of H-2B visa applications for Guam.

In January 2018, the U.S. District Court of Guam preliminarily enjoined USCIS from relying on the failure to satisfy peak-load or one-time occurrence conditions as grounds for denying H-2B visa petitions and ordered USCIS to reconsider H-2B visa petitions that were previously denied.

The 2018 NDAA allows Guam and CNMI to have up to 4,000 H-2B visa workers each year for military buildup-related construction projects. The Department of the Navy's workload projections in the July 2015 Final SEIS indicate that more than 3,000 foreign laborers will be needed to supplement the Guam or CNMI workforce during the peak of construction for the military build-up. While the 2018 NDAA addresses the labor shortage for the military build-up, it is unclear if Guam's non-defense H-2B visa shortages will be resolved.

The 2018 NDAA bill also extends Guam's exemption from the national H-2B visa cap until October 2023. The Guam H-2B worker provision in the 2018 NDAA takes effect April 11, 2018; and the earliest start date for H-2B workers in Guam is May 11, 2018.

In April 2018, the U.S. District Court of Guam certified a class of businesses in Guam, thereby permitting Guam employers who believe they have had unlawful denials of H-2B visa petitions by USCIS to seek temporary relief under the 2018 Preliminary Injunction Order. According to the Guam Department of Labor Alien Labor Processing and Certification Division, between the date of the 2018 Preliminary Injunction Order and April 20, 2018, approximately 1,601 H-2B visa petitions were filed. During this period, no H-2B visa petition was denied by the USCIS.

The amount of H-2B visa holders increased from 6,760 in March 2019 to 7,850 in March 2020. The COVID-19 Pandemic impacted construction projects causing a push for the 2021 National Defense Authorization Act passed to extend H-2B visa exemptions for civilian labor projects in Guam.

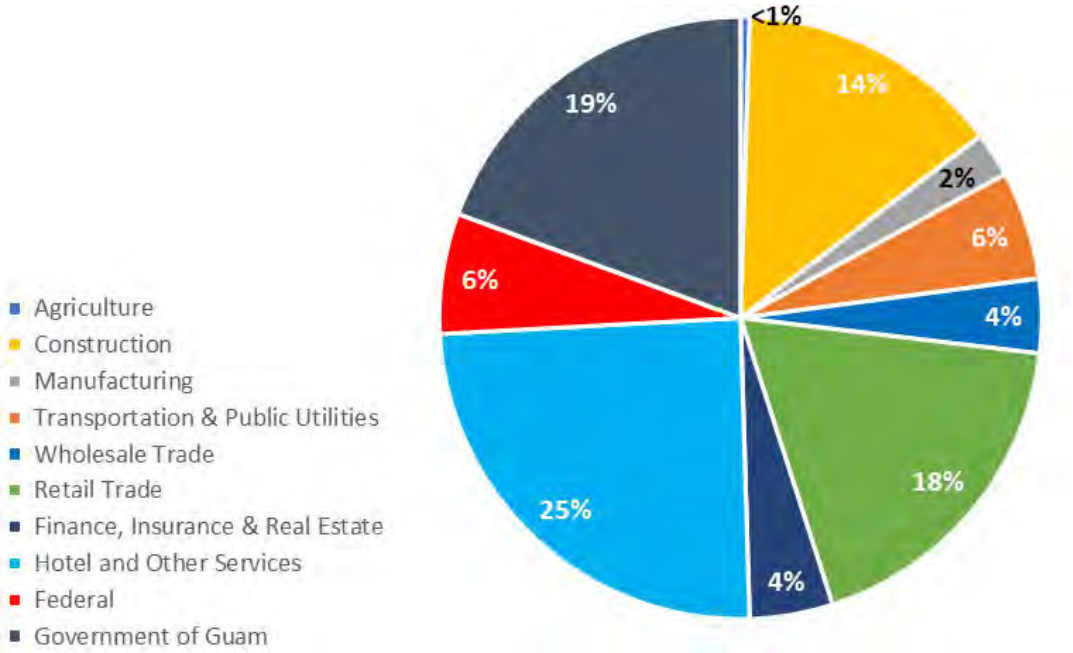
In 2021, Philippines was redesignated as eligible to participate in the H-2B visa program.

5.2.1.4 Employment

The private sector in Guam supplies approximately 75 percent of the labor force, while the public sector supplies nearly a quarter of all employment in Guam, including the Government

accounting for 18 percent of employment (Figure 5-7). Guam's civilian labor force is predominantly retail trade and service-oriented due to the prominence of the tourism industry. The Hotel and Other Services and Retail Trade industries are the largest categories of employers in Guam, representing 25 percent and 18 percent of total jobs, respectively. Construction is also an important sector, accounting for 15 percent of private employment in Guam.

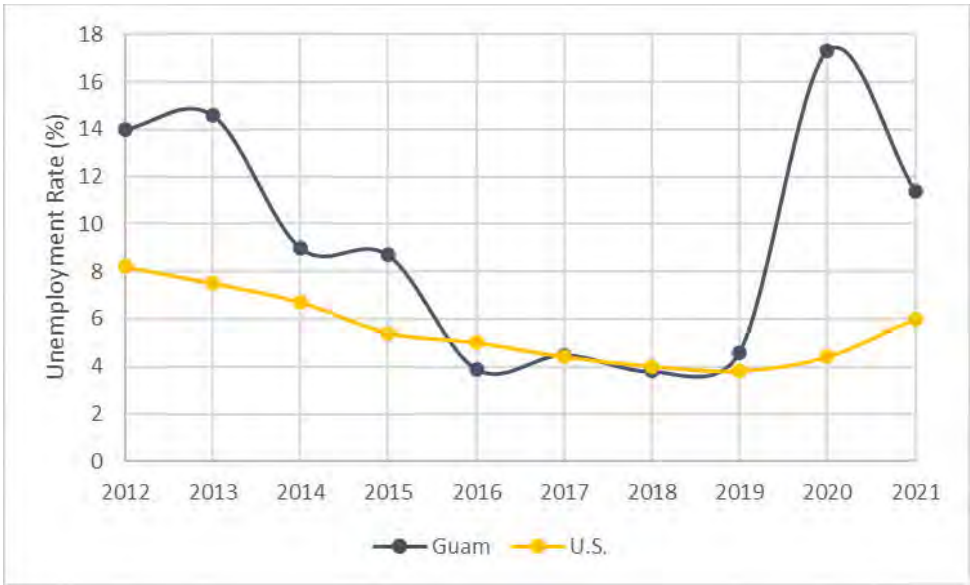
Figure 5-7: Guam Employment Percentage by Sector, 2021



Source: Government Bureau of Labor Statistics, September 2021 (latest)

In 2019, Guam's average unemployment rate of 6.1 percent was higher than the U.S. average unemployment rate of 3.4 percent. Throughout the COVID-19 pandemic, both Guam and the rest of the U.S experienced a significant increase in unemployment peaking at 19.4 percent and 11.2 percent respectively. Since December of 2020, Guam has decreased the rate to the current 11.4 percent. Even without considering COVID-19's impact, Guam's unemployment rate has been historically higher than the unemployment rate of the U.S. as shown in Figure 5-8.

Figure 5-8: Unemployment Rates in Guam and the U.S., 2012 – 2021



Source: The Unemployment Situation on Guam Summary History: 1974 – 2021, U.S. and Guam Bureau of Labor Statistics Department of Labor.

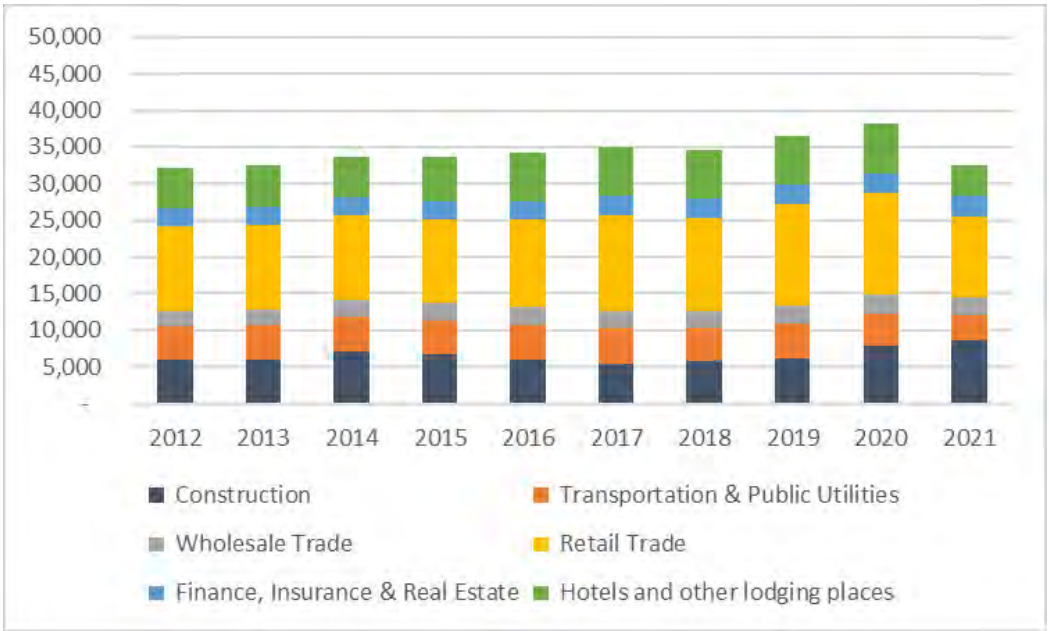
Other than the 12.9-point difference in 2020, the difference between the two metrics peaked in 2011, when Guam had an unemployment rate of 13.3 percent and the U.S. had an unemployment rate of 8.9 percent. Guam's high unemployment rate in 2011 was due in part to the delay in the military build-up after many private companies had prepared for large-scale construction projects, and the Japan earthquake and tsunami in March 2011 that temporarily impacted Guam's tourism industry. In addition, the reconciliation of Guam's demographic statistics from the 2011 release of the 2010 U.S. Census impacted the reporting of unemployment data.

Since 2011, Guam's unemployment rate had been falling rapidly and had, in recent years, come close to matching the U.S. unemployment rate. Guam's declining unemployment rate from 2013 to 2017 is primarily due to an increase in the number of jobs in the tourism and construction industries, as well as a slight decline in the rate of population growth.

Figure 5-9 shows the six largest private sector industries in terms of total number of civilian employees and growth from 2012 to 2021. All industries have seen nominal changes over this period except for the Construction Sector. Employment levels in this sector often fluctuate from year to year based on construction activity. However, the low in 2017 at 5,590 workers, a decrease of 13 percent from the previous year, is notably lower than the average of about 6,410 construction employees over the 10-year period.

As noted in Section 5.2.1.3, the decline in Construction Sector employment is largely attributed to the repatriation of H-2B workers. The number of H-2B workers declined from 1,042 in September 2016 to only 86 in September 2017 due to H-2B restrictions put in place that year. That decline has been greatly reversed given the recent approval of H-2B visa workers for military construction projects sourcing up to 1,470 H-2B workers as of May 2020.

Figure 5-9: Change in Guam Private Sector Employment, 2012-2021



Source: Government Bureau of Labor Statistics, June 2021

5.2.1.5 Trade

Guam has a history of carrying a sizeable trade imbalance, bringing in far more goods than it exports. Guam's Bureau of Statistics and Plans (BSP) does not have import reports post November 2019, however in that month, Guam imported approximately $36 million and exported $2.1 million. This ratio of approximately 15:1 is typical to Guam's annual figures dating back to 2014. On average, approximately 66 percent of imported goods, by value, were moved through the Port with the remaining portion moved by air. By volume, approximately 90 percent of goods move through the Port each year. The preference of Port shipments indicates the high cost of transporting cargo via air.

Much of Guam's trade is influenced by its unique duty-free status, meaning that no tariffs are added to international products. With expectations that the tourism industry will be reactivated in 2022-2023, international visitors to Guam will once again be able to purchase high-end luxury goods such as jewelry, perfumes, cosmetics, electronics, liquor, and cigarettes at lower prices. Of Guam's top import partners, the U.S. accounts for over half of Guam's imports by

value, followed by Singapore, Italy, South Korea, France, Japan, and China. While Guam remains heavily dependent on U.S. imports with 53% of imports originating from there as it has in past years, other countries such as Singapore, Italy and France are sources for luxury goods.

Guam's top imports by value include motor vehicles, electrical machinery/equipment, petroleum oils and gases and luxury items such as articles of leather, perfumes, beverages, and watches. Some of these imports, such as motor vehicles and petroleum products, are imported into Guam and then immediately exported. This transshipment cargo is unloaded at an intermediate port such as Guam, and, after temporary storage in the yard, is transferred to another vessel to be transported to the final port of discharge. More than half of Guam's exports are goods transshipped to surrounding Micronesian islands.

Top exports by value include fish, motor vehicles, and duty-free items such as tobacco products, alcoholic beverages and watches. Guam's top export destinations include FSM (e.g., the islands of Yap, Chuuk, Pohnpei and Kosrae), which represents Guam's largest transshipment market and accounts for over one third of Guam's exports by value, as well as Japan, Hong Kong, Palau, Marshall Islands, China and South Korea.

The Port's principal transshipment cargo is shipped in containers, representing approximately 88 percent of total transshipment tonnage in FY 2019 and FY 2020. With COVID-19 negatively impacting every aspect of economies worldwide, it was expected that cargo would be affected too. However, from the tonnage data available from 2019 to 2020, Guam only witnessed a 4% decrease in total breakbulk and containerized cargo.

Transit cargo typically arrives in the Port of Guam from the U.S. or Asia and is then transferred to smaller ports in the CNMI, Palau, FSM and RMI. Transshipment containers (mostly empty) from the Micronesian islands are then typically sent back through the Port of Guam, and outbound to U.S./Asia ports.

The handling of transshipment cargos that are supplemental to those bound for or exported from Guam allows the Port to grow revenues beyond those normally allowed by local economic conditions. Although transshipment cargo does not generate as much revenue (approximately six percent of total annual revenue) as local containers per year, transshipment is a means of achieving a greater return on investment in port infrastructure.

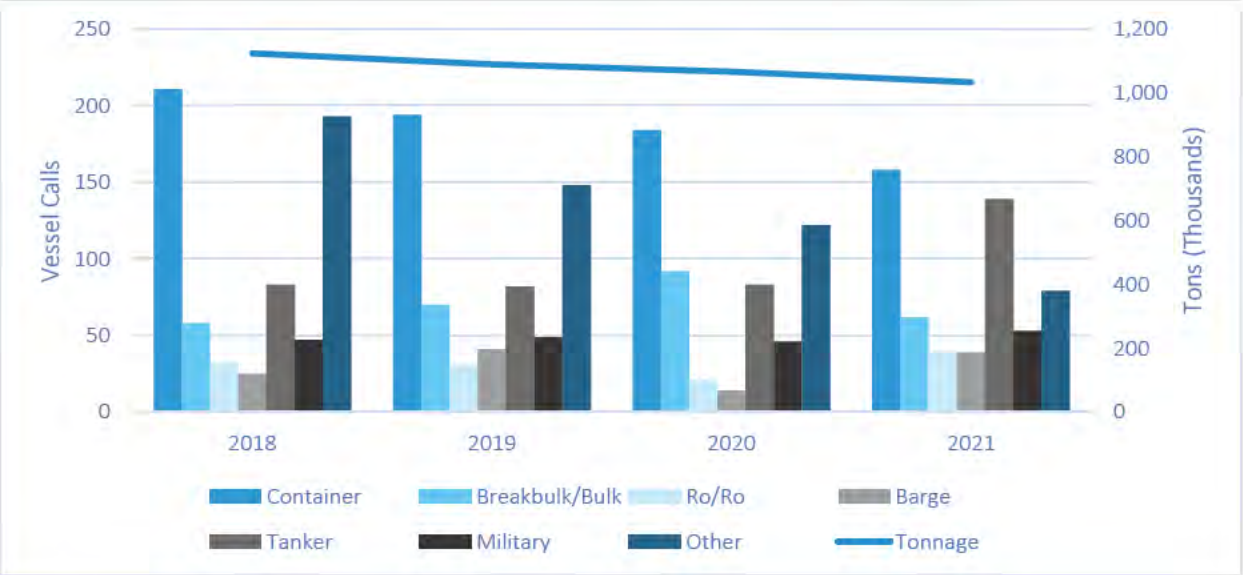
5.3 CARGO TRENDS

The Port handled approximately 1.1 million revenue tons in FY 2021, comprising approximately 975,000 tons in containerized cargo and 109,000 tons in breakbulk cargo. Liquid bulk cargoes do not contribute to the Port's total annual tonnage since the facilities are leased to private companies.

5.3.1 VESSEL TRAFFIC

Approximately 570 vessel calls occurred in FY 2021, carrying approximately one million tons of cargo (excluding automobiles). As shown in Figure 5-10, Container ships are the largest component of vessel calls, though they have been steadily declining from 211 in 2018 to 159 in FY 2021.

Figure 5-10: Historic Annual Vessel Traffic in Apra Harbor & Port Throughput



*2013 annualized projection
Source: WSP Analysis of PAG data

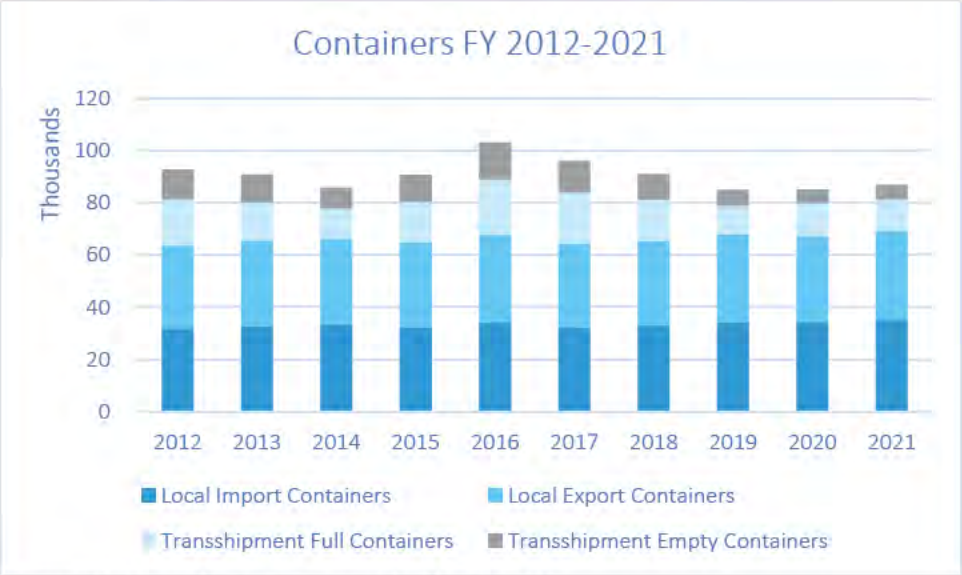
5.3.2 CONTAINERIZED CARGO

On average, approximately 95 percent of the PAG's total cargo tonnage (excluding Ro/Ro) is containerized cargo. The PAG's total revenues in the past five years from containerized cargo has averaged approximately $21.5 million per year (excluding indirect cargo revenue), or approximately 92 percent of the PAG's direct cargo revenues.

As shown in Figure 5-11, container volume at the Port consists of local containers and transshipment. Local container volumes handled by the Port have grown slowly but mostly steady over the past 10 years to 69,253 in FY 2021, a CAGR of 0.91%. Local cargo flows fluctuate based on Guam's population, major civilian and military projects, and the tourism industry. However, they have not varied by more 5% in any year since the financial crisis in 2009, even with the COVID-19 pandemic essentially eliminating tourism in 2021.

Transshipment containers, by contrast, have been volatile due to carrier decisions of where to transship cargo to islands in the region. Transshipped containers decreased from 28,889 in 2021 to 19,445 in 2014 before nearly doubling to 35,288 in 2016 (34% of Port containers) and then decreasing sharply again to just 17,541 in FY 2021 (20% of containers). Due to the transshipment volatility, total containers handled by the Port fell from a high of 103,15 in 2016 to 86,794 in FY 2021.

Figure 5-11: Port of Guam Historical Container Volumes



Source: WSP analysis. Data provided by the PAG

5.3.3 BREAKBULK CARGO

Breakbulk cargo includes a variety of commodities that cannot fit into containers and commodities that are more economically transported as breakbulk. The majority of the Port's breakbulk cargo is Ro/Ro, which refers to cargo that is rolled on/off a vessel, including automobiles, unitized and breakbulk cargo on wheeled equipment. Other breakbulk cargo includes steel plates, cement, rebar and pipes, sacks of aggregate, and asphalt.

Apart from automobiles, most breakbulk cargo inbound to Guam is destined for the construction industry. Outbound breakbulk cargo primarily consists of automobiles, construction materials (moving on transshipment routes) as well as fish, scrap metal, and a variety of other miscellaneous cargos.

On average, approximately 10 percent of the PAG's total cargo tonnage is breakbulk cargo (excluding automobiles). The PAG's total revenues in the past five years from breakbulk cargo

has averaged approximately $1.2 million each year, or approximately 2 percent of the PAG's annual revenues.

Historical breakbulk throughput and construction expenditures on Guam are provided in Figure 5-12. Breakbulk cargo volumes have varied year to year but have been approximately 90,000 tons with occasional outlier years such as 2010, 2017-18, and 2021. Like containerized cargo, breakbulk activity at the Port is not capacity constrained.

Figure 5-12: Port of Guam Historical Breakbulk Volumes (excluding automobiles)

Source: WSP analysis. Data provided by the PAG

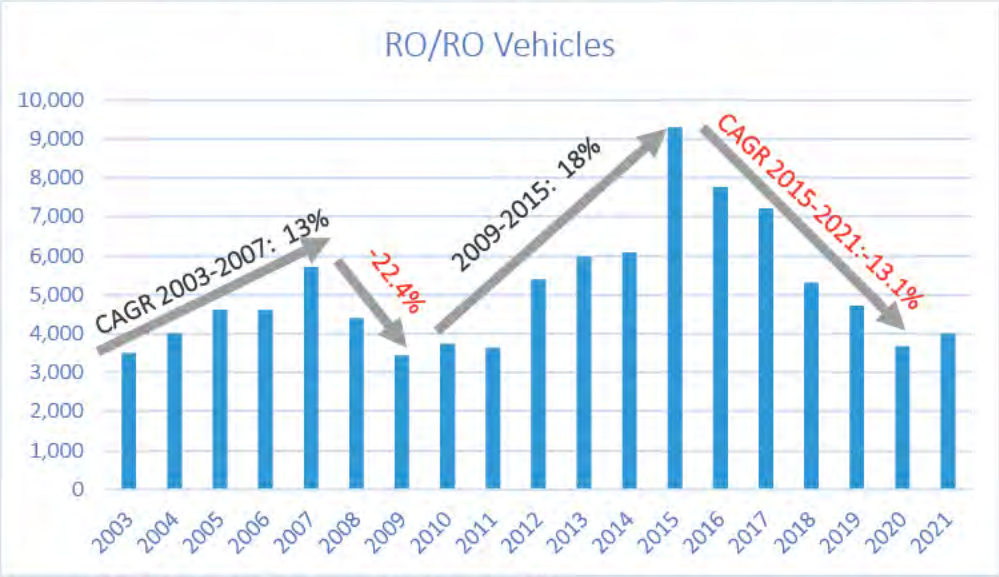
Breakbulk transshipment volumes typically make up less than 5 percent of total breakbulk volumes, with a high of 6,639 tons in 2015 (9.4% of total breakbulk) when overall Port transshipment spiked.

Ro/Ro

Ro/Ro cargo is categorized as a subset of breakbulk cargo in the Authority's statistics, but automobiles are treated independently in this Master Plan. Figure 5-13 shows the total Ro/Ro automobile throughput at the Port from 2003-2021.

Total Ro/Ro units have been cyclical. Units in FY 2020 (3,670) were very similar to 2003 (3,500 autos) and 2009 (3,433). In the interim years there were two peaks in 2007 (5,301 autos) and 2015 (9,291).

Figure 5-13: Port of Guam Historical Ro/Ro Tonnage and Automobiles

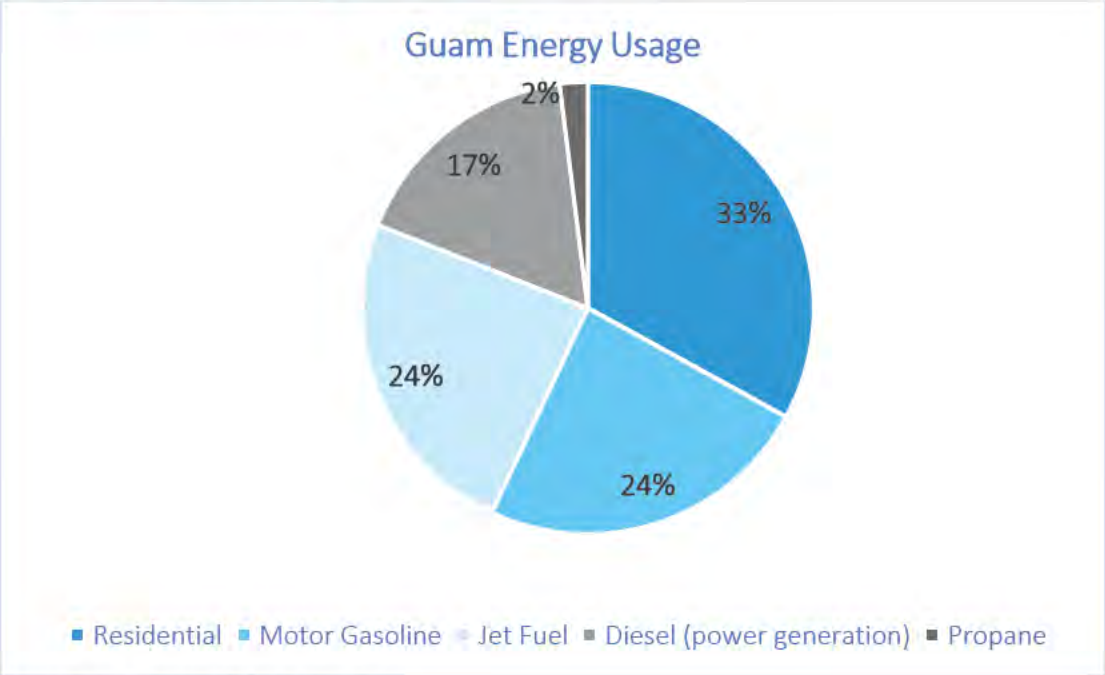


Source: WSP Analysis. Data provided by the PAG

5.3.4 LIQUID BULK

A variety of refined petroleum products (e.g., motor gasoline, aviation gasoline, jet fuel, automotive diesel oil and liquid natural gas) are delivered by ship to the Port for storage in onshore non-production storage and distribution facilities in the Marine Industrial Terminal. Bulk fuels from Mobil Oil and Tristar Agility are delivered to their storage tanks from the adjacent Golf Pier marine transfer facility or from Berth F1 through cross piping in the SPPC facility. The utilization of various fuels on Guam is shown in Figure 5-14. Residential power is the primary use, with 33% of power, followed by auto gas and jet fuel (24% each), diesel (17%) and propane (2%).

Figure 5-14: Guam Energy Use 2020

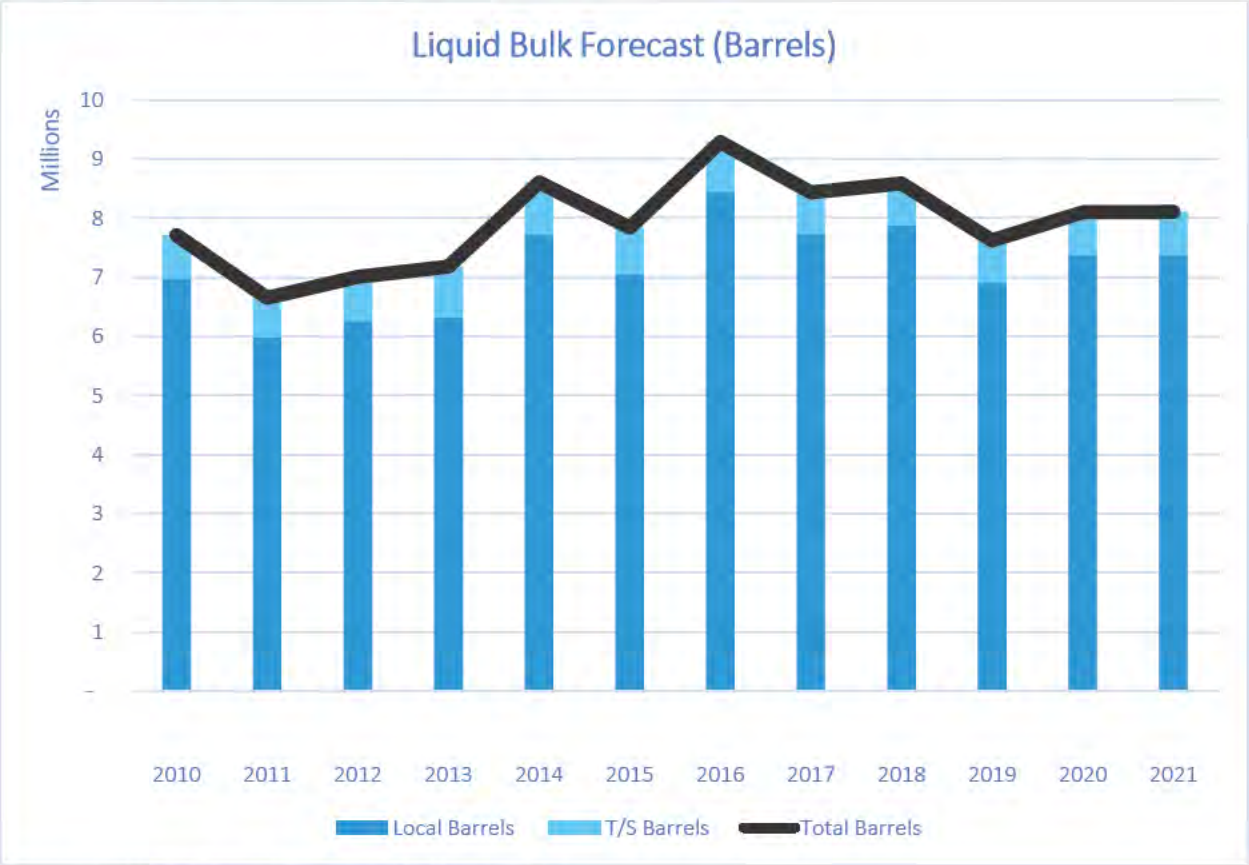


Source: US Energy Administration

Liquid bulk products are distributed by pipeline from their storage tanks to their loading racks, where the products are loaded into tank trucks and distributed to service stations and commercial and government accounts throughout the island. A portion of the bulk fuels are reloaded at the pier to coastal tankers for distribution to Micronesia, Rota and Tinian islands in the CNMI.

Liquid bulk cargo at the Port peaked at 9.3 million barrels in FY 2016 before falling to 7.6 million in 2019. Volumes rebounded slightly to 8.1 million barrels in FY 2020 and 2021. See Figure 5-15.

Figure 5-15: Port of Guam Liquid Bulk Trends



Source: WSP analysis. Data provided by the PAG

Transshipment volumes of liquid bulk products at the Port have been largely steady at about 10% of liquid bulk volume, with the exception of a brief peak of 13.5% in 2013.

5.3.5 CRUISING

Given that this Master Plan Update is primarily focused on cargo operations, a detailed analysis and assessment of cruise activity trends and projections is not included in this report. The review described below was performed for the purpose of assessing the impact of cruise vessel traffic on commercial cargo movements.

The Port's cruise operation shares berth space with other cargo industries at Berth F3. Prior to the COVID-19 pandemic, Guam received nine calls in 2019 with approximately 600 passengers per call. With exception of the Carnival Splendor, vessels typically range in length from 350 to 800 feet and carry between 350 and nearly 2,000 passengers. The Splendor is 950 feet long and has a capacity of 3,000 guests. Vessels typically arrive at 0800 hrs and depart at 1800 hours.

Because the Port does not have a dedicated cruise terminal to berth cruise vessels and process passengers, cruise operations directly impact cargo operations at Berth F3. In the past, cargo operations have been halted during cruise vessel calls due to safety and security considerations.

The water depth at Berth F3 is approximately -30 feet mean lower low water and is adequate to accommodate smaller cruise ships. The Cruise Terminal Location Report provided to the PAG in 2009 recommended that cruise operations be relocated to Hotel Wharf. Berthing cruise vessels at Hotel Wharf avoids conflicts with cargo vessels and allows for larger cruise vessels to call on Port facilities. Once the Hotel Wharf reconstruction is completed, the Port intends to follow that recommendation.

5.3.6 ROUTES AND CARRIERS

To service Guam, ocean carriers deploy cargo ships between the U.S. or Asia markets and Guam to take advantage of lower operating costs and then use smaller feeder vessels for transporting transshipment cargo between Guam and the Micronesia islands. Vessels on these trade routes often carry a combination of containers, breakbulk and roll-on/roll-off (Ro/Ro) cargo to reduce service costs and meet the various market demands of the islands. Roll-on/roll-off cargo consists of automobiles, unitized, and breakbulk cargo on wheeled equipment.

Carriers with service routes between the U.S. mainland and Guam are exempt from certain U.S. cabotage requirements contained in the Merchant Marine Act of 1920 (PL 66-261), also known as the Jones Act. Section 27 of the Jones Act requires that all goods transported by water between U.S. ports be carried on U.S.-flag ships, built in U.S. shipyards, owned by U.S. citizens, and crewed by U.S. citizens and U.S. permanent residents. Table 5-6 provides details on the carriers with service routes calling on the Port. Note that the total number of containers for each foreign carrier does not include intermittent container service during FY 2017.

Table 5-6: Ocean Carriers with Services to Guam

Company Name	Type	Cargo	Containers in FY 2021	% of Total FY 2021	Years serving the Port
Matson, Inc.	Jones Act Carrier (U.S.-built, flagged, owned, and crewed)	Local containers	48,723	56.1%	26 Years
American President Lines (APL)	U.S. Flag Carrier Foreign-built	Local containers	20,968	24.2%	32 Years
Waterman Steamship Corp.	U.S. Flag Carrier Foreign-built	Local Ro/Ro	0	0%	8 Years
Kyowa Shipping Co. (Kyowa)	Foreign Flag Carrier	Transshipment and local containers, breakbulk and Ro/Ro	7,811	9.0%	48 Years
Marianas Express Lines Limited (MELL)	Foreign Flag Carrier	Local containers	9,278	10.7%	25 Years*
Total			86,780	100%	

*MELL did not serve Guam from 2016 to 2018.
Source: PAG

Vessels serving Guam that do not directly proceed to other U.S. destinations are not required to use U.S. built ships (46 U.S.C. 12111), effectively allowing the deployment of foreign-owned, foreign-built U.S. flag vessels in the domestic Guam trade. However, the vessels must be U.S. flagged, meaning that the ships must employ a U.S. crew and are subject to USCG inspection. The foreign ownership of a U.S. flag vessel must be arranged through a special purpose U.S. trust.

The historical exemption from the U.S. build requirement is of limited usefulness to carriers in the domestic Guam trade since the natural westbound trade lane from the West Coast to Guam passes through Hawaii, which is not exempted from the U.S. build requirement. In the past five years, there have been numerous media reports and a small number of legislative proposals requesting a Jones Act exemption for Hawaii and other non-contiguous territories. Although a U.S. territory, CNMI (e.g., Saipan, Tinian, Rota) is exempt from the provisions of the Jones Act due to the international treaty associated with their annexation by the U.S.

Because foreign-flagged vessels are restricted from transferring cargo directly to/from U.S. ports on the mainland and Guam or Hawaii, these vessels must call at a foreign port in between calls to U.S mainland ports and Guam or Hawaii.

5.3.6.1 U.S. Carriers

The U.S. flag carriers serving Guam are Matson, Inc., APL, and Waterman. Matson is the only U.S. carrier that is fully compliant with the Jones Act requirements, i.e., transporting goods using U.S. flag ships, built in U.S. shipyards, owned by U.S. citizens and crewed by U.S. residents. The two other U.S. carriers operate foreign-built, U.S. flagged vessels.

Matson

Matson, Inc., formerly known as Matson Navigation Company, is a containership operator serving Guam, Hawaii and China trades. Matson entered the Guam trade by joining an alliance in 1996 with APL. At the time APL was being sold into foreign ownership and needed Matson to purchase and operate their Jones Act eligible containerships on their U.S. flag services.

Currently, Matson is the primary carrier at the Port, accounting for approximately 56 percent of all cargo in FY 2021. Matson's Guam service currently employs six containerships with capacities ranging from 2,378 Twenty-foot Equivalency Units (TEU) to 3,220 TEU's. These vessels carry cargo from the U.S. West Coast to Honolulu, then to Guam. As shown in Figure 5-16, the vessels continue on to China, where they are loaded with cargo to be shipped to the U.S. mainland and discharged in Long Beach (blue lines). Cargo on a Matson vessel that is destined for the FSM and RMI islands is transshipped via Kyowa's vessels from the Port. Matson also provides a weekly transshipment service between Guam and Rota and Saipan, CNMI.

Figure 5-16: Matson Service Through Guam

Source: Matson

American President Lines

APL provided service to Guam from 1980 until 1996, when it sold the service to Matson. However, APL continued to operate the vessels for 10 more years as part of an alliance with Matson. In 1997, APL was acquired by the Singapore-based Neptune Orient Line Limited (NOL) and became a foreign shipping company. The APL / Matson alliance terminated in 2006 with APL's departure from the Guam trade. APL reentered the Guam trade in 2016 with a biweekly service and at the beginning of 2017 began offering weekly service.

In 2016, French shipping line CMA CGM acquired NOL/APL. APL currently owns and operates (through special U.S. trusts) several foreign-built U.S. flag containerships that allows them to compete for Federal Government preference cargo, especially military preference cargoes, and are eligible for federal Maritime Security Program (MSP) operating subsidies. The Maritime Security Act of 1996 established the MSP, which provides an annual subsidy to sixty 60 U.S. flag ships operating in the foreign trade, i.e., 60 of the 81 ships in the U.S. flag foreign (international) trade fleet (as of 04/01/2017). The MSP is administered by U.S. Maritime Administration. The U.S. government grants the MSP subsidy to the ship owner in exchange for agreeing to make the ship available for military sealift in the event of an overseas contingency.

Currently, APL is the only domestic container carrier with direct service from Asia to Guam. This allows the company to transport "Buy America" construction supplies from Asia for use by commercial and DOD contractors on Guam.

APL carried approximately 24 percent of all cargo coming in and out of the Port in FY 2021. APL's Guam service is comprised of two container ships, the APL Saipan and APL Guam, with capacities of 1,641 TEUs and 1,100 TEUs, respectively. The two container ships run a weekly service that links Guam and Saipan to the U.S. mainland via the carrier's global network in Busan and Yokohama. Cargo from/to Guam joins APL's Eagle Express service (EX1) or the Guam Saipan Express service (GSX) in either Busan or Yokohama. These routes are shown in Figure 5-17.

Figure 5-17: APL Service Through Guam

Source: CMA CGM

Waterman

Waterman Steamship Corp., the principal subsidiary of International Shipholding Corp., is an independent owner and operator of U.S.-flag Ro/Ro vessels. In prior years, Waterman had a scheduled U.S.-flag car/truck carrier vessel service between Guam, Japan, South Korea and U.S. West Coast ports. In 2021, Waterman vessels did not call on the PAG.

5.3.6.2 Foreign Carriers

The foreign-flag carriers serving Guam include Kyowa Shipping Co. (Kyowa) and Marianas Express Lines Limited (MELL). These carriers serve the Guam-Asian market, as well as provide a majority of transshipment services to other non-U.S. territory ports in the region.

Kyowa

Founded in 1974, Kyowa Shipping Co. is a Japan-based regional carrier that provides regular liner shipping service from Japan, Australia, Asia, and Southeast Asia to Guam and Saipan. The company has become one of the top marine transport companies for the islands in the West Pacific Ocean.

Kyowa has a space chartering and connecting carrier agreement with Matson for service between Asia and Guam/Micronesia and with MELL for service to the FSM and RMI islands. Cargo originating from the U.S. mainland and Hawaii is sent to Guam on a weekly Matson vessel. Similarly, cargo from Asian ports on MELL's service rotation are sent to Guam on a weekly basis. Once in Guam, this cargo is transferred to one of Kyowa's multipurpose vessels that carry containers, breakbulk and Ro/Ro cargo and is transshipped to various destination ports throughout Micronesia.

In addition, Kyowa has a space chartering agreement with NYK-Hinode, a Japan-based cargo vessel operator, to deliver approximately 150 personal vehicles per month to Guam.

Cargo from Korea and Japan is also picked up directly by Kyowa vessels as part of its rotation and remains on these vessels until offloaded at its destination port in Micronesia. Figure 5-18 illustrates the service rotation.

Figure 5-18: Kyowa Direct and Transshipment Services Through Guam

Source: MSA

Marianas Express Lines Limited (MELL)

MELL was founded in 1997 and started with two vessels plying the route of Hong Kong, Guam, Saipan, and Taiwan. MELL is currently a container liner operator headquartered in Singapore that carries containers between China, Southeast Asia, Japan, Australia and islands in the Pacific. The company became a subsidiary of Pacific International Lines (Private) Ltd. in March 2015.

MELL provides regular service to Guam, utilizing two vessel rotations and deploying five vessels having an average capacity of 727 TEUs. The rotation for the Micronesia Express Service (MXS) is Hong Kong, Kaohsiung, Guam, Saipan, Yap, and Koror. The rotation for the East Micronesia Services (EMS) is Guam, Chuuk, Pohnpei, Kosrae, Majuro, and Ebeye. Figure 5-19 illustrates MELL's current service rotation.

MELL carried approximately 11 percent of all cargo coming in and out of the Port in FY 2021. The MXS service transfers an average of approximately 290 containers per vessel call in Guam. Cargo on a MELL vessel that is destined for the FSM and RMI islands is transshipped via Kyowa's vessels from the Port.

Figure 5-19: MELL Service Through Guam

Source: MELL

5.3.6.3 Competition

The Port has several competitive advantages over other ports in its region. First, Guam is the largest island in the Marianas archipelago and a strategic U.S. military hub. For this reason, the Port receives the benefits associated with catering to both a larger civilian and military population and has the resources to maintain and expand its facilities. Second, the Port is the only marine facility in the region with the required infrastructure (berth depth, storage yard) and equipment (gantry cranes, container handlers) to service container vessels with a capacity up to 4,000 TEUs.

Where a port has a very large local market, such as Guam, compared with other nearby ports, it is more likely to serve as a carrier's transshipment hub with its larger vessels centered on this "gateway" port. The use of smaller containerships or barges for transshipment routes offers carriers a more cost-effective way of providing faster and more frequent services to multiple smaller ports in the region on short and/or low container volume rotations. The smaller ports have shallow berths without dockside container cranes requiring smaller "geared" ships and barges, those with cranes installed on the vessel, to provide service to these ports.

During FY 2014 and FY 2015, a portion of Guam's transshipment cargo shifted to Saipan in the CNMI and to Majuro in the RMI but returned to Guam in FY 2016. These other island ports are heavily reliant on transshipment cargo because of their relatively small populations. For this

reason, these ports competitively price their cargo handling services. However, smaller ports such as these have limited infrastructure (berths and container storage space), cranes and container handling equipment.

Saipan

Saipan is the second-largest island in the Mariana Islands archipelago, after Guam. The island has been a municipality of the U.S. Commonwealth of the Northern Mariana Islands since 1978. Saipan had a population of 48,220 in 2010 and 43,385 in 2020 according to the USCB. However, the USCB estimates the current population as 52,000.

Saipan has experienced an influx of investment because of Chinese developers starting a number of projects on the island. The Port of Saipan has thus experienced investment aimed at expanding and modernizing its facilities. The Port of Saipan is operated by the Commonwealth Ports Authority. The Port of Saipan has 22 acres of container yard and 2,600 linear feet of berthing space. The channel, turning basin, and berthing areas have a depth of 40 feet. The Port of Saipan does not currently have fixed, mobile, or floating cranes.

Majuro

Majuro, a large coral atoll in the eastern chain of the Marshall Islands, is the capital and largest city of the RMI. Majuro had an estimated population of 27,797 in 2011, according to the RMI Census Report.

The Port of Majuro is operated by the Marshall Islands Ports Authority. It also does not have fixed, mobile, or floating cranes. With an approximate container yard area of 6.3 acres and 1,464 linear feet of total berthing space, the Port of Majuro is considerably smaller than the Port of Saipan. The channel, turning basin, and berthing areas have a minimum depth of 50 feet. The Port of Majuro primarily serves small fishing vessels and cargo vessels that deliver a variety of imported food, household items, construction equipment and materials, fuel products, and copra and coconut oil.

5.4 DEMAND FORECAST

Forecasts of expected volumes of containerized, breakbulk and petroleum cargos to be shipped through the Port over the next 20 years are used as the foundation for this Master Plan Update. Forecasting involves benchmarking against historical trends and performing sensitivity analysis looking forward.

The forecasts consist of three largely independent drivers, as depicted in Table 5-7.

1. Organic growth forecasts throughput to support the needs of the population living on Guam and the tourism industry

2. The military buildup will drive temporary increases in throughput, particularly in goods related to construction of new military and civilian infrastructure being developed to accommodate the increased military presence.
3. As the largest economy in the region with the best port facilities, Guam is a logical transshipment location for cargo bound to/from nearby islands. This throughput dependent upon decisions by ocean carriers regarding where to transship cargo or to serve some islands directly.

In addition, a separate forecast was developed for the steady state after the military buildup is complete. Throughput will be greater than the organic forecast as a larger population is served even as the temporary increase in construction ends after the buildup is complete.

Table 5-7: Overview of Cargo Forecasts

Forecast	Basis	Cargoes
1. Organic	Historical analysis - Cannot separate effects of local, tourism, military, construction	1. Containers 2. Bulk 3. Ro-Ro 4. Liquid bulk
2. Transshipment	Highly variable based on carrier decisions	
3. Military Buildup	- 2008 forecast adjusted for inflation and current NAVFAC projections - Peak characteristics - Historical data inconsistent	
4. Steady State Post Buildup	Population and activity increase with larger military presence	
Total Throughput:	High: Tourism recovers, strong military peak, 50% transshipment returns	
	Base: 50% increase of military buildup due to offsetting factors, 25% transshipment returns	

Forecast	Basis	Cargoes
Forecasts 1 to 4 combined	Low: Offsetting factors limit growth to historical percentages	

Source: WSP

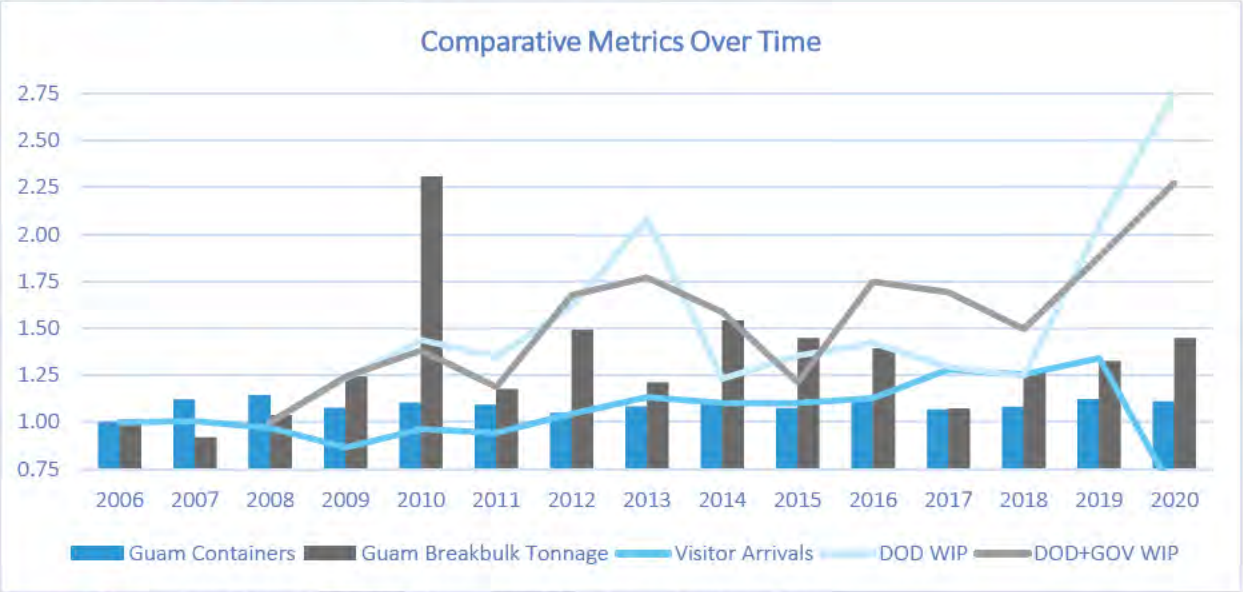
The forecast for this Master Plan is significantly complicated by the COVID-19 pandemic. As depicted in section 5-1, tourism dropped to essentially zero in March 2020 and has yet to start a significant recovery. Furthermore, supply chain issues have affected the availability and price of goods, to unknown effect. Finally, the military buildup is in process, but cannot be separated out from organic growth. These factors combine to limit the feasibility of developing a reliable statistical model to forecast throughput. Therefore, the forecast necessarily relies more upon expert judgment.

5.4.1 HISTORICAL ANALYSIS

WSP examined data from 2006 through 2020 to determine if statistical relationships between economic activity and port throughput could be developed. Key measures included visitor arrivals to Guam, population, tourism, and construction volume for the military and government. No statistically significant relationships were found relating to throughput. However, it is clear from the historical data that breakbulk is more closely correlated with construction expenditures than containers.

Figure 5-20 below shows how these variables have changed compared to a base year of 2006. Even as visitor arrivals grew steadily from 1.05 million in 2009 to 1.63 million in 2019 and construction spending increased substantially (if less consistently) since 2008, local containers (excluding transshipment) have been essentially flat since, with a low just under 64,000 in 2012 to a high of 67,864 in 2016. Breakbulk tonnage has been more variable during this timeframe rising from 60,831 tons in 2017 to 82,040 in 2020. Moreover, container counts remained steady despite the dramatic falloff in visitors in 2020 due to the Covid-19 pandemic – perhaps due to the military buildup offsetting some reductions in local needs.

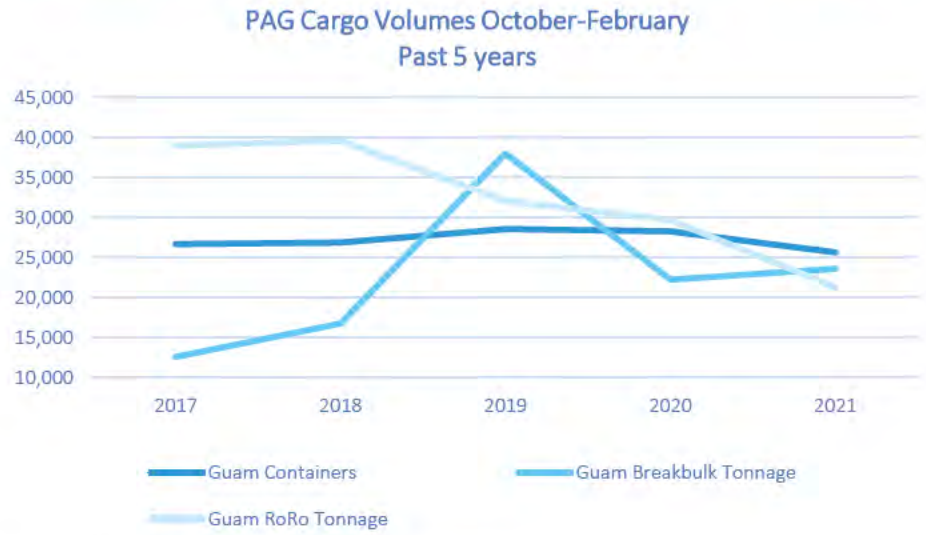
Figure 5-20: Comparative Metrics Over Time



Source: Throughput from PAG, WIP from NAVFAC, Guam Visitors Bureau

Focusing on the most recent five years, the stability of container volumes is even clearer. Despite increased construction as the military buildup began and the near cessation of tourism, local container volumes in winter 2020-21 were essentially identical to 2016-2017 and down only 9% from winter 2019-2020. Looking back further, container volumes for the local Guam market remain steady, shifting no more than 14% over the past 15 years through events such as the financial crisis and record-breaking tourism. See Figure 5-21.

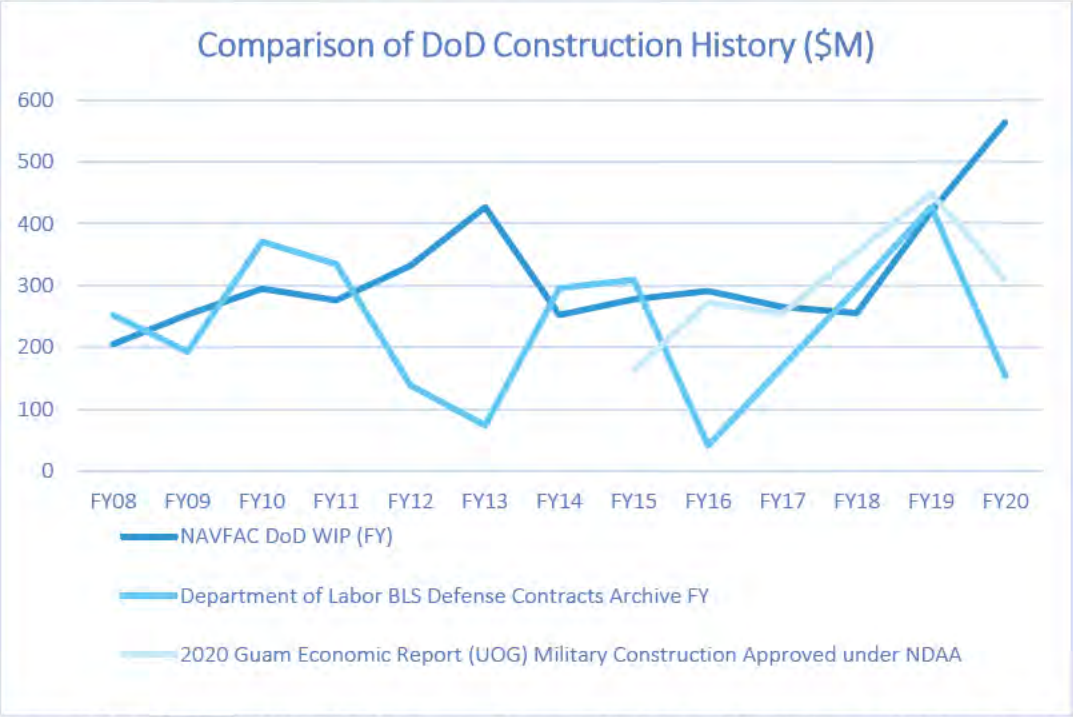
Figure 5-21: PAG Cargo Volumes, October – February, Past 5 Years



Source: WSP Analysis of data provided by PAG

WSP also examined multiple data sources and found inconsistencies in the historical data from difference sources. A key example is military WIP. Figure 5-22 below compares military WIP in the NAVFAC forecast to data from the Guam Bureau of Labor Statistics and the University of Guam (UOG) 2020 Guam Economic Report. Since 2008, NAVFAC reports over $4.1 billion of work in place compared to under $3.05 by the Department of Bureau of Labor Statistics (BLS). Since 2015, NAVFAC reports over $2.07 billion, compared to $1.80 billion for UOG and $1.39 billion for BLS. Most critically, NAVFAC has a substantial increase to $565 million in FY 2020 – the greatest amount in this timeframe by $140 million – while the other two data sources showed steep declines. NAVFAC utilizes the BLS data for civilian WIP, so the metric should be comparable. That it is not raises questions about how to handle the forecast going forward.

Figure 5-22: Comparison of DoD Construction History



Source: WSP Analysis, NAVFAC Marianas, Bureau of Labor and Statistics, and University of Guam

5.4.2 METHODOLOGY

The cargo volumes were forecast based on sustained increases under the Organic Growth Scenario for the anticipated population on Guam and the Micronesian region and supporting three separate scenarios (Organic, Mid Build-up, and Full Build-up) for the proposed military realignment and expansion program on Guam.

5.4.2.1 Military Build-up

As noted previously, the DoD is in the midst of a military build-up on Guam that will add over 7,000 U.S. servicemembers and dependents to the island. The build-up will impact cargo volumes in three ways:

- During the construction period, DoD contractors will import substantial volumes of materials and supplies. These supplies will come in containerized, breakbulk, and liquid bulk handling modes.
- The DoD will bring in additional active-duty personnel and their dependents. This will also increase the flow of household goods, personal vehicles and goods sold at the commissaries and at local businesses. This will primarily impact containerized volumes but will also have an impact on breakbulk and liquid bulk cargos.

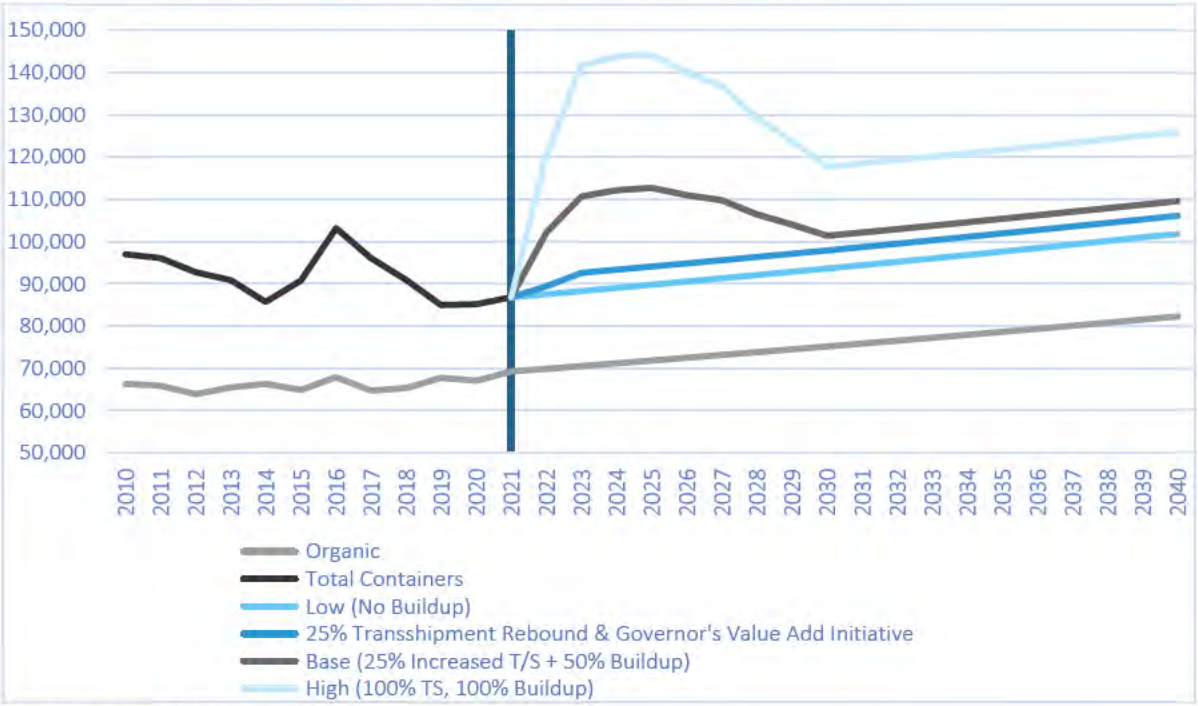
- The build-up will require additional workers from off-island both during and after construction. The US Customs and Immigration Services released guidance in May 2021 that enables Guam and the Northern Mariana Islands (CNMI) to admit foreign construction workers if they are supporting the military realignment under the National Defense Authorization Act (NDAA). A February 8, 2022 guidance further clarified that housing development qualifies for H-2B workers in addition to infrastructure improvements.

5.4.3 CONTAINER CARGO FORECAST

As depicted in Figure 5-23, three scenarios were defined for containers. Organic growth follows the 10-year CAGR of 0.91% growth. A second scenario assumes 25% of transshipment that has left Guam since 2016 returns and the Governor's Value-Add Initiative spurs growth. The Base forecast assumes the military buildup induces half the containers per billion dollars of expenditure assumed in the 2008 Master Plan, while the high scenario assumes the same ratio of container traffic to buildup expenditures from the 2008 Master Plan.

Planning for port throughput is based on the Base scenario, with a peak of 112,688 forecast in 2025. Note this is only about 10% greater than the 103,152 containers the Port handled in 2016 at the height of transshipment.

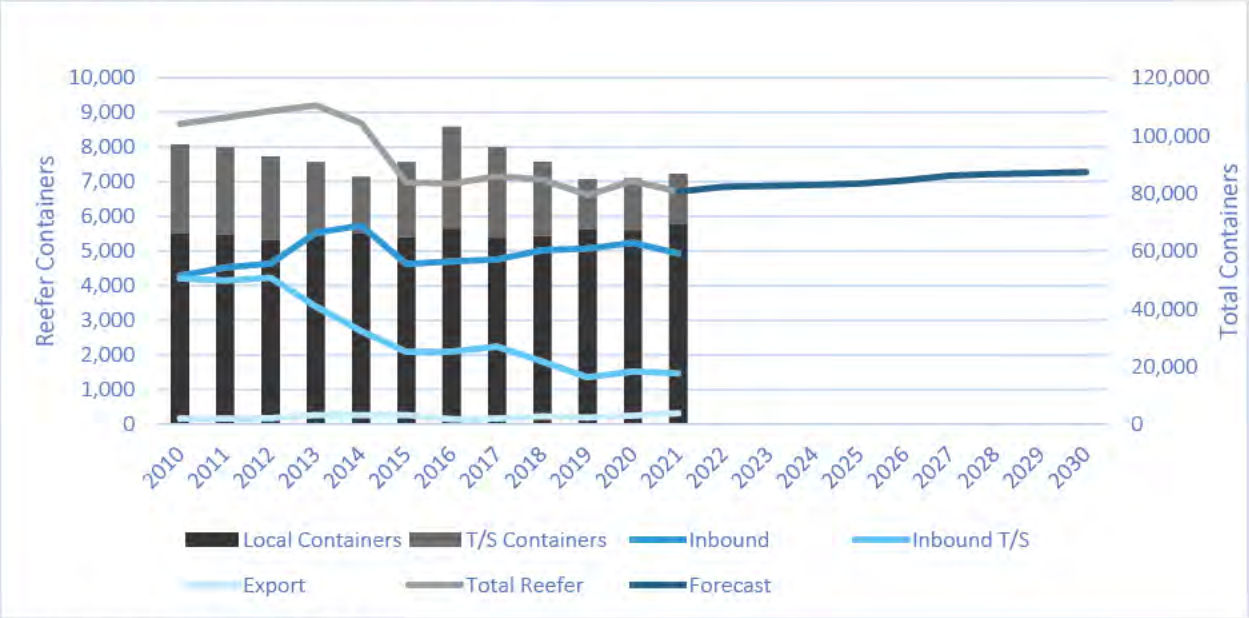
Figure 5-23: Container Forecast – Comparison of Growth Scenarios



Source: WSP analysis

Refrigerated containers, known as reefer, are an important subset of containerized throughput since adequate reefer sockets must be available to accommodate demand. Reefer cargo is primarily linked to organic growth since construction cargo generally does not require refrigeration. Thus, reefer containers are forecast to correlate with population, which has been declining but will receive a boost of new residents as servicemembers arrive. See Figure 5-24.

Figure 5-24: Reefer History and Forecast



Source: WSP analysis of PAG data

5.4.4 BREAKBULK CARGO FORECAST

Unlike other cargo types, breakbulk cargo is highly correlated with construction. The breakbulk forecast was developed by calculating the ratio between total construction expenditures on Guam and breakbulk throughput for the eight years from 2014-2021. This ratio was then applied to expected construction values for the coming eight years 2022-2029. The data is imperfect since military construction is reported as works in place (WIP) – the actual value of construction – while civilian construction is based on permit values that may or may not be implemented.

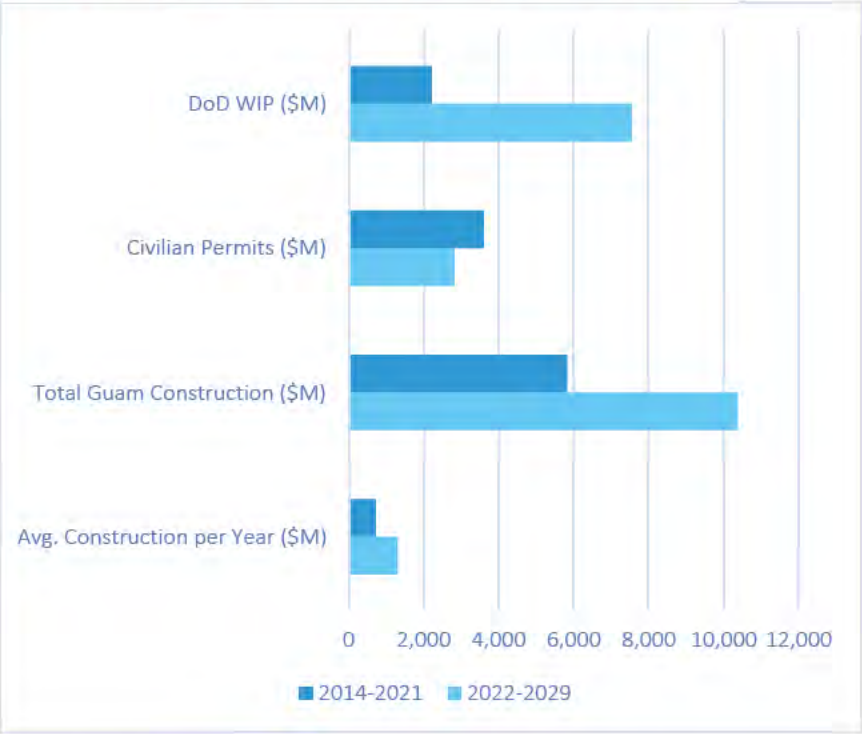
As shown in Figure 5-25 and Figure 5-26 below, construction expenditures (in 2020 dollars) are expected to increase from $727 million per year in 2014-2021 to $1.3 billion per year in 2022-2029. The associated increase in breakbulk tonnage is from an average of 82,576 tons per year to 154,924, a rise of 89% during the buildup years.

Source: WSP Analysis of NAVFAC and Guam Statistical Yearbook data

The analysis assumes that military construction will crowd out some public and private civilian projects by consuming substantial amounts of construction resources on Guam and increasing bid prices. Compared to the historical permit value average, civilian construction is assumed to be 50% in 2022-2025 before rising back to average by 2027.

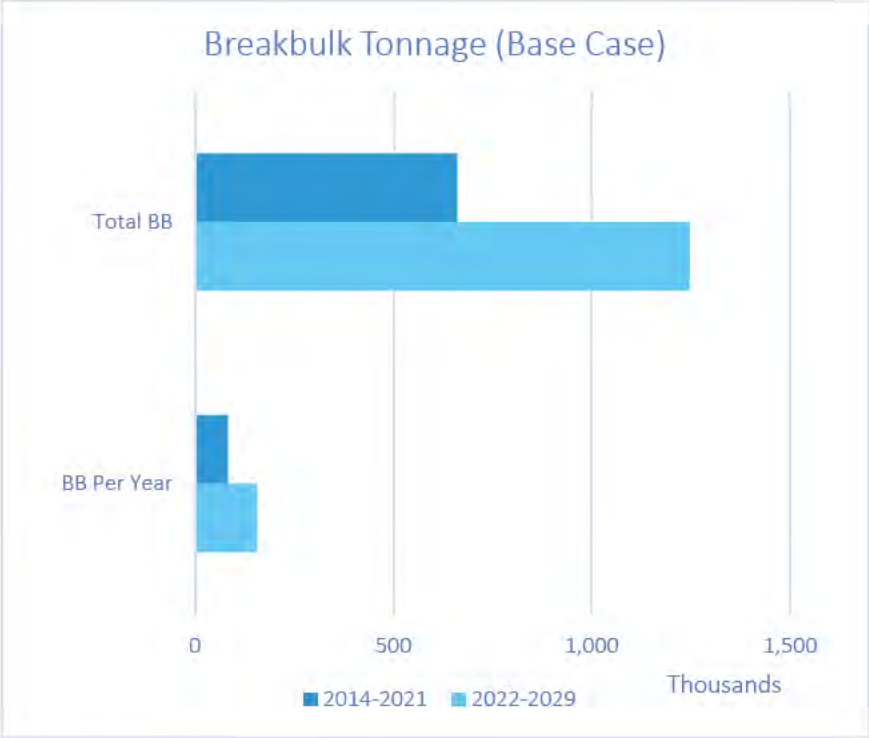
The resulting annual breakbulk forecast is shown in Figure 5-27. The low forecast assumes the smallest ratio between construction on island and breakbulk tonnage during the past 8 years; the base assumes the median ratio, and the high assumes the greatest ratio.

Figure 5-25: Guam Construction History and Forecast



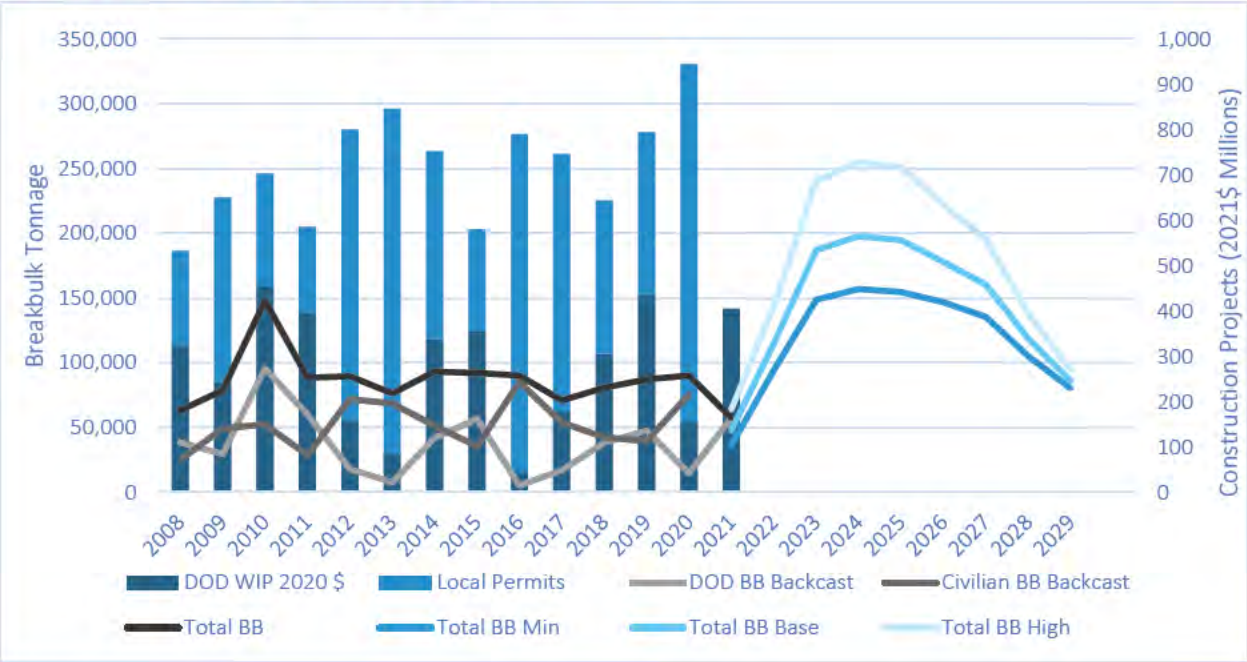
Source: WSP analysis

Figure 5-26: Breakbulk Tonnage History and Forecast



Source: WSP analysis

Figure 5-27: Breakbulk History and Forecast

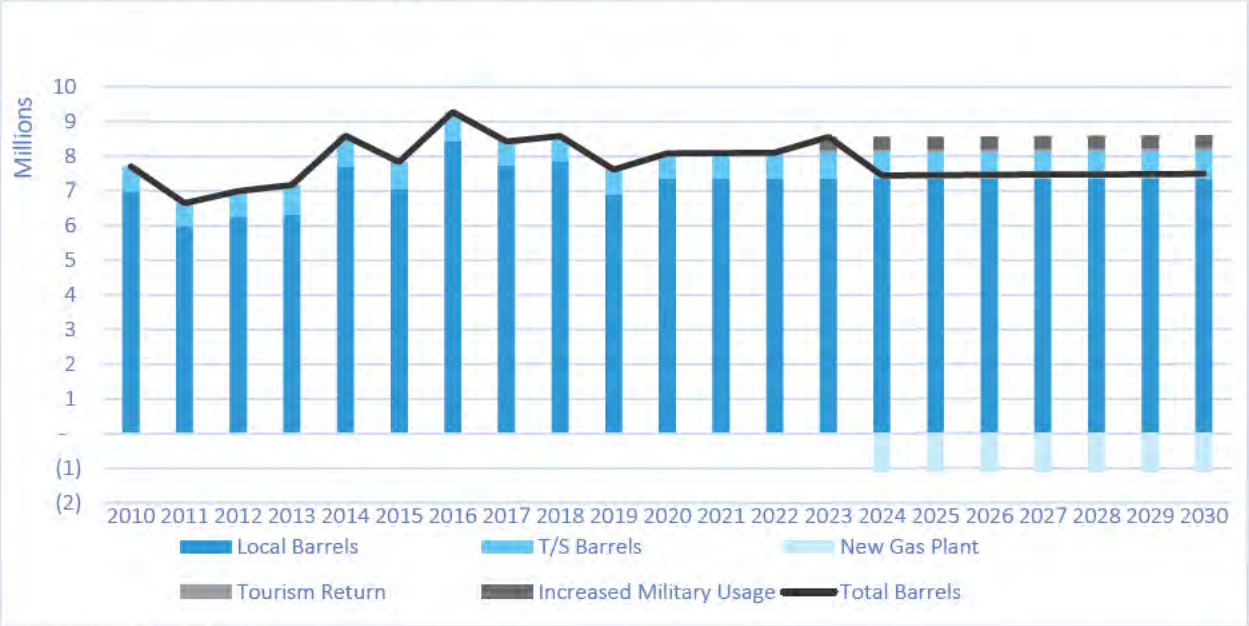


Source: WSP analysis

5.4.5 LIQUID BULK CARGO FORECAST

Many factors affect liquid bulk demand including the population, price of oil, tourism, and efficiency of power plants and automobiles. Guam has undertaken initiatives to reduce the use of fossil fuels, including construction of a new gas plant expected to come online by 2024 and several renewable energy projects. In addition, as with other cargoes, transshipment impacts liquid bulk. Given these offsetting trends, liquid fuel is forecast to be flat at 7.5 million barrels per year through 2030. See Figure 5-28.

Figure 5-28: Liquid Bulk History and Forecast (Barrels)



Source: WSP analysis

5.4.6 RO/RO FORECAST

Automobiles are forecast to grow in the coming years. First, FY 2021 saw the first increase in Ro/Ro since the peak in 2015, indicating a potential new increasing cycle after five years of reductions. Automobiles are expected to become more available following supply-chain issues related to COVID-19 and the chip shortage. In addition, the 5,000 servicemembers moving to Guam as part of the military realignment will be either bringing a car with them or buying one locally. Auto throughput is forecast to peak at 8,840 in 2026, still lower than the 2015 spike. See Figure 5-29.

Figure 5-29: Ro/Ro Vehicle Forecast

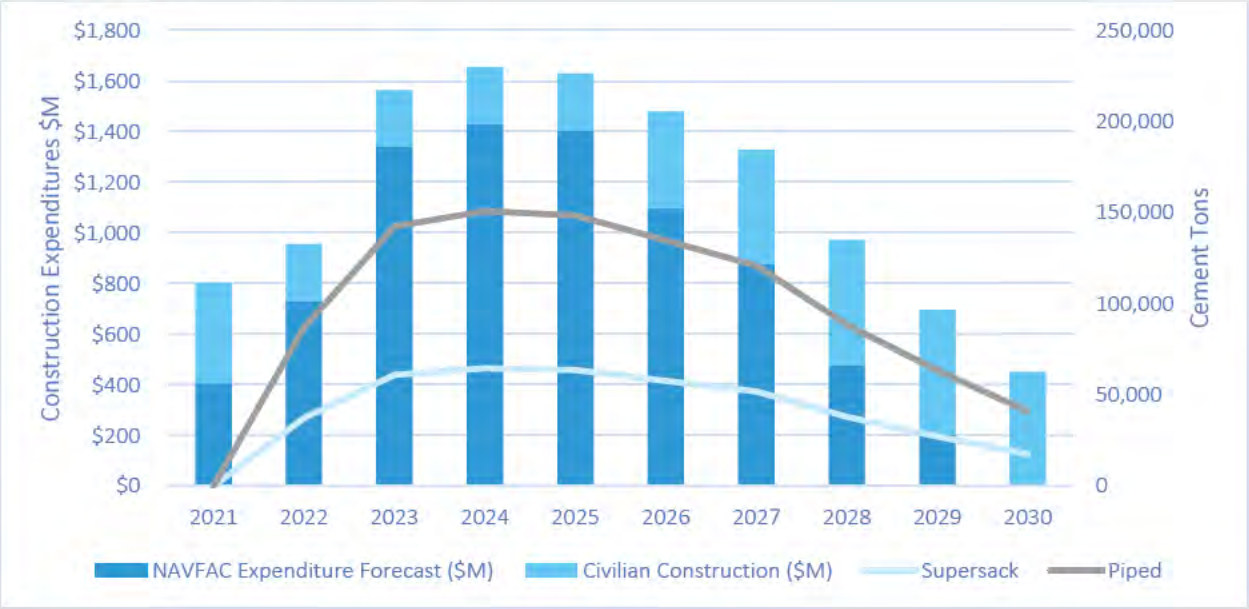
Source: WSP analysis

5.4.7 CEMENT FORECAST

As one of the key inputs for concrete construction, cement imports are expected to rise sharply due to the military buildup. Although no reliable historical numbers exist for comparison, WSP was able to develop a forecast based on data from interviews with key local concrete suppliers.

Cement arrives on Guam in two forms; flowable product that is piped to plants on or near the Port, and in supersacks that arrive as palletized breakbulk. As shown in Figure 5-30, cement is forecast to peak at 205,000 tons in 2024 when military the buildup is at its greatest. It is assumed that 30% of cement arrives in supersacks and 70% via pipe.

Figure 5-30: Cement Forecast



Source: WSP analysis

6 CAPACITY AND DEMAND ANALYSIS

6.1 OPERATIONAL ANALYSIS

Using the forecasted cargo volumes in Section 5, a capacity vs. demand analysis was performed for the PAG commercial cargo terminals. To make this comparison, a capacity analysis was performed using WSP's proprietary Port Rail Intermodal Modeling Environment (PRIME) tool. PRIME consist of two primary components:

- Terminal Layout Tool (TLT)
- Container Terminal Capacity Model (CTCM)

WSP collected operational data for cargo moving in and out of the commercial port. This data consisted of the following information.

- Vessel movement
  - Vessel and voyage name
  - Vessel arrival and departure time
  - Number of lifts (inbound and outbound)
  - Loss time due to breakdowns
  - Cranes deployed
- Container movement
  - Container number and type
  - Category (import/export/transship)
  - Container entry and exit time
  - Container entry and exit mode (vessel, truck)
- Gate movement
  - Container and chassis number
  - Transaction type (receipt, delivery)
  - Temperature (in case of reefer)
  - Transaction time

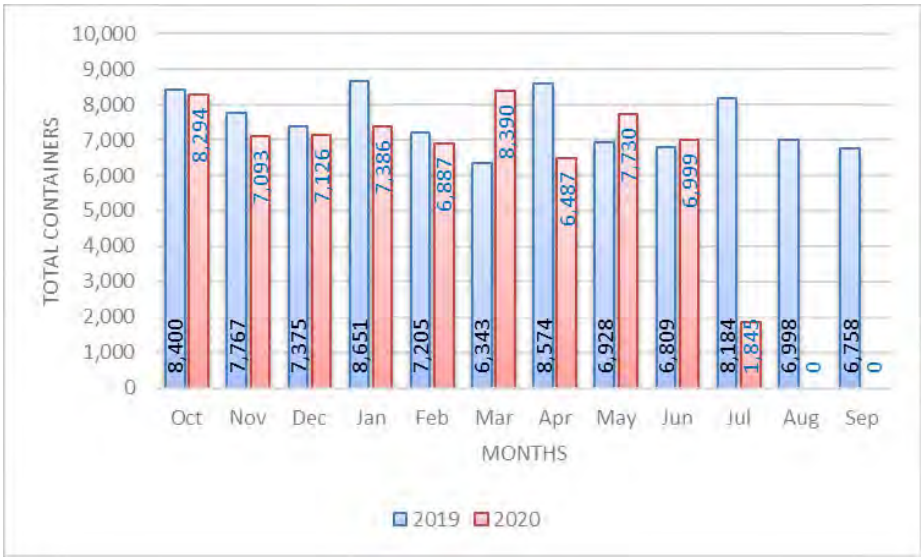
6.1.1 VESSEL MOVEMENT ANALYSIS

We analyzed vessel movement data which showed that PAG handles, on average, about 13,350 TEUs per month or about 7,500 containers per month for FY 2019 and 2020. Figure 6-1 below shows the monthly throughput for FY 2019 and 2020.

Typically, a terminal experiences seasonal variation in throughput based on the level of market demand during certain peak seasons. For example, higher monthly throughput in August-September as stores prepare for holiday inventory. The analysis showed that PAG saw a seasonal peaking of about 1.23 over the average monthly throughput based on FY 2019 and 2020 data.

TEU ratio provides the mixture of 20 feet and 40 feet containers arriving and departing the terminal. A ratio of 1.00 means all containers are 20 feet long, and a ratio of 2.00 means all containers are 40 feet long. PAG's vessel data analysis showed a TEU ratio of 1.78 for FY2019 and 2020.

Figure 6-1: PAG Monthly Container Lifts FY2019-2020



Source: PAG Data and WSP Analysis

The vessel data also included vessel work start and end time, lifts per vessel, and crane deployment for each vessel. Figure 6-3 shows the crane deployment pattern based on vessel lifts per call. The analysis showed the following results.

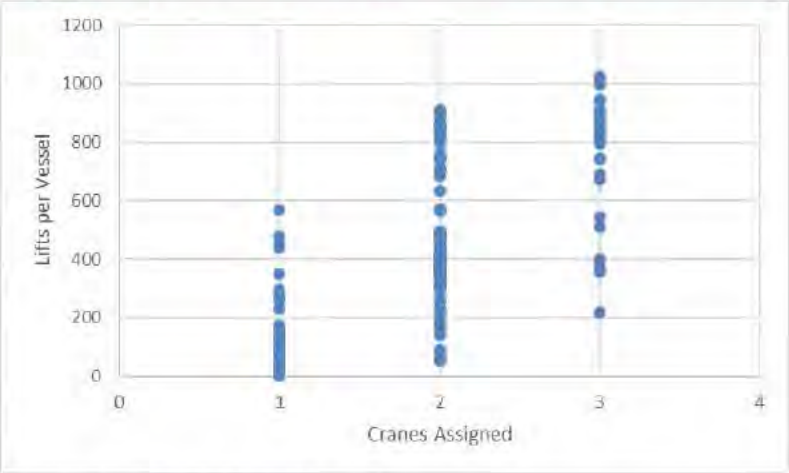
Figure 6-2: Vessel Mix and Turnover

Vessel Size (TEU)	Count	Share	Vessel Turnover
1000	117	55%	15%
2000	61	29%	40%
3000	25	12%	56%
4000	8	4%	41%

Source: WSP and the PAG

- Largest Vessel: Matson Kaiman Hila and Daniel K Inouye – 3,220 TEU
- Average Crane Productivity: 21.3 lifts per hour
- Crane deployment pattern:
  - ~250 vessel lifts: 1 crane
  - ~450 vessel lifts: 2 cranes
  - ~850 vessel lifts: 3 cranes

Figure 6-3: PAG Crane Deployment Pattern by Vessel Lifts



Source: PAG Data and WSP Analysis

WSP also interviewed Matson, Kyowa, MELL and APL to understand their vessel deployment plans and turnover rates during the build-up. Based on those discussions, future vessel mixes and turnover rates were developed. Table 6-1 shows the existing and future vessel mixes and turnover rate.

Table 6-1: Existing and Future Vessel Mix and Turnover

Vessel Capacity	Vessel Mix (% of Calls)		Turnover (% of Vessel Capacity	
	Existing	Build-Up	Existing	Build-up
1,000 TEU	55%	45%	15%	15%
2,000 TEU	29%	25%	40%	50%
3,000 TEU	12%	15%	56%	65%
4,000 TEU	4%	15%	41%	45%

Source: PAG Data and WSP Analysis

6.1.2 CONTAINER MOVEMENT ANALYSIS

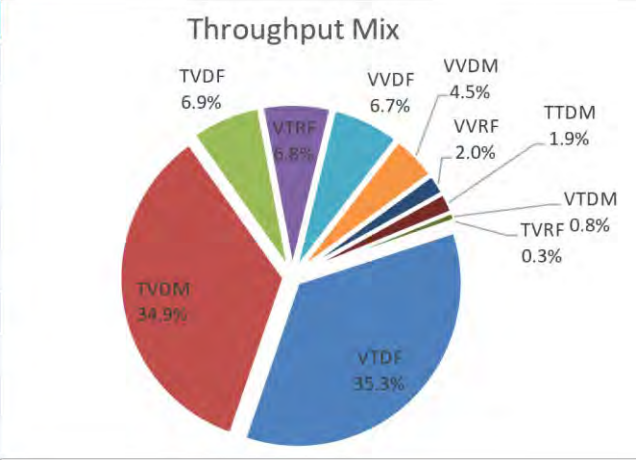
PAG provided a detailed database from their Terminal Operating System (TOS) containing container flow throughput in the commercial port. WSP analyzed container movement data to derive the throughput mix and dwell time distribution.

6.1.2.1 Throughput Mix

The throughput mix for PAG is showing in Figure 6-4. At PAG, import dry full containers accounted for the major share of the throughput mix with 35.3% and export dry empties accounted for second biggest share at about 35%.

Figure 6-4: PAG Throughput Mix

Code	Description	Count	Share
VTDF	Import Dry Full	23,258	35.3%
VTRF	Import Reefer Full	4,453	6.8%
VTDM	Import Dry Empty	526	0.8%
TVDF	Export Dry Full	4,519	6.9%
TVRF	Export Reefer Full	228	0.3%
TVDM	Export Dry Empty	23,006	34.9%
VVDF	T'Ship Dry Full	4,402	6.7%
VVRF	T'Ship Reefer Full	1,313	2.0%
VVDM	T'Ship Dry Empty	2,947	4.5%
TTDM	Depot Dry Empty	1,269	1.9%

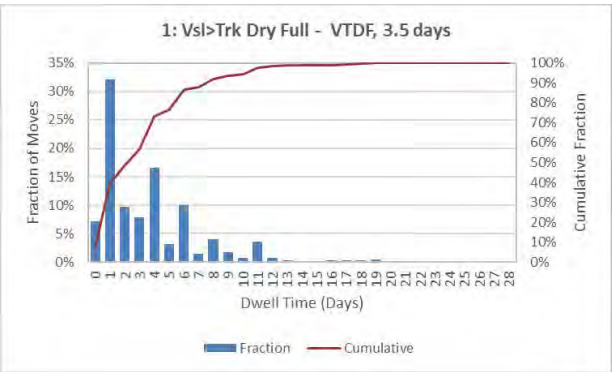


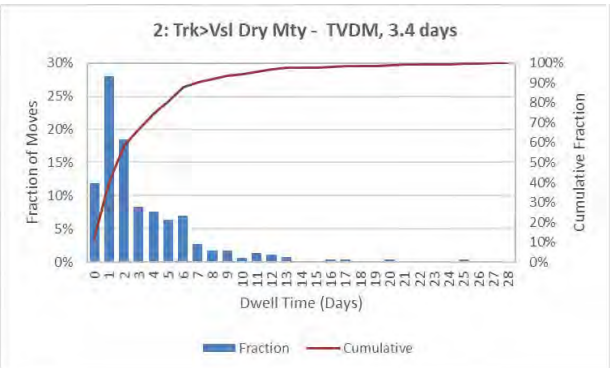
Source: PAG Data and WSP Analysis

6.1.2.2 Dwell Time

The database provided by PAG included arrival and departure dates and times for every container handled at the commercial port. Dwell times were determined by calculating the difference between these arrival and departure times, rounded to the nearest whole day. Mean and statistical distribution of dwell times were calculated for all major container mixes that impact the operations. The mean container storage dwell time for the majority of container flows are shown in Figure 6-6. Sample dwell distribution for top two container types are shown in Figure 6-5.

Figure 6-5: PAG Sample Dwell Distribution

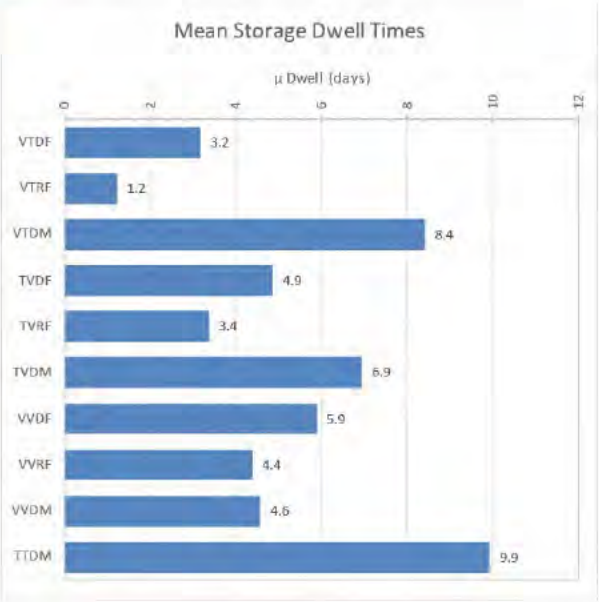




Source: PAG Data and WSP Analysis

Figure 6-6: PAG Mean Container Storage Dwell Time

Code	Description	Mean Dwell (days)
VTDF	Import Dry Full	3.2
VTRF	Import Reefer Full	1.2
VTDM	Import Dry Empty	8.4
TVDF	Export Dry Full	4.9
TVRF	Export Reefer Full	3.4
TVDM	Export Dry Empty	6.9
VVDF	T'Ship Dry Full	5.9
VVRF	T'Ship Reefer Full	4.4
VVDM	T'Ship Dry Empty	4.6
TTDM	Depot Dry Empty	9.9



Source: PAG Data and WSP Analysis

6.1.3 GATE MOVEMENT ANALYSIS

PAG provided a detailed database from the TOS describing the movement of containers through the gate complex. Peaking factors for peak hourly and daily flows were calculated using the database. Weekly peaking is calculated as the ratio of peak gate volume during a week to mean weekly gate volume over the course of a week. Hourly peaking is calculated as the ratio of peak gate volume during an hour to mean hourly gate volume over the course of a day. Table 6-2 shows the gate flow factors developed from the data provided by PAG.

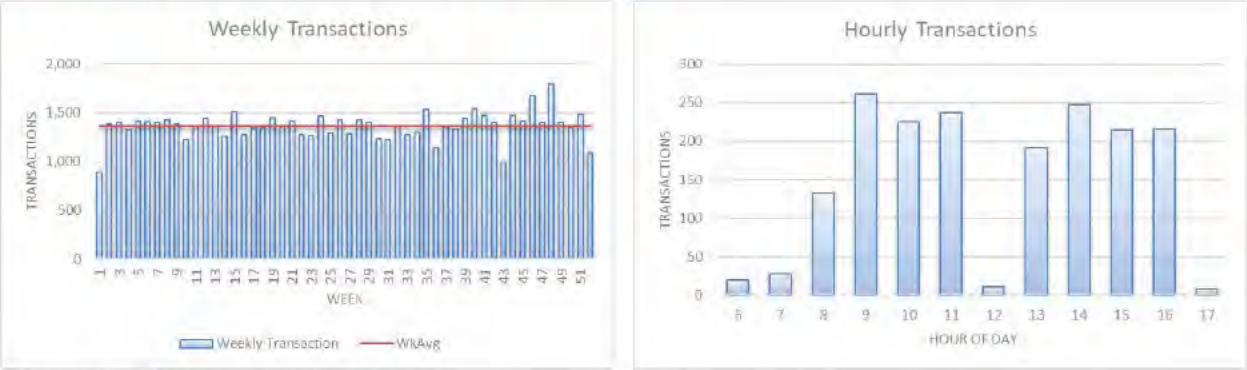
Table 6-2: PAG Gate Flow Factors

Variable	Unit	Value
Gate Operating Schedule	Shifts/Week	5
Gate Operating Schedule	Hours/Day	10
Gate Weekly Peak	Ratio	1.32

Source: PAG Data and WSP Analysis

Figure 6-7 shows the weekly transaction breakdown for the entire year on the left and hourly transaction breakdown for peak week on the right.

Figure 6-7: PAG Weekly and Hourly Gate Transaction



Source: PAG Data and WSP Analysis

6.2 CARGO TERMINAL CAPACITY

6.2.1 EXISTING OPERATIONS

Container yard operations require specialized equipment used to lift containers to/from the ship and in the storage yard. PAG currently has three ship-to-shore cranes that are used to lift the containers to/from the ship. The containers, once lifted from the ship, are then placed on chassis, which are moved by off-road terminal vehicles called Utility Tractor Rigs (UTRs). Once on the chassis, these containers can either be stored on the chassis in a designated area or they can be removed and then stacked on the ground using a Top Pick (TP). Currently, empty and transshipment containers at the cargo terminal are stacked on the ground (grounded). Refrigerated containers are placed on chassis and are stored near reefer outlets. All other loaded containers are either placed on chassis or are grounded. Figure 6-8 shows the current layout developed in PRIME, of container storage yard at the cargo terminal.

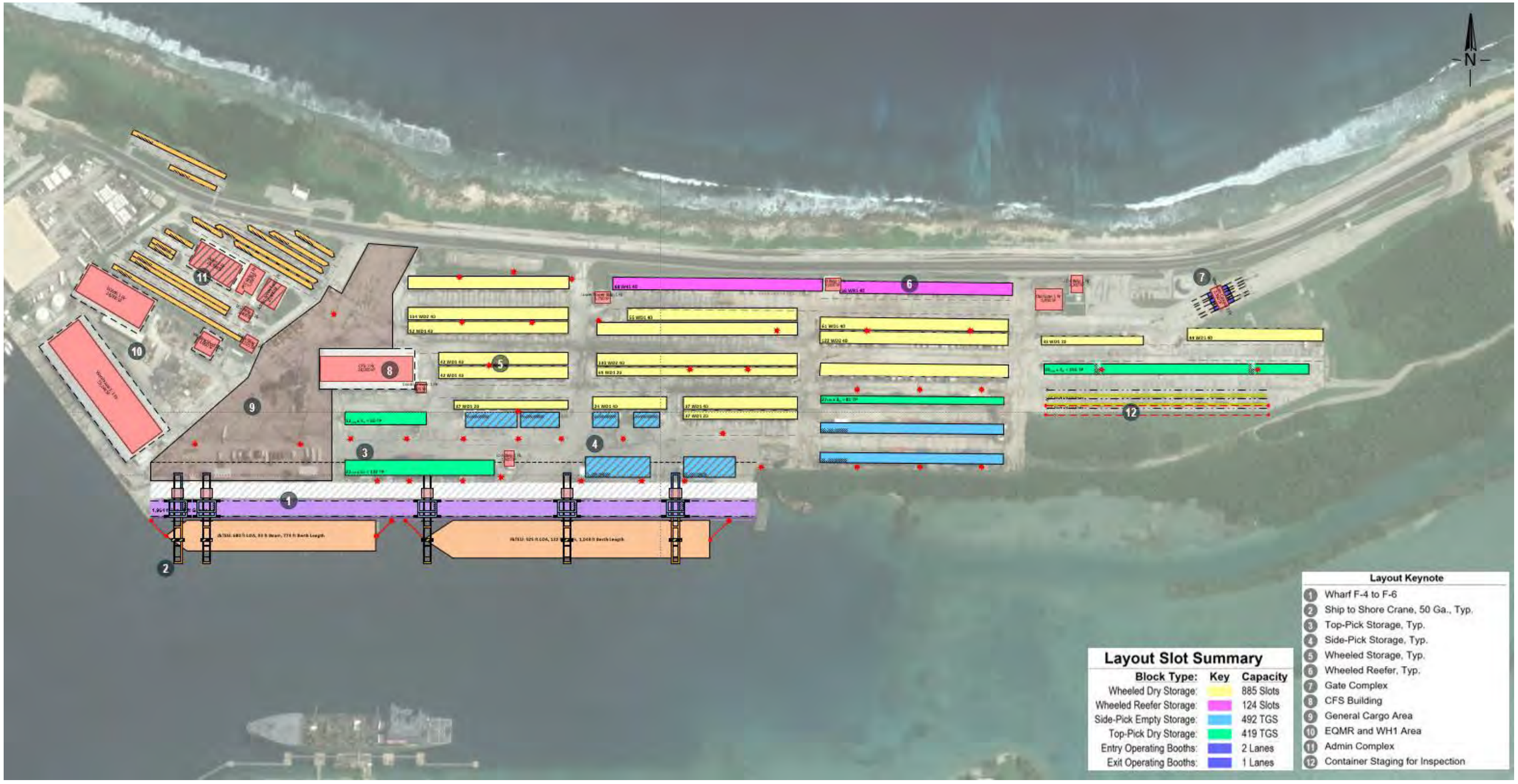
Table 6-3 shows the existing terminal ground slots (TGS) at the port as of 2021.

Table 6-3: PAG Existing Ground Slots

Storage Type	TGS
Full Dry Wheeled Slots	888
Full Top-Pick Grounded Slots	419
Empty Grounded Slots	492
Reefer Wheeled Slots	124

Source: PAG Data and WSP Analysis

Figure 6-8: Existing Terminal Layout



Source: Google Earth and WSP

6.2.2 TERMINAL CAPACITY ANALYSIS

WSP's PRIME tool was used to estimate maximum practical throughput capacity and cargo handling equipment needs as a function of site layout, equipment selection/performance and operating conditions for PAG. Maximum practical capacity is defined as that volume which, if exceeded, would cause a disproportionate increase in unit operating cost and/or decrease in performance, within the context of the terminal's land use, layout, and uncontrollable commercial drivers.

The CTCM is a static linear model that estimates berth-constrained and container yard-constrained throughput capacities. The model first estimates berth-constrained capacity. It then calculates the storage demand associated with the berth-constrained capacity. Storage capacity of the terminal is estimated and compared to the berth constrained storage demand. From this data, the ratio of site storage capacity to berth-driven storage demand is calculated. Finally, the storage-constrained throughput capacity is calculated.

6.2.2.1 Berth Throughout Capacity

The equation shown below is used to estimate the berth-constrained capacity of the marine terminal. The model calculates the maximum number of calls possible by the average container vessel, multiplies by the lifts per call, and annualizes the result.

$$C_B = Berth\ Capacity = \frac{C_W \times L_C \times 52\ wk/yr}{P_S}$$

Where,

C_w = maximum number of calls in a week
L_c = mean lifts per vessel call
P_s = Seasonal peaking factor

6.2.2.2 Storage Yard Throughput Capacity

The equation shown below is used for calculating the yard-constrained capacity of the terminal. The CTCM calculates the storage demand for each flow component, driven by the terminal volume, V. In this case, V is the berth-constrained capacity. The model takes the sum of storage capacities developed in the site plan for the facility, divides by the storage demand, and multiplies it by the driving volume to establish capacity.

$$C_Y = Yard\ Capacity = \frac{\sum_i^N C_i}{\sum_i^N S_i} \times V$$

Where,

i = Flow and Storage Component
V = Terminal annual volume
C_i = Storage Capacity for Flow I from Plan

The port's current throughput capacity was estimated based on the data received from PAG and using the above stated method. Table 6-4 shows the existing berth and yard throughput capacity of the terminal. Yard capacity is the limiting factor, thus, the port has an existing throughput capacity of 126,000 containers per year.

Table 6-4: PAG Existing Throughput Capacity

Throughput Type	TEU/Yr	Container/Yr
Berth Throughput Capacity	341,000	192,000
Yard Throughput Capacity	225,000	126,000

Source: WSP analysis

6.2.2.3 Gate Capacity

A new truck gate complex was constructed in 2015. The gate consists of four lanes with a concrete canopy, and three booths under the canopy. The gate lanes consist of one inbound lane, one reversable lane, one outbound lane, and the fourth lane is a bypass lane. The new gate complex uses the TOS to expedite the truck transaction time.

At current terminal throughput capacity of 126,000 containers per year, the existing gate has sufficient capacity to handle the anticipated flow of trucks. In the future, if a gate operating system (GOS) is implemented, it will further expedite the truck transaction time and increase processing capacity at the gate.

6.2.3 STS CRANES

In December 2016, WSP performed an independent analysis of PAG shipping schedules and STS crane operations. In order to perform the analysis, the ship-call schedules, including average and peak lift-count data and the normal complement of required STS Cranes, for each of the ships were obtained from the two primary shipping lines calling the PAG, Matson and APL. In addition, historical PAG STS Crane operational data were also requested to determine the average ship-lifts per operating hour for the PAG STS Cranes. From this data WSP was able to determine when these ships arrive, depart and the amount of time spent at berth, the average and peak number of hours required for STS Crane (un)loading operations on each ship, and when and/or there is a need for simultaneous multi-berth operations that would require deployment of the maximum number of STS Cranes. The finding of this analysis showed that four STS Cranes at a minimum are required to maintain the necessary level of service at the Port of Guam for a two-berth operation.

While performing the capacity analysis, the PRIME model showed that there is a requirement of minimum of three cranes to support the existing throughput capacity. However, as volume starts to increase during build-up, the port will need an additional fourth STS crane to support the capacity required to meet the forecasted demand.

6.2.4 GENERAL CARGO CAPACITY

A general cargo storage capacity analysis was performed based on the demand forecast described in Section 5. PAG currently handles and is forecasted to handle different types of cargo classified as general cargo including:

- Aggregate
- Asphalt
- Cement Bags
- Pipe
- Bulk Scrap Metal
- Heavy Lift
- Pre-slung
- Roll-on / Roll-off (Ro/Ro)
- Unitized

Storage area requirements for these different types of cargo were calculated using the existing method of storage at the port and other cargo handling facilities outside of PAG. Table 6-5 includes assumptions for storage area requirements as well as cargo type and circulation area assumptions.

Table 6-5: Storage Assumption for General Cargo

Cargo Type	Storage Utilization	Storage Density (CF / ton)	Circulation Area (% of Storage Area)	Storage Type
Aggregate	70%	6	100%	Open
Asphalt	70%	19	30%	Either
Cement Bags	70%	23	35%	Covered
Pipe	65%	54	50%	Open
Bulk Scrap Metal	65%	13	100%	Open
Heavy Lift	65%	160	75%	Open
Preslung	65%	99	50%	Open
Ro/Ro	70%	158	35%	Open
Unitized	70%	31	50%	Either

Source: WSP analysis

A peak two-week period of general cargo volumes was modeled to determine the average daily area requirements anticipated during peak volume years. The following existing operating data for vessel schedules and cargo tonnage were used to prorate the volume of cargo handled on each weekly vessel call during each peak week scenario:

- Ships are serviced 7 days a week
- Gate is open 5 days per week
- A peak week cargo volume factor of 1.5

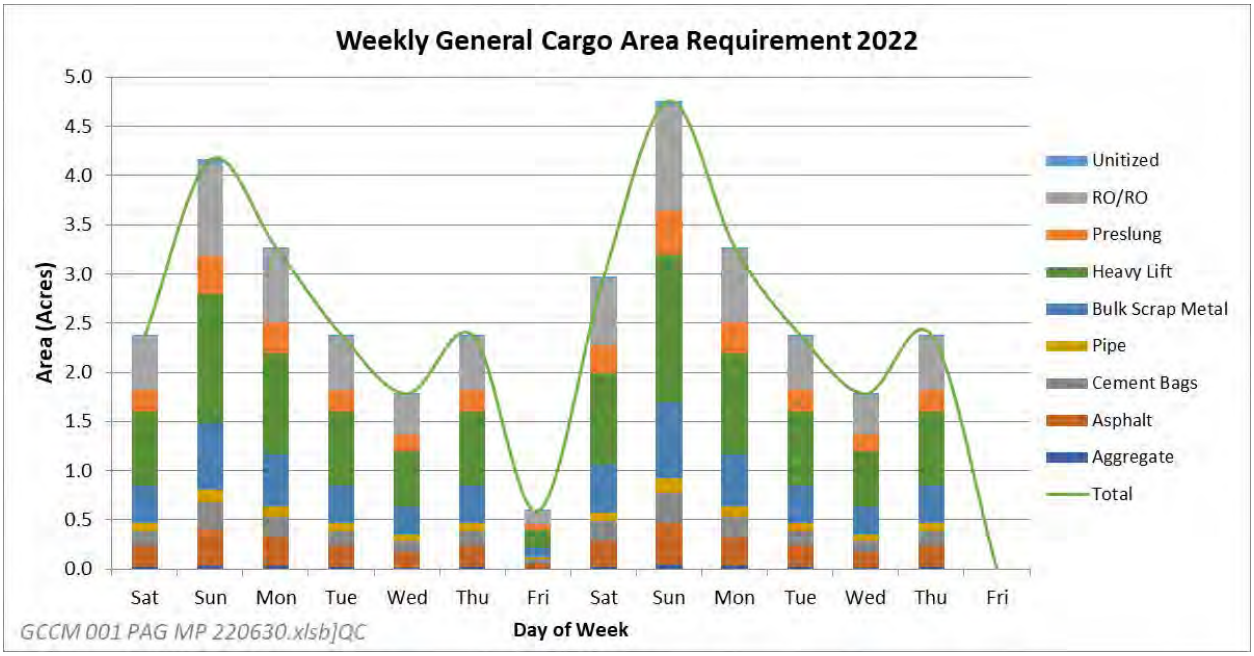
- Some cargo arriving late in the week departs the following week

Based on the cargo demand shown in Section 5, the general cargo ramps up in 2022 and peaks in 2024 before coming down in 2029. Thus, three general cargo area requirement analysis was performed for years 2022, 2024 and 2029.

6.2.4.1 General Cargo 2022

General cargo will start ramping up in 2022 at about 144,000 tons. Approximately 4.8 acres of storage area will be needed during this year. The current general cargo storage area is sufficient to handle this projected demand. Figure 6-9 shows the area requirement for two peak week periods of the year.

Figure 6-9: General Cargo Storage Requirement - 2022

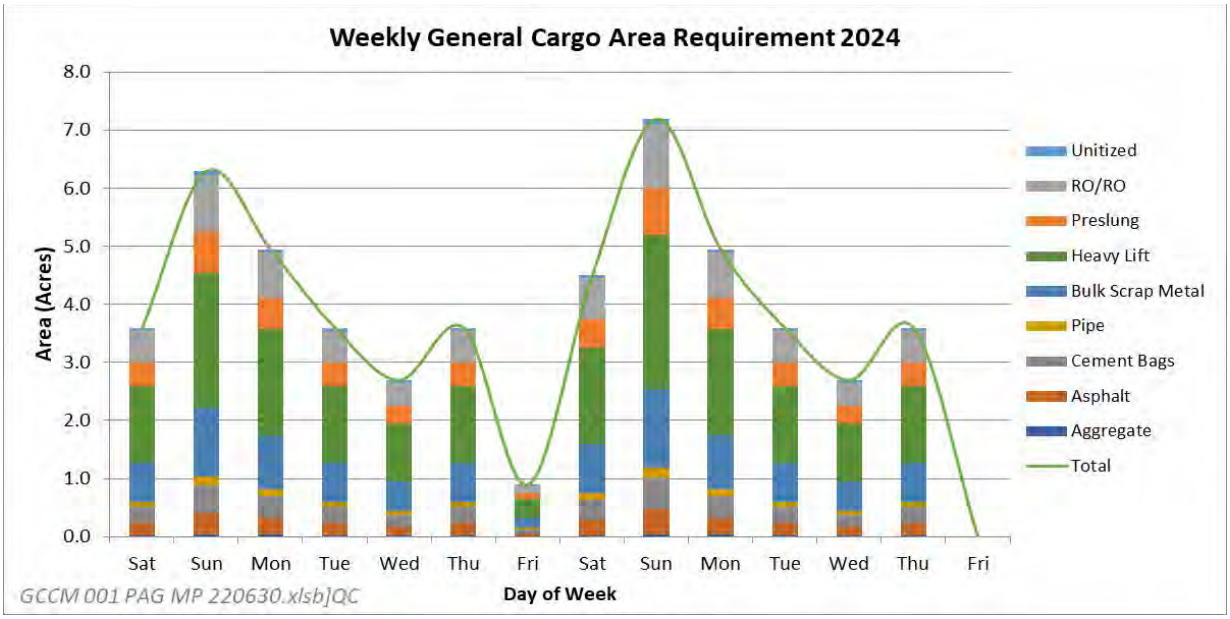


Source: WSP analysis

6.2.4.2 General Cargo 2024

General cargo will peak in 2024 at about 251,000 tons. Approximately 7.2 acres of storage area will be needed during this year. The current general cargo storage area will not be sufficient to handle this projected demand. With reconfiguration of container storage yard, additional general cargo storage area will be made available at the cargo terminal. Figure 6-10 shows the area requirement for two peak week periods of the year.

Figure 6-10: General Cargo Storage Requirement - 2024

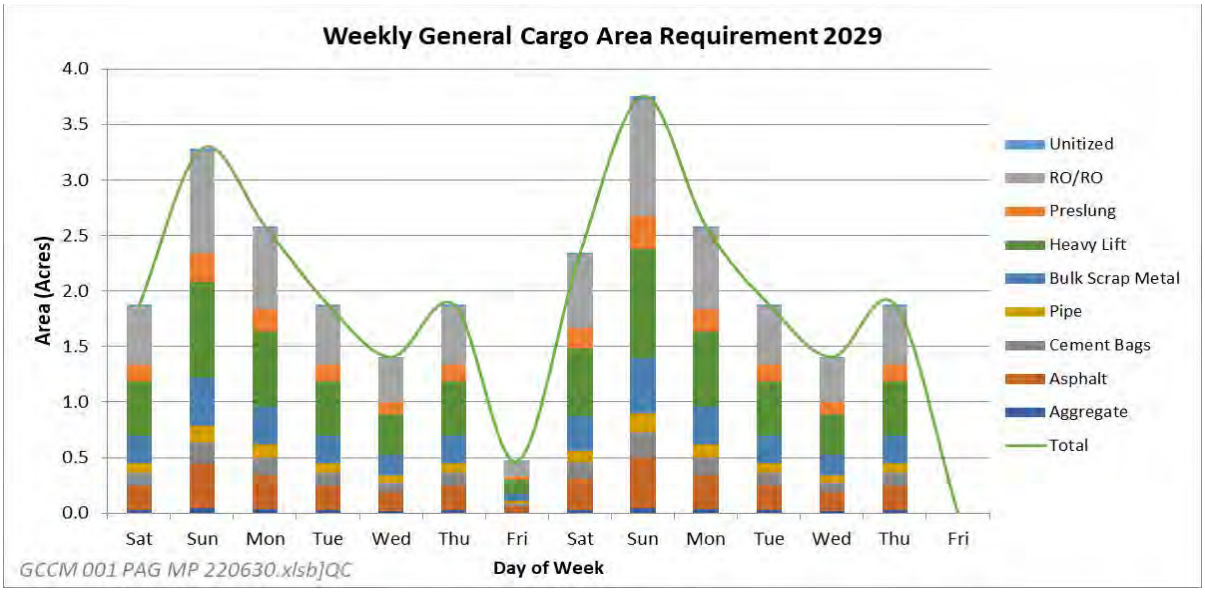


Source: WSP analysis

6.2.4.3 General Cargo 2029

In 2029, general cargo volume will return to pre-buildup numbers at about 94,000 tons. Approximately 3.8 acres of storage area will be needed that year. The current general cargo storage area will be sufficient to handle this projected demand. Moreover, with reduction in area demand for general cargo, additional space will be made available for container storage, if needed. Figure 6-11 shows the post build up area requirement for a two-peak week period of the year.

Figure 6-11: General Cargo Storage Requirement - 2029



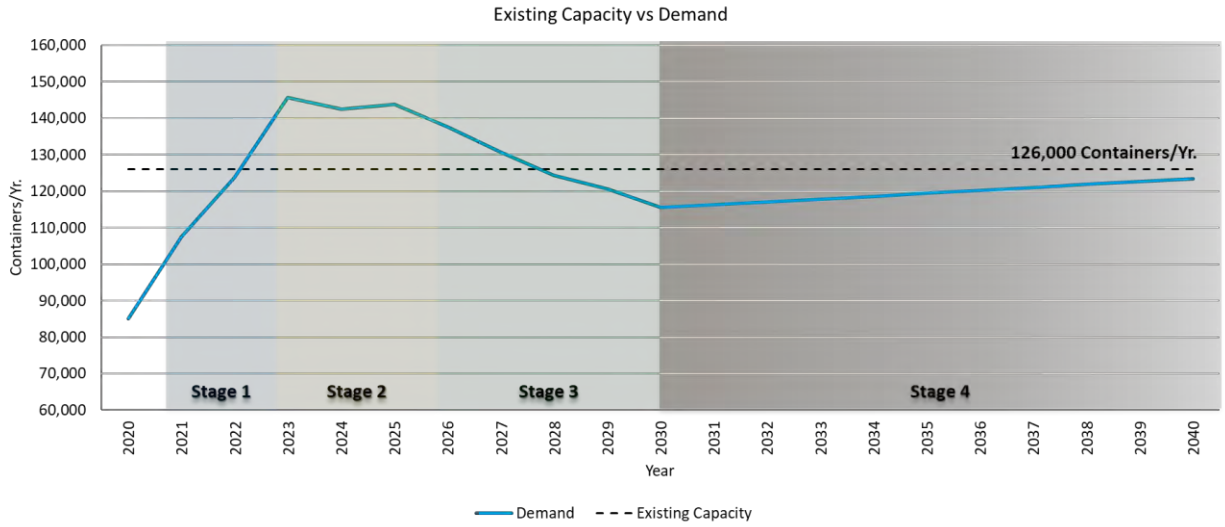
Source: WSP analysis

6.3 CAPACITY VS DEMAND

Section 5 describes various growth scenarios for the container cargo forecast. For this master plan, we considered the high forecast to ascertain adequate storage capacity is available at the cargo terminal. Figure 6-12 shows an Existing Capacity vs Container Demand chart in which the blue line denotes the high growth scenario for container demand and the black dashed line shows the existing PAG container terminal throughput capacity. It can be seen from the figure that demand will exceed capacity around 2023. The container cargo demand stays above 140,000 containers per year until 2026, before it starts to normalize to organic growth in 2030. Hence, capacity enhancements should be made in four stages.

- Stage 1: Ramp Up (2022 – 2023)
- Stage 2: Build-up (2024-2026)
- Stage 3: Ramp Down (2027 – 2029)
- Stage 4: Organic Growth (2030 – onward)

Figure 6-12: PAG Existing Capacity vs Container Demand



Source: WSP analysis

6.3.1.1 Terminal Capacity Enhancement

WSP developed four layouts to accommodate the three stages of container forecast along with general cargo area demand as discussed in Section 6.2.4.

Stage 1: Ramp Up

In order to handle the demand beyond year 2022, some wheeled slots in the storage yard will need to be converted to grounded slots. These changes will convert 290 wheeled storage slots into 300 grounded storage slots. There will be an additional 80 reefer sockets added to the terminal, which are planned by PAG as part of adding new 480V plugs which can be used by all customers. Currently, PAG has a mixture of 240V and 480V plugs, and only Matson can use the 240V plugs. This ground slot conversion will increase the terminal throughput capacity from 126,000 container per year to 137,000 containers per year. This conversion will also increase the general cargo area from 5.9 acres to 9.8 acres.

Stage 2: Build Up

In order to handle the demand for year 2024 – 2026, additional wheeled slots in the storage yard will need to be converted to grounded slots. The changes to the layout will convert 102 wheeled storage slots into 246 grounded storage slots. This ground slot conversion will increase the terminal throughput capacity from 137,000 container per year to 149,000 containers per year. The general cargo storage area will remain same at 9.8 acres. With this yard configuration, both container and general cargo peak demand will be accommodated. The yard equipment requirement and run times will increase as more containers are grounded.

Stage 3: Ramp Down

After the container and general cargo peak is over, the demand will start to decrease from military build-up levels. However, the demand will still not be at pre-buildup level. In order to minimize operational cost and provide flexibility in operations, some of the grounded slots will be converted back to wheeled. The changes to the layout will convert 276 grounded slots to 184 wheeled storage slots This ground slot conversion will decrease the terminal throughput capacity from 149,000 container per year to 137,000 containers per year. The general cargo storage area will decrease from 9.8 acres to 8.4 acres.

Stage 4: Organic Growth

After the military build-up is complete, the container and general cargo demand will return to its organic growth rate. At this stage, the terminal layout can return to the existing configuration. Changes done to the terminal layout during the military build-up will correct some of the terminal circulation challenges. These improvements will be kept after the buildup to have better truck circulation in the storage yard. The changes to the layout will convert 379 grounded slots to 299 wheeled storage slots. This ground slot conversion will decrease the terminal throughput capacity from 137,000 container per year to 126,000 containers per year. The general cargo storage area will decrease from 8.4 acres to 6.1 acres.

Table 6-6 shows a summary of various stages along with terminal capacity, storage slots and general cargo area availability.

Table 6-6: Terminal Enhancement Stages Summary

Parameters	Existing	Ramp Up	Build-up	Ramp Down	Organic
T'put Capacity (Lifts/Yr.)	126,000	137,000	149,000	137,000	126,000
Slot Availability (TGS)	1,920	2,001	2,114	2,022	1,942
Containers Stacked (%)	46%	70%	78%	65%	46%
General Cargo Area (Acres)	5.9	9.8	9.8	8.4	6.1

Source: WSP analysis

Figure 6-13 to Figure 6-16 shows terminal layouts from Stage 1 – Ramp Up to Stage 4 – Organic Growth respectively.

Figure 6-13: Improved Terminal Layout – Stage 1 Ramp-Up

Source: WSP analysis

Figure 6-14: Improved Terminal Layout – Stage 2 Build-up

Source: WSP analysis

Figure 6-15: Improved Terminal Layout – Stage 3 Ramp Down

Source: WSP analysis

Figure 6-16: Improved Terminal Layout – Stage 4 Organic Growth

Source: WSP analysis

6.4 PHASING SCHEDULE

As the Port proceeds towards handling of military build-up cargo, it will have to accommodate the increase in the cargo demand. This will involve scheduling the storage yard use and terminal changes in a way that the terminal is able to handle the forecasted demand.

With the confirmation that peak year volumes will be accommodated by making storage configuration changes at the port facility, understanding the annual storage area requirements allows for sequencing and verification that these changes don't impact cargo operations negatively. Capacity analysis results were used to determine the storage area requirements for general and container cargos from the current terminal configuration through the military buildup program and back to organic growth.

Table 6-7 shows the storage yard phasing schedule for general and container cargo under the Current Build-up (Mid) Scenario. The table is divided into container and general cargo characteristics. The container cargo columns show the forecasted volume (in containers), terminal ground slots, and percent of grounded container storage required. The general cargo columns show the forecasted volume (in tons), storage area available and percent of storage area used. Notes are provided to describe changes that impact the storage yard sizes or how they are used.

Table 6-7: Storage Yard Phasing Schedule

Year	Container			Breakbulk			Notes
	Volume (Cont.)	TGS	% Ground	Volume (tons)	Area (acres)	% Used	
2021	107,600	1,920	46%	64,000	5.9	56%	Current conditions
2022	123,800	2,001	70%	144,000	9.8	49%	• Convert 299 TGS wheeled to 300 TGS grounded. Add 80 reefer slots. • Add 3.9 acres of general cargo area.
2024	145,700	2,114	78%	255,000	9.8	73%	• Convert 102 TGS wheeled to 215 TGS grounded.
2026	137,700	2,022	65%	222,000	8.4	84%	• Convert 276 TGS grounded to 184 TGS wheeled. • Reduce 1.4 acres of general cargo area.

2030	115,500	1,942	46%	94,000	6.1	62%	• Convert 379 TGS grounded to 299 TGS wheeled. • Reduce 2.3 acres of general cargo area.

Source: WSP Analysis

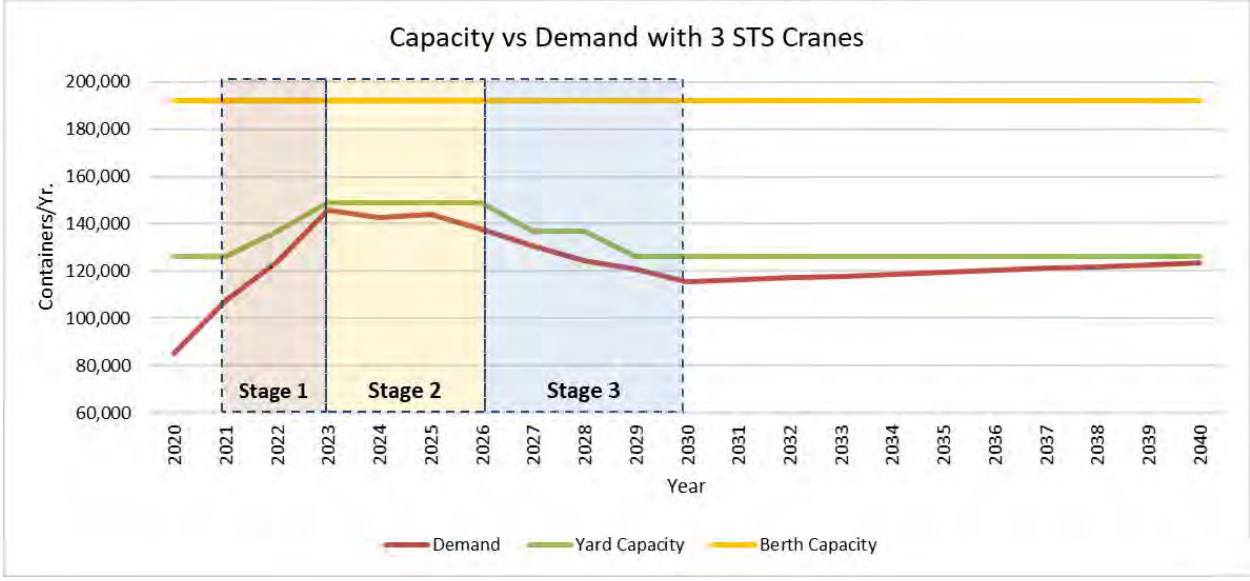
6.5 CRANE SENSITIVITY ANALYSIS

A crane sensitivity analysis was performed to quantify the potential impact on the military build-up schedule in case STS crane(s) are out of service for a significant period. The existing three cranes at PAG are currently capable of handling approximately 192,000 containers per year. This makes the effective capacity for each crane, approximately 64,000 lifts per year.

6.5.1 Three STS Cranes in Service

Figure 6-17 shows the capacity vs demand chart with all three STS cranes in operation and assumes they will be replaced as they reach their use life, during the military buildup. In this scenario, there is no impact on military cargo volumes during the build-up as berth throughput capacity is higher than the forecasted military build-up demand throughout the build-up period. Additional capacity after the buildup provides the needed operational readiness for future cargo increases that would be required during an active military operation in the region. The storage throughput capacity can be increased and decreased through implementing equipment/operational changes.

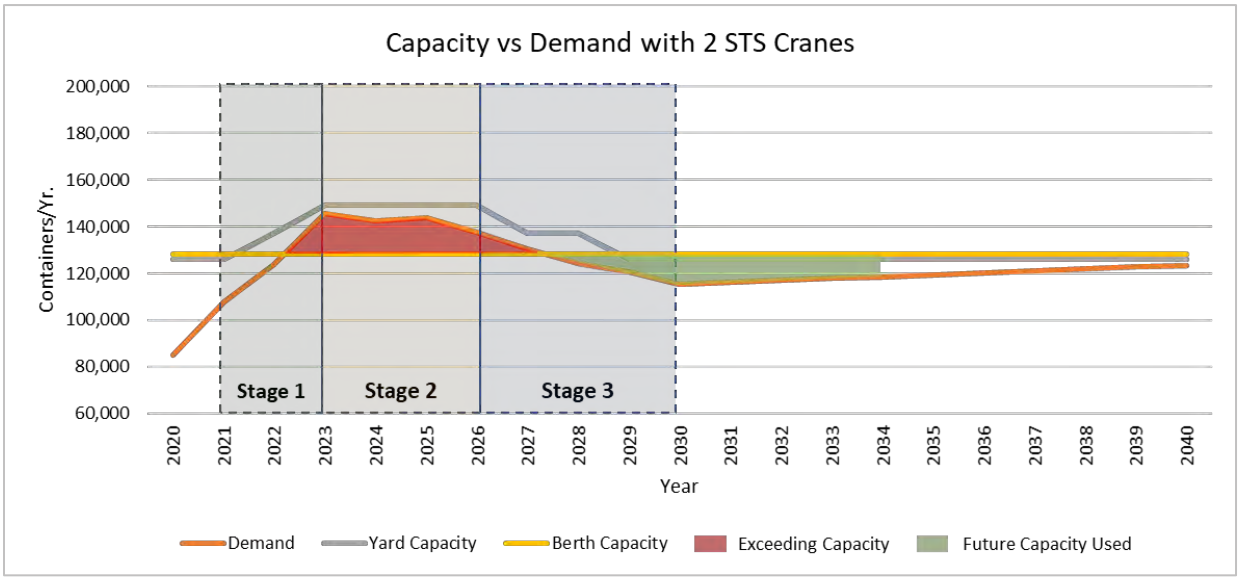
Figure 6-17: Capacity vs Demand - 3 STS Cranes



6.5.2 Two STS Crane in Service

As the cranes reach their useful life, if one STS crane (or any one of the three cranes in sequence) is out of service for a long period of time, the berth throughput capacity would decrease to 128,000 containers per year, which is lower than the cargo forecast with the military build-up peak. Figure 6-18 shows the capacity vs demand chart with two STS cranes in operation. With only two cranes in operation, a deficit of approximately 60,000 annual forecasted containers would be delayed to future years. To recoup this loss in capacity, the military build-up could be delayed up to four years and no additional capacity would be available for future live action operational readiness.

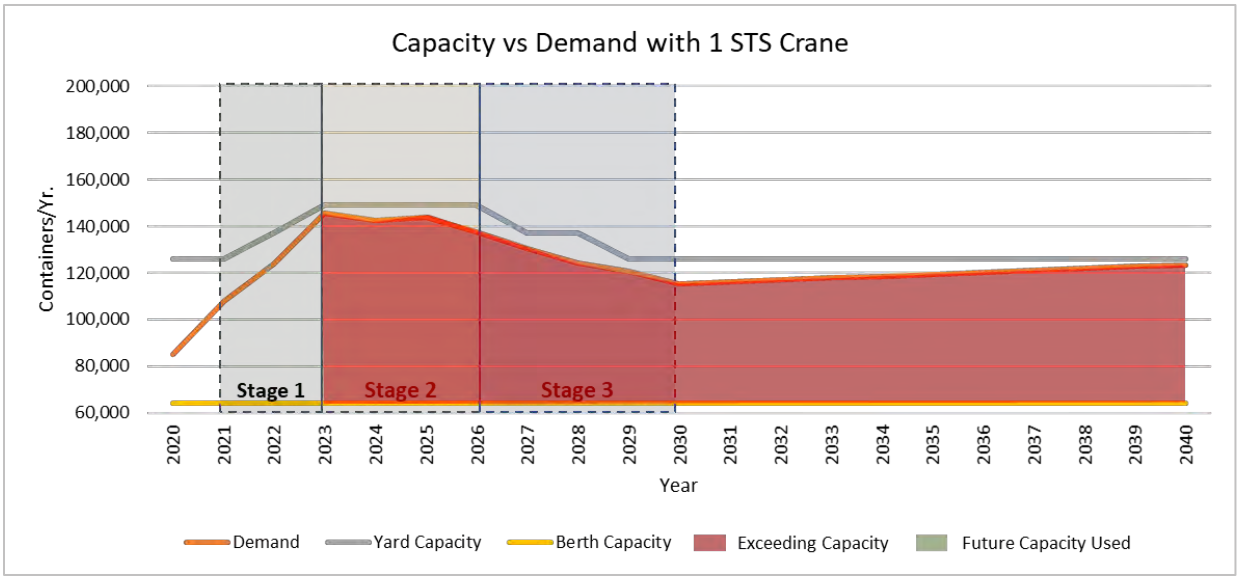
Figure 6-18: Capacity vs Demand - 2 STS Cranes



6.5.3 One STS Crane in Service

As the cranes reach their useful life, if two STS cranes (or any two of the three cranes in sequence) is out of service for a long period of time, the berth throughput capacity would be limited at 64,000 containers per year, which is significantly lower than organic demand for the port. Figure 6-19 shows the capacity vs demand chart with one STS crane in operation. With only one crane in operation, very little of the port or military build-up demand can be met. In this case, the port would not have sufficient crane capacity to handle organic cargo demand.

Figure 6-19: Capacity vs Demand - 1 STS Crane



7 PORT IMPROVEMENT PROGRAM

The combination of five decades of active use with limited reinvestment in aging facilities and infrastructure, and the increased cargo-handling demands associated with future island growth and the on-going military build-up has prompted the need for an improved and sustained capital improvement program.

This section identifies ongoing efforts and new opportunities that should be a factor in defining such a program. It includes a review of ongoing commercial terminal development efforts supported by bond funding and grants. It also reviews the actions that can be controlled by PAG once budgets are right-sized and structure is added to its Maintenance and Repair Programs and CIP investment strategy.

The PAG-controlled portion of this is significant. In order to sustain ongoing operations that are efficient and effective, the Port will need to shore up its financial structure and institute regimented maintenance and repair programs and phased CIP. This is to assure that facilities and equipment are aligned with service needs and achieve expected or extended service lives. It also plans for facility replacement, assuming the asset is still needed, following service life expiration.

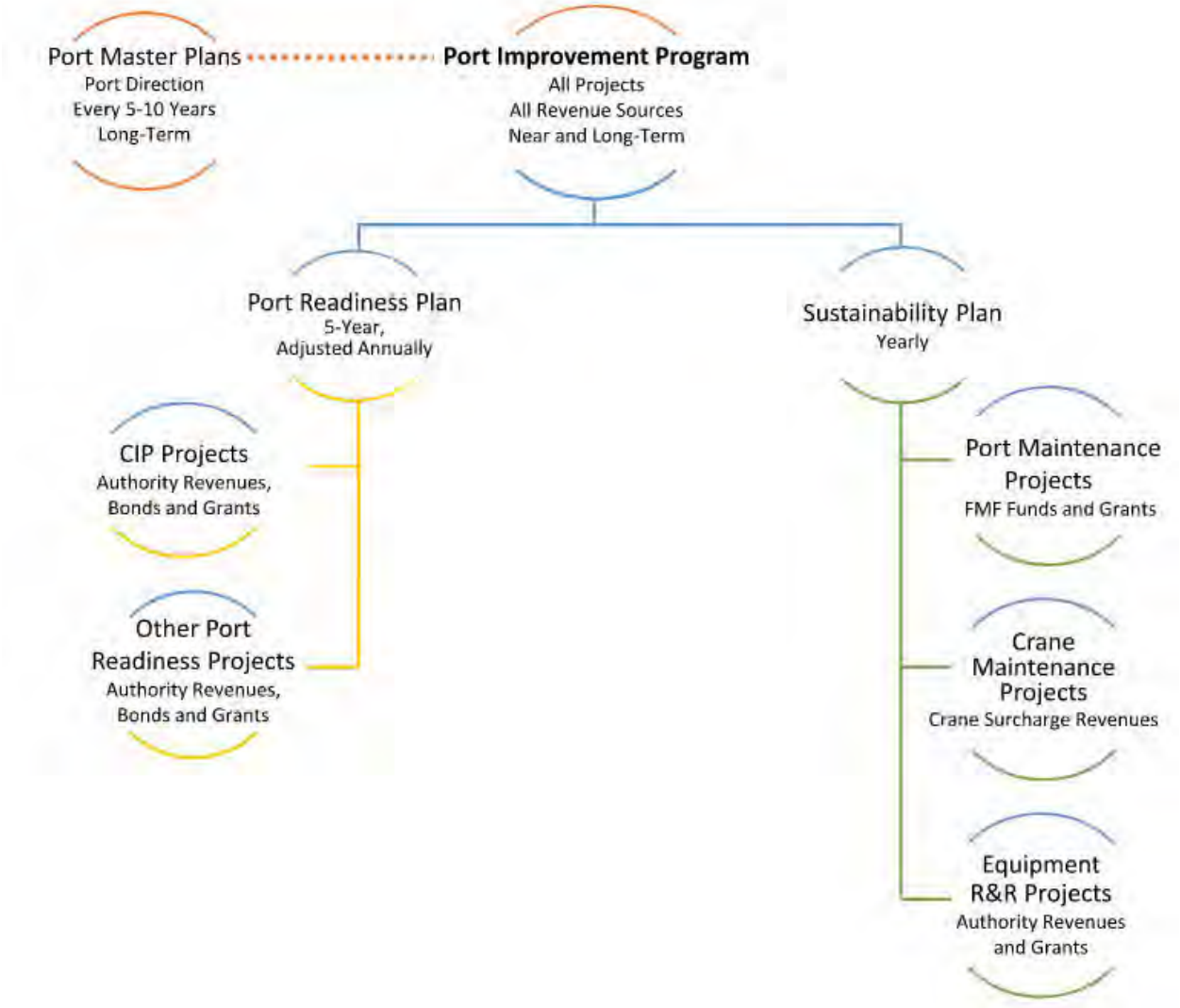
In general, the facilities and equipment needed to sustain operations include the following.

- Wharves and piers
- Buildings
- Terminal equipment (cranes and yard equipment)
- Utility systems (power/lighting [primary and backup], storm, potable water, firemain, sanitary sewer, fuel)
- Pavements and structures (access and traffic, ground storage, chassis storage, tank storage, containment and wash-down areas)
- Security fencing and gates
- Entrance and exist gate facilities

For the purposes of making recommendations for development of PAG facilities and strengthening its operating capacity within the 10-year planning horizon, it is important to differentiate between recommendations driven by sustained Port operations, capital improvements, and replacement of aging facilities that have exceeded their service lives.

Consequently, the Port Improvement Program is divided into two categories: The Port Readiness Plan (PRP) and the Sustainability Plan. The Port Readiness Plan is subdivided into Capital Improvement Projects and Other Port Readiness Projects. See Figure 7-1 for a flowchart showing the relationship between the Port Readiness Plan, CIP, and Sustainability Projects.

Figure 7-1: Port Improvement Program and Associated Plans



Source: PAG and WSP Analysis

7.1 PORT READINESS PLAN

The PRP is focused on hardening port infrastructure to ensure resiliency, reliability, and supply chain sustainability for all Port users, the DOD mission on Guam, and the local community. The PAG is continuing to define and quantify the PRP Readiness elements while pursuing additional funding and financing sources.

7.1.1 CAPITAL IMPROVEMENT PROJECTS

Capital improvement projects refer to projects in which capital expenditures are used to fund the construction or implementation of new or replacement assets such as buildings, piers, light poles, digital operating systems, etc. CIP's may be funded from a variety of sources such as grants, bonds, and PAG revenues.

Note that several CIP's need further definition of the scope and source of funding. These projects can only be executed when revenue generated by grants, bonds, or the tariff structure are available. For a list of the current CIP projects, see Table 7-1.

Table 7-1: Capital Improvement Projects

ID NO.	PROJECT TITLE/DESCRIPTION	FUNDING AUTHORITY	SCHEDULE									
			2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
1	Installation of Canopy Fronting Building Maintenance Bay	Port		CPLT								
2	Devanning Concrete Ramp	Port		CPLT								
3	LC3 Genset + Tank + AST + Slab Extension	PSGP/Port		CPLT								
4	Agat Small Boat Marina Design Build Bathroom and Showers					CPLT						
5	Golf Pier Replacement	Bonds/ Grants										100%
6	Golf Pier Near-Term Repairs	Port/ Grants									40%	60%
7	Enterprise One Financial Management System	Bonds			CPLT							
8	Replacement of (3) Metal Gate Booths	Port		CPLT								

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ID NO.	PROJECT TITLE/DESCRIPTION	FUNDING AUTHORITY	SCHEDULE									
			2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
9	STS Crane Demolition Project	Port		50%	25%	5%		20%				
10	Waterline Replacement	Bonds		10%	25%	35%	10%	20%				
11	Welding Shop – Phases 1 and 2	OIA/Port				10%	70%	20%				
12	Radar Intrusion and Vessel Tracking System	PSGP/Port			CPLT							
13	Rehabilitation of Hotel Wharf and Access Road	Bonds/ MARAD/ Port							40%	60%		
14	Lighting: Replace all Fluorescent Lights in All Buildings with LED Lights	Port							100%			
15	Gate Operating System	Grants/Port								50%	50%	
16	Inbound/Outbound OCR Portals	Grants/Port								50%	50%	
17	Northside Catwalk for the Agat Small Boat Marina Boat Ramp	Grants/Port		CPLT								
18	OWS at Berth F2	Port							100%			

ID NO.	PROJECT TITLE/DESCRIPTION	FUNDING AUTHORITY	SCHEDULE									
			2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
19	PUGG Secured Digital Framework	Grants/Port						50%	50%			
20	Various IT Projects (WiFi, RRM, VMT)	Grants/Port						50%	50%			
21	Various Yard Equipment	Grants/Port					60%	40%				
22	Installation of Pavilion and New Restrooms at Port Beach	Port						50%	50%			
23	WH-1 Building Repair/Upgrade	Bonds					10%	90%				
24	Seawall Improvement	Grants							20%	80%		
25	Typhoon Mawar Building Repair Projects							30%	70%			
26	Seawall Solar Project							50%	50%			
27	Warehouse 1 Demolition											
28	Old Horizon Building Roof Repair								50%	50%		

Doc. No. 38GL-26-2386.*

ID NO.	PROJECT TITLE/DESCRIPTION	FUNDING AUTHORITY	SCHEDULE									
			2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
29	Old Horizon Building Full Building Repair									50%	50%	
30	Crane Office Renovation							100%				
31	Replacement of LC5 Metering Cabinet							100%				
32	Operations Division Office Renovation							100%				
33	Gregorio D. Perez Marina Renovation and Rehabilitation	Grants/Port					20%	20%	20%	20%	20%	
34	Agat Small Boat Marina Renovation and Rehabilitation	Grants/Port					20%	20%	20%	20%	20%	

Source: The PAG

Doc. No. 38GL-26-2386.*

Figure 7-2: Capital Improvement Project Locations

Source: Google Earth and WSP

7.1.2 PORT READINESS PROJECTS

A list of Port Readiness Projects and their respective priorities is provided in Table 7-2 and shown graphically in Figure 7-3.

Table 7-2: Port Readiness Projects

ID NO.	PROJECT TITLE/DESCRIPTION	FUNDING AUTHORITY	SCHEDULE									
			2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
1	Purchase Container Handling Equipment	Grants/Port				20%	20%	20%	20%	20%		
2	TOS Upgrade	Grants/Port				10%	90%					
3	Fuel Connectivity Pipeline (F1 to Golf Pier)	Grants/Port				20%	20%	60%				
4	Wharf Upgrades for New Cranes						65%	30%	5%			
5	Three New STS Gantry Cranes	Grants/ Loans/Port						100%		100%		100%
6	Wharf SLE Berths F2-F6	Grants/Port				30%	45%	25%				
7	Container Yard Repavement Projects					20%	60%	20%				
8	Solar Energy Project					10%	30%	40%	20%			
9	JRM Pier Infrastructure (Pier F1 Near-Term Repairs)					10%	30%	30%	25%	5%		

ID NO.	PROJECT TITLE/DESCRIPTION	FUNDING AUTHORITY	SCHEDULE									
			2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
10	Cyber Security Initiative	Grants/Port				30%	70%					
11	F4 to F6 Ground Improvements	Grants/Port					50%	25%	25%			
12	Redevelopment of Area A	Grants/Port					20%	40%	20%			
13	Pier F1 Wharf Renovation/Reconstruction	Grants/Port						25%	50%	25%		
14	Dredging (Hotel Wharf, Fuel Piers, etc)	Grants/Port								100%		
15	Berth F3/F4/F6 Wharf Renovation/Reconstruction	Grants/Port						10%	10%	30%	25%	25%
16	Admin Bldg Annex	Port/Loans					20%	30%	30%	20%		
17	Building Demolition	Grants/Port										

Source: The PAG

Doc. No. 38GL-26-2386.*

Figure 7-3: Port Readiness Project Locations

Source: Google Earth and WSP

7.1.3 SUSTAINABILITY PROJECTS

Sustainability projects refer to projects that consist of the maintenance and upkeep of assets. In general, sustainability projects are mostly separate from CIP projects. However, once capital improvement projects are completed, they are subjected to sustainability investments to keep them operational throughout their intended service life. In some cases, sustainability projects are well-defined and scheduled because deficiencies have been identified, monitored, and risen to a level of priority where there is consensus in funding them among other competing interests. In other cases, projects are "To Be Scheduled" meaning that scheduling, packaging and pricing depend on the pace of deterioration, the need to develop a plan for phased implementation to preserve continuity of operations, prioritization among competing demands, and the need to be aligned with funds availability which is about to improve. These issues typically need to be evaluated for all projects, but in the instance of To Be Scheduled projects, the issues have not yet been addressed because other pressing priorities in a scarce economic environment have kept these needs on the back shelf to the point where they can no longer be ignored. See Table 7-3 for a list of current PAG sustainability projects and Figure 7-4 for a map showing their locations.

Table 7-3: Sustainability Projects

ID NO.	PROJECT TITLE/DESCRIPTION	FUNDING AUTHORITY	SCHEDULE									
			2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
1	Repair All Concrete Spalling at CFS Building			CPLT								
2	EQMR Building Maintenance				40%	50%	10%					
3	Hagatna Marina Clean OWS and Retrofit Check Valves								30%	70%		
4	F3 – F6 Fender Repair Project (Typhoon Mangkhut PA)	PA/Port		CPLT								
5	Supply and Install Arch Fenders at F4 – F6 (Typhoon Mangkhut)	HMGP/Port					CPLT					
6	Supply and Install Arch Fenders at F4 – F6 (Typhoon Mawar)								50%	50%		
7	Admin Building Concrete Repairs							100%				
8	Harbor of Refuge Renovation and Repairs (Mooring Blocks Only)				CPLT							

ID NO.	PROJECT TITLE/DESCRIPTION	FUNDING AUTHORITY	SCHEDULE									
			2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
9	F3 – F6 Bullrail Repairs						50%	50%				
10	Concrete Striping and Numbering (F4 – F6)							50%	50%			
11	Concrete Tire Stopper Project							100%				
12	LC1 Metering Cabinet							100%				
13	LC2 and LC3 Switch Gear Replacement							100%				
14	Replace Metal Halide and High-Pressure Sodium Lights							60%	40%			
15	Harbor of Refuge Pump Out Boat and Dock							50%	50%			
16	F3 Bulkhead Repairs							10%	70%	20%		
17	F3 Cylindrical Fenders (Typhoon Mawar)							20%	50%	30%		
18	OAE Services											

ID NO.	PROJECT TITLE/DESCRIPTION	FUNDING AUTHORITY	SCHEDULE									
			2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
19	Annual Maintenance of Mobil Pipeline and Golf Pier Maintenance	Port										
20	Golf Pier Concrete Slab Repair & 3 Motorized Valves	Grants/Port										
21	Harbor Master Misc Roof Related Items	Port		CPLT								
22	Installation of 2 Gates at Dock A and Dock B. Dry Dock Repair at Perez Marina	Port		CPLT								
23	Replacement of 125 Reefer Outlet Receptacles	Port			CPLT							
24	Service the ICCP System at Berth F5											
25	Agat Small Boat Marina Dock B Replacement	DOI/USFW/ DAWR/USDA			40%	60%						
26	Broken Grating Drainage Replacement	Port										
27	Electrical Work for 61 Reefer Outlets	Port			20%	80%						

ID NO.	PROJECT TITLE/DESCRIPTION	FUNDING AUTHORITY	SCHEDULE									
			2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
28	Harbor of Refuge Renovations and Repair Phase 2-5 (Mooring Blocks Only)	Grants/Port			CPLT							
29	Storm Drain Channel Repairs	Port										
30	WH-1 Hardening (Roll Up Doors)	HMGP/Port				100%						

Source: The PAG

Doc. No. 38GL-26-2386.*

Figure 7-4: PAG Sustainability Projects

Source: Google Earth and WSP

7.1.4 FUTURE PROJECTS

Future projects represent various capital improvement or sustainability/maintenance type projects that have been identified and have not yet been incorporated into the CIP, PRP, or Sustainability lists provided in the sections above. The list of future projects is provided below.

- ADA Projects
- CFS Building Painting
- Concrete Striping and Numberings
- Concrete Tire Stopper Project
- Construction of Hard Top Canopy for Fleet Maintenance
- Construction of Hard Top Canopy at the Inbound Truck Lane
- Construction of Hard Top Canopy at the Maintenance Shop
- Construction of Hard Top Canopy for the Top Loader Maintenance
- Deep Draft Wharf Feasibility Study
- Demolition of Fuel Tanks
- Development of Seaplane Ramp
- Development of Berth F7
- EQMR Office Space Renovations and Additions
- EQMR Repair and Upgrade (Reduced Scope of Work)
- F3 to F6 Bulkhead Repair
- Fencing Installation Around all Docks as Agat Small Boat Marina
- Firewater Backflow Preventer at CFS Building
- Golf Pier Demo and Reconstruction

- Improve Storm Drainage Along Reefer Receptacles
- Install A/V Annunciator/Warning Beacons on 10’ Tall Poles (2 each)
- Install Chain Link Fence at Operations
- Installation of Light Poles/Fixtures at Reefer Outlet Area
- Installation of New Dock at Harbor of Refuge
- LC1 Metering Cabinet
- LC2 and LC3 Switch Gear Replacement
- Light Post Bollard Restoration Project
- Miscellaneous Harbor Master Repair Projects
- Miscellaneous Maintenance at Operations Building
- Miscellaneous Projects
- Pavement Repair
- Gregorio D. Perez Marina Dock A Repair
- Port Police Century by the Admin Building
- Renovation of Two Restrooms at Operations Building
- Replace all Metal Hallide and any High-Pressure Sodium
- Repairs at 2nd Floor Roof Surrounding Harbor Master Office
- Replace Typhoon Shutter at Gatehouse, Admin Building
- Retrofit 11 Existing Outfall Pipes Handling
- Revetment Project Completion

- Structural Safety Measures for Buildings EQMR, WH-1, and the Welding Shop Against Falling Concrete
- Synchronizing Load Centers
- Utilization of Quarry for Recycling and Composting
- Waste Water Injection Pump Station and Storage Facility Project
- WH-1 Repairs and Upgrade (Reduced Scope of Work)

8 FINANCIAL ANALYSIS

8.1 INTRODUCTION

In the role of consulting engineer for the Authority, WSP developed a feasibility assessment based on proposed capital investments. **WSP is not a Registered Municipal Advisor, and, as such, is not registered with the Securities and Exchange Commission**. Accordingly, the financial terms and the details of anticipated debt issuances were provided to WSP by GEDA and the Authority. WSP assembled and analyzed these parameters to develop the financial forecasts provided in this Report and requisite cash flow pro-forma estimates were based upon information provided to WSP.

8.2 PORT FINANCIAL OVERVIEW

8.2.1 POPULATION

The PAG's total FY 21 operating revenue was $55 million, a modest increase compared to FY 2020 and on par with income pre-COVID in FY2019. The PAG's operating revenues are presented in Table 8-1.

Table 8-1: PAG Operating Revenues 2017-2021

Operating Revenue Category	FY 2017 ($000s)	FY 2018 ($000s)	FY 2019 ($000s)	FY 2020 ($000s)	FY 2021 ($000s)
Cargo throughput charges (1)	$30,715	$33,496	$34,357	$33,820	$34,777
Equipment and space rental (2)	$8,769	$9,015	$8,833	$9,192	$8,559
Crane surcharges	$6,092	$5,958	$5,875	$5,811	$5,984
Wharfage charges	$4,986	$5,435	$5,771	$5,639	$5,800
Other operating income (3)	$332	$264	$256	$224	$134
Total Operating Revenues	**$50,894**	**$54,168**	**$55,092**	**$54,686**	**$55,254**
Change from Prior Year	*-2.5%*	*6.4%*	*1.7%*	*-0.7%*	*1.0%*

(1) Facility Maintenance Fee (FMF) revenues are included in cargo throughput charges and totaled $1.5 million in FY 2017. Historical FMF revenue ranged from $1.4 million in FY 2013 to $1.75 million in FY 2016

(2) Includes Marina revenues

(3) Other operating income includes Special Services, Harbor of Refuge, and Other Operating Income

Source: WSP analysis of PAG data

Doc. No. 38GL-26-2386.*

Fees related to cargo vessels and the movement of freight represent the majority of the PAG's operating revenue. These charges include port entry fees, vessel dockage, cargo handling, fuel surcharge, and security fees. Equipment and space rental revenues include facility usage charges for the Marine Industrial Terminal, Gregorio D. Perez Marina, Agat Small Boat Marina, and Harbor of Refuge, as well as demurrage charges on cargo stored on the terminal. Crane surcharges are fees assessed for the use of the PAG's STS gantry cranes. Wharfage charges are fees assessed moving cargo across the wharfs, berths, or piers. Other operating income includes cruise passenger charges, bunkering fees, and fees for administrative and other special services. In addition to these operating revenues, the Authority receives funds from various grants from the Federal Government.

These fees include two special funds that provide revenue from cargo operations. Implemented in 2010, the facility maintenance fee (FMF) is a separate charge to provide funding for the maintenance, replacement, and repair of the PAG's cargo facilities. The crane surcharge was implemented in December 2012 after approval by the PUC. Crane surcharge revenue is dedicated to cover the costs of the operation and maintenance (O&M) of the existing gantry cranes, the purchase of future cranes, as well as any debt service for cranes.

8.2.2 EXPENSES

The PAG's operating expenses include the cost of operating and maintaining Port facilities and equipment, providing cargo services to shippers, and managing and administering the Port's business. Cash operating expenditures (excluding depreciation and other non-cash items) in FY 2021 were approximately $52 million. A breakdown of the PAG's cash operating expenses, with the labor and employee benefit allocated amongst the categories, is provided in Table 8-2.

Table 8-2: PAG Operating Expenses 2017-2021

Operating Expenses	FY 2017 ($000's)	FY 2018 ($000's)	FY 2019 ($000's)	FY 2020 ($000's)	FY 2021 ($000's)
Management and Administrative (4)	$10,822	$10,433	$11,866	$14,591	$14,877
Stevedoring services	$3,993	$3,629	$3,792	$4,392	$4,297
Terminal Services	$2,809	$2,539	$2,894	$3,351	$3,336
Equipment maintenance	$5,640	$6,087	$6,076	$6,391	$6,432
Transportation services	$5,550	$4,923	$5,153	$6,007	$6,023
Facility maintenance (5)	$1,987	$1,945	$1,962	$2,116	$2,142
General Expenses, Utilities, Insurance	$7,695	$8,213	$6,885	$6,977	$7,946
Retiree Healthcare Benefits	$7,551	$6,765	$2,960	$5,505	$6,954
Total Operating Expenses	**$46,047**	**$44,534**	**$41,588**	**$49,330**	**$52,007**
Change from Prior Year	*17.5%*	*-3.3%*	*-6.6%*	*18.6%*	*5.4%*

(4) Includes Management and Administration, General Expenses, Insurance, and Utilities

(5) Facility Maintenance costs are fully covered by the FMF revenues, which are included in revenue table under Cargo Throughput Charges. FMF funds are spent on designated projects approved by the PAG board, and may not be undertaken in the year the FMF fees were collected or may take multiple years to complete. Thus, FMF revenue and Facility Maintenance expenditures will not necessarily match in any given year

Source: WSP analysis of PAG data

Management and administrative expenses include the following.

- Salaries/wages
- Insurance benefits
- Retirement benefits
- Other benefits
- Other personnel costs
- Communications
- Leases/rentals
- Utilities
- General insurance
- Damage/shortage/write-down/supplies
- Advertising
- Agency and management fees
- Crane performance management contract
- Professional services
- Contractual services
- Earthquake expenses
- Typhoon expenses

The Authority employs approximately 385 staff. In FY 2021 this consisted of 146 in Management and Administration, 55 for equipment maintenance, 65 for transportation services, 50 for stevedoring services, 29 for facility maintenance, and 40 for terminal service.

8.3 SOURCES OF FUNDING

PAG construction projects are funded by a mix of grants, loans, special funds, and PAG revenues. Each of these sources is described in the following sections.

8.3.1 GRANTS

Grants are one of the three primary sources of funding for the PAG's Capital Investment Projects. The Authority has secured or seeking about $73 million in federal grants to fund Capital Improvement Projects from FY 22 to FY 30. This includes at least 12 different grant programs run by the USDOT, US Department of Defense, the Department of Homeland Security, the Department of Commerce, and Department of Agriculture.

8.3.2 2018 BOND ISSUANCE PROCEEDS

The PAG issued $71.445 million in 2018 Series port revenue bonds to finance a portion of the PAG's capital improvement program, fund a debt service reserve and redeem existing bank loans. The bonds are fully amortizing, have a debt service reserve funded at maximum annual debt service, and a final maturity of July 1, 2048. Maximum annual debt service is around $6.5 million and average annual debt service is around $4.1 million over the life of the debt.

Approximately $41.5 million of the Bonds' $71.45 million proceeds are to be allocated to Capital Improvement Projects between FY 22 and FY 30.

8.3.3 FACILITY MAINTENANCE FUND (FMF)

Implemented in 2010, the FMF is a separate charge to provide funding for the maintenance, replacement, and repair of the PAG's cargo facilities. The PAG assesses an FMF of $34.66 per loaded container or $1.88 per revenue ton for breakbulk. The PAG allocates 100 percent of annual FMF revenues for certain Sustainability Plan projects within the Cargo Terminal each year. However, the expenditure of the allocated funds for each project can occur over several years. Thus, some of these funds are programmed for prior year projects and may not be available for the FY 22-30 CIP. The PAG received approximately $1.8 million in FMF revenues in FY 2021. At the end of FY 2021, $4.3 million was held in FMF fund.

8.3.4 CRANE REPLACEMENT FUND

The crane surcharge was implemented in December 2012 after approval by the PUC. Crane surcharge revenue is dedicated to cover the costs of the operation and maintenance (O&M) of the existing gantry cranes, the purchase of future cranes, as well as any debt service for cranes. The PAG must deposit 9.5 percent of surcharge revenues for the first 44,400 loaded containers and the first 42,010 tons of breakbulk, equal to $547,205 if the baseline volumes are met, into the Crane Reserve Account. At the end of FY 2021, $4.9 million had accrued into the fund. Since these funds are not pledged revenue to service the 2018 bond issuance, Crane Replacement funds could potentially be utilized for a future debt issuance to pay for new gantry cranes.

8.3.5 LOCAL FUNDING

The PAG may fund capital projects with revenue from its operations if funds remain after operating costs and debt service are paid. As of the end of FY21, the PAG reported $10.3 million in unrestricted funds. Excluding depreciation, the PAG generated an operating surplus of approximately $3 million FY 2021. The PAG may petition the Public Utilities Commission (PUC) for tariff increases to provide additional funds for capital projects. Subject to the additional bonds test for the 2018 issuance, the PAG could also opt to finance capital improvements through a future debt issuance.

8.4 PORT IMPROVEMENT PLAN SUMMARY

The Port Improvement Plan (PIP) provided in Section 7 of this master plan details the projects and timing of improvements in the coming years. Each project is assigned a priority from 1 (most important) to 4 (lowest importance). For this summary, any costs not covered by grants or the 2018 bond funds fall to PAG/to be determined (TBD). It is expected that future grants and loans may cover portions of these local costs. See Table 8-3.

Table 8-3: Capital Plan 2022 – 2032 ($000,000s)

PIP ITEM	FY22	FY23	FY24	FY25	FY26	FY27	FY28	FY29	FY30	FY31	FY32	TOTAL
CIP	$2.6	$7.3	$35.2	$49.9	$9.8	$69.4	$9.4	$8.0	$0.0	$0.0	$0.0	**$191.6**
PRP	$0.0	$0.0	$23.5	$56.3	$64.8	$44.5	$40.0	$45.5	$184.5	$15.0	$15.0	**$489.1**
SUST	$2.4	$4.6	$4.1	$0.4	$0.4	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	**$11.9**
TOTAL	**$5.0**	**$11.9**	**$62.8**	**$74.6**	**$79.0**	**$53.0**	**$48.5**	**$53.5**	**$184.5**	**$15**	**$15**	

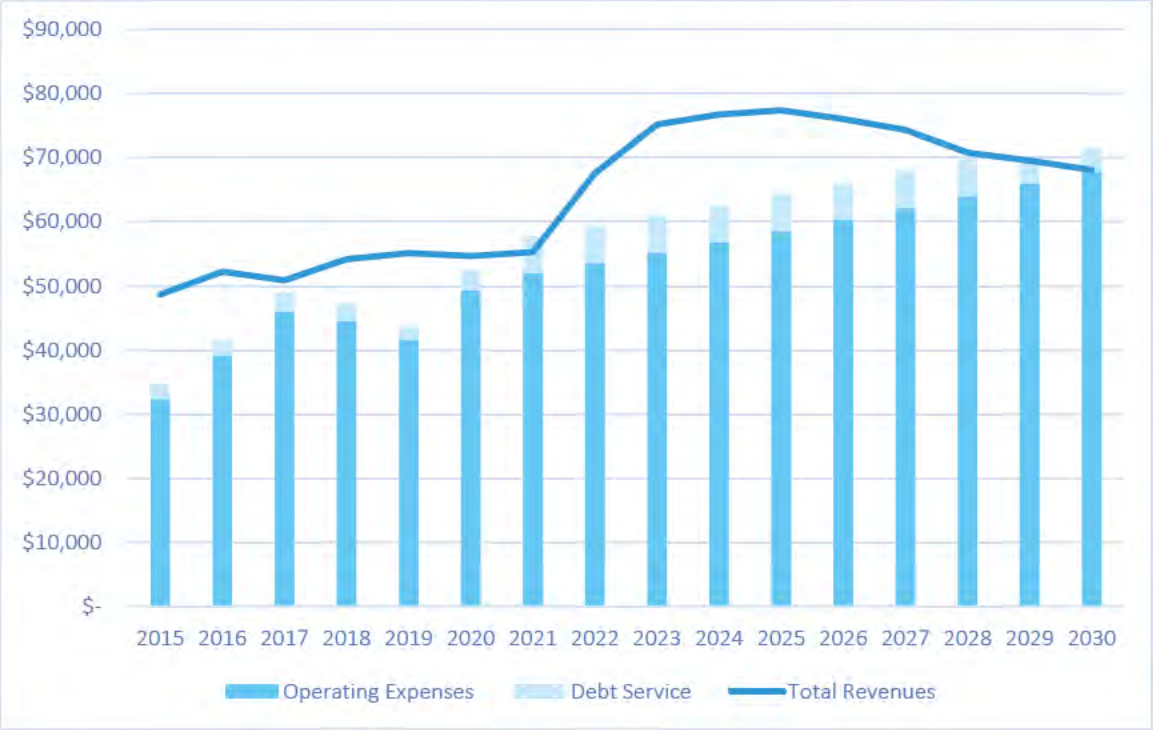
Source: WSP analysis of PAG data

Doc. No. 38GL-26-2386.*

8.5 PROJECTED CASH FLOWS

Figure 8-1 below depicts historical and projected revenues, operating expenditures, and debt service. The revenue projection assumes the Base Case throughput forecast, with the military buildup growing cargo throughput substantially in 2022-2024 before tapering. Operating expenses are assumed to grow 3% per year. No tariff increase is included in this projection.

Figure 8-1: Historical and Projected Revenues and Expenditures ($000s)



Source: WSP analysis of PAG data

9 ECONOMIC IMPACT

9.1 INTRODUCTION

The Port is clearly a major driver of economic activity for Guam. The island cannot sustain its economy without the ability to import goods through the Port, given that air freight is the only civilian alternative, more costly, and has far less capacity. Thus, it could be argued that nearly the entire economy of Guam depends on keeping the Port in a state of good repair. However, this is not a useful construct for evaluating the economic impact of the Master Plan CIP because the Port will continue to make the necessary investments to enable operations in any case.

9.2 IMPACT OF THE MASTER PLAN ON GUAM'S ECONOMY

The primary economic impact of the Master Plan program is to the construction industry. The master plan analysis identified that Port capacity is adequate to accommodate foreseeable throughput, even with substantial near-term increase due to the military buildup. Therefore, the master plan projects largely focus on ensuring the Port is in a state of good repair for the long term. In other words, the master plan projects will not increase port throughput, though certain projects, notably Hotel Wharf reconstruction will facilitate both improved efficiency and the ability to handle military deployments. Because of this, the economic impact focuses on job creation and activity generated by capital expenditures.

9.2.1 PRIMARY IMPACTS

Primary Economic impacts include direct, indirect, and induced impacts. Direct impacts reflect the new spending, hiring, and production by engineering and construction companies to complete the program.

9.2.2 SECONDARY IMPACTS

Secondary economic impacts include indirect and induced impacts as money is spent on local supplies and by wage-earners in the local economy.

- Spending on capital improvement projects will create economic activity in the construction sector and related sectors. For example, contractors working at the Port require building suppliers, equipment, fuel to operate machinery, personal protective equipment, and other resources. The businesses supplying these related resources therefore enjoy increased sales due to the Port construction program. These businesses, in turn, require inputs from other companies to create their products. This is known as indirect economic impact.

- Construction and related businesses employees earn wages and spend earnings in all areas of the economy such as housing, food, goods, and services. In this manner, a dollar spent on construction will create downstream effects, known as induced

economic impacts. Together, the direct, indirect, and induced impacts comprise the total economic impact.

9.3 PORT CAPITAL PLAN

The Port Capital Plan consists of three elements:

1. Capital Improvement Plan projects include rehabilitation of Hotel Wharf and its access road, replacement of Golf Pier and Pier F1, rehabilitation of Gregorio D. Perez Marina and Agat Small Boat Marina, and other projects.
2. Port Readiness Program projects such as wharf renovation/reconstruction, dredging Hotel Wharf and Fuel Piers, and procuring new gantry cranes, etc.
3. Maintenance/Sustainability projects to keep assets in a state of good repair.

The following figure summarizes the plan for each element from 2022 through 2032. A total of $692 million in project cost is planned, with the majority (71%) spent on PRP projects. More than 25% of the construction program ($184.5M) is slated for 2030.

Figure 9-1: Port Planned Expenditures 2022 – 2023 (2022 $'s)

Source: WSP analysis of PAG data

9.4 METHODOLOGY

Economic impact assessments typically utilize an input-output modeling framework that estimates the indirect and induced effect of spending in one sector of the economy (e.g., construction) on other sectors (e.g., construction equipment and supplies, fuel to operate machinery, etc.). However, this multiplier effect of construction on Guam is muted compared to

other economies. Nearly all of the materials and supplies needed for construction are imported to Guam. Thus, there is limited indirect impact on local suppliers since the downstream benefits of construction mostly flow off island.

The military commissioned analyses of the economic impact of its buildup on Guam, notably the 2012 Draft Environmental Impact Statement (DEIS) and 2014 Socioeconomic Impact Assessment Study: Guam and CNMI Military Relocation prepared by NAVFAC (SIAS Study). IMPLAN multipliers were utilized to estimate secondary economic impacts. IMPLAN is a widely-utilized software product that calculates these effects. Prior studies have often relied on Hawaii as a proxy for Guam for input-output multipliers. However, a University of Guam analysis determined that multipliers are likely overstated since the Guam economy is far smaller and has less domestic production.

The SIAS analyzed the impact of the military buildup as then planned for all sectors of the Guam economy, including construction. Key metrics from the SIAS study are utilized for the current analysis, including the relationship between expenditures on construction and job creation, the mix of Guam residents and foreign workers that will fill those jobs, and the multipliers for secondary and induced impacts from construction.

These ratios were adjusted to the current analysis by accounting for inflation and applying the metrics to the construction program recommended in the capital plan to calculate the jobs supported by port construction.

A key component of economic impact is not just the jobs created, but the wages earned from those jobs. Higher wage jobs create more wealth that may be spent in the local economy. Clearly there will be a broad mix of jobs related to the Port capital program as the projects will utilize planners, engineers, construction managers, construction workers, skilled tradespeople, and unskilled labor. The Bureau of Labor Statistics reports an average construction industry wage of $17.07 per hour ($35.460 per year) for Guam in 2019.

This SIAS study estimated 75 civilian full-time equivalent workers plus 4 supervisors per $10 million of project cost based on the 2012 Draft Environmental Impact Statement (DEIS) developed for the military buildup (DEIS Volume 9 Appendix F, Table 4.3-1). Adjusting for inflation, the equivalent 2022 value is $10 million of construction supports 53.3% jobs. Per the Guam Consumer Price Index (Guam Bureau of Statistics and Plans, 2022 Fourth Quarter), the 2022 consumer price index was 149.9; 28.9% greater than the 2012 value of 116.3%.

There are three broad categories of projects that have differing effects on labor – and thus, economic impact. Construction is labor intensive – a rule of thumb is that approximately 33% of costs are spent on labor. Equipment has a much lower labor component. Equipment such as yard tractors, is delivered ready-to-use and does not increase employment on Guam. Other equipment such as cranes, require on-site assembly. All equipment requires maintenance and repairs which creates jobs and economic activity. Finally, expenditures on IT and financial systems are primarily for software and create almost no employment beyond limited hardware

installation or user training. The analysis assumes equipment generates 1/5 the number of jobs as construction, and IT/Finance 1/10th.

The government of Guam will also enjoy fiscal impacts from port construction due to sales, income, and business taxes levied on elements of the project.

9.5 GUAM WORKFORCE

Due to the limited local labor force on Guam, a significant portion of construction work is comprised of foreigner workers. The 2014 SIAS study estimated that, on average, 70% of construction workers will be foreigners on H2B visas. These workers are less likely to spend money earned in wages locally for numerous reasons, such as frequently being housed in dormitory-style accommodations, and typically not having family members come to Guam during their employment (NAVFAC interviews for SIAS found just 0.2 to 0.35 dependents per foreign worker).

The SIAS and DEIS assumed the following percentages for local expenditures.

- 19% of construction contracts purchased from local suppliers
- 20% of H2B worker incomes spent locally (assuming housing provided by employer)
- 45% of local workers' incomes spent locally
- 47% of construction supervisors' incomes spent locally

Although military buildup construction is smaller than contemplated when the DEIS was written, over $9 billion is still forecast to be expended. The construction labor force, therefore, can be expected to be fully employed on either military or civilian projects. The marginal increase in local work due to the Port construction program is thus limited, though the increased demand would be expected to drive construction wages upward.

9.6 RESULTS

Applying this methodology to the Port Capital Plan, an estimated 3,435 full-time equivalent (i.e. 2,080 hours) direct jobs are projected to be supported by Port capital expenditures from 2022-2032. The average number of jobs is 423 during this period, with a peak of 1,405 in 2030. Changes in the timing of construction would adjust the annual figures. See Table 9-1.

Table 9-1: Port CIP and Labor Statistics

Capital Program Element	Total	% of Total	Jobs per $10M	Direct Jobs
Construction	593,682,917	85.7%	56.2	3,335
Equipment	80,125,000	11.6%	11.2	90
IT/Finance	18,545,000	2.7%	5.6	10
Total	692,352,917	100%		3,435

Source: WSP analysis of PAG data

Using the average construction salary as a benchmark equates to approximately $122 million in wages during the capital program.

The NAVFAC economic analysis construction multiplier in the SIAS analysis (which considers the large percentage of wages paid to H2B workers) averages 36% for construction labor over the term of analysis. Implementing this multiplier results in an additional 1,222 indirect/induced jobs for a total of 4,657. See Table 9-2.

Table 9-2: Projected Direct and Indirect Jobs Through 2032

Total Jobs	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	Total
Direct Jobs	28	52	296	464	301	611	213	265	1,036	84	84	3,435
Indirect/ Induced Jobs	10	19	105	165	107	217	76	94	369	30	30	1,222
Total Jobs	39	71	402	629	408	828	289	359	1,405	114	114	4,657

Source: WSP analysis of PAG data

Induced jobs are spread throughout the economy. Assuming the average wage for Guam of $19.10/hour results in an additional $48 million in indirect/induced wages for a total of $170 million.

Fiscal Impacts:

Government of Guam revenues related to the construction program will include personal income taxes on the wages of the workers, gross receipts tax (GRT), and corporate income tax. Assuming a similar ratio of expenditures to GRT and corporate taxes, the estimate cashflow to the Government is $25.2 million total from 2022-2032, equal to an average of $2.3 million per year.

Appendix A – Master Plan Scope of Work

PORT AUTHORITY OF GUAM MODERNIZATION PROGRAM
JOSE D. LEON GUERRERO COMMERCIAL PORT
PORT AUTHORITY OF GUAM (PAG)

OWNERS AGENT/ENGINEER CONSULTANT AGREEMENT

2020 PAG Master Plan

TASK ORDER NO. 10
(FY020-002WSP)

SCOPE OF WORK
(EXHIBIT A)

Introduction

The intent of this *2020 PAG Master Plan* is to clearly articulate the Port's near-term and long-term approach to modernization while PAG becomes more self-sufficient, achieves fiscally sustainable operations, and promotes increased awareness and consensus on its approach among all affected stakeholders.

Our approach to updating the plan will involve four elements of validation, review and coordination:

1. Analyze and update, as appropriate, the assumptions and criteria that underlie the previous PAG Master Plan Update 2013 Report
2. Validate and integrate key elements of the following reports that were developed since the Master Plan Update 2013 Report was released:
    a) Master Plan Approval Documents
    b) Cargo Forecast Updates
    c) Terminal Development and Operations Plans
    d) Terminal Operating System and Gate Operating System Reports
    e) The 2016 PUC Tariff Report
    f) The 2018 Consulting Engineer's Report in support of the CIP Revenue Bond issuance
3. Expand the scope of the Master Plan to include an implementation strategy based on potential expanded facility requirements, updated cargo and revenue projections, planned staffing adjustments, planned tariff adjustments, and a coordinated funding approach involving combination of bonds, grants and self-financing.

4. Validate and incorporate decisions and outcomes of various initiatives and policy changes that have occurred over the past seven years that include, but are not limited to, the following:

    - The current revised Military Buildup Program and schedule
        - The Military Buildup has been delayed and resized
        - The NAVFAC Pacific Guam Program Management Office will be providing better updated information on the program
        - Cargo related projections will now have a better basis
        - Cargo-related revenue projections will be updated based on the above
    - The Port responded to the PUC in 2016 by issuing a new 5-Year Tariff which will now be reviewed and updated as appropriate for the next 5-year period
    - A simplified tariff structure is being developed to facilitate more efficient electronic Terminal Operating System (TOS) data interfacing and invoicing with stakeholders
    - TOS improvements are being incorporated to improve operational efficiencies, data accuracy, and facilitate electronic data sharing
    - A new Performance Maintenance Contractor (PMC) contract is being issued to improve equipment maintenance
    - A new Information Technology Consulting Firm (ITCF) contract is being issued to augment port TOS/IT development and improve terminal operations and improve security
    - The Port is developing a more structured Maintenance Program for Facilities and Equipment
    - The Port is planning on procuring two new STS container cranes to replace older equipment and increase operating efficiencies
    - The MARAD funded H-wharf upgrade program is commencing with the facilities coming online by 2022
    - The CIP Bond supported projects are moving ahead and will become part of the Port's infrastructure over the next three years
    - Guam Customs is developing a new inspection facility adjacent to the terminal gate which will be integrated with the cargo operations

This Master Plan is intended to provide a comprehensive review of the Port's current condition, identify the elements of continuous improvement and sustainability, and articulate an implementation strategy that remains coordinated with the anticipated forces of change within the foreseeable planning horizon.

The following technical approach is envisioned in order to achieve the goals described above.

Task 10.3.1: Project Kickoff & Data Collection

The WSP Planning Team will initiate this task by conducting a series of project kick-off sessions in Guam over a one-week period. It is anticipated that a Port Authority of Guam (PAG) Strategic Planning Group (SPG) will be created before the project kickoff week begins. This group will be the primary interface between the WSP Planning Team and the PAG.

Blair Garcia, James Reed, Shannon McLeod, Louis Wolinetz, Hardik Gajjar and Rob van Eijndhoven will begin the kickoff week by meeting with the SPG for a review of the previous port master plan update, current modernization and capital improvement plans and other relevant activities that are currently underway or contemplated for the future. This series of week-long meetings will serve to amplify the basic components for the project and provide better defined information useful for both PAG management and WSP's planning activities. Inventory and facility review efforts for other project tasks will begin during this week as well. Stakeholder participation in the master planning process will begin this same week through meetings with stakeholder organizations identified by both WSP and the SPG. Formal meeting schedules will be coordinated by the SPG with a proposed agenda provided by WSP.

Utilizing existing PAG site and facility drawings, equipment inventories, and reports developed since the last Master Plan update, WSP will assemble existing facility and equipment inventories and review the current uses of landside and waterside properties, pertinent facilities and applicable operating equipment as well as adjacent related complementary properties. Not only will these inventories serve as an essential foundation for the master planning effort, they can be useful tools for PAG as a stand-alone and upgradable worksheet.

In addition to the review of current land and water uses that will support Task 10.3.3, WSP will review relevant information provided by the SPG and PAG management and other relevant documents to further augment the master planning process. As the information is collected and the inventory is developed, a data log will be created and maintained throughout the execution of the Task Order. Periodic updates of the data log will be provided to the SPG. Relevant Task Order information (background documents, collected data, deliverables, transmittals) will be warehoused on the WSP ProjectSolve site for ease of access by both WSP and the SPG.

Task 10.3.2: PAG Overview

Once the initial data collection and project kickoff phase is completed, the master planning efforts will focus on the following:

- Summarize goals and objectives for the MP Update
- Discuss the current PAG governance and reporting structure to the Public Utilities Commission (PUC)

- Describe the current port employment description to include
    - PAG organization, responsibility and staffing
    - PMC, ITCF and other third-party support services
- Summarize funding issues/opportunities/strategies
    - Tariffs
    - Leases
    - Debt Ceiling
    - Reserve Covenants
    - Grants
        i. Department of Defense (DOD) PIEP Funds
        ii. Security Grants
        iii. Other Grants
    - Loans and Debt Service
        i. Crane Loan(s)
        ii. Equipment Loans
        iii. Revenue Bonds
    - Autonomous Agency Contributions
    - Development Opportunities
    - Cargo and Revenue History
    - Management and other Special Reserve Accounts
    - Facility Maintenance Fees

Task 10.3.3: Review Current Operations

The purpose of this task is to review and summarize current facilities and operations within the Port. The review will consider current operations, utilization and adequacy of the following PAG assets:

- Landside access (roads)
- Waterside access (channels/berths)
- Current cargo-related infrastructure inventory
    - buildings
    - wharves
    - utilities
    - structures
- Current equipment and systems inventory
- Navigation aids and vessels
- Owned, occupied and leased land

A comprehensive summary of the above list of attributes will be developed to set the foundation for the infrastructure and equipment planning that will occur in later tasks. The current operating structure/procedures and pending lease agreements will be included as part of this conditions review and summary.

Task 10.3.4: Stakeholder Outreach

During Task 10.3.1, an initial series of stakeholder outreach meetings will be conducted to inform key port stakeholders about this master planning effort and to begin collecting their perspective and input as it relates to the future development and modernization of the port. The SPG will arrange and coordinate all stakeholder meetings. Prior to these meetings, informative materials will be produced by WSP and agreed to by the SPG prior to presenting them to the stakeholders. The following groups are anticipated to be included in the initial outreach meetings:

- Port Board of Directors (BOD),
- Port Management and Staff
- Legislative Oversight Chair
- Port Users Group Guam (PUGG)
- Guam Customs
- Others as directed by the PAG and SPG

Other groups or combinations of these groups may meet together or separately. Follow-up discussions with stakeholders as required during the planning tasks will be conducted through the direction of the SPG. It is anticipated that an initial stakeholder outreach effort will be conducted during the project kickoff (as described above) and another after the completion of Task 10.3.6 and a final outreach once the draft report is completed. This third outreach effort would include all of the initial groups listed above as well as the following groups:

- PUC
- Office of the Governor
- Guam Legislature
- NAVFAC Pacific Guam Program Management Office
- Others as directed by the PAG and SPG

If required, additional outreach efforts may be supported by WSP's on-island staff, but this effort is not included in this technical approach.

Task 10.3.5: Market Analysis & Cargo Forecast

The intent of this effort is to assess the current and projected cargo opportunities/requirements based on Guam's market drivers including the most current projections for the US Military Buildup in Guam and the CNMI. The latest forecast models developed in support of the last 5-year Tariff Analysis and the CIP Bond Program will be updated based upon a review of recent market drivers and validation of the previous cargo forecasts.

SPG, PAG Commercial, and PUGG engagement will be needed to identify commercial cargo opportunities and current/projected tenant requirements. This will include confirmation of compatible facility and land uses inside and outside the commercial port and its impact on services (demand, investment) and revenue (leases, fees) requirements. The magnitude and timing of the military buildup in Guam and the CNMI

has changed over the past decade. Working in concert with the NAVFAC Pacific Guam Program Management Office, WSP will review and update the past cargo forecasts that have been developed and confirm the range of possible demand scenarios that may occur.

To develop the current market demand forecast scenarios, the planning team will initiate discussions with the NAVFAC Pacific Guam Program Management Office to obtain the latest buildup planning projections. The planning team will then evaluate the impact of the updated military buildup plans and adjust the previous container and bulk cargo forecast to represent several market scenarios as follows:

- Low: organic growth with a slow military buildup
- Mid: organic growth with a moderate pace military buildup
- High: organic growth with an accelerated military buildup

Once the forecasts for container and bulk cargoes are updated, they will then be compared to the existing and future throughput capacity estimates developed in Task 10.3.6.

Task 10.3.6: Capacity & Needs Analysis

Using the throughput capacity models developed for the 2013 Master Plan Update, capacity estimations for each of the cargo demand scenarios will be performed. This effort will include, but is not limited to:

- Reviewing all operating and equipment assumptions to verify that they are currently being used or change them to emulate current operations.
- Meet with PAG Management and review any planned actions resulting from previous PUC directives.
- Review STS Crane replacement and procurement calendars and funding scenarios

To verify the updated operating variables in the model, vessel, storage yard and gate operations will be analyzed to verify or update key model inputs (productivity rates, cargo mix, storage densities, etc.). Once the model inputs are validated or updated, capacity analyses will be performed for each of the demand scenarios to identify the optimum market driven scheduling required to implement elements of the modernization and capital improvement programs. This modeling effort will begin with identifying the throughput capacity estimations for each end year demand scenario and then work backward to determine the appropriate phased improvement schedule driven by market need. This will be accomplished by comparing the three demand scenarios (yearly) against capacity estimates to size infrastructure, equipment and operations to meet the defined annual needs over a 20-year timeframe.

Task 10.3.7: Modernization Program & Scenario Requirements

The port modernization and capital improvement program requirements and the land use master plan will then be combined to develop an end-state (20 year) infrastructure and land use plan for each of the demand scenarios. These plans will include a review

of ongoing commercial terminal development efforts while also identifying potential non-commercial terminal development opportunities and requirements. The plans will also include the following considerations:

- Review implications of improved Guam Customs facilities and procedures
- Review implications of improved PAG/PUGG communication processes
- Review implications of STS crane fleet upgrades
- Review implications of improved STS and yard equipment maintenance practices
- Review implications of future PMC support agreements
- Review implications of expanded/improved facilities (H-wharf, EQMR, Administration Building, Golf Pier, F1 Improvements, and Fuel Connectivity between Golf Pier and F1)
- Review implications of new/expanded facility opportunities (container yard, LNG facilities, expanded tank farms, etc.)
- Integration of relevant stakeholder input on scenario analysis, related development requirements, scenario gaps and flexible implementation approach

Once the three full build scenario plans are developed, a CIP development phasing program for accommodating market demand gaps for near-term (0-5 years) and long-term (6-20 years) will be developed. This will include phased development land use plans; a program schedule and estimated development costs estimates for each phase. Elements of modernization and sustainability related to the commercial cargo terminal will be included in the phased plans. The estimated development costs will be created as an order of magnitude conceptual annual Capital Expenditures (CapEx) budget including infrastructure, equipment procurement, systems and equipment for a series of phased improvements for each demand scenario. Close coordination and discussion with the SPG will be required during the development of the market driven phased development programs. Program phasing will be coordinated between market demand scenarios to incorporate elements of flexibility to react if further changes in the military buildup occur.

For each market scenario driven phased program, annual variable Operating Expenditures (OpEx) will be estimated using the throughput capacity model defined in Task 10.3.6. The model will be calibrated to emulate the current operations and will then be used to estimate the labor, energy (fuel and electricity) and consumables required for handling cargo through the port and maintaining the infrastructure/equipment under each of the demand scenarios.

Task 10.3.8: Financial Analysis

Identifying the revenue available for funding future growth and ensuring that resources are available to maintain existing assets is essential for the long-term financial sustainability and operational viability of the Port. This task will provide future revenue projections at the Port and develop related funding strategies to maximize the financial resources available for operations and future CIP improvements.

This task will begin by working with the financial controller to review the revenue and expense history at the Port for the prior five years and evaluate noticeable trends or anomalies that when combined with updated buildup information and other new initiatives can establish baseline data for future projections.

The next step will involve forecasting future revenue based on Commercial, SPG, and PUGG input on non-cargo revenues and potential military input related to the cargo forecast associated with the timing and magnitude of the military buildup (identified in Task 10.3.5). Any changes or refinements to the last 5-Year Tariff Projection and 20 Year Financial Plan will also be incorporated. Likewise, adjustments to the 20-Year CIP and future operating and maintenance (O&M) costs, considering year of execution and escalation will be reviewed and updated.

Once the historical trends, new opportunities, and cargo forecasts have been confirmed, projecting future cash flow from operations and leases can begin. For the cargo-related portion, the financial analysis will project cargo revenues based on the three market scenarios previously defined in Task 10.3.5:

The revenue projections will incorporate cargo volumes/schedules, non-cargo leases, potential outside investments and grants, and PUC petition for tariff adjustments. Revenues from non-cargo operations and lease revenue will be analyzed and projected based on likely growth and future rate increases. All revenues will be summarized to attain gross revenues. The next step will involve taking gross revenues to net revenues. Net revenue and net revenue available for financing (net revenue less reserves and other encumbrances) will be calculated by deducting OpEx, CapEx identified in Task 10.3.7 along with any other expenses identified as part of our research (e.g. Autonomous Agency Contributions, Reserve Accounts, other encumbrances) and existing debt service or other obligations from gross revenues. A net present value calculation will be applied to mitigate the risk of inflation or other impacts on future revenues and to help accurately assess bonding capacity.

Inherent in each scenario that is developed will be unique revenues and costs associated with the selected operational modes and funding strategies, including the benefits of changes to staffing and equipment.

WSP will incorporate the data on port operational and financial projections into the financial model, developed in Microsoft Excel, created to support the 2018 bond issuance.

The key objective of this task will be to identify the amount of bonding capacity that the net revenue can accommodate taking into consideration the debt ceiling, loan covenants, reserve covenants, and other relevant loans, bonds and grants. This task will also identify and evaluate alternative funding strategies to maximize the potential bonding capacity. Further, WSP will calculate the increase in tariffs that would be necessary to fully fund the proposed capital improvements.

Note that WSP is not a broker-dealer registered with the Securities and Exchange Commission, and, as such, cannot make recommendations regarding borrowing to PAG. WSP can project bonding capacity based on standard, 30-year level debt service bond issuances with key assumptions provided by the PAG, GEDA, or the PAG's financial advisor.

A full description of the architecture of the financial model and its operation, along with any changes that have been designed since the previous submittal (for PUC purposes) of model-generated materials will be included. An outline of the contextual assumptions that surround the inputs and outputs of the model will be identified as part of this task.

The financial analysis task will have the following subtasks:

Subtask 10.3.8.1 – Methodology and Approach
This subtask will include supporting documentation such as an Implementation Plan Approach, Financial Feasibility Analysis Approach, and Economic Impact Assessment Approach

Subtask 10.3.8.2 – Implementation Plan
This subtask will evaluate the timing and magnitude of necessary improvements and sustainability requirements.

The Task 10.3.7 effort will continue into and be performed in parallel with this Task 10.3.8 financial analysis because an iterative analysis process will be required to balance the market driven phased programs for each scenario against their estimated annual financial performance. This analysis will help identify the optimum timing of infrastructure improvements and major equipment/supply acquisitions so that excess capacity is not wasted, and insufficient capacity does not cause a loss of potential revenue or escalate operating costs.

Task 10.3.9: Economic Impact Assessment
This task will provide an assessment of the economic impact that CIP investments, increasing tariffs, and growing cargo volumes will have on Guam. The economic assessment will have the following subtasks:

Subtask10.3.9.1 –Identify economic data sources, trends, forecasts, and models (e.g., customized input output models) relevant to Guam economic conditions. From this research effort, selected consumption and business expenditure trend patterns will be investigated for use in determining economic impacts.

Subtask 10.3.9.2 – Review Tariff Study assumptions. Evaluate potential impacts of tariff increases on island prices, cost of living, business costs. Relationships between

port tariffs and product prices/cost of living and producer price indices (holding other economic and demographic factors constant) will be investigated to determine if correlations can be identified. This information will help to assess whether, and to what extent, on-island product prices may be affected by tariffs or other transport cost factors, holding other factors constant. To the extent possible (data availability permitting), estimates of the impacts on specific products will be considered. No formal statistical/econometric modeling is proposed.

Subtask 10.3.9.3 – Evaluate the economic impacts of different cargo volumes and CIP investment scenarios. Based on the previous tasks, and other internal sources, assumptions will be made regarding the potential increase in commodity prices, other business and government costs, and changes to economic activity that might occur with and without Port CIP investments and efficiency gains in response to the military expansion. Avoided adverse economic impacts attributable to the modernization will be identified and evaluated and serve to offset the negative impacts from higher port tariffs. Scenarios will include variable levels of buildup and the corresponding increases and reductions in the private sector local economy. Qualitative assessments will be made, supplemented by supporting data, but no formal economic modeling is proposed.

Subtask 10.3.9.4 – Economic Analysis Section of the Report. A summary outlining the methodology, assumptions, and findings from the first three subtasks will be provided as a Section in the Master Plan.

Task 10.3.10: Project/Program Planning & Analysis
Several special studies and areas for analysis will be required as part of the master planning process. The following is a listing of identified studies and/or analyses to be performed:

Subtask 10.3.10.1 – Guam Customs Inspection Facility Feasibility Study
The PAG has provided US Customs with a 4-acre parcel of land adjacent to the main terminal gate to be developed as a local office and cargo inspection facility. WSP will work with Customs to ascertain and validate their design requirements and confirm that the resulting planned facilities will integrate with the planned traffic circulation flows to/from the terminal. WSP will participate in stakeholder meetings with Customs, the PUGG, SPG and PAG to facilitate the clarification of the Customs facility design criteria. WSP will develop and analyze two to three layouts which will be discussed with the stakeholders to reach consensus on an acceptable facility plan for incorporation into the master plan. The physical interface with the terminal will be developed along with CapEx and OpEx cost estimates for incorporation into the master plan.

Subtask 10.3.10.2 – Cargo Terminal
This subtask will focus on the physical “Opportunities and Constraints” resulting from the current configuration, and planed reconfiguration, of the terminal facilities and

properties and how the modernization program will influence terminal operations. Current and planned facility and building functional usages will be investigated and analyzed, such as the impacts of the new Administration Building Annex concept and the upgraded EQMR Building. Facility repurposing, demolition and/or expansion options will be explored to improve overall terminal traffic patterns, functionality and operating efficiencies. Elements of this study may include, but not limited to, the following:

- Addition of the Guam Customs facilities
- Wharf facility upgrades to accommodate new STS crane interfacing infrastructure
- Gate Operational System (GOS) implementation
- Improved reefer monitoring
- Reconfigured container storage
- Expanded liquid bulk storage
- Expanded H-wharf operations
- LNG facility alternatives
- Expanded staff parking

Subtask 10.3.10.3 – Agat and Hagatna Marinas

Condition surveys of the two marinas will be performed and the results presented to the SPG for consideration. Stakeholder (tenants, boat slip lease holders, etc.) input regarding their wants and needs will be solicited and categorized for consideration by the SPG. After SPG review and comment, WSP will develop a set of recommendations covering fixes, enhancements and/or improvements for consideration by the PAG. The recommendations will be presented in a summary presentation supported by estimates of any CapEx costs and related revenue generating capacity of any future developments. The results of this effort will be incorporated appropriately into the master plan.

Subtask 10.3.10.4 – Harbor of Refuge

WSP will first meet with the SPG to assess how the Harbor of Refuge is currently being used to service the port and the people of Guam. The existing lease holds will be reviewed and interviews with tenants and other stakeholders will be used to assess areas requiring improvement and/or expansion. A basic condition assessment of the harbor's facilities and infrastructure will be performed. Recommendations for improvements and/or alternative land usages will be made for incorporation into the master plan update. These recommendations will be supported by estimates of CapEx and OpEx costs and related revenue generating capacity of any future developments to be incorporated into the modernization plan.

Subtask 10.3.10.5 – Proposed LNG Facility

Third-party stakeholders have indicated an interest in constructing LNG terminal facilities within the Port of Guam. WSP, in concert with the SPG, will meet with the stakeholders to ascertain their requirements and review the alternative sites that have been proposed. A brief feasibility study will be performed to look at the "positives" and "negatives" associate with each of the proposed sites. It is assumed that this development would be funded by the stakeholders and that their facilities would be

constructed on port leased properties. An economic evaluation will be performed to determine the appropriate financial terms for the property lease and a tariff structure for the import/export of product across the wharf and associated distribution pipelines. The results of this analysis will be summarized in a report to be presented to the PAG for consideration. LNG facilities incorporation into the master plan update will be indicated as an optional alternative for consideration.

Subtask 10.3.10.6 – Area A Feasibility
Area A is the former Mobil Oil site that had been used primarily as a liquid bulk tank farm. A feasibility study will be performed to develop potential alternative uses for the site. Potential stakeholder interest for use of the property will be solicited locally on Guam for alternative development scenarios. Feedback from interested stakeholders will be used as one source for any alternative development. Other alternatives will be developed by WSP based on our experience with port development scenarios from around the globe. Alternatives will need to include considerations for CapEx costs associated with demolition of remaining infrastructure and the environmental permitting and remediation requirements, depending upon the degree of ground contamination identified for the site. Recommendations for alternative land usages for this site will be included in a summary report and incorporated into the master plan update. These recommendations will be supported by estimates of CapEx and OpEx costs and related revenue generating capacity for any future development to be incorporated into the modernization plan.

Subtask 10.3.10.7 – Solar Panel Initiative Feasibility Study
The PAG is interested in the feasibility of installing a photovoltaic panel system on the rooftops of several Port buildings. The primary goal of this initiative is to create an economic model that could predict the feasibility of installing a photovoltaic system and potential tax benefits. A secondary goal is to achieve non-economic factors such as green stewardship and carbon footprint reduction.

The feasibility study includes two primary tasks as outlined below:

A. Solar Site and Energy Analysis:

   The first phase of this Solar Panel Feasibility Study is an analysis of the Port of Guam site and facilities to determine the suitability, size, location, and productivity of potential solar photovoltaic (PV) installations. The primary tasks include:

   - Identify optimal roof location for solar array, including evaluation of annual solar access due to shading, azimuth, and tilt angle.
   - Develop energy production estimates for on-site PV generation.
   - Optimize PV array (location, area, capacity, tilt angle, orientation, prevention of shading from local obstructions) to meet total site energy goals.

- Provide criteria and recommendations for PV module equipment and assess mounting options for rooftop or site PV array installations.

Deliverables for the Site and Energy Analysis will be a written report summarizing findings and including system size and production data as well as site markups.

B. Economic Incentives and Stakeholder Implications:

After the initial Site and Energy Analysis is completed, the energy and system capacity data will be used to study the financial case for deployment and any potential stakeholder implications and incentive opportunities. Primary tasks include:

- Producing an energy cost study to determine expected operational savings relative to the capital expenses from system installation.
- Evaluating the financial case and structure of a solar PV system as an investment vehicle.
- Determining any available incentive programs or alternative delivery options for improving financial case.
- Evaluating social or other non-economic factors that may impact the decision to pursue installation of a solar PV system.

Deliverables include a written report outlining the findings of the economic study and making final recommendations around implementation.

Subtask 10.3.10.8 - PUGG Initiative for System Integration

The PUGG has defined the need for improved data and information sharing/reporting between the stakeholders involved in the cargo supply chain at the Port of Guam. These stakeholders primarily include the shippers, Guam Customs and the PAG. WSP will work with a third-party consultant to provide digital implementation services to help facilitate improved electronic communication in this regard. WSP has already been engaged by the PAG to provide TOS and IT systems improvements that deal with the basic systems that serve as the communications backbone associated with the cargo supply chain at the port (e.g. NAVIS).

WSP, in concert with RVE Management (RVE) and the SPG, will meet with the stakeholders to further ascertain the detailed requirements that the PUGG is looking to have implemented at the port. These requirements will be evaluated in light of the current TOS/IT approach, systems, hardware and software being implemented at the port and the scope of WSP/RVE's current services. A set of recommendations will then be made as to how best to integrate the PUGG requirements and their proposed consultant into the current TOS/IT planning and systems design process. Upon SPG and PAG approval, WSP/RVE will then work in concert with the PUGG to develop a coherent plan to integrate their requirements into the data and information reporting architecture of the TOS/IT systems now being implemented.

Task 10.3.11: Final Recommendations
The recommended phased development program scenario will be identified by comparing the performance of each and consider sustainable organic requirements, modernization objectives, and the most likely military buildup impacts needing to be accommodated.

The proposed schedule and financial strategy for implementing the recommended program elements will be both stable and flexible to adapt to changing circumstances over time.

Any briefings needed to update key stakeholders and approval processes (Legislature, PUC, PUGG) will be accomplished at Port direction and at a time and budget to be determined.

Deliverables

1. Data Collection Summary: A working Excel log that summarizes the data collected and being used for this study. This log will be available on ProjectSolve and shared with the SPG on a regular basis throughout the project.
2. Draft Findings Presentation (through Task 10.3.6): An interim presentation of key findings through Task 10.3.6 will be provided. While on island presenting these draft findings, additional required stakeholder meetings will occur and Tasks 10.3.7 and 10.3.8 will begin.
3. A summary of the results of economic analyses performed under Task 10.3.9
4. Results of the various studies and analyses performed under Task 10.3.10 will be coordinated and presented as they are performed. Findings and recommendations will be first provided as draft presentations, for stakeholders, in a series of meeting and/or conference calls for discussion, refinements, reviews and ultimately consensus. Final recommendations and/or findings will be vetted by the SPG and published in the final master plan report.
5. Draft Findings (through Task 10.3.11) Presentation: Prior to finalizing the draft report, a presentation of all analysis findings will be performed via webinar.
6. Draft Master Plan Report: Submitted to the SPG for review and comment.
7. Final Master Plan Report: Submitted upon considering SPG, PUC and other key stakeholder's review comments.
8. Post-release Briefings: TBD

Consultant's Cost Computations (Cost Estimate)

See Exhibit B

Progress Reporting:

Progress of deliverables will be updated monthly. Reporting shall adhere to the protocols established in CONSULTANT AGREEMENT.

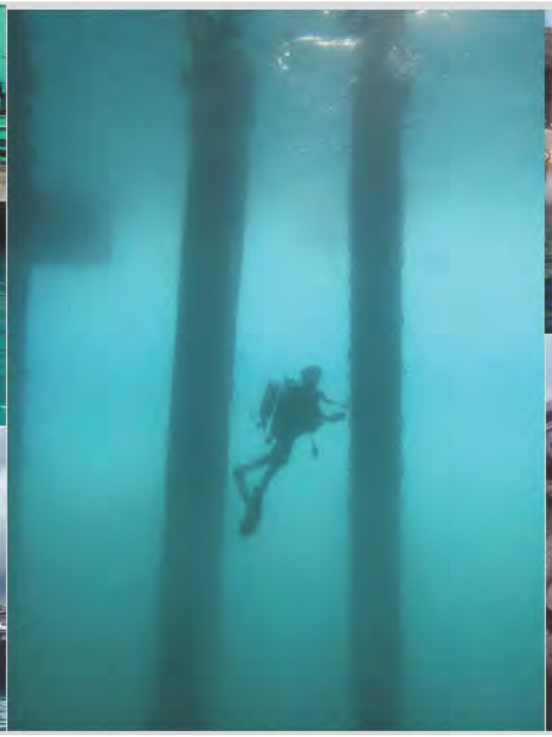
List of Attachments and Exhibits:

Exhibit B Consultants Cost Computation

Appendix B – F2-F6 Inspection and Feasibility Study Report

WSP USA
590 Marine Corps Drive
Suite 421
Tamuning, Guam 96913

Final Submittal



Port Authority of Guam

Berths F2 through F6
Condition Assessment Report

Submitted to
Port Authority of Guam
Piti, Guam

This study was prepared under contract with the Port Authority of Guam (PAG), with financial support from the Office of Local Defense Community Cooperation (OLDCC). The content reflects the views of the PAG and does not necessarily reflect the views of OLDCC.

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September 2024

Berths F2-F6 Condition Assessment and Feasibility Study Report - Final

Port Authority of Guam
BERTHS F2, F3, F4, F5, AND F6

Submitted to

Port Authority of Guam
Piti, Guam

30 September 2024

Submitted by

WSP USA
590 South Marine Corps Drive
Suite 421
Tamuning, Guam 96913

30901541B

FINAL
POST TYPHOON MAWAR CONDITION ASSESSMENT REPORT
PORT AUTHORITY OF GUAM: BERTHS F2 – F6

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EXECUTIVE SUMMARY

This report presents the current overall condition assessment rating for Berths F2, F3, F4, F5, and F6 and a summary of observations and findings from the inspection effort. The initial inspection effort was performed in October and November of 2022 and included routine above-deck, below-deck/above-water, and underwater inspections of structural components. Following this effort, the island of Guam was severely impacted by Typhoon Mawar in May 2023 which caused extensive damage to Port infrastructure. In June 2023, PAG performed a cursory above-water assessment of typhoon-related damage to Berths F2 through F6. Representative photos of observed damage are provided in the document titled, "Port Damage Assessment at a Glance, "*Port Authority of Guam Responses to Typhoon Mawar Supporting Photographs*". Similarly, follow-up above-water damage assessments were performed by WSP in September 2023 and January 2024. A limited-scope, underwater survey of the steel sheet pile bulkhead at Berths F2 and F3 were also performed in May of 2024. Observations, damage assessments, discussions, and associated repair costs from these efforts were combined with results from the October/November 2022 inspection effort and are summarized in this report.

Berth F2

Berth F2 is in **poor** condition. Concrete along the vertical berth face has delaminated and spalled from the steel sheet pile wall at several locations. At multiple locations, the sheet pile wall is exposed within the upper tidal zone and has moderate to major corrosion. Open-corrosion spalling and exposed/corroded steel reinforcement are present at multiple locations at the top of the bulkhead wall. Moderate to major corrosion is present at the mooring hardware. Holes and voids are present at several underwater locations along the steel sheet pile bulkhead.

Berth F3

Berth F3 is in **serious** condition. Minor corrosion damage to the steel sheet pile wall is present at several locations below the waterline. Minor to severe spalling and open corrosion spalling of the concrete bullrail/face is present at several locations. Minor to moderate corrosion is present at the mooring hardware. Near Station 01+00, the asphalt pavement has settled at three locations where the longitudinal concrete pile cap aligns with the sheet pile bulkhead. These depressions were first observed in August of 2023; three months after Typhoon Mawar and are located in the vicinity of where a floating dry dock sank near Berth F3. In February 2024, an underwater survey identified missing anodes, and multiple holes, dents, and cracks in the steel sheet pile wall between stations 0+00 and 1+60.

Berth F4

Berth F4 is in **poor** condition. Minor corrosion damage to the steel sheet pile wall is present at several locations below the waterline. Minor to severe spalling and concrete delamination is present at several locations along the bullrail and vertical bulkhead face. Major to severe corrosion damage was observed at one steel fender panel. Severe damage consisting of missing, ripped, or torn rubber fenders is present at approximately 58 percent of the fender panels. Resulting from Typhoon Mawar, one fender panel is missing.

Berth F5

Berth F5 is in **poor** condition. Along the bullrail and vertical concrete face, concrete delamination and closed-corrosion spalling are present at multiple locations. At the pile supported portion of F5, cracks and open-corrosion spalling are present at multiple locations. Along the berth face, severely damaged rubber fender elements (missing, ripped, or torn) are present at approximately 82 percent of the fender panels. Resulting from Typhoon Mawar, six fender panels are missing.

Berth F6

Berth F6 is in **poor** condition. Along the bullrail, concrete delamination and closed-corrosion spalling are present at multiple locations. At the pile supported portion of F6, minor to moderate defects were observed at four locations. Along the berth face, severely damaged rubber fender elements are present at approximately 18 percent of the fender panels. Resulting from Typhoon Mawar, one fender panel is missing.

In line with the damages summarized above and described in Sections 3 and 4, repair recommendations for pre- and post-typhoon damages and associated cost estimates have been developed and are provided in this report. Repair recommendations include repair/replacement of elements found deficient for their intended use and include repair of concrete elements, steel sheet pile bulkheads, fender systems, and mooring systems. With respect to the severely damaged sheet pile bulkheads at Berths F2 and F3, a repair concept that minimizes in-water work and involves installation of relieving platforms behind the bulkheads is discussed in Section 7.0.

Total Damage Repair Cost Estimate: $25,571,582

1.0 INTRODUCTION

As part of Service Agreement FY021-003 dated 4 November 2020, the Port Authority of Guam authorized Task Order No. 12 (FY23-001), In-Water Inspection and Feasibility Study. As part of this task order, WSP USA Inc. (WSP) performed above-water and underwater inspections and a facility condition assessment of Berths F2, F3, F4, F5, and F6. Observations and findings from the field inspection effort are summarized in this facility condition assessment report. Condition assessment ratings were assigned to primary structural components: concrete facing, steel sheet pile bulkheads, mooring hardware, fender systems, asphalt/concrete overlay, piles, and pile caps. Using this information, comprehensive facility condition assessment ratings were then assigned to each berth. Supplemental damages from Typhoon Mawar are also discussed in Section 4.0 and were considered when assigning overall facility condition assessment ratings to the berths.

1.1 FACILITY DESCRIPTION

The Port of Guam (Port) is located on the western side of the island of Guam and encompasses over 1,000 acres of land. Strategically located along major Pacific shipping and air routes, the Port serves as an important transportation hub for the Commonwealth of the Northern Marianas, the Micronesian islands, and markets to the east and west. Maritime facilities at the Port consist of the following facilities. Note that this FCAR is limited to evaluation of Berths F2 through F6. See Figure 1.

- Pier F1 (Apra Harbor)
- **Berths F2 through F6 (Apra Harbor)**
- Hotel Wharf (Apra Harbor)
- Golf Pier (Apra Harbor)
- Family Beach (Apra Harbor)
- Outhouse Beach (Apra Harbor)
- Dog-Leg Pier (Apra Harbor)
- Harbor of Refuge
- Agat Marina
- Perez Marina (Boat Basin)

Figure 1: Apra Harbor

1.2 BERTHS F2 THROUGH F6

Berths F2, F3, F4, F5, and F6 are located on the western side of Apra Harbor in the Port's industrial district. It is estimated that some structures have been in service since the 1940's and have undergone multiple repair/rehabilitation cycles. Berth F2 is approximately 676 feet long and serves as a ship repair facility and mooring wharf for tugs, barges, and crew boats. Berth F3 is a general-use wharf starting at the northeast corner of Berth F2 and extending 750 feet to the southeast. Berths F4, F5, and F6 are approximately 1,955 feet long and support loading and unloading of shipping containers and bulk cargo via three ship-to-shore cranes.

Berths F2, F3, F4, and F6 are bulkhead-type structures consisting of steel sheet pile walls faced with concrete that extends several feet below the mean lower-low water (MLLW) level. The berth face at F2 is defined by a reinforced concrete pile cap located at the top of the bulkhead wall. The berth face at F3 through F6 consists of a concrete bullrail with integrated cleats and mooring bollards. A wearing surface consisting of asphalt concrete pavement is present on the upland portion of these facilities. From Stations 16+90 to 22+50, Berths F5 and F6 are pile supported structures consisting of a concrete deck slab spanning between concrete pile caps and supported by concrete piles. At this area, a concrete bulkhead is present and is positioned six feet north of a cut off sheet pile wall. On the waterside a sheet pile toe-wall is present and located south of the waterside pile row.

The fender system at F2 consists of irregularly spaced rubber tires and floating foam-filled fenders. At F3, the fender system is comprised of regularly spaced rubber cylindrical fenders suspended from the concrete bulkhead between Stations 02+95 and 07+50. At F4, F5, and F6, the fender system consists of regularly spaced fender panels backed by rubber arch fenders.

Figure 2: Berths F2 – F6

2.0 FACILITY CONDITION ASSESSMENT

2.1 CONDITION ASSESSMENT APPROACH

WSP performed a routine condition assessment of above-deck, below-deck/above-water, and underwater elements at Berths F2, F3, F4, F5, and F6. Inspections were performed in accordance with ASCE Manuals and Reports on Engineering Practice No. 130, *Waterfront Facilities Inspection and Assessment* (ASCE MOP 130).

2.2 FACILITY CONDITION ASSESSMENT METHODOLOGY

Condition Assessment of elements included both visual observation and limited hands-on assessment. In accordance with ASCE MOP 130, elements were assigned an element-level damage rating, with damages defined as minor, moderate, major, or severe. These damage ratings are defined in Chapter 2 of ASCE MOP 130 and have been standardized to provide a qualitative and consistent description of an elements level of damage. Abbreviated element level damage rating tables from ASCE MOP 130 are provided in Appendix A for reference.

Following completion of the field work, element level damage ratings in combination with visual observations were used to assign condition assessment ratings for each primary structural component. In accordance with Table 2-14 of ASCE MOP 130, a summary of the facility condition assessment ratings is provided below.

Table 1: Facility Condition Assessment Ratings

Rating	Description
Good	No visible damage or only minor damage noted. Structural elements may show very minor deterioration, but no overstressing observed. No repairs are required.
Satisfactory	Limited minor to moderate defects or deterioration observed but no overstressing observed. No repairs are required.
Fair	All primary structural elements are sound but minor to moderate defects or deterioration observed. Localized areas of moderate to advanced deterioration may be present but do not significantly reduce the load-bearing capacity of the structure. Repairs are recommended, but the priority of the recommended repairs is low.
Poor	Advanced deterioration or overstressing observed on widespread portions of the structure but does not significantly reduce the load-bearing capacity of the structure. Repairs may need to be carried out with moderate urgency.
Serious	Advanced deterioration, overstressing, or breakage may have significantly affected the load-bearing capacity of the primary structural components. Local failures are possible and loading restrictions may be necessary. Repairs may need to be carried out on a high-priority basis with urgency.
Critical	Very advanced deterioration, overstressing, or breakage has resulted in localized failure(s) of primary structural components. Failures that are more widespread are possible or likely to occur, and load restrictions should be implemented as necessary. Repairs may need to be carried out on a very high-priority basis with strong urgency.

2.2.1 Above-deck Inspection

The above-deck inspection was performed between November 2nd and 4th, 2022 and evaluated the general condition of the deck surface, mooring hardware, fender system, and miscellaneous appurtenances. The inspection was performed by walking along the deck surface and visually observing the condition of the elements.

A follow-on cursory assessment of Berth F3 was performed in January 2024. The purpose of this assessment was to observe and document settlement behind the sheet pile wall near Station 1+00.

2.2.2 Below-deck Inspection

The below-deck inspection was performed between October 30th and November 4th 2022 and evaluated the general condition of the piles, pile caps, deck soffit, sheet pile bulkheads, concrete facing, mooring hardware, fender systems, and miscellaneous appurtenances. Concrete elements were visually assessed for damage, such as cracks, mechanical damage, and corrosion spalls. Steel elements were visually assessed for corrosion damage, such as pitting, flaking, and loss of cross-sectional thickness. The below-deck assessment was performed using a small aluminum skiff at low tidal elevations, which allowed the inspection crew direct visual and hands-on access to structural elements.

A follow-on assessment was performed on 15 September 2023. For this effort, the condition of the concrete facing and fender systems were assessed using a small skiff to navigate along the perimeter of the structures.

2.2.3 Underwater Inspection

The underwater inspection was performed between October 17th and 30th, 2022 and assessed 100 percent of the sheet pile walls at Berths F2, F3, F4, F5, and F6 and 100 percent of the structural plumb piles at Berths F5 and F6. For this effort, WSP's in-house engineer dive team performed dive operations using self-contained underwater breathing apparatus (SCUBA) procedures. The engineer dive team consisted of a four-person crew: dive supervisor, safety diver/tender, and two divers.

All piles included in this work received a Level I/visual inspection in accordance with ASCE MOP 130. This level of inspection is essentially a "swim-by" over the entire length of the pile above the mudline and typically does not involve removal of marine growth or cleaning the pile. The diver relies primarily on visual and/or tactile observations (depending on water clarity) to make condition assessments. A Level II inspection was performed on approximately 10 percent of the inspection piles. In addition to a visual inspection, this level involves removing the marine growth in a 12-inch-high band around the pile at three elevations (mudline, mean lower low water, and midway between). At sheet pile wall locations, Level II inspections were performed at 50 foot intervals. In addition to an overall visual inspection of the pile, removal of marine growth allows the diver a more in-depth visual examination at three locations. A Level III inspection was performed on approximately 5 percent of the inspected piles. This highly

detailed level of inspection consisted of ultrasonic thickness measurements at Level II locations. At sheet pile wall locations, Level III inspections were performed at 100 foot intervals.

A follow-on underwater inspection was performed on May 20, 21, and 23, 2024, and included limited inspection of steel sheet pile bulkheads at Berths F2 through F6. Based on findings from the September 2023 assessment and conversations with PAG staff, priority was given to inspecting specific locations of these berths that experienced damage resulting from Typhoon Mawar.

3.0 INITIAL CONDITION ASSESSMENT FINDINGS

Findings from the October and November 2022 inspection effort and ratings for above-water and underwater elements are described in the following sections. Ratings have been assigned based on field observations and element level damage ratings for individual elements. Observations and findings from the inspection effort have been tabulated and are provided in Appendix B. Similarly, damage maps showing the type and location of damage are provided in Appendix C for all berths.

3.1 BERTH F2

3.1.1 Sheet Pile Bulkhead

The sheet pile bulkhead is in **fair** condition. Minor to moderate corrosion pitting and holes were observed at several locations both above and below the waterline. At isolated underwater locations, major to severe damage consisting of holes and voids are present. Anodes were found to have approximately 90 percent remaining cross section. At several locations above water, the sheet piling is exposed and has moderate to major corrosion damage. See Photo 1 and Photo 2. At the southwest corner, severe corrosion is present and a return wall is not in place to prevent water from flowing behind the wall.

3.1.2 Concrete Facing

The concrete facing is in **poor** condition. Cracks, closed-corrosion spalls, and open-corrosion spalls with exposed reinforcement are present at multiple locations. At several locations above water, the concrete facing has delaminated from the sheet piling. See Photo 3.

3.1.3 Mooring Hardware

In general, the mooring hardware is in **poor** condition. Minor to moderate corrosion and scaling are present at a majority of the bollards. Major to severe corrosion is present at several of the base plates and associated anchor bolts.

3.1.4 Fender System

The fender system is in **fair/poor** condition. At several locations, rubber tires are suspended from the berth face and were not evaluated. Three of the five floating foam-filled fenders have moderate damage consisting of gouges, wear, and visible belting. At these locations, moderate corrosion is present at the steel connection hardware.

3.1.5 Pavement

The pavement is in **poor** condition. Cracks, broken pavement, vegetation, and uneven surfaces are present at multiple locations. See Photo 4.

3.1.6 Slope Protection

The slope protection is in **satisfactory** condition. Defects were not observed.

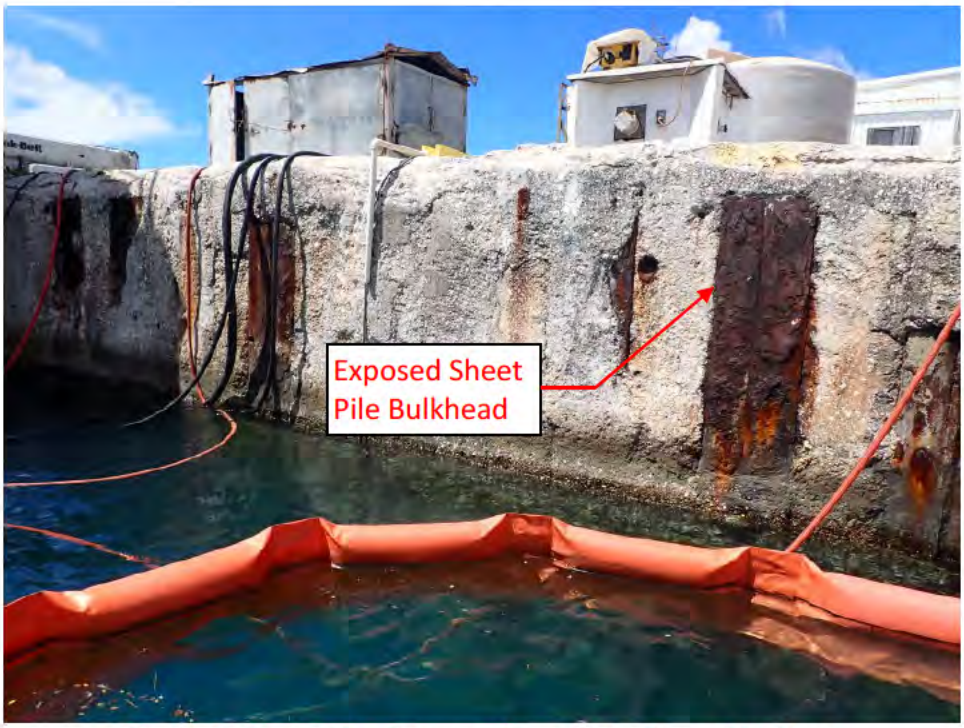

Photo 1: Berth F2 – Exposed/Corroded Sheet Pile Wall

Photo 2: Berth F2 – Void at Sta 06+10

Photo 3: Berth F2 – Typical Condition Along Berth Face

Photo 4: Berth F2 – Typical Pavement Condition

3.2 BERTH F3

3.2.1 Sheet Pile Bulkhead

The sheet pile bulkhead is in **satisfactory** condition. Minor corrosion is present at several locations below the waterline. On average, Level III steel thickness readings at the sheet pile flanges and webs were 0.49 and 0.33, respectively. Anodes were found to have approximately 90 percent remaining cross section.

3.2.2 Concrete Facing

The concrete facing is in **fair** condition. Delaminated concrete is present at multiple locations along the berth face; primarily within the top three feet of the concrete face where at the bullrail/wall interface. Hammer sounding indicated the presence of concrete delamination at multiple locations along the bullrail. Rust staining from abandoned steel embeds is present at multiple locations along the wall. See Photo 5 and Photo 6.

3.2.3 Mooring Hardware

The mooring hardware is in **fair** condition. Minor to moderate corrosion and loss of coating are present at multiple locations. In general, minor defects such as hairline cracks and concrete delamination are present at the concrete foundations. See Photo 7.

3.2.4 Fender System

The fender system is in **good** condition. From Sta 00+00 to 02+75, rubber cylindrical fenders and chains were not present. However, steel chain plates which are used to suspend the fenders from the berth face were in place. At five locations, nuts are missing from the embedded anchor bolts. From Sta 02+75 to 07+50, no defects were observed within the cylindrical rubber fenders, chains, or embedded steel plates. See Photo 8.

3.2.5 Pavement

The pavement is in **satisfactory** condition. Minor cracks and surface irregularities were observed at isolated locations.

Photo 5: Berth F3 – Typical Mechanical Spall at Bullrail

Photo 6: Berth F3 – Typical Concrete Facing

Photo 7: Berth F3 – Typical Mooring Hardware

Photo 8: Berth F3 – Typical Fender System

3.3 BERTH F4

3.3.1 Sheet Pile Bulkhead

The sheet pile bulkhead is in **satisfactory** condition. Minor corrosion is present at several locations below the waterline. On average, Level III steel thickness readings at the sheet pile flanges and webs were 0.50 and 0.35, respectively. Anodes were found to have approximately 90 percent remaining cross section. See Photo 9.

3.3.2 Concrete Facing

The concrete facing is in **fair** condition. Delaminated and spalled concrete are present at multiple locations along the berth face; primarily within the top three feet at the bullrail/wall interface. Rust staining from abandoned steel embeds is present at multiple locations. Along the bullrail, minor concrete delamination and spalling are present at multiple locations. See Photo 10.

3.3.3 Mooring Hardware

The mooring hardware is in **fair** condition. Minor to moderate corrosion and loss of coating are present at multiple locations. Major corrosion was observed at the cavel at Station 09+54 (marked as 850). In general, hairline cracks and minor spalls are present at the concrete foundations. At Station 10+68, moderate closed-corrosion spalling is present at the cavel foundation. See Photo 11.

3.3.4 Fender System

The fender system is in **poor** condition. Moderate to major corrosion is present at multiple steel fenders panels. Major to severe corrosion is present at a majority of the steel weight chains. Split, torn, and delaminated rubber fenders that have either failed or have major to severe damage were observed at 25 percent of the fender panel locations. See Photo 12.

3.3.5 Pavement

The pavement is in **satisfactory** condition. Minor cracks and surface irregularities were observed at isolated locations.

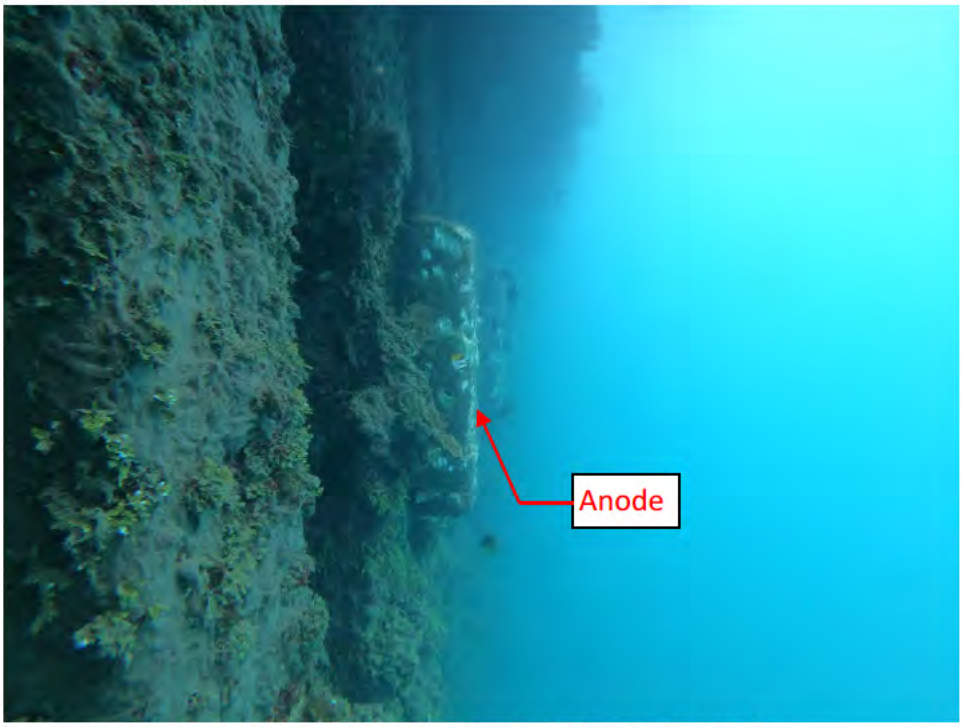

Photo 9: Berth F4 – Typical Sheet Pile Wall

Photo 10: Berth F4 – Typical Berth Face

Photo 11: Berth F4 – Closed-Corrosion Spalling at Sta 10+68

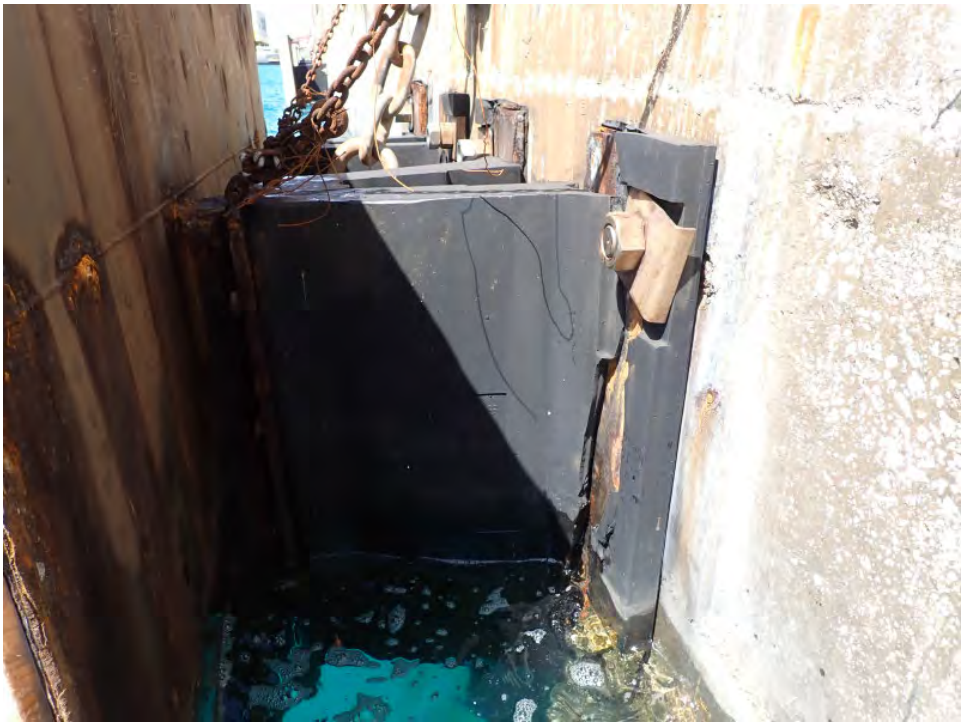

Photo 12: Berth F4 – Failed Fender System at Sta 13+40

3.4 BERTH F5

3.4.1 Sheet Pile Bulkhead

The sheet pile bulkhead is in **satisfactory** condition. Minor corrosion is present at several locations below the waterline. On average, Level III steel thickness readings at the sheet pile flanges and webs were 0.52 and 0.38 respectively. Anodes were found to have approximately 90 percent remaining cross section.

At the sheet pile toe-wall located south of the waterside pile row, minor corrosion is present at several locations. On average, the Level III steel thickness readings at the sheet pile flanges and webs were 0.54 and 0.36, respectively.

3.4.2 Concrete Facing

The concrete facing is in **satisfactory** condition. Minor hairline cracks were observed at multiple locations. Open- and closed-corrosion spalls are present at isolated locations.

3.4.3 Piles

The concrete piles are in **satisfactory** condition. In general, defects were not observed. However, major damage consisting of a crack and closed-corrosion spalling is present at Pile 17D. See Photo 13.

3.4.4 Pile Caps

The concrete pile caps are in **poor** condition. Between Bents 9 and 30, major and severe damage consisting of cracks and open- and closed-corrosion spalling were observed at several locations. See Photo 14.

3.4.5 Bulkhead Wall

The bulkhead wall is in **satisfactory** condition. Defects were not observed.

3.4.6 Deck Soffit

The concrete deck soffit is in **satisfactory** condition. Minor concrete delamination was observed at an isolated location near Bent 1.

3.4.7 Mooring Hardware

The mooring hardware is in **fair** condition. Minor to moderate corrosion and loss of coating are present at all locations. See Photo 15.

3.4.8 Fender System

The fender system is in **poor** condition. Moderate to major corrosion is present at multiple steel fenders panels. Major to severe corrosion is present at a majority of the steel weight chains. Split, torn, and delaminated rubber fenders that have either failed or have major to severe damage were observed at approximately 50 percent of the fender panel locations. See Photo 16.

3.4.9 Pavement

The pavement is in **satisfactory** condition. Minor cracks and surface irregularities were observed at isolated locations.

Photo 13: Berth F5 – Crack at Pile 28D

Photo 14: Berth F5 – Severe Crack at Bent 15A-B

Photo 15: Berth F5 – Moderate Corrosion Damage at Sta 15+63

Photo 16: Berth F5 – Fender Panel at Sta 19+54

3.5 BERTH F6

3.5.1 Sheet Pile Bulkhead

The sheet pile bulkhead is in **satisfactory** condition. Minor corrosion is present at several locations below the waterline. On average, Level III steel thickness readings at the sheet pile flanges and webs were 0.51 and 0.36, respectively. Moderate corrosion is present at the return wall east of Bent 63. See Photo 17. Anodes were found to have approximately 90 percent remaining cross section.

3.5.2 Concrete Berth Face

The concrete facing is in **fair** condition. Minor surface irregularities were observed at several locations; primarily at the bullrail/wall interface. Along the bullrail, minor to moderate spalling and concrete delamination are present at multiple locations. See Photo 18.

3.5.3 Piles

The concrete piles are in **satisfactory** condition. Defects were not observed at a majority of the piles inspected. At one location, moderate damage consisting of a crack and close-corrosion spalling is present.

3.5.4 Pile Caps

The concrete pile caps are in **satisfactory** condition. Major and severe damage consisting of open- and closed-corrosion spalling was observed four locations between Bents 41 and 63.

3.5.5 Bulkhead Wall

The bulkhead wall is in **satisfactory** condition. Defects were not observed.

3.5.6 Deck Soffit

The concrete deck soffit is in **satisfactory** condition. Defects were not observed.

3.5.7 Mooring Hardware

The mooring hardware is in **satisfactory** condition. Minor to moderate corrosion and loss of coating are present at all locations.

3.5.8 Fender System

The fender system is in **fair** condition. Moderate corrosion is present at multiple steel fenders panels. See Photo 19. Major to severe corrosion is present at a majority of the steel weight chains. Split, torn, and delaminated rubber fenders that have either failed or have major to severe damage were observed at 27 percent of the fender panel locations.

3.5.9 Pavement

The pavement is in **satisfactory** condition. Minor cracks and surface irregularities were observed at isolated locations. See Photo 20.

Photo 17: Berth F6 – Return Wall East of Bent 63

Photo 18: Berth F6 – Typical Berth Face

Photo 19: Berth F6 – Typical Fender Panel

Photo 20: Berth F6 – Typical Pavement

3.6 CRANE RAIL

3.6.1 Waterside Crane Rail

The waterside crane rail is in **fair to poor** condition. Depressions in the asphalt pavement are present at multiple locations along the crane rail length that results in ponding water. At Station 12+50, the rail has settled approximately 1/2-inch; evidenced by ponding water over the rail. Between Stations 08+00 and 11+00, moderate to major corrosion are present along the top and sides of the rail.

3.6.2 Landside Crane Rail

The landside crane rail is in **fair to poor** condition. Depressions in the asphalt pavement are present at multiple locations along the crane rail length that results in ponding water. Between Stations 08+00 and 11+00, moderate to major corrosion are present along the top and sides of the rail.

4.0 POST TYPHOON MAWAR CONDITION ASSESSMENT FINDINGS

On 24 May 2023, the island of Guam experienced severe winds, wind-driven rain, and storm surges resulting from Typhoon Mawar. As a result, several of the PAG's maritime and upland assets experienced severe damage. With respect to Berths F2 through F6, WSP performed a cursory post-Typhoon Mawar assessment in September 2023. This assessment included an inspection of the fender system, bullrail, and concrete face. In January of 2024, WSP performed a localized inspection of Berth F3 to observe the condition of the asphalt pavement at locations where settlement/erosion are present.

In February 2024, an underwater survey was performed by a local dive and salvage company. The survey included assessment of approximately 160 feet of the underwater sheet pile bulkhead at Berth F3; spanning from station 0+00 to 0+160. Findings from this effort are summarized in a document titled, "Wharf F3 Sheet Pile Inspection", dated February 20, 2024. See Appendix D.

In May 2024, WSP performed a post-event underwater inspection of Berths F2 through F6 to identify damages related to the May 2023 typhoon. As described in the ASCE MOP 130, "…the purpose of a post-event inspection is to assess the structural stability of a structure and/or determine if further attention to the structure is necessary as a result of the event." Similar to the initial inspection effort described in Section 3.0, WSP performed visual observation of underwater structural elements and noted damages that were not previously observed during the fall 2022 inspection effort. The scope of work included in this post-event inspection effort is tabulated below.

- Berth F2: Sheet pile bulkhead from STA 0+00 to STA 3+80
- Berth F3: Sheet pile bulkhead from STA 0+00 to STA 7+50
- Berth F4: Four select locations that experienced damaged fender systems from the typhoon.
- Berth F5: Six select locations that experienced damaged fender systems from the typhoon.
- Berth F6: Four select locations that experienced damaged fender systems from the typhoon.

In addition, WSP has also reviewed photographs from the document titled, Port Damage Assessment at a Glance, "*Port Authority of Guam Responses to Typhoon Mawar Supporting Photographs*". This document includes photographs of post-typhoon damage ranging from minor to severe at Berths F3 through F6. See Appendix E. A description of damages that have been identified from our review of this document and on-site inspections are summarized below.

Berth F2

- Between STA 0+25 and STA 0+50, multiple dents in the steel bulkhead from elevation -6 MLLW to -20 MLLW.
- Horizontal fracture in the steel bulkhead at STA 0+30 (Photo 21).
- Holes at multiple locations of steel sheet pile bulkhead from STA 0+84 to STA 2+75.
- Multiple dents in the steel sheet pile bulkhead from STA 0+28 to 0+86. See tabulated damage table and damage drawings for additional information.

Berth F3

- Severe mechanical spalling with exposed reinforcement along the concrete bullrail (approximately 295 feet) (Photo 22).
- Severe damage to six cylindrical fender units (Photo 22 and Photo 23).
- Settlement of the asphalt concrete pavement and soil erosion at three locations near Station 1+00 (Photo 24).
- Multiple holes in the steel bulkhead between STA 0+39 and 1+75 (Photo 25).
- Missing anodes at multiple locations.
- Permanent deformation of the steel bulkhead between stations 0+40 and 1+70 located approximately 7 feet below the water and measuring 24 to 30 inches in height (Photo 26).
- Exposed steel reinforcement and spalling at multiple locations underwater (Photo 27 and Photo 28).
- Separation (gaps of 3/4 inches) of the concrete pile cap and steel bulkhead at multiple locations (Photo 29).
- Bent/permanently deformed shear tabs at multiple anchor plates.

Berth F4

- Mechanical spalling and open corrosion spalling along the bullrail and top of concrete facing (approximately 60 feet) (Photo 30).
- Missing weight chains at (2) fender systems.
- Severe damage to rubber fender elements at (5) locations.
- Missing UHMW-PE panel facing at (1) location.
- Severely damaged/missing fender panel at (1) location.
- Severe damage to seismic joint at Berths F4/F5.

Berth F5

- Mechanical spalling and open corrosion spalling along the bullrail and top of concrete facing (approximately 50 feet) (Photo 31).
- Severe damage to rubber fender elements at (4) locations.
- Missing UHMW-PE panel facing at (1) location.
- Severely damaged/missing fender panel at (6) locations.

Berth F6

- Mechanical spalling and open corrosion spalling along the bullrail and top of concrete facing (approximately 25 feet) (Photo 32).
- Severe damage to steel fender panel (Photo 32).
- Severely damaged/missing fender panel at (1) location.

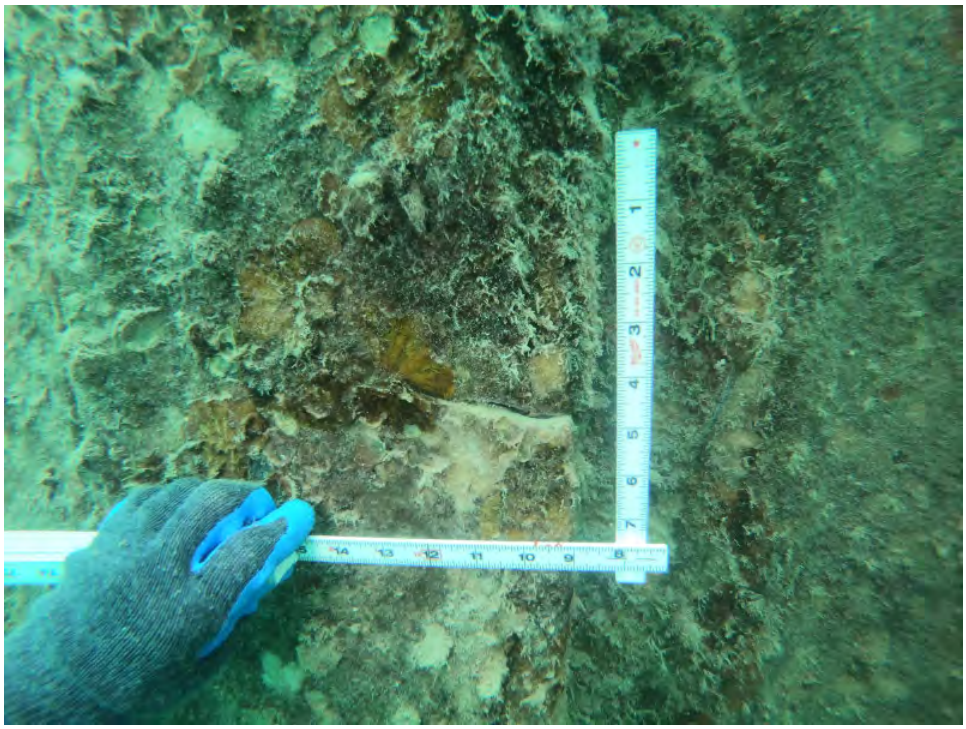

Photo 21: Berth F2 (Fractured Flange at STA 0+30)

Photo 22: Berth F3 (Severe OCS and Fender Damage at STA 06+55)

Photo 23: Berth F3 (Missing Cylindrical Fender Units at STA 05+50

Photo 24: Berth F3 (Pavement Settlement near STA 01+00)

Photo 25: Berth F3 (Hole at STA 01+05)

Photo 26: Berth F3 (Damaged Sheet Pile Bulkhead, Photo Courtesy of T&T)

Photo 27: Berth F3 (Concrete Spalling Underwater)

Photo 28: Berth F3 (Exposed Steel Reinforcement and Spalling Underwater)

Photo 29: Berth F3 (Separation of the Concrete Pile Cap from Steel Bulkhead)

Photo 30: Berth F4 (Damage at STA 10+18)

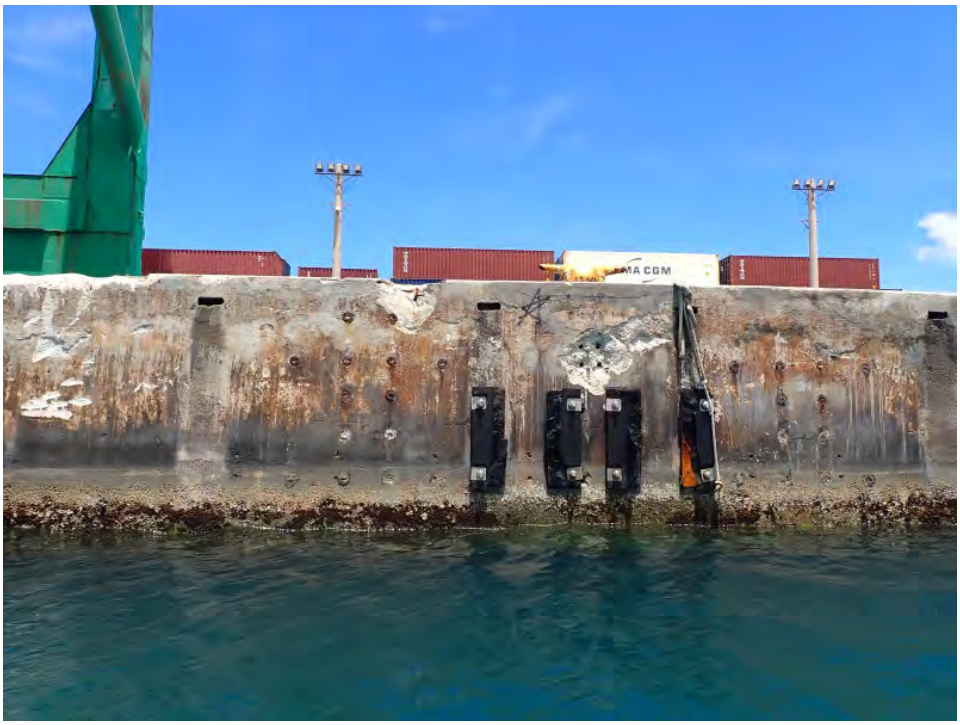

Photo 31: Berth F5 (Damage at STA 15+07)

Photo 32: Berth F6 (Damage at STA 23+44)

5.0 OVERALL FACILITY CONDITION ASSESSMENT RATING

Condition assessment ratings for Berths F2 through F6 are summarized in Table 2. Assessment ratings were assigned based on visual observations, element level damage ratings, and supplemental damages resulting from Typhoon Mawar. For reference, pre-typhoon ratings are shown in parenthesis. The overall rating was determined by considering the following.

- Total number of observed damages
- Severity of observed damages
- Distribution of observed damages
- Sensitivity of affected elements
- Location of damages
- Serviceability

Table 2: Berths F2 – F6 Condition Assessment Ratings

Berth Identification	Condition Assessment Rating
F2	**Poor** *(poor)*
F3	**Serious** *(fair)*
F4	**Poor** *(fair)*
F5	**Poor** *(fair)*
F6	**Poor** *(fair)*

6.0 DISCUSSION

6.1 SUMMARY OF DAMAGES AT BERTHS F2 THROUGH F6

In general, moderate to advanced damage and deterioration are present throughout the structures. Defects consisting of broken/missing fender systems, open-corrosion spalls, mechanical spalls, settlement of pavement, missing anodes, permanently deformed steel bulkheads, and localized holes in the sheet pile bulkheads are present at multiple locations. For these reasons, berths F2, F4, F5, and F6 have been assigned a condition assessment rating of poor. Due to the aggressive progression of pavement settlement at Berth F3 and findings from the Feb 2024 underwater inspection effort, this berth has been assigned a rating of serious. With exception of Berth F2, the steel sheet pile bulkheads at Berths F3 through F6 have been in service since the 1970's and have undergone several repairs and upgrades. It is estimated that the sheet pile sections at F3 through F6 are type MZ38; having a flange thickness of 1/2-inch and web thickness of 3/8-inch. On average, 1 to 10% section loss and 4 to 25% section loss are present at flange and web locations, respectively. In accordance with ASCE MOP 130, these levels of cross section loss are consistent with moderate damage. At Berth F2, whose construction is unknown and predates 1970, damage at flange and web locations varies from minor to major.

Berths F2 through F6 have been in service for over 50 years and are approaching the end of their service lives. Within the marine construction industry, a 50-year service life typically represents the upper limit for a structure's life span. In general, it appears that the cathodic protection program consisting of sacrificial anodes is performing well and preventing rapid growth of deterioration. For reference, anodes are not currently present at Berth F2. To help ensure that the berths remain operational until such time that they are replaced, it is recommended that near-term repairs are performed to extend the service life of these structures. Repair recommendations for Berths F2 through F6 are further discussed in Section 7.0.

7.0 BERTHS F2 THROUGH F6 REPAIR RECOMMENDATIONS

Repair recommendations for structural marine assets at Berths F2 through F6 are provided below. These repairs have been prioritized for each berth and include pre- and post-typhoon damages. In general, recommendations are based on assigned element level damage ratings for individual elements and the effect the damaged element have on the overall use of the berth. For this report, elements assigned a damage rating of major or severe represent structural elements with advanced deterioration and/or damage. It is recommended that these elements are repaired in the near future to avoid progression of damage and possible interruptions to Port and tenant operations. See Appendix F or applicable repair concept sketches.

7.1 BERTH F2

- <u>Bulkhead Repair – STA 0+00 to STA 0+50</u>
  a) Strengthening of dented sheet piles:
     - Sawcut pavement perimeter and excavate to 10’ below the bottom of the pile cap.
     - Intentionally roughen concrete surfaces to 1/4-inch amplitude.
     - Install anchor studs to inside face of sheet pile and concrete pile cap above.
     - Place formwork and reinforcement
     - Place concrete
     - Remove forms
     - Backfill with clean materials

  b) Relieving platform:
     - Install 24” diameter pipe piles spaced at 16’ on centers.
     - Place formwork and reinforcement for concrete caps and deck.
     - Pour concrete.
     - Remove formwork
     - Backfill and install pavement

- <u>Sheet Pile Wall Hole/tear Repair – 27 Locations</u>
  - Install a filler material such as sand or gravel in the hole to fill the void.
  - Fabricate and install custom steel plates to match the existing sheet pile flange/web profile.

- <u>Repair Misaligned Sheet Piles – 2 Locations (1 location having 3 misalignments)</u>
  - Excavate soil in front of misaligned sheets to a depth of approximately 2 ft.
  - Install a filler material such as sand or gravel in the void between the sheets.
  - Fabricate and install custom steel plates to match the existing profile of the sheets.
  - Replace excavated material in front of sheet pile wall.

- <u>Repair Void at Station 06+76 – 1 Location</u>
  - Remove and salvage existing rip rap material.

- Remove debris and install a filler material such as sand, gravel, or a cementitious material in the void.
- Reinstall rip rap to confine the filler material and prevent it from eroding. Installation of additional rip rap may be necessary.

- Mooring Bollard Coating Repairs – 10 Locations with MJ or SV Damage
  - Setup containment
  - Abrasive clean surface of bollard/cleat to remove existing coating system.
  - Clean and prep surface in accordance with coating manufacturer recommendations.
  - Hand apply a high-performance coating system.

7.2 BERTH F3

- Bullrail Spall Repair – 305 Feet
  - Remove loose concrete and debris.
  - Sawcut around perimeter of damaged concrete section.
  - At locations where steel reinforcement is exposed, remove concrete to a depth of 1-inch below the reinforcement.
  - Intentionally roughen concrete surfaces to 1/4-inch amplitude.
  - Install formwork and thoroughly clean prior to installation of repair material.
  - Install a marine grade cementitious repair material.
  - Remove formwork.

- Bulkhead Repair – STA 0+00 to STA 1+60
  a) Underwater spall repair and separation of concrete cap from bulkhead:
     - Remove damaged pavement, sawcut perimeter of pavement, and excavate to 10’ below bottom of pile cap
     - Blast clean concrete and steel surfaces to be repaired underwater.
     - Cut debonded concrete facing reinforcement flush with concrete.
     - Install anchor studs in the cleaned concrete to hold concrete patch.
     - Drill grout passages above and below the damage.
     - Intentionally roughen concrete surfaces to 1/4-inch amplitude.
     - Place formwork
     - Install a marine grade cementitious repair material using grout passages.
     - Remove formwork
  b) Steel bulkhead strengthening:
     - Intentionally roughen concrete surfaces to 1/4-inch amplitude.
     - Install anchor studs to inside face of sheet pile and concrete pile cap above.
     - Place formwork and reinforcement.
     - Place concrete.
     - Remove forms.

- Backfill with clean materials

c) Relieving platform:
   - Install 24”diameter pipe piles spaced at 16’ on centers.
   - Place formwork and reinforcement for concrete caps and deck.
   - Pour concrete.
   - Remove formwork.
   - Backfill and install pavement.

- Replace Fender Systems – (6 Locations)
  - Remove damaged fenders, chains, and associated brackets.
  - Where needed, install new post-installed concrete anchors for brackets.
  - Install rubber cylindrical fenders, brackets, chain, and associated hardware.

- Replace Damaged Fender Brackets – 31 Locations
  - Provide temporary support to fender.
  - Remove and replace bent bracket. Where needed, install new post-installed concrete anchors.
  - Install new bracket and reattach rubber cylindrical fender.

- Sheet Pile Hole Repair – 18 Locations
  - Install a filler material such as sand or gravel in the hole to fill the void.
  - Fabricate and install custom steel plates to match the existing sheet pile flange/web profile.

- Replace damaged/missing anodes – 20 Locations
  - Install new sacrificial anodes. Clean and prepare steel surface. Weld anode to surface of steel sheet pile.

7.3 BERTH F4

- Bullrail Spall Repair – 80 Feet
  - Remove loose concrete and debris.
  - Sawcut around perimeter of damaged concrete section.
  - At locations where steel reinforcement is exposed, remove concrete to a depth of 1-inch below the reinforcement.
  - Intentionally roughen concrete surfaces to 1/4-inch amplitude.
  - Install formwork and thoroughly clean prior to installation of repair material.
  - Install a marine grade cementitious repair material.
  - Remove formwork.

- Fender Panel Weight Chain Replacement – 7 Locations
  - Provide temporary support to the fender panel.
  - Remove and dispose of the existing chain and hardware.
  - Install a new weight chain and hardware.
  - Match size and SWL of existing chain and hardware.

- Rubber Fender Replacement – 8 Locations
  - Provide temporary support to fender panel.
  - Disconnect fenders from berthface and place on deck. Protect anchor bolts during fender removal.
  - Remove, dispose, and install new fenders.
  - Reinstall panel.

- Steel Fender Panel Replacement – 1 Location
  - Provide temporary support to fender panel.
  - Disconnect fenders from berthface and place on deck. Protect anchor bolts during fender removal.
  - Remove and salvage rubber fenders.
  - Dispose of existing panel.
  - Deliver new Panel to site and install rubber fenders.
  - Reinstall fender panel.

- Complete Fender Unit Replacement – 2 Locations
  - At locations where panel is missing, remove existing rubber fender remnants and anchor bolt nuts.
  - At locations where damaged fender panel is in place, provide temporary support to fender panel.
  - Disconnect fenders from berthface and place panel on deck. Protect anchor bolts during fender removal.
  - Demo and dispose of fender unit
  - Fabricate and deliver new panel, fenders, and hardware to site.
  - Install complete fender unit (panel, fenders, facings, chains, and hardware). At some locations, it may be necessary to install new anchor bolts and/or adjust location of fender unit to avoid interference with existing hardware.

- UHMW-PE Facing Replacement – 2 Locations
  - Remove and replace damaged UHMW-PE facing.
  - Match size and thickness of existing.

- Repair Seismic Joint at F4/F5 – 1 Location
  - Remove loose concrete and debris.
  - Sawcut around perimeter of damaged concrete section.
  - At locations where steel reinforcement is exposed, remove concrete to a depth of 1-inch below the reinforcement.
  - Intentionally roughen concrete surfaces to 1/4-inch amplitude.
  - Install formwork and thoroughly clean prior to installation of repair material.
  - Install a marine grade cementitious repair material.
  - Remove formwork.

- Coating Rehabilitation at Bollards – 2 Locations
  - Setup containment at each location and remove the existing coating system.
  - Prepare the surface in accordance with the coating manufacturer's recommendations.
  - Apply the high-performance coating system.

7.4 BERTH F5

- Bullrail Spall Repair – 56 Feet
  - Remove loose concrete and debris.
  - Sawcut around perimeter of damaged concrete section.
  - At locations where steel reinforcement is exposed, remove concrete to a depth of 1-inch below the reinforcement.
  - Intentionally roughen concrete surfaces to 1/4-inch amplitude.
  - Install formwork and thoroughly clean prior to installation of repair material.
  - Install a marine grade cementitious repair material.
  - Remove formwork.

- Fender Panel Weight Chain Replacement – 3 Locations
  - Provide temporary support to the fender panel.
  - Remove and dispose of the existing chain and hardware.
  - Install a new weight chain and hardware.
  - Match size and SWL of existing chain and hardware.

- Rubber Fender Replacement – 6 Locations
  - Provide temporary support to fender panel.
  - Disconnect fenders from berthface and place on deck. Protect anchor bolts during fender removal.
  - Remove, dispose, and install new fenders.
  - Reinstall panel.

- Complete Fender Unit Replacement – 6 Locations
  - At locations where panel is missing, remove existing rubber fender remnants and anchor bolt nuts.
  - At locations where damaged fender panel is in place, provide temporary support to fender panel.
  - Disconnect fenders from berthface and place panel on deck. Protect anchor bolts during fender removal.
  - Demo and dispose of fender unit.
  - Fabricate and deliver new panel, fenders, and hardware to site.
  - Install complete fender unit. At some locations, it may be necessary to install new anchor bolts and/or adjust location of fender unit to avoid interference with existing hardware.

- UHMW-PE Facing Replacement – 1 Location

- Remove and replace damaged UHMW-PE facing.
- Match size and thickness of existing.

- Below-Deck Concrete Spall Repair – 50± cubic feet
  - Set up containment to prevent debris from entering water.
  - Remove loose concrete and debris.
  - Sawcut around perimeter of damaged concrete section.
  - At locations where steel reinforcement is exposed, remove concrete to a depth of 1-inch below the reinforcement.
  - Intentionally roughen concrete surfaces to 1/4-inch amplitude.
  - Install formwork and thoroughly clean prior to installation of repair material.
  - Install a marine grade cementitious repair material.
  - Remove formwork.

- Below-Deck Concrete Crack Repair – 100± linear feet
  - Set up containment to prevent debris from entering water.
  - Remove loose concrete and debris along crack and clean cavity.
  - Install injection ports at regular spacings along crack length.
  - Install marine grade cementitious repair material or marine grade epoxy.

7.5 BERTH F6

- Bullrail Spall Repair – 40 Feet
  - Remove loose concrete and debris.
  - Sawcut around perimeter of damaged concrete section.
  - At locations where steel reinforcement is exposed, remove concrete to a depth of 1-inch below the reinforcement.
  - Intentionally roughen concrete surfaces to 1/4-inch amplitude.
  - Install formwork and thoroughly clean prior to installation of repair material.
  - Install a marine grade cementitious repair material.
  - Remove formwork.

- Fender Panel Weight Chain Replacement – 6 Locations
  - Provide temporary support to the fender panel.
  - Remove and dispose of the existing chain and hardware.
  - Install a new weight chain and hardware.
  - Match size and SWL of existing chain and hardware.

- Rubber Fender Replacement – 2 Locations
  - Provide temporary support to fender panel.
  - Disconnect fenders from berthface and place on deck. Protect anchor bolts during fender removal.
  - Remove, dispose, and install new fenders.
  - Reinstall panel.

- Steel Fender Panel Replacement – 1 Location
  - Provide temporary support to fender panel.
  - Disconnect fenders from berthface and place on deck. Protect anchor bolts during fender removal.
  - Remove and salvage rubber fenders.
  - Dispose of existing panel.
  - Deliver new Panel to site and install rubber fenders.
  - Reinstall fender panel.

- Complete Fender Unit Replacement – 1 Location
  - At locations where panel is missing, remove existing rubber fender remnants and anchor bolt nuts.
  - At locations where damaged fender panel is in place, provide temporary support to fender panel.
  - Disconnect fenders from berthface and place panel on deck. Protect anchor bolts during fender removal.
  - Demo and dispose of fender unit
  - Fabricate and deliver new panel, fenders, and hardware to site.
  - Install complete fender unit. At some locations, it may be necessary to install new anchor bolts and/or adjust location of fender unit to avoid interference with existing hardware.

- Below-Deck Concrete Spall Repair – 9± cubic feet
  - Set up containment to prevent debris from entering water.
  - Remove loose concrete and debris.
  - Sawcut around perimeter of damaged concrete section.
  - At locations where steel reinforcement is exposed, remove concrete to a depth of 1-inch below the reinforcement.
  - Intentionally roughen concrete surfaces to 1/4-inch amplitude.
  - Install formwork and thoroughly clean prior to installation of repair material.
  - Install a marine grade cementitious repair material.
  - Remove formwork.

8.0 REPAIR COST ESTIMATES

The cost estimate summary for repair of Berths F2 through F6 is provided below and have been prioritized based on observed element level damage ratings for pre- and post-typhoon damages. These costs are intended to provide a rough order of magnitude for the work being performed in 2025 and include construction, planning, administration, business privilege tax, and contingency as shown below.

Table 3: Pre- and Post-Typhoon Mawar Repair Cost Estimate (2025)

ITEM	DESCRIPTION	COST
1	Administrative and Legal Expenses (5% of 8 & 9)	$693,843
2	Land, Structures, Right-of-Ways, Appraisals, etc	$0
3	Relocation Expenses and Payments	$0
4	Architectural and Engineering Fees (8% of 8 & 9)	$1,110,149
5	Other Architectural and Engineering Fees (10% of 8 & 9)	$1,387,686
6	Project Inspection Fees (12% of 8 & 9)	$1,665,223
7	Site Work	
8	Demolition and Removal	
9	Construction	$10,306,859
10	Equipment	
11	Miscellaneous	$936,688
12	Subtotal (sum lines 1 – 11)	**$19,670,448**
13	Contingencies	$5,901,134
14	SUBTOTAL	**$25,571,582**
15	Project (Program) Income	$0
16	Total Project Cost (sum 14 and 15)	**$25,571,582**

Notes:

1. Project is Buy America with contractor mobilizing from Hawai'i.
2. Repairs performed in 2025.
3. Include repair of elements including pre- and post-typhoon Mawar damage.

APPENDIX A

ASCE MOP 130
ELEMENT LEVEL DAMAGE RATING SYSTEM

Table 2-9. Damage Ratings for Mooring Foundations*

Damage Rating		Existing Damage[a]	Exclusions [Defects Requiring Elevation to the Next Higher Damage Rating(s)]
NI	Not Inspected	Not inspected, inaccessible, or passed by[b]	
ND	No Defects	• Good original hard surface, hard material, sound	No Defects Rating not appropriate if • Weathering on timber, steel, or composite fenders • Hairline cracks in concrete elements
MN	Minor	• Timber Foundations: Weathered timber; evidence of fungal decay; minor checks, splits, and gouges up to 1/4-in. wide • Steel Foundations: Weathering of steel coating, light surface corrosion • Concrete Foundations: No significant section loss to load-bearing areas, hairline cracking of the concrete due to corrosion of the mooring hardware • Composites: Weathered surfaces	Minor damage not appropriate if • Load-bearing areas around mooring hardware not sound • Displacement, loss of bearing, or connections • Fungal decay, insect infestation within or adjacent to the bearing area on timber elements • Corrosion loss exceeding fabrication tolerances (at any location) • Structural damage or corrosion cracking or concrete elements
MD	Moderate	• Timber cracked and checked up to 1/2-in. wide; weathered surfaces; fungal decay under or adjacent to the mooring hardware, with loss of section (max 1 in.) • Corrosion of steel with less than 10 to 25% section loss at any location • Noticeable cracking of concrete, larger than hairline but with no loss of interlock	Moderate damage not appropriate if • Displacements, loss of bearing, or connections • Changes in straight-line configuration or local buckling • Loss of thickness exceeding 30% of nominal at any location for steel elements • Structural breakage, spalls, or corrosion cracks in concrete elements • Chemical deterioration[c] or “softening” of concrete elements
MJ	Major	• Timber cracked and checked greater than 1/2-in. wide; weathered; fungal decay present (max 3 in. depth); up to 25% loss of bearing • Steel corrosion with 25 to 50% section loss at any location • Noticeable cracking of concrete, resulting in loss of interlock • Composite elements cracked or split	Major damage not appropriate if • Breakage or displacement of any element • Exposed steel strands in prestressed concrete elements • Perforations or loss of section exceeding 50% on steel elements

Table 2-9. Damage Ratings for Mooring Foundations (Continued)*

Damage Rating		Existing Damage[a]	Exclusions [Defects Requiring Elevation to the Next Higher Damage Rating(s)]
SV	Severe	• Displacement/yielding of any support members • Loss of full bearing of fitting under hardware • Fungal decay of timber members (greater than 3 in. depth) • Significant corrosion of steel members with greater than 50% section loss at any location • Cracking or spalling of concrete based under hardware • Composite broken or damaged	

*Taken from ASCE Waterfront Facilities Inspection and Assessment Manual No. 130, 2015.
a = Any defect listed is sufficient to identify relevant damage grade.
b = If not inspected due to inaccessibility or passed by, note as such.
c = Chemical deterioration: Sulfate attack, alkali-silica reaction, alkali-aggregtate reaction, alkali-carbonate reaction ettringite distress, or other chemical/concrete deterioration.

Table 2-11. Damage Ratings for Pneumatic, Foam-Filled, and Hydropneumatic Fenders*

Damage Rating		Existing Damage[a]	Exclusions [Defects Requiring Elevation to the Next Higher Damage Rating(s)]
NI	Not Inspected	Not inspected, inaccessible, or passed by[b]	
ND	No Defects	• Good original surfaces • Components sound • All hardware intact and operable	No Defects Rating not appropriate if • Components are weathered, worn, or torn
MN	Minor	• Wear on the fender unit with no visible belting • Hardware intact with visible surface corrosion, but less than 10% section loss • Swivel operable but binding	
MD	Moderate	• Wear on the fender, belting visible to a maximum depth of 1 inch • Hardware intact with 10 to 25% section loss • Swivel heavily corroded and or bound	Moderate damage not appropriate if • Fender unit permanently set or deformed
MJ	Major	• Wear on the fender, belting visible to a maximum depth of 2 inches • Permanent deformation of unit • Hardware loose or heavily corroded with between 25 and 50% section loss • Swivel heavily corroded and or bound, or with 25 to 50% section loss • Air pressure inflation and valves do not appear operable	Major damage not appropriate if • Components missing or broken
SV	Severe	• Considerable wear on the fender, belting visible to a depth greater than 2 inches • Punctures, tears, or holes in fender; foam exposed • Hardware heavily corroded with greater than 50% section loss or missing or broken • Swivel heavily corroded and or bound, or with greater than 50% section loss or broken • Air pressure inflation and valves are broken or damaged[c]	

*Taken from ASCE Waterfront Facilities Inspection and Assessment Manual No. 130, 2015.
a = Any defect listed is sufficient to identify relevant damage grade.
b = If not inspected due to inaccessibility or passed by, note as such.
c = For pneumatic and hydropneumatic fenders, an assessment of the air pressure and inflation/pressurization system should be confirmed.

Table 2-12. Damage Ratings for Rubber Fender Elements*

Damage Rating		Existing Damage[a]	Exclusions [Defects Requiring Elevation to the Next Higher Damage Rating(s)]
NI	Not Inspected	Not inspected, inaccessible, or passed by[b]	
ND	No Defects	• Good original surface, sound • Connections intact and tight	No Defects Rating not appropriate if • Noticeable abrasion or wear of rubber surfaces
MN	Minor	• Small gouges or surface defects present less than 10% of nominal depth • Connection intact, tight with light corrosion (less than 10% section loss at any location)	Minor damage not appropriate if • Surface cracking or degradation of rubber components
MD	Moderate	• Gouges, wear, or tears less than 25% of nominal depth • Rubber damaged at the connectors or connection plates • Connections loose, a bolt missing, or corrosion with 10 to 25% section loss at any location	Moderate damage not appropriate if • Permanent deformation or misalignment of rubber elements
MJ	Major	• Cracks, gouges, or tears between 25 and 50% of nominal depth • Rubber torn at the connectors or connection plates • Connections loose, two bolts missing, or corrosion with 25 to 50% section loss at any location	Major damage not appropriate if • Rubber element is split or torn through
SV	Severe	• Cracks, gouges, or tears greater than 50% of nominal depth • Rubber torn through at the connectors or connection plates • Connections with loose or missing bolts, or corrosion with greater than 50% section loss at any location	

*Taken from ASCE Waterfront Facilities Inspection and Assessment Manual No. 130, 2015.
a = Any defect listed is sufficient to identify relevant damage grade.
b = If not inspected due to inaccessibility or passed by, note as such.

Table 2-13. Damage Ratings for Fender Panels*

Damage Rating		Existing Damage[a]	Exclusions [Defects Requiring Elevation to the Next Higher Damage Rating(s)]
NI	Not Inspected	Not inspected, inaccessible, or passed by[b]	
ND	No Defects	• Good original surfaces • All connections intact • Backing panel sound	No Defects Rating not appropriate if • Coatings damaged • Visible surface corrosion
MN	Minor	• Small cracks or gouges (less than 10% of nominal) • 90% of panel connections intact • Backing frame with surface corrosion with no significant loss of section • Support chains intact with light surface corrosion	Minor Rating not appropriate if • Panels displaced or misaligned • Any loose or missing hardware
MD	Moderate	• Cracks or gouges (less than 25% of nominal) • 75% of panel connections intact • Panels displaced from the backing panel • Backing frame corroded • Support chains intact, with less than 25% section loss	Moderate Rating not appropriate if • Panels displaced or misaligned • Any loose or missing hardware
MJ	Major	• Cracks or gouges (less than 50% of nominal) • 50% of the panel connections intact or multiple panels displaced from the backing panel • Backing frame corroded with loose scale, but panel substantially in place • Support chains heavily corroded with more than 25% section loss	Major Rating not appropriate if • Panel/frame system sagging, misaligned, or with limited bearing
SV	Severe	• Cracks or gouges (greater than 50% of nominal) • Less than 50% of the panel connections intact or multiple panels displaced from the backing panel • Backing frame heavily corroded with loose scale • Sagging/displacement of panel/frame system • Support chains heavily corroded with loose scale and/or missing or broken	

*Taken from ASCE Waterfront Facilities Inspection and Assessment Manual No. 130, 2015.
a = Any defect listed is sufficient to identify relevant damage grade.
b = If not inspected due to inaccessibility or passed by, note as such.

Table 2-14. Condition Assessment Ratings

Rating		Description
6	Good	No visible damage or only minor damage noted. Structural elements may show very minor deterioration, but no overstressing observed. No repairs are required.
5	Satisfactory	Limited minor to moderate defects or deterioration observed but no overstressing observed. No repairs are required.
4	Fair	All primary structural elements are sound but minor to moderate defects or deterioration observed. Localized areas of moderate to advanced deterioration may be present but do not significantly reduce the load-bearing capacity of the structure. Repairs are recommended, but the priority of the recommended repairs is low.
3	Poor	Advanced deterioration or overstressing observed on widespread portions of the structure but does not significantly reduce the load-bearing capacity of the structure. Repairs may need to be carried out with moderate urgency.
2	Serious	Advanced deterioration, overstressing, or breakage may have significantly affected the load-bearing capacity of the primary structural components. Local failures are possible and loading restrictions may be necessary. Repairs may need to be carried out on a high-priority basis with urgency.
1	Critical	Very advanced deterioration, overstressing, or breakage has resulted in localized failure(s) of primary structural components. More widespread failures are possible or likely to occur, and load restrictions should be implemented as necessary. Repairs may need to be carried out on a very high-priority basis with strong urgency.

*Taken from ASCE Waterfront Facilities Inspection and Assessment Manual No. 130, 2015.

Table 2-5. Damage Ratings for Steel Elements*

Damage Rating		Existing Damage[a]	Exclusions [Defects Requiring Elevation to the Next Higher Damage Rating(s)]
NI	Not Inspected	Not inspected, inaccessible, or passed by[b]	
ND	No Defects	• Protective coating or wrap intact • Light surface rust • No apparent loss of material	
MN	Minor	• Protective coating or wrap damaged and loss of thickness up to 15% of nominal at any location • Less than 50% of perimeter or circumference affected by corrosion at any elevation or cross section • Loss of thickness up to 15% of nominal at any location	Minor damage not appropriate if • Changes in straight line configuration or local buckling • Corrosion loss exceeding fabrication tolerances (at any location).
MD	Moderate	• Protective coating or wrap damaged and loss of thickness 15 to 30% of nominal at any location • More than 50% of perimeter or circumference affected by corrosion at any elevation or cross section • Loss of thickness 15 to 30% of nominal at any location	Moderate damage not appropriate if • Changes in straight line configuration or local buckling • Loss of thickness exceeding 30% of nominal at any location
MJ	Major	• Protective coating or wrap damaged and loss of nominal thickness 30 to 50% at any location • Partial loss of flange edges or visible reduction of wall thickness on pipe piles • Loss of nominal thickness 30 to 50% at any location	Major damage not appropriate if • Changes in straight line configuration or local buckling • Perforations or loss of wall thickness exceeding 50% of nominal
SV	Severe	• Protective coating or wrap damaged and loss of wall thickness exceeding 50% of nominal at any location • Structural bends or buckling, breakage, and displacement at supports, loose, or lost connections • Loss of wall thickness exceeding 50% of nominal at any location	

*Taken from ASCE Waterfront Facilities Inspection and Assessment Manual No. 130, 2015.
a = Any defect listed is sufficient to identify relevant damage grade.
b = If not inspected due to inaccessibility or passed by, note as such.

Table 2-6. Damage Ratings for Reinforced Concrete Elements*

Damage Rating		Existing Damage[a]	Exclusions [Defects Requiring Elevation to the Next Higher Damage Rating(s)]
NI	Not Inspected	Not inspected, inaccessible, or passed by[b]	
ND	No Defects	Good original hard surface, hard material, sound	
MN	Minor	• Mechanical or impact spalls up to 1 in. deep • Occasional corrosion stains or small pop-out corrosion spalls • General cracks up to 1/16 in. wide	Minor damage not appropriate if • Structural damage • Corrosion cracks • Chemical deterioration[c]
MD	Moderate	• Structural cracks up to 1/16 in. wide • Corrosion cracks up to 1/4 in. wide • Chemical deterioration: random cracks up to 1/16 in. wide; "Soft" concrete and/or rounding of corners up to 1 in. deep • Mechanical abrasion or impact spalls greater than 1 in. deep	Moderate damage not appropriate if • Structural breakage and/or spalls • Exposed reinforcement • Loss of cross section due to chemical deterioration beyond rounding of corner edges
MJ	Major	• Structural cracks 1/16 in. to 1/4 in. wide and partial breakage (through section cracking with structural spalls) • Corrosion cracks wider than 1/4 in. and open or closed corrosion spalls (excluding pop-outs) • Multiple cracks and disintegration of surface layer due to chemical deterioration • Mechanical abrasion or impact spalls exposing the reinforcing	Major damage not appropriate if • Loss of cross section exceeding 30% due to any cause
SV	Severe	• Structural cracks wider than 1/4in. wide or complete breakage • Complete loss of concrete cover due to corrosion of reinforcing steel with more than 30% of diameter loss for any main reinforcing bar • Loss of bearing and displacement at connections • Loss of concrete cover (exposed steel) due to chemical deterioration • Loss of more than 30% of cross section due to any cause	

*Taken from ASCE Waterfront Facilities Inspection and Assessment Manual No. 130, 2015.
a = Any defect listed is sufficient to identify relevant damage grade.
b = If not inspected due to inaccessibility or passed by, note as such.
c = Chemical deterioration: sulfate attack, alkali-silica reaction, alkali-aggregate reaction, alkali-carbonate reaction ettringite distress, or other chemical/concrete deterioration.

Table 2-8. Damage Ratings for Mooring Hardware*

Damage Rating		Existing Damage[a]	Exclusions [Defects Requiring Elevation to the Next Higher Damage Rating(s)]
NI	Not Inspected	Not inspected, inaccessible, or passed by[b]	
ND	No Defects	• Material sound, surfaces smooth without indications of corrosion, surface coating in good condition, connections sound • Bolt countersinks grouted or sealed	No Defects Rating not appropriate if • Surface coatings worn or damaged • Visible corrosion on fasteners
MN	Minor	• Fitting has surface corrosion over 10 to 25% of its area. • Minor wear marks or pitting on surface of fittings are less than 1/8-in. deep • Fasteners have minor corrosion with no significant loss of section.	Minor damage not appropriate if • Deep pits, gouges, or wear on fitting surfaces • Any noticeable loss of section on fasteners threads, if visible
MD	Moderate	• Fitting has moderate surface corrosion with loose scale over less than 50% of its area • Significant surface wear marks or pitting on fitting are up to 1/4-in. deep • Fasteners have corrosion with less than 25% loss of section	Moderate damage not appropriate if • Loose scale on fasteners • Inability to remove fasteners due to heavy corrosion, if accessible
MJ	Major	• Fitting has surface corrosion with loose scale over 50% or more of its surface area and/or less than 25% section loss • Significant surface wear marks or pitting on fitting 1/4-in. deep or greater • Fasteners have corrosion with loose scale or loss of section greater than 25%	Major damage not appropriate if • Displaced, damaged, or broken fitting components • Loose or missing fasteners
SV	Severe	• Fitting has heavy surface corrosion and loose scale with greater than 25% loss of section at critical areas of the fitting • Structural displacement, deformation, or rotation of the fitting are present; fitting components are broken, cracked, or delaminated • Loose, broken, or missing fasteners	

*Taken from ASCE Waterfront Facilities Inspection and Assessment Manual No. 130, 2015.
a = Any defect listed is sufficient to identify relevant damage grade.
b = If not inspected due to inaccessibility or passed by, note as such.

APPENDIX B

TABULATED FIELD DATA

INSPECTION RECORD - SHEET PILES

LOCATION:	COMMERCIAL PORT, PITI GUAM	**DIVERS:**	
STRUCTURE ID:	BERTH F2 (STA 00+00 TO 06+76)	**DEPTH REFERENCE:** ☐ DATUM ☐ GUAGE ☐ TIDE	GDN,LAC,BAP,DRW
WSP JOB NO:	30901541B	**SHEET PILE TYPE:** STEEL	***BOLDED DAMAGE NOTES INDICATES POST TYPHOON MAWAR (MAY 2023) DAMAGES**

STATION ID	ML DEPTH	DAMAGE DEPTH	DAMAGE TYPE	DAMAGE LOCATION			DAMAGE SIZE (IN)			DAMAGE RATING						COMMENTS
				WEB	FLANGE	JOINT	LENGTH	WDTH	DEPTH	NI	ND	MN	MD	MJ	SV	
00+00	13		COR				96	1					X			SEPARATION AT INTERLOCK, -10 TO CAP SOFFIT
	13															WATERLINE: FLANGE: 0.473 / WEB: 0.266
	13															MUDLINE: FLANGE: 0.546 / WEB: 0.313
00+20		-17	HOLE				2	2	3			X				INSIDE FLANGE
00+20		-18	HOLE				2	2	3			X				INSIDE FLANGE
00+28		**-11 TO -19**	**DENT**				**96**	**16**	**2**						**X**	**VERTICAL DENT**
00+30		**-9**	**DENT**				**12**	**16**	**2**						**X**	
		-12	**DENT**				**24**	**16**	**2**						**X**	
		-12	**FRACTURE**				**6**								**X**	**TEAR IN SP FLANGE**
		-16	**DENT**				**12**	**16**	**1**						**X**	
		-19	**DENT**				**24**	**16**	**2**						**X**	
00+33		**-9**	**DENT**				**12**		**2**						**X**	**1X1 PUNCTURE**
00+35		**-14 TO -19**	**DENT**				**24**	**16**	**2**						**X**	**VERTICAL DENT**
00+37		**-16**	**DENT**				**48**	**15**	**3**						**X**	**VERTICAL DENT**
00+40		**-21 TO -28**	**DENT/GOUGE**												**X**	**MULTIPLE DENTS & GOUGES**
00+41		**-13 TO -21**	**DENT**				**96**	**16**	**1**						**X**	**VERTICAL DENT**
00+48		**-14**	**DENT**				**36**	**12**	**1**						**X**	
		-27	**DENT**				**18**	**16**	**2**						**X**	
00+78		**-21**	**DENT**				**16**	**6**							**X**	

INSPECTION RECORD - SHEET PILES

LOCATION: COMMERCIAL PORT, PITI GUAM

DIVERS:

STRUCTURE ID: BERTH F2 (STA 00+00 TO 06+76)

DEPTH REFERENCE: ☐ DATUM ☐ GUAGE ☐ TIDE

GDN,LAC,BAP,DRW

WSP JOB NO: 30901541B

SHEET PILE TYPE: STEEL

*BOLDED DAMAGE NOTES INDICATES POST TYPHOON MAWAR (MAY 2023) DAMAGES

STATION ID	ML DEPTH	DAMAGE DEPTH	DAMAGE TYPE	DAMAGE LOCATION			DAMAGE SIZE (IN)			DAMAGE RATING						COMMENTS
				WEB	FLANGE	JOINT	LENGTH	WDTH	DEPTH	NI	ND	MN	MD	MJ	SV	
00+83		-11	HOLE				24	24	24					X		
00+84		**-18**	**HOLE**				**1**	**1**				**X**				**CORROSION HOLE**
00+86		**-6**	**DENT**				**12**	**12**	**1**							**DENTED FLANGE**
01+10			COR/PIT										X			WATERLINE: FLANGE: 0.300 / WEB: 0.351
																MID-WATER: FLANGE: 0.378 / WEB: 0.333
																MUDLINE: FLANGE: 0.496 / WEB: 0.383
01+33		**-16**	**HOLE**		**X**		**3**	**3**							**X**	
01+39		**-11**	**HOLE**		**X**		**2**	**6**							**X**	
		-13			**X**		**2**	**2**							**X**	
01+56		**-22**	**HOLE**		**X**		**3**	**1**							**X**	
		-23	**HOLE**				**3**	**1**							**X**	
01+61		**-17**	**HOLE**		**X**		**1**	**1**							**X**	
		-18	**HOLE**		**X**		**2**	**1**							**X**	
01+67		**-12**	**HOLE**		**X**		**2**	**6**							**X**	
01+95		**-21**	**HOLE**		**X**		**24**	**6**							**X**	
02+03		**-16**	**HOLE**	**X**			**1**	**1**							**X**	
				X			**6**	**6**							**X**	
					X		**4**	**6**							**X**	

INSPECTION RECORD - SHEET PILES

LOCATION: COMMERCIAL PORT, PITI GUAM

DIVERS:

STRUCTURE ID: BERTH F2 (STA 00+00 TO 06+76)

DEPTH REFERENCE: ☐ DATUM ☐ GUAGE ☐ TIDE

GDN,LAC,BAP,DRW

WSP JOB NO: 30901541B

SHEET PILE TYPE: STEEL

***BOLDED DAMAGE NOTES INDICATES POST TYPHOON MAWAR (MAY 2023) DAMAGES**

STATION ID	ML DEPTH	DAMAGE DEPTH	DAMAGE TYPE	DAMAGE LOCATION			DAMAGE SIZE (IN)			DAMAGE RATING						COMMENTS
				WEB	FLANGE	JOINT	LENGTH	WDTH	DEPTH	NI	ND	MN	MD	MJ	SV	
					X		2	2							X	
02+12		**-22**	**HOLE**	**X**			**2**	**2**							**X**	
			HOLE	X			**4**	**6**							**X**	
02+49		**-25**	**HOLE**				**2**	**2**							**X**	
02+00	-27		COR HOLE		X		24	6	6				X			1/8" DEEP PITS
																WATERLINE: FLANGE: 0.350 / WEB: NOT RECORDED
																MID-WATER: FLANGE: 0.448 / WEB: 0.313
																MUDLINE: FLANGE: 0.543 / WEB: 0.336
02+75		**-19**	**HOLE**		X			**2**	**2**						X	
03+00	-23															LVL2
03+50	-25		COR HOLE		X		1	4	4			X				X3
03+54	-26	-24	INTERLOCK SEP					3					X			SEPARATION OF INTERLOCK
03+57	-25	-20	INTERLOCK SEP					3					X			SEPARATION OF INTERLOCK
03+60	-25	-20	INTERLOCK SEP					8					X			SEPARATION OF INTERLOCK
03+95		WL	COR HOLE				4	2				X				
04+00	-24	-5	COR HOLE									X				
																WATERLINE: FLANGE: 0.516 / WEB: 0.385

INSPECTION RECORD - SHEET PILES

LOCATION: COMMERCIAL PORT, PITI GUAM

DIVERS:

STRUCTURE ID: BERTH F2 (STA 00+00 TO 06+76)

DEPTH REFERENCE: ☐ DATUM ☐ GUAGE ☐ TIDE

GDN,LAC,BAP,DRW

WSP JOB NO: 30901541B

SHEET PILE TYPE: STEEL

***BOLDED DAMAGE NOTES INDICATES POST TYPHOON MAWAR (MAY 2023) DAMAGES**

STATION ID	ML DEPTH	DAMAGE DEPTH	DAMAGE TYPE	DAMAGE LOCATION			DAMAGE SIZE (IN)			DAMAGE RATING						COMMENTS
				WEB	FLANGE	JOINT	LENGTH	WDTH	DEPTH	NI	ND	MN	MD	MJ	SV	
																MID-WATER: FLANGE: 0.481 / WEB: 0.380
																MUDLINE: FLANGE: 0.493 / WEB: 0.363
04+53	-19		COR HOLE				6	3	18				X			
05+00	-21		DENT						2			X				DENT ON FLANGE AT -13 AND -19
																WATERLINE: FLANGE: 0.485 / WEB: 0.423
																MID-WATER: FLANGE: NO READING / WEB: 0.276
																MUDLINE: FLANGE: 0.535 / WEB: 0.406
06+00																WATERLINE: FLANGE: 0.503 / WEB: 0.323
																MID-WATER: FLANGE: 0.485 / WEB: 0.330
																MUDLINE: FLANGE: 0.510 / WEB: 0.406
06+10			VOID				360	120	120						X	
06+15		-5	COR HOLE										X			
06+76		2	COR												X	SEVERE CORROSION AT TOP OF WALL

INSPECTION RECORD - SHEET PILES

LOCATION: COMMERCIAL PORT, PITI GUAM

DIVERS:

STRUCTURE ID: BERTH F3 (STA 00+00 TO 07+50)

DEPTH REFERENCE: ☐ DATUM ☐ GUAGE ☐ TIDE

GDN,DRW,BAP, LAC

WSP JOB NO: 30901541B

SHEET PILE TYPE: STEEL

*BOLDED DAMAGE NOTES INDICATES POST TYPHOON MAWAR (MAY 2023) DAMAGES

STATION ID	ML DEPTH	DAMAGE DEPTH	DAMAGE TYPE	DAMAGE LOCATION			DAMAGE SIZE (IN)			DAMAGE RATING						COMMENTS
				WEB	FLANGE	JOINT	LENGTH	WDTH	DEPTH	NI	ND	MN	MD	MJ	SV	
00+25		-8	DENT	X	X		1620								X	EXTENDS TO STA 01+60
00+30		-8	HOLE				2	2						X		
00+35		-8	HOLE/CRACK				2	0.25						X		
00+39		-10	HOLE				10	2							X	
00+40		-7	DENT				24	3							X	EXTENDS TO STA 01+70
		-2	MESP												X	EXTENDS TO STA 01+30
00+40		-10	BRK ANODE												X	BROKEN ANODE MOUNT
00+45		-10	BRK ANODE												X	BROKEN ANODE MOUNT
00+47		-10	TEAR				12	0.25						X		FLANGE/WEB TEAR
00+51		-8	MISS ANODE												X	MISSING ANODE
00+50		-2	CRACK													AT CONC/STEEL
00+55		-8	HOLE				3.5	3.5							X	X2
00+57		-8	MISS ANODE												X	MISSING ANODE
00+56		-7	HOLE				2	2					X			
00+63		-8	MISS ANODE												X	MISSING ANODE
00+68		-8	MISS ANODE												X	MISSING ANODE

INSPECTION RECORD - SHEET PILES

LOCATION:	COMMERCIAL PORT, PITI GUAM	DIVERS:	
STRUCTURE ID:	BERTH F3 (STA 00+00 TO 07+50)	DEPTH REFERENCE: ☐ DATUM ☐ GUAGE ☐ TIDE	GDN,DRW,BAP, LAC
WSP JOB NO:	30901541B	SHEET PILE TYPE: STEEL	*BOLDED DAMAGE NOTES INDICATES POST TYPHOON MAWAR (MAY 2023) DAMAGES

STATION ID	ML DEPTH	DAMAGE DEPTH	DAMAGE TYPE	DAMAGE LOCATION			DAMAGE SIZE (IN)			DAMAGE RATING						COMMENTS
				WEB	FLANGE	JOINT	LENGTH	WDTH	DEPTH	NI	ND	MN	MD	MJ	SV	
00+70		-5	HOLE				2	2					X			X2 HOLES
00+73		-8	MISS ANODE												X	MISSING ANODE
00+75		-7	HOLE		X	X	4	4					X			X3 HOLES (4X4, 1X3, AND 2X2)
00+79		-8	MISS ANODE												X	MISSING ANODE
00+80			DMG												X	DAMAGED/DETACHED ANODES, MULT LOCS
00+85		-8	MISS ANODE												X	MISSING ANODE
00+92		-8	MISS ANODE												X	MISSING ANODE
00+90		-8	MISS												X	MISSING ANODE
00+92		-6	HOLE				2	12					X			
01+00		-8	BRK ANODE												X	BROKEN ANODE MOUNT
		-8	MISS ANODE												X	
	30															WATERLINE: FLANGE: 0.313 / WEB: 0.238
	30															MID-WATER: FLANGE: 0.528 / WEB: 0.363
	30															MUDLINE: FLANGE: 0.500 / WEB: 0.328
01+05		-8	HOLE				5	18							X	
01+06		-8	MISS												X	MISSING ANODE

INSPECTION RECORD - SHEET PILES

LOCATION:	COMMERCIAL PORT, PITI GUAM	DIVERS:	
STRUCTURE ID:	BERTH F3 (STA 00+00 TO 07+50)	DEPTH REFERENCE: ☐ DATUM ☐ GUAGE ☐ TIDE	GDN,DRW,BAP, LAC
WSP JOB NO:	30901541B	SHEET PILE TYPE: STEEL	*BOLDED DAMAGE NOTES INDICATES POST TYPHOON MAWAR (MAY 2023) DAMAGES

STATION ID	ML DEPTH	DAMAGE DEPTH	DAMAGE TYPE	DAMAGE LOCATION			DAMAGE SIZE (IN)			DAMAGE RATING						COMMENTS
				WEB	FLANGE	JOINT	LENGTH	WDTH	DEPTH	NI	ND	MN	MD	MJ	SV	
01+12		-8	MISS												X	MISSING ANODE
01+18		-8	MISS												X	MISSING ANODE
01+23		-8	MISS ANODE												X	MISSING ANODE
01+24		-8	MISS												X	MISSING ANODE
01+30		-8	MISS												X	MISSING ANODE
01+30	-8		HOLE				3	3							X	
01+35	-2															CLOUDY LIQUID FROM GAP IN CONC/STEEL
01+36		-8	MISS												X	MISSING ANODE
01+40	-8		HOLE				16	12							X	X2
01+42		-5	HOLE				3	3						X		
01+42		-8	MISS												X	MISSING ANODE
01+44		-5	HOLE				6	6							X	
01+48		-8	MISS												X	MISSING ANODE
01+50	-8		HOLE				4.5	4.5							X	
01+52		-6	HOLE				12	2								

INSPECTION RECORD - SHEET PILES

LOCATION:	COMMERCIAL PORT, PITI GUAM	**DIVERS:**	
STRUCTURE ID:	BERTH F3 (STA 00+00 TO 07+50)	**DEPTH REFERENCE:** ☐ DATUM ☐ GUAGE ☐ TIDE	GDN,DRW,BAP, LAC
WSP JOB NO:	30901541B	**SHEET PILE TYPE:** STEEL	*BOLDED DAMAGE NOTES INDICATES POST TYPHOON MAWAR (MAY 2023) DAMAGES

STATION ID	ML DEPTH	DAMAGE DEPTH	DAMAGE TYPE	DAMAGE LOCATION			DAMAGE SIZE (IN)			DAMAGE RATING						COMMENTS
				WEB	FLANGE	JOINT	LENGTH	WDTH	DEPTH	NI	ND	MN	MD	MJ	SV	
01+52		**-8**	**MISS**												**X**	**MISSING ANODE**
01+57		**-3**	**CRUSH**												**X**	**CRUSHED WEBS W/ TEARINGT**
01+59		**-8**	**MISS**												**X**	**MISSING ANODE**
01+65		**-3**	**HOLE/CRUSH**				**3**	**5**							**X**	**CRUSHED WEB W/ HOLE**
01+65		**-8**	**BRK ANODE**												**X**	**BROKEN ANODE MOUNT**
			MISS ANODE												**X**	**MISSING ANODE**
01+70		**-8**	**MISS**												**X**	**MISSING ANODE**
01+76		**-8**	**BRK ANODE**												**X**	**BROKEN MOUNT**
02+00	33		COR									X				1/16" PITTING
																WATERLINE: FLANGE: 0.329 / WEB: 0.280
																MID-WATER: FLANGE: 0.513 / WEB: 0.255
																MUDLINE: FLANGE: 0.543 / WEB: 0.375
03+20	33		COR									X				1/16" PITTING
																WATERLINE: NO READING
																MID-WATER: NO READING
																MUDLINE: FLANGE: 0.476 / WEB: 0.351
03+80		-8	COR HOLE	X	X		12	6	24				X			
03+98		**-4**	**HOLE**			**X**	**16**	**3**							**X**	

INSPECTION RECORD - SHEET PILES

LOCATION:	COMMERCIAL PORT, PITI GUAM	**DIVERS:**	
STRUCTURE ID:	BERTH F3 (STA 00+00 TO 07+50)	**DEPTH REFERENCE:** ☐ DATUM ☐ GUAGE ☐ TIDE	GDN,DRW,BAP, LAC
WSP JOB NO:	30901541B	**SHEET PILE TYPE:** STEEL	***BOLDED DAMAGE NOTES INDICATES POST TYPHOON MAWAR (MAY 2023) DAMAGES**

STATION ID	ML DEPTH	DAMAGE DEPTH	DAMAGE TYPE	DAMAGE LOCATION			DAMAGE SIZE (IN)			DAMAGE RATING						COMMENTS
				WEB	FLANGE	JOINT	LENGTH	WDTH	DEPTH	NI	ND	MN	MD	MJ	SV	
		-11	**DENT**												**X**	**PILE CAP TO -11**
04+30	31		COR									X				WATERLINE: FLANGE: NO READING / WEB: 0.328
																MID-WATER: FLANGE: NO READING / WEB: 0.351
							310									MUDLINE: FLANGE: 0.526 / WEB: 0.371
							285									
05+35	30		COR				280					X				WATERLINE: FLANGE: 0.526/ WEB: NO READING
																MID-WATER: FLANGE: 0.526 / WEB: 0.333
							330									MUDLINE: FLANGE: 0.493 / WEB: 0.363
							370									
06+45	30		COR				375					X				WATERLINE: FLANGE: 0.496 / WEB: 0.301
																MID-WATER: FLANGE: 0.491 / WEB: 0.335
							330									MUDLINE: FLANGE: 0.493 / WEB: 0.351
							420									
07+00	33		COR				345					X				WATERLINE: FLANGE: 0.496 / WEB: 0.291
																MID-WATER: FLANGE: 0.500 / WEB: 0.358
																MUDLINE: FLANGE: 0.511 / WEB: 0.365

INSPECTION RECORD - SHEET PILES

LOCATION:	COMMERCIAL PORT, PITI GUAM	**DIVERS:**	
STRUCTURE ID:	BERTH F4 (STA 07+50 TO 14+05)	**DEPTH REFERENCE:** ☐ DATUM ☐ GUAGE ☐ TIDE	**BAP,DRW,LAC, BAH**
WSP JOB NO:	30901541B	**SHEET PILE TYPE:** STEEL	***BOLDED DAMAGE NOTES INDICATES POST TYPHOON MAWAR (MAY 2023) DAMAGES**

STATION ID	ML DEPTH	DAMAGE DEPTH	DAMAGE TYPE	DAMAGE LOCATION			DAMAGE SIZE (IN)			DAMAGE RATING						COMMENTS
				WEB	FLANGE	JOINT	LENGTH	WDTH	DEPTH	NI	ND	MN	MD	MJ	SV	
07+50	36															WATERLINE: FLANGE: 0.526 / WEB: 0.351
07+50																MID-WATER: FLANGE: 0.530 / WEB: 0.333
07+50																MUDLINE: FLANGE: 0.523 / WEB: 0.351
10+00	35															WATERLINE: FLANGE: 0.540 / WEB: 0.385
10+00																MID-WATER: FLANGE: 0.521 / WEB: 0.395
10+00																MUDLINE: FLANGE: 0.480 / WEB: 0.320
11+00	39															WATERLINE: FLANGE: 0.478 / WEB: 0.321
11+00																MID-WATER: FLANGE: 0.528 / WEB: 0.415
11+00																MUDLINE: FLANGE: 0.503 / WEB: 0.358
12+00	37															WATERLINE: FLANGE: 0.488 / WEB: 0.403
12+00																MID-WATER: FLANGE: 0.535 / WEB: 0.333
12+00																MUDLINE: FLANGE: 0.530 / WEB: 0.341
13+00	40															WATERLINE: FLANGE: 0.435 / WEB: 0.341
13+00																MID-WATER: FLANGE: 0.511 / WEB: 0.338
13+00																MUDLINE: FLANGE: 0.516 / WEB: 0.353
13+50	40															WATERLINE: FLANGE: 0.451 / WEB: 0.360
13+50																MID-WATER: FLANGE: 0.461 / WEB: 0.321
13+50																MUDLINE: FLANGE: 0.511 / WEB: 0.335

INSPECTION RECORD - SHEET PILES

LOCATION:	COMMERCIAL PORT, PITI GUAM	**DIVERS:**	
STRUCTURE ID:	BERTH F5 (STA 14+05 TO 20+55)	**DEPTH REFERENCE:** ☐ DATUM ☐ GUAGE ☐ TIDE	**BAP,DRW,LAC,GDN,BAH**
WSP JOB NO:	30901541B	**SHEET PILE TYPE:** STEEL	

STATION ID	ML DEPTH	DAMAGE DEPTH	DAMAGE TYPE	DAMAGE LOCATION			DAMAGE SIZE (IN)			DAMAGE RATING						COMMENTS
				WEB	FLANGE	JOINT	LENGTH	WDTH	DEPTH	NI	ND	MN	MD	MJ	SV	
14+05	40															WATERLINE: FLANGE: 0.506 / WEB: 0.365
14+05																MID-WATER: FLANGE: 0.516 / WEB: 0.386
14+05																MUDLINE: FLANGE: 0.505 / WEB: 0.338
15+00	40															WATERLINE: FLANGE: 0.496 / WEB: 0.365
15+00																MID-WATER: FLANGE: 0.525 / WEB: 0.365
15+00																MUDLINE: FLANGE: 0.538 / WEB: 0.365
16+00	40															WATERLINE: FLANGE: 0.480 / WEB: 0.380
16+00																MID-WATER: FLANGE: 0.531 / WEB: 0.341
16+00																MUDLINE: FLANGE: 0.510 / WEB: 0.366
16+90 CORNER	30															WATERLINE: FLANGE: 0.533 / WEB: 0.530
16+90 CORNER																MID-WATER: FLANGE: 0.570 / WEB: 0.488
16+90 CORNER																MUDLINE: FLANGE: 0.508 / WEB: 0.491
17+00 CUTOFF WALL			COR AT TOP										X			FLANGE: 0.523 / WEB: 0.358
18+00 CUTOFF WALL			COR AT TOP										X			FLANGE: 0.513 / WEB: 0.346
19+00 CUTOFF WALL			COR AT TOP										X			FLANGE: 0.473 / WEB: 0.313
20+00 CUTOFF WALL			COR AT TOP										X			FLANGE: 0.520 / WEB: 0.298
17+00 TOE-WALL	34															FLANGE: 0.540 / WEB: 0.348
18+00 TOE-WALL	33															FLANGE: 0.560 / WEB: 0.351
19+00 TOE-WALL	33															FLANGE: 0.493 / WEB: 0.381

INSPECTION RECORD - SHEET PILES

LOCATION:	COMMERCIAL PORT, PITI GUAM	**DIVERS:**	
STRUCTURE ID:	BERTH F5 (STA 14+05 TO 20+55)	**DEPTH REFERENCE:** ☐ DATUM ☐ GUAGE ☐ TIDE	**BAP,DRW,LAC,GDN,BAH**
WSP JOB NO:	30901541B	**SHEET PILE TYPE:** STEEL	

STATION ID	ML DEPTH	DAMAGE DEPTH	DAMAGE TYPE	DAMAGE LOCATION			DAMAGE SIZE (IN)			DAMAGE RATING						COMMENTS
				WEB	FLANGE	JOINT	LENGTH	WDTH	DEPTH	NI	ND	MN	MD	MJ	SV	
20+00 TOE-WALL	34															FLANGE: 0.558 / WEB: 0.371

INSPECTION RECORD - PILES

LOCATION: COMMERCIAL PORT, PITI GUAM		**DIVERS:**	
STRUCTURE ID: BERTH F5 (STA 14+05 TO 20+55)	**DEPTH REFERENCE:** X DATU ☐ GUAGE ☐ TIDE	**BAP,DRW,LAC,GDN,BAH**	
WSP JOB NO: 30901541B	**MATERIAL:** STEEL	**A/W STAFF:**	MAD, CRE

PILE TYPE	BENT #	PILE ROW	ML ELEV ±	DAMAGE ELEV	DAMAGE		DAMAGE RATING						COMMENTS
					TYPE	SIZE (in)	NI	ND	MN	MD	MJ	SV	
PLUMB	1	A	-30					X					
PLUMB	1	B	-33	5	CCS	48X12				X			
PLUMB	1	C	-15					X					
PLUMB	1	D	-5					X					
PLUMB	2	A	-31					X					
PLUMB	2	D	-5					X					
PLUMB	3	A	-31					X					
PLUMB	3	B	-23					X					
PLUMB	3	C	-15					X					
PLUMB	3	D	-9					X					
PLUMB	4	A	-30					X					
PLUMB	4	D	-7					X					
PLUMB	5	A	-32					X					
PLUMB	5	B	-24					X					
PLUMB	5	C	-12					X					
PLUMB	5	D	-7					X					
PLUMB	6	A	-31					X					
PLUMB	6	D	-8					X					
PLUMB	7	A	-31					X					
PLUMB	7	B	-24					X					
PLUMB	7	C	-16					X					
PLUMB	7	D	-10					X					

INSPECTION RECORD - PILES

LOCATION: COMMERCIAL PORT, PITI GUAM

DIVERS:

STRUCTURE ID: BERTH F5 (STA 14+05 TO 20+55)

DEPTH REFERENCE: X DATU ☐ GUAGE ☐ TIDE

BAP,DRW,LAC,GDN,BAH

WSP JOB NO: 30901541B

MATERIAL: STEEL

A/W STAFF: MAD, CRE

PILE TYPE	BENT #	PILE ROW	ML ELEV ±	DAMAGE ELEV	DAMAGE		DAMAGE RATING						COMMENTS
					TYPE	SIZE (in)	NI	ND	MN	MD	MJ	SV	
PLUMB	8	A	-30					X					
PLUMB	8	D	-10					X					
PLUMB	9	A	-31					X					
PLUMB	9	B	-26					X					
PLUMB	9	C	-15					X					
PLUMB	9	D	-9					X					
PLUMB	10	A	-32					X					
PLUMB	10	D	-9					X					
PLUMB	11	A	-30					X					
PLUMB	11	B	-25					X					
PLUMB	11	C	-16					X					
PLUMB	11	D	-9					X					
PLUMB	12	A	-30					X					
PLUMB	12	D	-9					X					
PLUMB	13	A	-32					X					
PLUMB	13	B	-25					X					
PLUMB	13	C	-15					X					
PLUMB	13	D	-9					X					
PLUMB	14	A	-31					X					
PLUMB	14	D	-9					X					
PLUMB	14.9	A	-31										
PLUMB	15	A	-31					X					
PLUMB	15.1	A	-31										

INSPECTION RECORD - PILES

LOCATION: COMMERCIAL PORT, PITI GUAM		**DIVERS:**	
STRUCTURE ID: BERTH F5 (STA 14+05 TO 20+55)	**DEPTH REFERENCE:** X DATU ☐ GUAGE ☐ TIDE	**BAP,DRW,LAC,GDN,BAH**	
WSP JOB NO: 30901541B	**MATERIAL:** STEEL	**A/W STAFF:**	MAD, CRE

PILE TYPE	BENT #	PILE ROW	ML ELEV ±	DAMAGE ELEV	DAMAGE		DAMAGE RATING						COMMENTS
					TYPE	SIZE (in)	NI	ND	MN	MD	MJ	SV	
PLUMB	15	B	-26					X					
PLUMB	15	C	-14					X					
PLUMB	15	D	-6					X					
PLUMB	16	A	-32					X					
PLUMB	16	D	-6					X					
PLUMB	17	A	-31					X					
PLUMB	17	B	-24					X					
PLUMB	17	C	-17										
PLUMB	17	D	-10	-1	CR, CCS						X		
PLUMB	18	A	-30					X					
PLUMB	18	D	-10		DELAM					X			CORNER DELAM
PLUMB	19	A	-29					X					
PLUMB	19	B	-24					X					
PLUMB	19	C	-11					X					LVL2
PLUMB	19	D	-6					X					JACKET
PLUMB	20	A	-30					X					
PLUMB	20	D	-5					X					JACKET
PLUMB	20	A	-30					X					
PLUMB	20	B	-21					X					
PLUMB	21	C	-15					X					LVL2
PLUMB	21	D	-9					X					

INSPECTION RECORD - PILES

LOCATION: COMMERCIAL PORT, PITI GUAM		**DIVERS:**	
STRUCTURE ID: BERTH F5 (STA 14+05 TO 20+55)	**DEPTH REFERENCE:** X DATU ☐ GUAGE ☐ TIDE	**BAP,DRW,LAC,GDN,BAH**	
WSP JOB NO: 30901541B	**MATERIAL:** STEEL	**A/W STAFF:**	MAD, CRE

PILE TYPE	BENT #	PILE ROW	ML ELEV ±	DAMAGE ELEV	DAMAGE		DAMAGE RATING						COMMENTS
					TYPE	SIZE (in)	NI	ND	MN	MD	MJ	SV	
PLUMB	22	A	-30					X					
PLUMB	22	D	-9					X					
PLUMB	22	A	-31					X					
PLUMB	22	B	-24					X					
PLUMB	23	C	-13					X					
PLUMB	23	D	-5					X					LVL2, JACKET
PLUMB	24	A	-31					X					
PLUMB	24	D	-5					X					JACKET
PLUMB	25	A	-29					X					
PLUMB	25	B	-23					X					LVL2, JACKET
PLUMB	25	C	-14					X					
PLUMB	25	D	-8					X					
PLUMB	26	A	-29					X					
PLUMB	26	D	-8					X					
PLUMB	27	A	-31					X					
PLUMB	27	B	-24					X					LVL2
PLUMB	27	C	-11					X					
PLUMB	27	D	-6					X					JACKET
PLUMB	28	A	-30					X					
PLUMB	28	D	-6	4	CR	1/32"			X				JACKET, X3 CRACKS SOUTH FACE

INSPECTION RECORD - PILES

LOCATION: COMMERCIAL PORT, PITI GUAM		**DIVERS:**	
STRUCTURE ID: BERTH F5 (STA 14+05 TO 20+55)	**DEPTH REFERENCE:** ☒ DATU ☐ GUAGE ☐ TIDE	**BAP,DRW,LAC,GDN,BAH**	
WSP JOB NO: 30901541B	**MATERIAL:** STEEL	**A/W STAFF:**	MAD, CRE

PILE TYPE	BENT #	PILE ROW	ML ELEV ±	DAMAGE ELEV	DAMAGE		DAMAGE RATING						COMMENTS
					TYPE	SIZE (in)	NI	ND	MN	MD	MJ	SV	
PLUMB	29	A	-29					X					
PLUMB	29	B	-23					X					
PLUMB	29	C	-14					X					
PLUMB	29	D	-9					X					
PLUMB	30	A	-30					X					
PLUMB	30	D	-9					X					
PLUMB	31	A	-30					X					
PLUMB	31	B	-21					X					
PLUMB	31	C	-13					X					
PLUMB	31	D	-6					X					JACKET
PLUMB	32	A	-30					X					
PLUMB	32	D	-6					X					JACKET
PLUMB	33	A	-29					X					
PLUMB	33	B	-24					X					
PLUMB	33	C	-15					X					
PLUMB	33	D	-8					X					JACKET
PLUMB	34	A	-29					X					LVL2
PLUMB	34	D	-8					X					JACKET
PLUMB	35	A	-31					X					
PLUMB	35	B	-22					X					LVL2
PLUMB	35	C	-11					X					
PLUMB	35	D	-6					X					JACKET

INSPECTION RECORD - PILES

LOCATION: COMMERCIAL PORT, PITI GUAM

DIVERS:

STRUCTURE ID: BERTH F5 (STA 14+05 TO 20+55)

DEPTH REFERENCE: X DATU ☐ GUAGE ☐ TIDE

BAP,DRW,LAC,GDN,BAH

WSP JOB NO: 30901541B

MATERIAL: STEEL

A/W STAFF: MAD, CRE

PILE TYPE	BENT #	PILE ROW	ML ELEV ±	DAMAGE ELEV	DAMAGE		DAMAGE RATING						COMMENTS
					TYPE	SIZE (in)	NI	ND	MN	MD	MJ	SV	
PLUMB	36	A	-31					X					
PLUMB	36	D	-6		COR CR	1/16X24			X				
PLUMB	37	A	-30					X					
PLUMB	37	B	-23					X					
PLUMB	37	C	-14					X					LVL2
PLUMB	37	D	-8					X					JACKET
PLUMB	38	A	-29					X					
PLUMB	38	D	-8					X					JACKET
PLUMB	39	A	-31					X					
PLUMB	39	B	-24					X					
PLUMB	39	C	-12					X					
PLUMB	39	D	-6					X					LVL2, JACKET
PLUMB	40	A	-31					X					
PLUMB	40	D	-6					X					JACKET
PLUMB	41	A	-29					X					
PLUMB	41	B	-24					X					
PLUMB	41	C	-14					X					
PLUMB	41	D	-7					X					JACKET

INSPECTION RECORD - PILES

LOCATION: COMMERCIAL PORT, PITI GUAM		**DIVERS:**	
STRUCTURE ID: BERTH F5 (STA 14+05 TO 20+55)	**DEPTH REFERENCE:** X DATU ☐ GUAGE ☐ TIDE	**BAP,DRW,LAC,GDN,BAH**	
WSP JOB NO: 30901541B	**MATERIAL:** STEEL	**A/W STAFF:**	MAD, CRE

PILE TYPE	BENT #	PILE ROW	ML ELEV ±	DAMAGE ELEV	DAMAGE		DAMAGE RATING						COMMENTS
					TYPE	SIZE (in)	NI	ND	MN	MD	MJ	SV	

INSPECTION RECORD - SHEET PILES

LOCATION:	COMMERCIAL PORT, PITI GUAM	**DIVERS:**	
STRUCTURE ID:	BERTH F6 (STA 20+55 TO 27+05)	**DEPTH REFERENCE:** ☐ DATUM ☐ GUAGE ☐ TIDE	**GDN,DRW,BAP,LAC**
WSP JOB NO:	30901541B	**SHEET PILE TYPE:** STEEL	

STATION ID	ML DEPTH	DAMAGE DEPTH	DAMAGE TYPE	DAMAGE LOCATION			DAMAGE SIZE (IN)			DAMAGE RATING						COMMENTS
				WEB	FLANGE	JOINT	LENGTH	WDTH	DEPTH	NI	ND	MN	MD	MJ	SV	
21+00 CUTOFF WALL			COR AT TOP										X			FLANGE: 0.500 / WEB: 0.378
22+00 CUTOFF WALL			COR AT TOP										X			FLANGE: 0.523 / WEB: 0.360
22+40	33										X					WATERLINE: FLANGE: 0.483 / WEB: 0.338
22+40																MID-WATER: FLANGE: 0.541 / WEB: 0.341
22+40																MUDLINE: FLANGE: 0.533 / WEB: 0.376
23+00	32										X					WATERLINE: FLANGE: 0.523 / WEB: 0.386
23+00																MID-WATER: FLANGE: 0.486 / WEB: 0.360
23+00																MUDLINE: FLANGE: 0.493 / WEB: 0.366
24+35	35										X					WATERLINE: FLANGE: 0.520 / WEB: 0.380
24+35																MID-WATER: FLANGE: 0.505 / WEB: 0.368
24+35																MUDLINE: FLANGE: 0.523 / WEB: 0.386
25+45	31										X					WATERLINE: FLANGE: 0.510 / WEB: 0.330
25+45																MID-WATER: FLANGE: 0.516 / WEB: 0.330
25+45																MUDLINE: FLANGE: 0.470 / WEB: 0.381
26+55	20										X					WATERLINE: FLANGE: 0.481 / WEB: 0.381
26+55																MID-WATER: FLANGE: 0.523 / WEB: 0.345
26+55																

INSPECTION RECORD - PILES

LOCATION: COMMERCIAL PORT, PITI GUAM

DIVERS:

STRUCTURE ID: BERTH F6 (STA 20+55 TO 27+05)

DEPTH REFERENCE: X DATU ☐ GUAGE ☐ TIDE

BAP,LAC,GDN,DRW

WSP JOB NO: 30901541B

MATERIAL: STEEL

A/W STAFF: MAD, CRE

PILE TYPE	BENT #	PILE ROW	ML ELEV ±	DAMAGE ELEV	DAMAGE		DAMAGE RATING						COMMENTS
					TYPE	SIZE (in)	NI	ND	MN	MD	MJ	SV	
PLUMB	42	A	-29					X					
PLUMB	42	D	-7					X					JACKET
PLUMB	43	A	-31					X					
PLUMB	43	B	-23					X					
PLUMB	43	C	-13					X					
PLUMB	43	D	-5					X					JACKET
PLUMB	44	A	-30					X					
PLUMB	44	D	-5					X					JACKET
PLUMB	45	A	-30					X					
PLUMB	45	B	-23					X					LVL2
PLUMB	45	C	-15					X					
PLUMB	45	D	-7		CORNER DELAM				X				NO JACKET
PLUMB	46	A	-29					X					
PLUMB	46	D	-7		CR	1/32"X24"				X			JACKET
PLUMB	47	A	-32					X					LVL2
PLUMB	47	B	-23					X					
PLUMB	47	C	-14					X					
PLUMB	47	D	-5	6	CR,CCS	1/32"X8"			X				JACKET, CCS 36X8X8

INSPECTION RECORD - PILES

LOCATION: COMMERCIAL PORT, PITI GUAM

DIVERS:

STRUCTURE ID: BERTH F6 (STA 20+55 TO 27+05)

DEPTH REFERENCE: X DATU ☐ GUAGE ☐ TIDE

BAP,LAC,GDN,DRW

WSP JOB NO: 30901541B

MATERIAL: STEEL

A/W STAFF: MAD, CRE

PILE TYPE	BENT #	PILE ROW	ML ELEV ±	DAMAGE ELEV	DAMAGE		DAMAGE RATING						COMMENTS
					TYPE	SIZE (in)	NI	ND	MN	MD	MJ	SV	
PLUMB	48	A	-31					X					
PLUMB	48	D	-6					X					JACKET
PLUMB	49	A	-32					X					
PLUMB	49	B	-24		COR CR	1/16"			X				
PLUMB	49	C	-15					X					
PLUMB	49	D	-8					X					
PLUMB	50	A	-32					X					
PLUMB	50	D	-8					X					LVL2, JACKET
PLUMB	51	A	-33					X					
PLUMB	51	B	-25					X					
PLUMB	51	C	-13					X					
PLUMB	51	D	-6					X					JACKET
PLUMB	52	A	-32					X					
PLUMB	52	D	-6					X					JACKET
PLUMB	53	A	-31					X					LVL2
PLUMB	53	B	-25					X					
PLUMB	53	C	-15					X					
PLUMB	53	D	-7					X					JACKET
PLUMB	54	A	-31					X					
PLUMB	54	D	-7					X					JACKET
PLUMB	55	A	-33					X					
PLUMB	55	B	-26					X					
PLUMB	55	C	-13					X					LVL2

INSPECTION RECORD - PILES

LOCATION: COMMERCIAL PORT, PITI GUAM

DIVERS:

STRUCTURE ID: BERTH F6 (STA 20+55 TO 27+05)

DEPTH REFERENCE: X DATU ☐ GUAGE ☐ TIDE

BAP,LAC,GDN,DRW

WSP JOB NO: 30901541B

MATERIAL: STEEL

A/W STAFF: MAD, CRE

PILE TYPE	BENT #	PILE ROW	ML ELEV ±	DAMAGE ELEV	DAMAGE		DAMAGE RATING						COMMENTS
					TYPE	SIZE (in)	NI	ND	MN	MD	MJ	SV	
PLUMB	55	D	-6					X					JACKET
PLUMB	56	A	-31					X					
PLUMB	56	D	-6					X					JACKET
PLUMB	57	A	-31					X					
PLUMB	57	B	-23					X					
PLUMB	57	C	-14					X					
PLUMB	57	D	-7					X					JACKET
PLUMB	58	A	-31					X					
PLUMB	58	D	-7					X					JACKET
PLUMB	59	A	-33					X					
PLUMB	59	B	-24					X					
PLUMB	59	C	-11					X					
PLUMB	59	D	-6					X					LVL2, NO JACKET
PLUMB	60	A	-34					X					
PLUMB	60	D	-6					X					JACKET
PLUMB	61	A	-31					X					
PLUMB	61	B	-26					X					LVL2
PLUMB	61	C	-16					X					
PLUMB	61	D	-7					X					JACKET
PLUMB	62	A	-31					X					
PLUMB	62	D	-7					X					JACKET

INSPECTION RECORD - PILES

LOCATION: COMMERCIAL PORT, PITI GUAM

DIVERS:

STRUCTURE ID: BERTH F6 (STA 20+55 TO 27+05)

DEPTH REFERENCE: X DATU ☐ GUAGE ☐ TIDE

BAP,LAC,GDN,DRW

WSP JOB NO: 30901541B

MATERIAL: STEEL

A/W STAFF: MAD, CRE

PILE TYPE	BENT #	PILE ROW	ML ELEV ±	DAMAGE ELEV	DAMAGE		DAMAGE RATING						COMMENTS
					TYPE	SIZE (in)	NI	ND	MN	MD	MJ	SV	
PLUMB	63	A	-32					X					
PLUMB	63	B	-23					X					
PLUMB	63	C	-15					X					
PLUMB	63	D	-7					X					JACKET

INSPECTION RECORD - CONCRETE FRAMING ELEMENTS

LOCATION: COMMERCIAL PORT, PITI GUAM | **WSP JOB NO:** 30901541B | **INSPECTORS:** MAD, CRE

STRUCTURE ID: BERTHS F2-F6

*BOLDED DAMAGE NOTES INDICATES POST TYPHOON MAWAR (MAY 2023) DAMAGES

STRUCTURE	STATION ID	ELEMENT	DAMAGE	PILE ROW	DAMAGE LOCATION	DAMAGE TYPE	DAMAGE SIZE (IN)			DAMAGE RATING						COMMENTS
							LENGTH	WIDTH	DEPTH	NI	ND	MN	MD	MJ	SV	
F2	00+00 TO 05+50	CONC FACE	OCS		TOP FACE								X			MESP AND OCS TYPICAL ALONG ENTIRE BERTH FACE
F2	01+15	CONC FACE	HOLE		5' DWN		4	1	2				X			
F2	01+60	CONC FACE	OCS		1' DWN		60	24	8						X	OCS W/ EXPOSED SHEET PILING
F2	01+60 TO 02+50	CONC FACE	OCS		1' DWN										X	OCS W/ EXPOSED SHEET PILING MULT LOCS
F2	**01+70**	**CONC FACE**	**OCS**		**1' DWN**		**36**	**7**	**4**						**X**	**X3 EXPOSED STIRRUPS**
F2	03+75	CONC FACE	OCS		1' DWN		48	72	2						X	OCS W/ EXPOSED SHEET PILING
F2	04+25	CONC FACE	CCS		1' DWN		96	60					X			
F2	06+00 TO 06+66	CONC FACE	CCS		4' DWN								X			24" TALL AND FULL LENGTH FROM 06+00 TO 06+66
F2	02+00 TO 04+00	CONC FACE														CONC FACE NOT INSPECTED DUE TO S-2007 DRY DOCK
F3	03+30	CONC FACE	DL		2' DWN		18	24					X			
F3	**0+25**	**CONC FACE**	**GAP**												**X**	**3/4" GAP CONC TO SP EXTENDS TO 0+60**
F3	**0+40**	**CONC FACE**	**MESP**		**2' DWN**									**X**		**SPALLED CONCRETE EXTENDS TO STA 1+60**
F3	03+65	CONC FACE	DL		2' DWN		12	12				X				(2) AT THIS LOC
F3	**01+15**	**CONC FACE**	**GAP**		**4' DWN**										**X**	**3/4" GAP CONC TO SP EXTENDS TO 01+30**
F3	04+15	CONC FACE	DL		TOP BULLRAIL							X				
F3	04+70	CONC FACE	DL		TOP BULLRAIL		36	18					X			
F3	04+85	CONC FACE	OCS		BULLRAIL		36	18					X			
F3	05+00	CONC FACE	DL		1' DWN		36	18					X			
F3	05+05	CONC FACE	DL		1' DWN		12	12				X				
F3	05+10	CONC FACE	DL		TOP BULLRAIL		12	18				X				
F3	05+15	CONC FACE	DL		1' DWN		12	12								
F3	05+20	CONC FACE	DL		1' DWN		12	12				X				
F3	05+50	CONC FACE	OCS		1' DWN		48	36	1.5					X		
F3	05+75	CONC FACE	DL		1' DWN		12	18				X				

INSPECTION RECORD - CONCRETE FRAMING ELEMENTS

LOCATION: COMMERCIAL PORT, PITI GUAM | **WSP JOB NO:** 30901541B | **INSPECTORS:** MAD, CRE

STRUCTURE ID: BERTHS F2-F6

*BOLDED DAMAGE NOTES INDICATES POST TYPHOON MAWAR (MAY 2023) DAMAGES

STRUCTURE	STATION ID	ELEMENT	DAMAGE	PILE ROW	DAMAGE LOCATION	DAMAGE TYPE	DAMAGE SIZE (IN)			DAMAGE RATING						COMMENTS
							LENGTH	WIDTH	DEPTH	NI	ND	MN	MD	MJ	SV	
F3	05+30	CONC FACE	DL		1' DWN		12	12				X				
F3	05+80	CONC FACE	DL		TOP BULLRAIL		60	60					X			
F3	06+20	CONC FACE	OCS		TOP BULLRAIL		24	12					X			
F3	06+30	CONC FACE	DL		5' DWN		12	18				X				
F3	06+45	CONC FACE	DL		2' DWN		24	8				X				
F3	06+55	CONC FACE	CCS		2' DWN		24	72					X			
F3	06+80	CONC FACE	OCS		TOP BULLRAIL		48	48					X			
F3	06+85	CONC FACE	OCS		TOP BULLRAIL		36	18					X			
F3	07+10	CONC FACE	CCS		TOP BULLRAIL		48	48				X				
F3	00+20	BULLRAIL	MESP				24	6	3			X				FAILED REPAIR
F3	**00+35**	**BULLRAIL**	**OCS**		**BULLRAIL**		**1380**							**X**		**OCS/MESP EXTENDING 150' EAST**
F3	00+58	BULLRAIL	MESP				16	6	2			X				
F3	00+81	BULLRAIL	SPALL				24	6	2			X				
F3	01+36	BULLRAIL	DL				36	8	1			X				FAILED REPAIR
F3	01+82	BULLRAIL	MESP				36	16	3				X			
F3	**02+50**	**BULLRAIL**	**OCS**		**BULLRAIL**		**24**	**12**					**X**			
F3	**03+00**	**BULLRAIL**	**OCS**		**BULLRAIL**		**24**	**12**					**X**			
F3	**03+40**	**BULLRAIL**	**OCS**		**BULLRAIL**		**24**	**12**					**X**			
F3	**03+50**	**BULLRAIL**	**OCS**		**BULLRAIL**		**24**	**12**					**X**			
F3	**03+60**	**BULLRAIL**	**OCS**		**BULLRAIL**		**24**	**12**					**X**			
F3	03+80	BULLRAIL	MESP				6	6	1			X				

INSPECTION RECORD - CONCRETE FRAMING ELEMENTS

LOCATION: COMMERCIAL PORT, PITI GUAM | **WSP JOB NO:** 30901541B | **INSPECTORS:** MAD, CRE

STRUCTURE ID: BERTHS F2-F6

*BOLDED DAMAGE NOTES INDICATES POST TYPHOON MAWAR (MAY 2023) DAMAGES

STRUCTURE	STATION ID	ELEMENT	DAMAGE	PILE ROW	DAMAGE LOCATION	DAMAGE TYPE	DAMAGE SIZE (IN)			DAMAGE RATING						COMMENTS
							LENGTH	WIDTH	DEPTH	NI	ND	MN	MD	MJ	SV	
F3	03+93	BULLRAIL	MESP				6	6	1			X				
F3	04+00	BULLRAIL	DL				12	6				X				FAILED REPAIR
F3	04+08	BULLRAIL	DL				84	3				X				
F3	04+23	BULLRAIL	DL				24	6				X				
F3	04+27	BULLRAIL	DL				6	3				X				
F3	04+33	BULLRAIL	DL				3	3				X				
F3	04+37	BULLRAIL	MESP				36	6				X				
F3	04+50	BULLRAIL	MESP				24	6	2			X				X2 AT WS AND LS FACE OF BULLRAIL
F3	**04+60**	**BULLRAIL**	**OCS**		**BULLRAIL**		**240**							**X**		**OCS EXTENDING 20' EAST**
F3	04+87	BULLRAIL	MESP				6	3	1			X				
F3	**05+05**	**BULLRAIL**	**OCS**		**BULLRAIL**		**300**								**X**	**OCS EXTENDING 25' EAST**
F3	05+06	BULLRAIL	MESP				24	6	2			X				
F3	05+11	BULLRAIL	MESP				36	6	3			X				
F3	05+18	BULLRAIL	MESP				12	6	1			X				
F3	05+22	BULLRAIL	DL				22	8	3			X				
F3	05+43	BULLRAIL	MESP				6	6	1			X				
F3	**05+50**	**BULLRAIL**	**OCS**		**BULLRAIL**		**840**								**X**	**OCS EXTENDING 70' EAST**
F3	05+59	BULLRAIL	MESP				6	6	1			X				
F3	05+62	BULLRAIL	MESP				18	8	1			X				
F3	05+75	BULLRAIL	MESP				12	4	1			X				
F3	05+76	BULLRAIL	DL				24	4				X				
F3	05+81	BULLRAIL	DL				3	3				X				
F3	05+89	BULLRAIL	OCS				60	4	2					X		
F3	06+12	BULLRAIL	OCS				16	3	3				X			

INSPECTION RECORD - CONCRETE FRAMING ELEMENTS

LOCATION: COMMERCIAL PORT, PITI GUAM | **WSP JOB NO:** 30901541B | **INSPECTORS:** MAD, CRE

STRUCTURE ID: BERTHS F2-F6

*BOLDED DAMAGE NOTES INDICATES POST TYPHOON MAWAR (MAY 2023) DAMAGES

STRUCTURE	STATION ID	ELEMENT	DAMAGE	PILE ROW	DAMAGE LOCATION	DAMAGE TYPE	DAMAGE SIZE (IN)			DAMAGE RATING						COMMENTS
							LENGTH	WIDTH	DEPTH	NI	ND	MN	MD	MJ	SV	
F3	06+18	BULLRAIL	DL				24	12	3			X				
F3	06+21	BULLRAIL	DL				68	18	3				X			
F3	**06+40**	**CONC FACE**	**OCS**		**BULLRAIL**		**240**								**X**	**OCS EXTENDING 20' EAST**
F3	06+44	BULLRAIL	MESP				56	8	2				X			
F3	06+60	BULLRAIL	MESP				36	6	3			X				FAILED REPAIR
F3	06+75	BULLRAIL	MESP				6	3	1			X				
F3	06+94	BULLRAIL	MESP				48	6	3			X				
F3	**06+95**	**BULLRAIL**	**OCS**		**BULLRAIL**		**120**							**X**		**MESP EXTENDING 10' EAST**
F3	06+97	BULLRAIL	BAR				48	6	3			X				
F3	07+03	BULLRAIL	BAR				36	24	3			X				
F3	07+05	BULLRAIL	MESP				48	12	4			X				
F3	07+15	BULLRAIL	MESP				6	3	1			X				
F3	07+19	BULLRAIL	DL				48	6				X				
F4	09+70	CONC FACE	CR				84	HL				X				TOP DWN 7'
F4	10+95	CONC FACE	CCS/DL		2' DWN		12	18	2			X				TYP ALONG BERTH FACE
F4	07+88	BULLRAIL	DL				12	3	3			X				
F4	07+92	BULLRAIL	DL				56	6	12			X				
F4	07+95	BULLRAIL	BAR				18	3	2			X				
F4	08+19	BULLRAIL	MESP				12	4	1			X				
F4	08+58	BULLRAIL	MESP				6	3	1			X				
F4	**08+75**	**BULLRAIL**	**MESP**				**120**					**X**				**MESP EXTENDING 10' EAST**
F4	08+99	BULLRAIL	DL				12	12	3			X				
F4	09+08	BULLRAIL	DL				12	12	3			X				
F4	**09+15**	**BULLRAIL**	**MESP**				**120**					**X**				**MESP EXTENDING 10' EAST**

INSPECTION RECORD - CONCRETE FRAMING ELEMENTS

LOCATION: COMMERCIAL PORT, PITI GUAM | **WSP JOB NO:** 30901541B | **INSPECTORS:** MAD, CRE

STRUCTURE ID: BERTHS F2-F6

*BOLDED DAMAGE NOTES INDICATES POST TYPHOON MAWAR (MAY 2023) DAMAGES

STRUCTURE	STATION ID	ELEMENT	DAMAGE	PILE ROW	DAMAGE LOCATION	DAMAGE TYPE	DAMAGE SIZE (IN)			DAMAGE RATING						COMMENTS
							LENGTH	WIDTH	DEPTH	NI	ND	MN	MD	MJ	SV	
F4	09+43	BULLRAIL	DL				24	6	3			X				
F4	**09+95**	**BULLRAIL**	**MESP**				**300**								**X**	**EXTENDING 25' EAST**
F4	10+14	BULLRAIL	DL				12	3				X				
F4	10+19	BULLRAIL	DL				12	6	3			X				
F4	**10+30**	**BULLRAIL**	**MESP**				**240**					**X**				**EXTENDING 20' EAST**
F4	10+53	BULLRAIL	DL				6	3				X				
F4	10+57	BULLRAIL	DL				36	12	2			X				
F4	10+66	BULLRAIL	SPALL				24	6	3			X				
F4	10+97	BULLRAIL	DL				18	6	6			X				
F4	11+01	BULLRAIL	SPALL				48	3	3			X				
F4	11+09	BULLRAIL	DL				12	6	1			X				
F4	11+11	BULLRAIL	SPALL				48	6	2			X				
F4	11+22	BULLRAIL	SPALL				24	6	2			X				
F4	11+24	BULLRAIL	SPALL				36	3	3			X				
F4	11+32	BULLRAIL	SPALL				36	12	3			X				
F4	**11+45**	**BULLRAIL**	**MESP**				**180**							**X**		**EXTENDING 15' EAST**
F4	11+61	BULLRAIL	SPALL				48	2	2			X				
F4	**11+85**	**BULLRAIL**	**OCS**				**120**						**X**			**MESP/OCS EXTENDING 10' EAST**
F4	12+09	BULLRAIL	DL				24	6	2			X				
F4	12+32	BULLRAIL	OCS				120	12	4						X	
F4	12+37	BULLRAIL	DL				12	6	3			X				
F4	13+07	BULLRAIL	SPALL				6	3	3			X				
F4	**13+19**	**BULLRAIL**	**MESP**				**60**					**X**				**EXTENDING 5' EAST**

INSPECTION RECORD - CONCRETE FRAMING ELEMENTS

LOCATION: COMMERCIAL PORT, PITI GUAM | **WSP JOB NO:** 30901541B | **INSPECTORS:** MAD, CRE

STRUCTURE ID: BERTHS F2-F6

*BOLDED DAMAGE NOTES INDICATES POST TYPHOON MAWAR (MAY 2023) DAMAGES

STRUCTURE	STATION ID	ELEMENT	DAMAGE	PILE ROW	DAMAGE LOCATION	DAMAGE TYPE	DAMAGE SIZE (IN)			DAMAGE RATING						COMMENTS
							LENGTH	WIDTH	DEPTH	NI	ND	MN	MD	MJ	SV	
F4	13+35	BULLRAIL	DL				24	12	2			X				
F4	13+45	BULLRAIL	DL				36	4	4			X				
F4	**13+49**	**BULLRAIL**	**MESP**				**60**					**X**				**EXTENDING 5' EAST**
F4	13+60	BULLRAIL	SPALL				36	3	3			X				
F4	13+63	BULLRAIL	SPALL				6	12	1			X				
F4	**13+80**	**BULLRAIL**	**MESP**				**120**					**X**				**EXTENDING 10' EAST**
F4	13+95	BULLRAIL	DL				36	6	6			X				
F5	14+41	BULLRAIL	SPALL				12	6	1			X				
F5	14+44	BULLRAIL	SPALL				12	6	1			X				
F5	14+50	BULLRAIL	DL				48	6	6			X				
F5	**14+60**	**BULLRAIL**	**MESP**				**240**						**X**			**EXTENDING 20' EAST**
F5	14+73	BULLRAIL	BAR				36	12	12			X				
F5	15+00	BULLRAIL	OCS				24	24	3				X			
F5	15+05	BULLRAIL	OCS				12	12	2				X			
F5	15+07	BULLRAIL	DL				56	12	6				X			
F5	15+15	CONC FACE	OCS		4' DWN		24	8	8				X			
F5	15+27	BULLRAIL	BAR				18	3	3			X				
F5	15+45	CONC FACE	CR					1/32"				X				DIAG CRACK AT REPAIR
F5	15+46	BULLRAIL	SPALL				12	6	2			X				
F5	16+07	BULLRAIL	DL				18	12	3			X				
F5	16+18	BULLRAIL	DL									X				DELAM AT CLEAT
F5	**16+27**	**BULLRAIL**	**OCS**				**120**	**4**	**2**				**X**			**EXTENDS 10' EAST**
F5	16+48	BULLRAIL	SPALL				24	12	2			X				
F5	**16+55**	**BULLRAIL**	**MESP**				**120**						**X**			**EXTENDS 10' EAST**

INSPECTION RECORD - CONCRETE FRAMING ELEMENTS

LOCATION: COMMERCIAL PORT, PITI GUAM | **WSP JOB NO:** 30901541B | **INSPECTORS:** MAD, CRE

STRUCTURE ID: BERTHS F2-F6

*BOLDED DAMAGE NOTES INDICATES POST TYPHOON MAWAR (MAY 2023) DAMAGES

STRUCTURE	STATION ID	ELEMENT	DAMAGE	PILE ROW	DAMAGE LOCATION	DAMAGE TYPE	DAMAGE SIZE (IN)			DAMAGE RATING						COMMENTS
							LENGTH	WIDTH	DEPTH	NI	ND	MN	MD	MJ	SV	
F5	16+69	BULLRAIL	DL				84	12	12				X			
F5	16+87	BULLRAIL	DL				6	24	3			X				
F5	16+97	BULLRAIL	SPALL				3	3	1			X				
F5	17+01	BULLRAIL	SPALL				6	3	1			X				
F5	17+05	BULLRAIL	DL				48	6	3				X			
F5	17+36	BULLRAIL	SPALL				6	2	2			X				
F5	17+45	CONC FACE	CR					1/32"				X				DIAG CRACK AT REPAIR
F5	**17+50**	**BULLRAIL**	**MESP**				**120**						**X**			**EXTENDING 10' EAST**
F5	17+55	CONC FACE	DL				18	18				X				AT DIAGONAL SOFFIT
F5	17+55	CONC FACE	CR					1/32"				X				DIAG CRACK AT REPAIR
F5	17+65	BULLRAIL	SPALL				36	2	2				X			
F5	17+66	BULLRAIL	SPALL				12	6	2			X				
F5	17+99	BULLRAIL	DL				56	12	12				X			
F5	18+21	BULLRAIL	SPALL				4	1	1			X				
F5	18+29	BULLRAIL	SPALL				12	8	2			X				
F5	18+37	CONC FACE	CR				60	HL				X				BULLRAIL TO SOFFIT
F5	18+40	BULLRAIL	DL				24	6	2			X				
F5	18+45	BULLRAIL	DL				36	6	6				X			
F5	18+45	CONC FACE	CR				60	HL					X			CRACK AT REPAIR
F5	18+57	BULLRAIL	SPALL				12	6	1			X				
F5	18+79	BULLRAIL	SPALL				8	6	1			X				
F5	18+80	BULLRAIL	SPALL				12	6	2			X				
F5	19+00	BULLRAIL	DL				56	12	12				X			
F5	19+54	BULLRAIL	DELAM				36	12	6				X			

INSPECTION RECORD - CONCRETE FRAMING ELEMENTS

LOCATION: COMMERCIAL PORT, PITI GUAM | **WSP JOB NO:** 30901541B | **INSPECTORS:** MAD, CRE

STRUCTURE ID: BERTHS F2-F6

*BOLDED DAMAGE NOTES INDICATES POST TYPHOON MAWAR (MAY 2023) DAMAGES

STRUCTURE	STATION ID	ELEMENT	DAMAGE	PILE ROW	DAMAGE LOCATION	DAMAGE TYPE	DAMAGE SIZE (IN)			DAMAGE RATING						COMMENTS
							LENGTH	WIDTH	DEPTH	NI	ND	MN	MD	MJ	SV	
F5	19+75	CONC FACE	OCS		8' DWN		48	18	8				X			(3) EXP BARS
F5	19+89	BULLRAIL	SPALL				12	6	1			X				
F5	20+08	BULLRAIL	DL				56	12	12				X			
F5	20+14	BULLRAIL	SPALL				12	3	1			X				
F5	20+25	BULLRAIL	SPALL				6	3	1			X				
F5	20+25	CONC FACE	OCS		5' DWN		24	6	4				X			EXP BARS W/ RUST
F5	20+32	BULLRAIL	SPALL				4	3	1			X				
F5	20+43	BULLRAIL	SPALL				12	6	1			X				
F5	20+49	BULLRAIL	SPALL				8	4	1			X				
F6	24+50	CONC FACE	OCS		1' DWN		18	12	12				X			(2) EXP BARS W/ RUST
F6	20+73	BULLRAIL	DL				12	1	1			X				
F6	20+96	BULLRAIL	SPALL				6	3	1			X				
F6	21+01	BULLRAIL	DL				48	3	2				X			
F6	21+22	BULLRAIL	DL				48	3	3				X			
F6	21+77	BULLRAIL	DL				36	6	3				X			
F6	21+85	BULLRAIL	DL				24	12				X				
F6	22+00	CONC FACE	OCS		FACE		36	8	8						X	6' DOWN FROM BULLRAIL
F6	**22+23**	**BULLRAIL**	**MESP**				**120**					**X**				**EXTENDING 10' EAST**
F6	22+31	BULLRAIL	DL				120	12					X			
F6	22+47	BULLRAIL	SPALL				48	12					X			
F6	22+87	BULLRAIL	SPALL				6	6				X				
F6	22+88	BULLRAIL	CR					HL				X				
F6	23+10	BULLRAIL	SPALL				12	2	1			X				
F6	23+12	BULLRAIL	DL				6	6	1			X				

INSPECTION RECORD - CONCRETE FRAMING ELEMENTS

LOCATION: COMMERCIAL PORT, PITI GUAM | **WSP JOB NO:** 30901541B | **INSPECTORS:** MAD, CRE

STRUCTURE ID: BERTHS F2-F6

*BOLDED DAMAGE NOTES INDICATES POST TYPHOON MAWAR (MAY 2023) DAMAGES

STRUCTURE	STATION ID	ELEMENT	DAMAGE	PILE ROW	DAMAGE LOCATION	DAMAGE TYPE	DAMAGE SIZE (IN)			DAMAGE RATING						COMMENTS
							LENGTH	WIDTH	DEPTH	NI	ND	MN	MD	MJ	SV	
F6	**23+20**	**BULLRAIL**	**MESP**				**120**						**X**			**EXTENDING 10' EAST**
F6	23+51	BULLRAIL	DL				12	6				X				
F6	23+55	BULLRAIL	DL				6	2				X				
F6	23+60	BULLRAIL	DL				6	6				X				
F6	23+61	BULLRAIL	DL				2	6				X				
F6	23+68	BULLRAIL	DL				48	6	3				X			
F6	23+76	BULLRAIL	DL				6	6				X				
F6	23+80	BULLRAIL	DL				12	6	2			X				
F6	23+85	BULLRAIL	DL				24	3	2			X				
F6	23+91	BULLRAIL	DL				12	3	3			X				
F6	24+49	BULLRAIL	DL				127	12	12				X			
F6	24+53	BULLRAIL	DL				100	18	4				X			
F6	24+72	BULLRAIL	SPALL				6	2	1			X				
F6	**24+90**	**BULLRAIL**	**MESP**				**60**					**X**				**EXTENDING 5' EAST**
F6	25+08	BULLRAIL	DL				24	12				X				
F6	25+63	BULLRAIL	DL				48	3	6				X			
F6	25+72	BULLRAIL	DL				48	1	3				X			
F6	25+80	BULLRAIL	DL				63	12	6				X			
F6	26+78	BULLRAIL	DL				12	12	6			X				
F6	26+79	BULLRAIL	DL				12	3	3			X				
F6	27+00	BULLRAIL	OCS				120	12	3				X			

INSPECTION RECORD - CONCRETE FRAMING ELEMENTS

LOCATION: COMMERCIAL PORT, PITI GUAM | **WSP JOB NO:** 30901541B | **INSPECTORS:** MAD, CRE

STRUCTURE ID: BERTHS F2-F6

*BOLDED DAMAGE NOTES INDICATES POST TYPHOON MAWAR (MAY 2023) DAMAGES

STRUCTURE	STATION ID	ELEMENT	DAMAGE	PILE ROW	DAMAGE LOCATION	DAMAGE TYPE	DAMAGE SIZE (IN)			DAMAGE RATING						COMMENTS
							LENGTH	WIDTH	DEPTH	NI	ND	MN	MD	MJ	SV	

INSPECTION RECORD - CONCRETE FRAMING ELEMENTS

LOCATION: COMMERCIAL PORT, PITI GUAM | WSP JOB NO: 30901541B | INSPECTORS: MAD, CRE

STRUCTURE ID: BERTH F5 BELOW DECK

STRUCTURE	DESCRIPTION	MATERIAL	BENT #	PILE ROW	DAMAGE LOCATION	DAMAGE TYPE	DAMAGE SIZE (IN)			DAMAGE RATING						COMMENTS
							LENGTH	WIDTH	DEPTH	NI	ND	MN	MD	MJ	SV	
F5	DECK	CONC	1	B.5	SOF	CR	48	1/32"				X				
F5	DECK	CONC	1	C.5	SOF	DL	48	12				X				
F5	DECK	CONC	1	C	SOF	DL	24	12				X				
F5	DECK	CONC	9	A.5	SOF	CR	48	1/32"				X				
F5	PILE CAP	CONC	9	A.7	CAP	CCS	60	12	2			X				
F5	PILE CAP	CONC	9	D.2	W	CCS	96	2	8					X		
F5	PILE CAP	CONC	9	D.2	E	CCS	60	8	8				X			
F5	PILE CAP	CONC	9-10	D.3		CCS	120	18	6				X			
F5	PILE CAP	CONC	11	D.3	W	CR	30	1/16"					X			
F5	PILE CAP	CONC	11	B.5	CORNER	CCS	36	36	18						X	
F5	PILE CAP	CONC	11	A	SOF	CR	180	1/16"					X			
F5	PILE CAP	CONC	12-13	A	F	CR	108	1/4"							X	
F5	PILE CAP	CONC	13	A	F	CR	60	1/16"					X			
F5	PILE CAP	CONC	15	A.7	W	CR	60	1/4"							X	
F5	PILE CAP	CONC	15	A-A.7	SOF	CR	180	1/16"					X			
F5	PILE CAP	CONC	15	A-B	E	CR	204	1/4"							X	
F5	PILE CAP	CONC	15	A	N	CR	216	1/8"						X		EXTENDS FROM 15 TO 17
F5	PILE CAP	CONC	16	A.7	E,W,SOF	OCS	60	72	3						X	

INSPECTION RECORD - CONCRETE FRAMING ELEMENTS

LOCATION: COMMERCIAL PORT, PITI GUAM | **WSP JOB NO:** 30901541B | **INSPECTORS:** MAD, CRE

STRUCTURE ID: BERTH F5 BELOW DECK

STRUCTURE	DESCRIPTION	MATERIAL	BENT #	PILE ROW	DAMAGE LOCATION	DAMAGE TYPE	DAMAGE SIZE (IN)			DAMAGE RATING						COMMENTS
							LENGTH	WIDTH	DEPTH	NI	ND	MN	MD	MJ	SV	
F5	PILE CAP	CONC	16-17	E		CR	144	1/8"						X		
F5	PILE CAP	CONC	17	A.5-B	W	CR	100	1/4"							X	CCS ON SOFFIT AT THIS LOC
F5	PILE CAP	CONC	17	A.5-B	E	CR	100	1/8"						X		
F5	PILE CAP	CONC	17	B	SOF	CCS	36	60					X			
F5	PILE CAP	CONC	17	B	BTM CORNER	OCS/CCS	96	12	8						X	OCS EAST, CCS WEST
F5	PILE CAP	CONC	17-18	E		CCS	96	6	6					X		6" UP FROM SOFFIT
F5	PILE CAP	CONC	19	C	CAP	CR	36	1/32"				X				X3
F5	PILE CAP	CONC	19	D	CAP	CCS						X				
F5	PILE CAP	CONC	19	B	N	CCS	48	8					X			CORNER
F5	PILE CAP	CONC	19.3	C	S	OCS	24	8	2						X	
F5	PILE CAP	CONC	20.5	C	SOF	OCS	12	12	1					X		
F5	PILE CAP	CONC	20.7	D	SOF	OCS	16	16	1					X		
F5	PILE CAP	CONC	21	C	W	OCS	48	12	8						X	
F5	PILE CAP	CONC	21	B	W	CCS	72	6	6				X			CORNER
F5	PILE CAP	CONC	21	B	SOF	CCS	36	8	6				X			
F5	PILE CAP	CONC	21	C	E	OCS	72	8	6						X	
F5	PILE CAP	CONC	21	C	W	OCS	84	8	8						X	
F5	PILE CAP	CONC	21.5	D	SOF	CCS	24	12				X				
F5	PILE CAP	CONC	23	B		OCS	60	6	6						X	
F5	PILE CAP	CONC	23	C	N	CCS	6	8						X		
F5	PILE CAP	CONC	24.2	D	SOF	OCS	12	12	2					X		
F5	PILE CAP	CONC	25	C	SOF	CCS	36	4	3				X			CORNER

INSPECTION RECORD - CONCRETE FRAMING ELEMENTS

LOCATION: COMMERCIAL PORT, PITI GUAM | **WSP JOB NO:** 30901541B | **INSPECTORS:** MAD, CRE

STRUCTURE ID: BERTH F5 BELOW DECK

STRUCTURE	DESCRIPTION	MATERIAL	BENT #	PILE ROW	DAMAGE LOCATION	DAMAGE TYPE	DAMAGE SIZE (IN)			DAMAGE RATING						COMMENTS
							LENGTH	WIDTH	DEPTH	NI	ND	MN	MD	MJ	SV	
F5	PILE CAP	CONC	25	D	N	CR	36	1/8"						X		4" FROM BTM OF CAP
F5	PILE CAP	CONC	26	D	SOF	OCS	12	6	2					X		
F5	PILE CAP	CONC	26.1	D	SOF	CCS	24	24					X			
F5	PILE CAP	CONC	27	C	W	OCS	60	6	6						X	ALSO 24X24 CCS
F5	PILE CAP	CONC	27	C	E	CCS	60	4	6				X			
F5	PILE CAP	CONC	28	D.5	S	CCS	60	12	3					X		CORNER
F5	PILE CAP	CONC	28.5-29	D	SOF	CCS	96	12	8					X		CORNER
F5	PILE CAP	CONC	31	D.5-E	SOF	CR	100	1/4"							X	
F5	PILE CAP	CONC	38	D.1	SOF	OCS	12	8	2				X			X3
F5	PILE CAP	CONC	39.5	D	SOF	CCS	8	8	2				X			CORNER

INSPECTION RECORD - CONCRETE FRAMING ELEMENTS

LOCATION: COMMERCIAL PORT, PITI GUAM | **WSP JOB NO:** 30901541B | **INSPECTORS:** MAD, CRE

STRUCTURE ID: BERTH F6 BELOW DECK

STRUCTURE	DESCRIPTION	MATERIAL	BENT #	PILE ROW	DAMAGE LOCATION	DAMAGE TYPE	DAMAGE SIZE (IN)			DAMAGE RATING						COMMENTS
							LENGTH	WIDTH	DEPTH	NI	ND	MN	MD	MJ	SV	
F6	PILE CAP	CONC	47	D.5	W	CCS	24	18	18					X		
F6	PILE CAP	CONC	49	D		OCS	12	12	2						X	
F6	PILE CAP	CONC	63	C		OCS	48	6	4						X	
F6	PILE CAP	CONC	63	B.6	SOF	OCS	12	8	3					X		

INSPECTION RECORD - CONCRETE FRAMING ELEMENTS

LOCATION: COMMERCIAL PORT, PITI GUAM | **WSP JOB NO:** 30901541B | **INSPECTORS:** MAD, CRE

STRUCTURE ID: BERTH F6 BELOW DECK

STRUCTURE	DESCRIPTION	MATERIAL	BENT #	PILE ROW	DAMAGE LOCATION	DAMAGE TYPE	DAMAGE SIZE (IN)			DAMAGE RATING						COMMENTS
							LENGTH	WIDTH	DEPTH	NI	ND	MN	MD	MJ	SV	

INSPECTION RECORD - APPURTENANCES

LOCATION: COMMERCIAL PORT, PITI GUAM | **WSP JOB NO:** 30901541B | **INSPECTORS:** MAD, CRE

STRUCTURE ID: F2-F6

*BOLDED DAMAGE NOTES INDICATES POST TYPHOON MAWAR (MAY 2023) DAMAGES

STRUCTURE	DESCRIPTION	MATERIAL	STA ID	DAMAGE LOCATION	DAMAGE TYPE	DAMAGE SIZE (IN)			DAMAGE RATING						COMMENTS
						LENGTH	WIDTH	DEPTH	NI	ND	MN	MD	MJ	SV	
F4	PANEL	STEEL	07+92		COR							X			
F4	FACING	UHMW-PE	07+92		GOUGES							X			
F4	CHAIN	STEEL	07+92		COR								X		
F4	CHAIN PL	STEEL	07+92							X					
F4	BRACKET	STEEL	07+92		COR							X			
F4	FENDER-E	RUBBER	07+92							X					
F4	FENDER-W	RUBBER	07+92							X					
F4	PANEL	STEEL	08+48		COR							X			
F4	FACING	UHMW-PE	08+48		GOUGES						X				
F4	CHAIN	STEEL	08+48		COR								X		
F4	CHAIN PL	STEEL	08+48							X					
F4	BRACKET	STEEL	08+48		COR							X			
F4	FENDER-E	RUBBER	08+48							X					
F4	FENDER-W	RUBBER	08+48							X					
F4	PANEL	STEEL	09+04		COR								X		
F4	FACING	UHMW-PE	09+04		GOUGES						X				
F4	**CHAIN**	**STEEL**	**09+04**		**COR**									**X**	**MISSING**
F4	CHAIN PL	STEEL	09+04							X					
F4	BRACKET	STEEL	09+04		COR							X			
F4	FENDER-E	RUBBER	09+04								X				
F4	FENDER-W	RUBBER	09+04								X				
F4	PANEL	STEEL	09+54		COR								X		
F4	FACING	UHMW-PE	09+54		GOUGES						X				

INSPECTION RECORD - APPURTENANCES

LOCATION: COMMERCIAL PORT, PITI GUAM | **WSP JOB NO:** 30901541B | **INSPECTORS:** MAD, CRE

STRUCTURE ID: F2-F6

*BOLDED DAMAGE NOTES INDICATES POST TYPHOON MAWAR (MAY 2023) DAMAGES

STRUCTURE	DESCRIPTION	MATERIAL	STA ID	DAMAGE LOCATION	DAMAGE TYPE	DAMAGE SIZE (IN)			DAMAGE RATING						COMMENTS
						LENGTH	WIDTH	DEPTH	NI	ND	MN	MD	MJ	SV	
F4	**CHAIN**	**STEEL**	**09+54**		**COR**									**X**	**MISSING**
F4	CHAIN PL	STEEL	09+54							X					
F4	BRACKET	STEEL	09+54		COR							X			
F4	**FENDER-E**	**RUBBER**	**09+54**		**TORN**									**X**	
F4	**FENDER-W**	**RUBBER**	**09+54**		**TORN**									**X**	
F4	**PANEL**	**STEEL**	**10+18**		**COR**									**X**	**MISSING**
F4	**FACING**	**UHMW-PE**	**10+18**		**GOUGES**									**X**	**MISSING**
F4	**CHAIN**	**STEEL**	**10+18**		**COR**									**X**	
F4	CHAIN PL	STEEL	10+18							X					
F4	**BRACKET**	**STEEL**	**10+18**		**COR**									**X**	**MISSING**
F4	**FENDER-E**	**RUBBER**	**10+18**		**TEAR**									**S**	**MISSING**
F4	**FENDER-W**	**RUBBER**	**10+18**		**TEAR**									**S**	**MISSING**
F4	PANEL	STEEL	10+68		COR							X			
F4	FACING	UHMW-PE	10+68		GOUGES							X			
F4	CHAIN	STEEL	10+68											X	MISSING
F4	CHAIN PL	STEEL	10+68							X					
F4	BRACKET	STEEL	10+68		COR							X			
F4	**FENDER-E**	**RUBBER**	**10+68**		**TORN**								**X**		**PULLOUT OF ANCHOR BOLTS**
F4	**FENDER-W**	**RUBBER**	**10+68**										**X**		**PULLOUT OF ANCHOR BOLTS**
F4	PANEL	STEEL	11+22		COR							X			
F4	FACING	UHMW-PE	11+22		GOUGES						X				
F4	CHAIN	STEEL	11+22		COR									X	

INSPECTION RECORD - APPURTENANCES

LOCATION: COMMERCIAL PORT, PITI GUAM | **WSP JOB NO:** 30901541B | **INSPECTORS:** MAD, CRE

STRUCTURE ID: F2-F6

*BOLDED DAMAGE NOTES INDICATES POST TYPHOON MAWAR (MAY 2023) DAMAGES

STRUCTURE	DESCRIPTION	MATERIAL	STA ID	DAMAGE LOCATION	DAMAGE TYPE	DAMAGE SIZE (IN)			DAMAGE RATING						COMMENTS
						LENGTH	WIDTH	DEPTH	NI	ND	MN	MD	MJ	SV	
F4	CHAIN PL	STEEL	11+22							X					
F4	BRACKET	STEEL	11+22		COR							X			
F4	FENDER-E	RUBBER	11+22		TEAR						X				
F4	FENDER-W	RUBBER	11+22		TEAR						X				
F4	PANEL	STEEL	11+78		COR						X				
F4	FACING	UHMW-PE	11+78		GOUGES						X				
F4	CHAIN	STEEL	11+78							X					
F4	CHAIN PL	STEEL	11+78							X					
F4	BRACKET	STEEL	11+78		COR							X			
F4	**FENDER-E**	**RUBBER**	**11+78**		**TORN**									**X**	
F4	**FENDER-W**	**RUBBER**	**11+78**		**TORN**									**X**	
F4	PANEL	STEEL	12+32		COR							X			
F4	FACING	UHMW-PE	12+32		WORN							X			
F4	CHAIN	STEEL	12+32		COR								X		
F4	CHAIN PL	STEEL	12+32							X					
F4	BRACKET	STEEL	12+32		COR							X			
F4	FENDER-E	RUBBER	12+32		TORN									X	
F4	FENDER-W	RUBBER	12+32		TORN									X	
F4	PANEL	STEEL	12+86		COR							X			
F4	FACING	UHMW-PE	12+86		GOUGES								X		BOLT HEADS EXPOSED
F4	CHAIN	STEEL	12+86		COR					X					
F4	CHAIN PL	STEEL	12+86							X					
F4	BRACKET	STEEL	12+86		COR						X				
F4	FENDER-E	RUBBER	12+86		TEAR					X					

INSPECTION RECORD - APPURTENANCES

LOCATION: COMMERCIAL PORT, PITI GUAM | **WSP JOB NO:** 30901541B | **INSPECTORS:** MAD, CRE

STRUCTURE ID: F2-F6

*BOLDED DAMAGE NOTES INDICATES POST TYPHOON MAWAR (MAY 2023) DAMAGES

STRUCTURE	DESCRIPTION	MATERIAL	STA ID	DAMAGE LOCATION	DAMAGE TYPE	DAMAGE SIZE (IN)			DAMAGE RATING						COMMENTS
						LENGTH	WIDTH	DEPTH	NI	ND	MN	MD	MJ	SV	
F4	FENDER-W	RUBBER	12+86		DL/TEAR					X					
F4	PANEL	STEEL	13+40		COR							X			
F4	FACING	UHMW-PE	13+40		WORN						X				
F4	CHAIN	STEEL	13+40		COR					X					
F4	CHAIN PL	STEEL	13+40							X					
F4	BRACKET	STEEL	13+40		COR							X			
F4	FENDER-E	RUBBER	13+40		FAIL									X	
F4	FENDER-W	RUBBER	13+40		FAIL									X	
F4	PANEL	STEEL	13+95		COR						X				
F4	FACING	UHMW-PE	13+95		GOUGES						X				
F4	CHAIN	STEEL	13+95							X					
F4	CHAIN PL	STEEL	13+95							X					
F4	BRACKET	STEEL	13+95							X					
F4	FENDER-E	RUBBER	13+95							X					
F4	FENDER-W	RUBBER	13+95							X					
F5	PANEL	STEEL	14+50		COR							X			
F5	FACING	UHMW-PE	14+50		WORN						X				
F5	CHAIN	STEEL	14+50		COR							X			
F5	CHAIN PL	STEEL	14+50							X					
F5	BRACKET	STEEL	14+50		COR							X			
F5	**FENDER-E**	**RUBBER**	**14+50**		**TEAR**									**X**	**MULTIPLE TEARS**
F5	**FENDER-W**	**RUBBER**	**14+50**		**TEAR**								**X**		**MULTIPLE TEARS**
F5	**PANEL**	**STEEL**	**15+07**											**X**	**MISSING**
F5	**FACING**	**UHMW-PE**	**15+07**											**X**	**MISSING**

INSPECTION RECORD - APPURTENANCES

LOCATION: COMMERCIAL PORT, PITI GUAM | **WSP JOB NO:** 30901541B | **INSPECTORS:** MAD, CRE

STRUCTURE ID: F2-F6

*BOLDED DAMAGE NOTES INDICATES POST TYPHOON MAWAR (MAY 2023) DAMAGES

STRUCTURE	DESCRIPTION	MATERIAL	STA ID	DAMAGE LOCATION	DAMAGE TYPE	DAMAGE SIZE (IN)			DAMAGE RATING						COMMENTS
						LENGTH	WIDTH	DEPTH	NI	ND	MN	MD	MJ	SV	
F5	**CHAIN**	**STEEL**	**15+07**											**X**	**MISSING**
F5	**CHAIN PL**	**STEEL**	**15+07**											**X**	**MISSING**
F5	**BRACKET**	**STEEL**	**15+07**											**X**	**MISSING**
F5	**FENDER-E**	**RUBBER**	**15+07**											**X**	**MISSING**
F5	**FENDER-W**	**RUBBER**	**15+07**											**X**	**MISSING**
F5	**PANEL**	**STEEL**	**15+63**											**X**	**MISSING**
F5	**FACING**	**UHMW-PE**	**15+63**											**X**	**MISSING**
F5	**CHAIN**	**STEEL**	**15+63**											**X**	**MISSING**
F5	CHAIN PL	STEEL	15+63							X					
F5	**BRACKET**	**STEEL**	**15+63**											**X**	**MISSING**
F5	**FENDER-E**	**RUBBER**	**15+63**											**X**	**MISSING**
F5	**FENDER-W**	**RUBBER**	**15+63**											**X**	**MISSING**
F5	**PANEL**	**STEEL**	**16+18**											**X**	**MISSING**
F5	**FACING**	**UHMW-PE**	**16+18**											**X**	**MISSING**
F5	**CHAIN**	**STEEL**	**16+18**											**X**	**MISSING**
F5	**CHAIN PL**	**STEEL**	**16+18**								**X**				
F5	**BRACKET**	**STEEL**	**16+18**											**X**	**MISSING**
F5	**FENDER-E**	**RUBBER**	**16+18**											**X**	**MISSING**
F5	**FENDER-W**	**RUBBER**	**16+18**											**X**	**MISSING**
F5	**PANEL**	**STEEL**	**16+74**		**COR**								**X**		
F5	FACING	UHMW-PE	16+74		GOUGES							X			MISSING 1 UHMW-PE PANEL
F5	CHAIN	STEEL	16+74		COR								X		
F5	CHAIN PL	STEEL	16+74		COR							X			
F5	BRACKET	STEEL	16+74		COR							X			

INSPECTION RECORD - APPURTENANCES

LOCATION: COMMERCIAL PORT, PITI GUAM | **WSP JOB NO:** 30901541B | **INSPECTORS:** MAD, CRE

STRUCTURE ID: F2-F6

*BOLDED DAMAGE NOTES INDICATES POST TYPHOON MAWAR (MAY 2023) DAMAGES

STRUCTURE	DESCRIPTION	MATERIAL	STA ID	DAMAGE LOCATION	DAMAGE TYPE	DAMAGE SIZE (IN)			DAMAGE RATING						COMMENTS
						LENGTH	WIDTH	DEPTH	NI	ND	MN	MD	MJ	SV	
F5	FENDER-E	RUBBER	16+74		TEAR								X		
F5	FENDER-W	RUBBER	16+74		TEAR							X			
F5	PANEL	STEEL	17+35		COR							X			
F5	FACING	UHMW-PE	17+35		GOUGES							X			
F5	CHAIN	STEEL	17+35		COR							X			
F5	CHAIN PL	STEEL	17+35		COR						X				
F5	BRACKET	STEEL	17+35		COR							X			
F5	FENDER-E	RUBBER	17+35		TEAR						X				
F5	FENDER-W	RUBBER	17+35		TEAR							X			
F5	PANEL	STEEL	17+99		COR							X			
F5	FACING	UHMW-PE	17+99		GOUGES						X				
F5	CHAIN	STEEL	17+99		COR								X		
F5	CHAIN PL	STEEL	17+99							X					
F5	BRACKET	STEEL	17+99		COR							X			
F5	FENDER-E	RUBBER	17+99		TEAR								X		MULTIPLE TEARS
F5	FENDER-W	RUBBER	17+99		TEAR									X	SHEARED THROUGH X-SECTION
F5	**PANEL**	**STEEL**	**18+45**											**X**	**MISSING**
F5	**FACING**	**UHMW-PE**	**18+45**											**X**	**MISSING**
F5	**CHAIN**	**STEEL**	**18+45**											**X**	**MISSING**
F5	CHAIN PL	STEEL	18+45							X					
F5	**BRACKET**	**STEEL**	**18+45**											**X**	**MISSING**
F5	**FENDER-E**	**RUBBER**	**18+45**											**X**	**MISSING**
F5	**FENDER-W**	**RUBBER**	**18+45**											**X**	**MISSING**
F5	PANEL	STEEL	19+00		COR						X				

INSPECTION RECORD - APPURTENANCES

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STRUCTURE ID: F2-F6

*BOLDED DAMAGE NOTES INDICATES POST TYPHOON MAWAR (MAY 2023) DAMAGES

STRUCTURE	DESCRIPTION	MATERIAL	STA ID	DAMAGE LOCATION	DAMAGE TYPE	DAMAGE SIZE (IN)			DAMAGE RATING						COMMENTS
						LENGTH	WIDTH	DEPTH	NI	ND	MN	MD	MJ	SV	
F5	FACING	UHMW-PE	19+00		GOUGES						X				
F5	CHAIN	STEEL	19+00		COR								X		
F5	CHAIN PL	STEEL	19+00							X					
F5	BRACKET	STEEL	19+00		COR							X			
F5	**FENDER-E**	**RUBBER**	**19+00**		**DL/TEAR**									**X**	
F5	**FENDER-W**	**RUBBER**	**19+00**		**TEAR**									**X**	**MULTIPLE TEARS**
F5	**PANEL**	**STEEL**	**19+54**											**X**	**MISSING**
F5	**FACING**	**UHMW-PE**	**19+54**											**X**	**MISSING**
F5	**CHAIN**	**STEEL**	**19+54**											**X**	**MISSING**
F5	**CHAIN PL**	**STEEL**	**19+54**											**x**	**MISSING**
F5	**BRACKET**	**STEEL**	**19+54**											**X**	**MISSING**
F5	**FENDER-E**	**RUBBER**	**19+54**											**X**	**MISSING**
F5	**FENDER-W**	**RUBBER**	**19+54**											**X**	**MISSING**
F5	PANEL	STEEL	20+08							X					
F5	FACING	UHMW-PE	20+08		GOUGES						X				
F5	CHAIN	STEEL	20+08							X					
F5	CHAIN PL	STEEL	20+08							X					
F5	BRACKET	STEEL	20+08							X					
F5	FENDER-E	RUBBER	20+08							X					
F5	FENDER-W	RUBBER	20+08							X					
F6	PANEL	STEEL	20+68							X					
F6	FACING	UHMW-PE	20+68		GOUGES						X				
F6	CHAIN	STEEL	20+68							X					
F6	CHAIN PL	STEEL	20+68							X					

INSPECTION RECORD - APPURTENANCES

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STRUCTURE ID: F2-F6

*BOLDED DAMAGE NOTES INDICATES POST TYPHOON MAWAR (MAY 2023) DAMAGES

STRUCTURE	DESCRIPTION	MATERIAL	STA ID	DAMAGE LOCATION	DAMAGE TYPE	DAMAGE SIZE (IN)			DAMAGE RATING						COMMENTS
						LENGTH	WIDTH	DEPTH	NI	ND	MN	MD	MJ	SV	
F6	BRACKET	STEEL	20+68							X					
F6	FENDER-E	RUBBER	20+68							X					
F6	FENDER-W	RUBBER	20+68							X					
F6	PANEL	STEEL	21+22		COR							X			
F6	FACING	UHMW-PE	21+22		GOUGES						X				
F6	CHAIN	STEEL	21+22		COR					X					
F6	CHAIN PL	STEEL	21+22							X					
F6	BRACKET	STEEL	21+22		COR							X			
F6	FENDER-E	RUBBER	21+22		TEAR						X				
F6	FENDER-W	RUBBER	21+22		TEAR						X				
F6	PANEL	STEEL	21+77		COR							X			
F6	FACING	UHMW-PE	21+77		GOUGES								X		MISSING 1 PANEL
F6	CHAIN	STEEL	21+77		COR								X		
F6	CHAIN PL	STEEL	21+77							X					
F6	BRACKET	STEEL	21+77		COR							X			
F6	FENDER-E	RUBBER	21+77		TEAR						X				
F6	FENDER-W	RUBBER	21+77		TEAR						X				
F6	**PANEL**	**STEEL**	**22+31**											**X**	**MISSING**
F6	**FACING**	**UHMW-PE**	**22+31**											**X**	**MISSING**
F6	**CHAIN**	**STEEL**	**22+31**											**X**	**MISSING**
F6	**CHAIN PL**	**STEEL**	**22+31**											**X**	**MISSING**
F6	**BRACKET**	**STEEL**	**22+31**											**X**	**MISSING**
F6	**FENDER-E**	**RUBBER**	**22+31**											**X**	**MISSING**
F6	**FENDER-W**	**RUBBER**	**22+31**											**X**	**MISSING**

INSPECTION RECORD - APPURTENANCES

LOCATION: COMMERCIAL PORT, PITI GUAM | **WSP JOB NO:** 30901541B | **INSPECTORS:** MAD, CRE

STRUCTURE ID: F2-F6

*BOLDED DAMAGE NOTES INDICATES POST TYPHOON MAWAR (MAY 2023) DAMAGES

STRUCTURE	DESCRIPTION	MATERIAL	STA ID	DAMAGE LOCATION	DAMAGE TYPE	DAMAGE SIZE (IN)			DAMAGE RATING						COMMENTS
						LENGTH	WIDTH	DEPTH	NI	ND	MN	MD	MJ	SV	
F6	PANEL	STEEL	23+44									X			
F6	FACING	UHMW-PE	23+44		GOUGES						X				
F6	CHAIN	STEEL	23+44		COR								X		
F6	CHAIN PL	STEEL	23+44							X					
F6	BRACKET	STEEL	23+44		COR							X			
F6	**FENDER-E**	**RUBBER**	**23+44**		**TEAR**									**X**	
F6	**FENDER-W**	**RUBBER**	**23+44**		**TEAR**									**X**	
F6	PANEL	STEEL	23+98		COR						X				
F6	FACING	UHMW-PE	23+98		GOUGES						X				
F6	CHAIN	STEEL	23+98		COR					X					
F6	CHAIN PL	STEEL	23+98							X					
F6	BRACKET	STEEL	23+98		COR							X			
F6	FENDER-E	RUBBER	23+98		TEAR					X					
F6	FENDER-W	RUBBER	23+98		SHEAR					X					
F6	PANEL	STEEL	24+53		COR						X				
F6	FACING	UHMW-PE	24+53		GOUGES						X				
F6	CHAIN	STEEL	24+53		COR								X		
F6	CHAIN PL	STEEL	24+53							X					
F6	BRACKET	STEEL	24+53		COR							X			
F6	FENDER-E	RUBBER	24+53							X					
F6	FENDER-W	RUBBER	24+53							X					
F6	PANEL	STEEL	25+08		COR							X			
F6	FACING	UHMW-PE	25+08		GOUGES							X			
F6	CHAIN	STEEL	25+08		COR								X		

INSPECTION RECORD - APPURTENANCES

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STRUCTURE ID: F2-F6

*BOLDED DAMAGE NOTES INDICATES POST TYPHOON MAWAR (MAY 2023) DAMAGES

STRUCTURE	DESCRIPTION	MATERIAL	STA ID	DAMAGE LOCATION	DAMAGE TYPE	DAMAGE SIZE (IN)			DAMAGE RATING						COMMENTS
						LENGTH	WIDTH	DEPTH	NI	ND	MN	MD	MJ	SV	
F6	CHAIN PL	STEEL	25+08							X					
F6	BRACKET	STEEL	25+08		COR							X			
F6	FENDER-E	RUBBER	25+08		TEAR						X				
F6	FENDER-W	RUBBER	25+08		TEAR						X				
F6	PANEL	STEEL	25+63		COR							X			
F6	FACING	UHMW-PE	25+63		GOUGES									X	BOLT HEADS AND PANEL EXPOSED
F6	CHAIN	STEEL	25+63		COR									X	
F6	CHAIN PL	STEEL	25+63							X					
F6	BRACKET	STEEL	25+63		COR							X			
F6	FENDER-E	RUBBER	25+63							X					
F6	FENDER-W	RUBBER	25+63							X					
F6	PANEL	STEEL	26+35		COR							X			
F6	FACING	UHMW-PE	26+35		GOUGES						X				
F6	CHAIN	STEEL	26+35		COR								X		
F6	CHAIN PL	STEEL	26+35							X					
F6	BRACKET	STEEL	26+35		COR							X			
F6	FENDER-E	RUBBER	26+35							X					
F6	FENDER-W	RUBBER	26+35							X					
F6	PANEL	STEEL	26+75		COR						X				
F6	FACING	UHMW-PE	26+75		GOUGES						X				
F6	CHAIN	STEEL	26+75		COR									X	
F6	CHAIN PL	STEEL	26+75							X					
F6	BRACKET	STEEL	26+75		COR							X			
F6	FENDER-E	RUBBER	26+75							X					

INSPECTION RECORD - APPURTENANCES

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STRUCTURE ID: F2-F6

*BOLDED DAMAGE NOTES INDICATES POST TYPHOON MAWAR (MAY 2023) DAMAGES

STRUCTURE	DESCRIPTION	MATERIAL	STA ID	DAMAGE LOCATION	DAMAGE TYPE	DAMAGE SIZE (IN)			DAMAGE RATING						COMMENTS
						LENGTH	WIDTH	DEPTH	NI	ND	MN	MD	MJ	SV	
F6	FENDER-W	RUBBER	26+75							X					
F3	CYL FENDER	RUBBER	00+29						X						NO FNDR PRESENT
F3	CHAIN	STEEL	00+29						X						NO CHAIN PRESENT
F3	**BRACKET-N**	**STEEL**	**00+29**		**BENT**									**X**	**BENT TAB**
F3	**BRACKET-S**	**STEEL**	**00+29**		**BENT**									**X**	**BENT TAB**
F3	CYL FENDER	RUBBER	00+50						X						NO FNDR PRESENT
F3	CHAIN	STEEL	00+50						X						NO CHAIN PRESENT
F3	**BRACKET-N**	**STEEL**	**00+50**		**BENT**									**X**	**BENT TAB**
F3	**BRACKET-S**	**STEEL**	**00+50**		**BENT**									**X**	**BENT TAB**
F3	CYL FENDER	RUBBER	00+71						X						NO FNDR PRESENT
F3	CHAIN	STEEL	00+71						X						NO CHAIN PRESENT
F3	**BRACKET-N**	**STEEL**	**00+71**		**BENT**									**X**	**BENT TAB**
F3	**BRACKET-S**	**STEEL**	**00+71**		**BENT**									**X**	**BENT TAB**
F3	CYL FENDER	RUBBER	00+80						X						NO FNDR PRESENT
F3	CHAIN	STEEL	00+80						X						NO CHAIN PRESENT
F3	**BRACKET-N**	**STEEL**	**00+80**		**BENT**									**X**	**BENT TAB**
F3	**BRACKET-S**	**STEEL**	**00+80**		**BENT**									**X**	**BENT TAB**
F3	CYL FENDER	RUBBER	00+92						X						NO FNDR PRESENT
F3	CHAIN	STEEL	00+92						X						NO CHAIN PRESENT
F3	**BRACKET-N**	**STEEL**	**00+92**		**BENT**									**X**	**BENT TAB**
F3	**BRACKET-S**	**STEEL**	**00+92**		**BENT**									**X**	**BENT TAB**
F3	CYL FENDER	RUBBER	01+12						X						NO FNDR PRESENT
F3	CHAIN	STEEL	01+12						X						NO CHAIN PRESENT
F3	**BRACKET-N**	**STEEL**	**01+12**		**BENT**									**X**	**BENT TAB**

INSPECTION RECORD - APPURTENANCES

LOCATION: COMMERCIAL PORT, PITI GUAM | **WSP JOB NO:** 30901541B | **INSPECTORS:** MAD, CRE

STRUCTURE ID: F2-F6

*BOLDED DAMAGE NOTES INDICATES POST TYPHOON MAWAR (MAY 2023) DAMAGES

STRUCTURE	DESCRIPTION	MATERIAL	STA ID	DAMAGE LOCATION	DAMAGE TYPE	DAMAGE SIZE (IN)			DAMAGE RATING						COMMENTS
						LENGTH	WIDTH	DEPTH	NI	ND	MN	MD	MJ	SV	
F3	**BRACKET-S**	**STEEL**	**01+12**		**BENT**									**X**	**BENT TAB**
F3	CYL FENDER	RUBBER	01+34						X						NO FNDR PRESENT
F3	CHAIN	STEEL	01+34						X						NO CHAIN PRESENT
F3	**BRACKET-N**	**STEEL**	**01+34**		**BENT**									**X**	**BENT TAB**
F3	**BRACKET-S**	**STEEL**	**01+34**		**BENT**									**X**	**BENT TAB AND MISSING NUT**
F3	CYL FENDER	RUBBER	01+54						X						NO FNDR PRESENT
F3	CHAIN	STEEL	01+54						X						NO CHAIN PRESENT
F3	**BRACKET-N**	**STEEL**	**01+54**		**BENT**									**X**	**BENT TAB**
F3	**BRACKET-S**	**STEEL**	**01+54**		**BENT**									**X**	**BENT TAB**
F3	CYL FENDER	RUBBER	01+75						X						NO FNDR PRESENT
F3	CHAIN	STEEL	01+75						X						NO CHAIN PRESENT
F3	**BRACKET-N**	**STEEL**	**01+75**		**BENT**									**X**	**BENT TAB AND MISSING NUT**
F3	**BRACKET-S**	**STEEL**	**01+75**		**BENT**									**X**	**BENT TAB**
F3	CYL FENDER	RUBBER	01+96						X						NO FNDR PRESENT
F3	CHAIN	STEEL	01+96						X						NO CHAIN PRESENT
F3	**BRACKET-N**	**STEEL**	**01+96**		**BENT**									**X**	**BENT TAB AND MISSING NUT**
F3	**BRACKET-S**	**STEEL**	**01+96**		**BENT**									**X**	**BENT TAB**
F3	CYL FENDER	RUBBER	02+17						X						NO FNDR PRESENT
F3	CHAIN	STEEL	02+17						X						NO CHAIN PRESENT
F3	BRACKET-N	STEEL	02+17							X					
F3	BRACKET-S	STEEL	02+17								X				MISSING 1 NUT
F3	CYL FENDER	RUBBER	02+38						X						NO FNDR PRESENT
F3	CHAIN	STEEL	02+38						X						NO CHAIN PRESENT
F3	BRACKET-N	STEEL	02+38								X				MISSING 2 NUTS

INSPECTION RECORD - APPURTENANCES

LOCATION: COMMERCIAL PORT, PITI GUAM | **WSP JOB NO:** 30901541B | **INSPECTORS:** MAD, CRE

STRUCTURE ID: F2-F6

*BOLDED DAMAGE NOTES INDICATES POST TYPHOON MAWAR (MAY 2023) DAMAGES

STRUCTURE	DESCRIPTION	MATERIAL	STA ID	DAMAGE LOCATION	DAMAGE TYPE	DAMAGE SIZE (IN)			DAMAGE RATING						COMMENTS
						LENGTH	WIDTH	DEPTH	NI	ND	MN	MD	MJ	SV	
F3	BRACKET-S	STEEL	02+38							X					
F3	CYL FENDER	RUBBER	02+60							X					
F3	CHAIN	STEEL	02+60							X					
F3	**BRACKET-N**	**STEEL**	**02+60**		**BENT**							**X**			N
F3	**BRACKET-S**	**STEEL**	**02+60**		**BENT**							**X**			N
F3	CYL FENDER	RUBBER	02+81							X					
F3	CHAIN	STEEL	02+81							X					
F3	BRACKET-N	STEEL	02+81							X					
F3	BRACKET-S	STEEL	02+81							X					
F3	CYL FENDER	RUBBER	03+01							X					
F3	CHAIN	STEEL	03+01							X					
F3	BRACKET-N	STEEL	03+01							X					
F3	**BRACKET-S**	**STEEL**	**03+01**		**BENT**							**X**			
F3	CYL FENDER	RUBBER	03+22							X					
F3	CHAIN	STEEL	03+22							X					
F3	**BRACKET-N**	**STEEL**	**03+22**		**BENT**							**X**			
F3	**BRACKET-S**	**STEEL**	**03+22**		**BENT**							**X**			
F3	CYL FENDER	RUBBER	03+43							X					
F3	CHAIN	STEEL	03+43							X					
F3	**BRACKET-N**	**STEEL**	**03+43**		**BENT**							**X**			
F3	**BRACKET-S**	**STEEL**	**03+43**		**BENT**							**X**			
F3	CYL FENDER	RUBBER	03+64							X					
F3	CHAIN	STEEL	03+64							X					
F3	BRACKET-N	STEEL	03+64							X					

INSPECTION RECORD - APPURTENANCES

LOCATION: COMMERCIAL PORT, PITI GUAM | **WSP JOB NO:** 30901541B | **INSPECTORS:** MAD, CRE

STRUCTURE ID: F2-F6

*BOLDED DAMAGE NOTES INDICATES POST TYPHOON MAWAR (MAY 2023) DAMAGES

STRUCTURE	DESCRIPTION	MATERIAL	STA ID	DAMAGE LOCATION	DAMAGE TYPE	DAMAGE SIZE (IN)			DAMAGE RATING						COMMENTS
						LENGTH	WIDTH	DEPTH	NI	ND	MN	MD	MJ	SV	
F3	BRACKET-S	STEEL	03+64							X					
F3	CYL FENDER	RUBBER	03+85							X					
F3	CHAIN	STEEL	03+85							X					
F3	BRACKET-N	STEEL	03+85							X					
F3	BRACKET-S	STEEL	03+85							X					
F3	CYL FENDER	RUBBER	04+05							X					
F3	CHAIN	STEEL	04+05							X					
F3	BRACKET-N	STEEL	04+05							X					
F3	BRACKET-S	STEEL	04+05							X					
F3	CYL FENDER	RUBBER	04+27							X					
F3	CHAIN	STEEL	04+27							X					
F3	**BRACKET-N**	**STEEL**	**04+27**		**BENT**									**X**	
F3	**BRACKET-S**	**STEEL**	**04+27**		**BENT**									**X**	
F3	**CYL FENDER**	**RUBBER**	**04+48**		**GOUGES**						**X**				
F3	CHAIN	STEEL	04+48							X					
F3	**BRACKET-N**	**STEEL**	**04+48**		**BENT**									**X**	
F3	**BRACKET-S**	**STEEL**	**04+48**		**BENT**									**X**	
F3	**CYL FENDER**	**RUBBER**	**04+70**		**GOUGES**						**X**				
F3	CHAIN	STEEL	04+70							X					
F3	BRACKET-N	STEEL	04+70							X					
F3	BRACKET-S	STEEL	04+70							X					
F3	**CYL FENDER**	**RUBBER**	**04+92**		**MISSING**									**X**	
F3	CHAIN	STEEL	04+92							X					
F3	BRACKET-N	STEEL	04+92							X					

INSPECTION RECORD - APPURTENANCES

LOCATION: COMMERCIAL PORT, PITI GUAM | **WSP JOB NO:** 30901541B | **INSPECTORS:** MAD, CRE

STRUCTURE ID: F2-F6

*BOLDED DAMAGE NOTES INDICATES POST TYPHOON MAWAR (MAY 2023) DAMAGES

STRUCTURE	DESCRIPTION	MATERIAL	STA ID	DAMAGE LOCATION	DAMAGE TYPE	DAMAGE SIZE (IN)			DAMAGE RATING						COMMENTS
						LENGTH	WIDTH	DEPTH	NI	ND	MN	MD	MJ	SV	
F3	BRACKET-S	STEEL	04+92							X					
F3	**CYL FENDER**	**RUBBER**	**05+14**		**TEAR**							**X**			
F3	CHAIN	STEEL	05+14							X					
F3	BRACKET-N	STEEL	05+14							X					
F3	BRACKET-S	STEEL	05+14							X					
F3	**CYL FENDER**	**RUBBER**	**05+35**		**MISSING**									**X**	
F3	CHAIN	STEEL	05+35							X					
F3	**BRACKET-N**	**STEEL**	**05+35**		**MISSING**									**X**	
F3	**BRACKET-S**	**STEEL**	**05+35**		**MISSING**									**X**	
F3	CYL FENDER	RUBBER	05+56							X					
F3	CHAIN	STEEL	05+56							X					
F3	**BRACKET-N**	**STEEL**	**05+56**		**BENT**									**X**	
F3	**BRACKET-S**	**STEEL**	**05+56**		**BENT**									**X**	
F3	**CYL FENDER**	**RUBBER**	**05+77**		**MISSING**									**X**	
F3	CHAIN	STEEL	05+77							X					
F3	**BRACKET-N**	**STEEL**	**05+77**		**MISSING**									**X**	
F3	**BRACKET-S**	**STEEL**	**05+77**		**MISSING**									**X**	
F3	**CYL FENDER**	**RUBBER**	**05+98**		**MISSING**									**X**	
F3	CHAIN	STEEL	05+98							X					
F3	**BRACKET-N**	**STEEL**	**05+98**		**MISSING**									**X**	
F3	**BRACKET-S**	**STEEL**	**05+98**		**MISSING**									**X**	
F3	**CYL FENDER**	**RUBBER**	**06+18**		**TEAR**								**X**		
F3	CHAIN	STEEL	06+18							X					
F3	**BRACKET-N**	**STEEL**	**06+18**		**BENT**									**X**	

INSPECTION RECORD - APPURTENANCES

LOCATION: COMMERCIAL PORT, PITI GUAM | **WSP JOB NO:** 30901541B | **INSPECTORS:** MAD, CRE

STRUCTURE ID: F2-F6

*BOLDED DAMAGE NOTES INDICATES POST TYPHOON MAWAR (MAY 2023) DAMAGES

STRUCTURE	DESCRIPTION	MATERIAL	STA ID	DAMAGE LOCATION	DAMAGE TYPE	DAMAGE SIZE (IN)			DAMAGE RATING						COMMENTS
						LENGTH	WIDTH	DEPTH	NI	ND	MN	MD	MJ	SV	
F3	**BRACKET-S**	**STEEL**	**06+18**		**BENT**									**X**	
F3	**CYL FENDER**	**RUBBER**	**06+40**		**MISSING**									**X**	
F3	CHAIN	STEEL	06+40							X					
F3	**BRACKET-N**	**STEEL**	**06+40**		**BENT**									**X**	
F3	**BRACKET-S**	**STEEL**	**06+40**		**BENT**									**X**	
F3	**CYL FENDER**	**RUBBER**	**06+61**		**GOUGES**							**X**			
F3	CHAIN	STEEL	06+61							X					
F3	BRACKET-N	STEEL	06+61							X					
F3	BRACKET-S	STEEL	06+61							X					
F3	CYL FENDER	RUBBER	06+82							X					
F3	CHAIN	STEEL	06+82							X					
F3	BRACKET-N	STEEL	06+82							X					
F3	BRACKET-S	STEEL	06+82							X					
F3	CYL FENDER	RUBBER	07+03							X					
F3	CHAIN	STEEL	07+03							X					
F3	BRACKET-N	STEEL	07+03							X					
F3	BRACKET-S	STEEL	07+03							X					
F3	CYL FENDER	RUBBER	07+25							X					
F3	CHAIN	STEEL	07+25							X					
F3	BRACKET-N	STEEL	07+25							X					
F3	BRACKET-S	STEEL	07+25							X					
F3	CYL FENDER	STEEL	07+45							X					
F3	CHAIN	STEEL	07+45							X					
F3	BRACKET-N	STEEL	07+45							X					

INSPECTION RECORD - APPURTENANCES

LOCATION: COMMERCIAL PORT, PITI GUAM | **WSP JOB NO:** 30901541B | **INSPECTORS:** MAD, CRE

STRUCTURE ID: F2-F6

*BOLDED DAMAGE NOTES INDICATES POST TYPHOON MAWAR (MAY 2023) DAMAGES

STRUCTURE	DESCRIPTION	MATERIAL	STA ID	DAMAGE LOCATION	DAMAGE TYPE	DAMAGE SIZE (IN)			DAMAGE RATING						COMMENTS
						LENGTH	WIDTH	DEPTH	NI	ND	MN	MD	MJ	SV	
F3	BRACKET-S	STEEL	07+45							X					
F2	BOL 1	STEEL	00+10		COR							X			MN COATING DAMAGE
F2	BOL 1 FDN	STEEL	00+10		COR							X			COR AT BP AND BOLTS
F2	PL BOL	STEEL	00+30		COR							X			
F2	BOL 2	STEEL	00+50		COR						X				
F2	BOL 2 FDN	STEEL	00+50		COR									X	COR AT BP AND BOLTS
F2	PL BOL	STEEL	00+65		COR							X			
F2	BOL 3	STEEL	01+00		COR/PIT							X			
F2	BOL 3 FDN	STEEL	01+00		COR/PIT							X			COR AT BP
F2	BOL 4	STEEL	01+20		COR/PIT							X			
F2	BOL 4 FDN	STEEL	01+20		COR/PIT								X		COR AT BP
F2	BOL 5	STEEL	01+50		COR						X				MN COATING DAMAGE
F2	BOL 5 FDN	STEEL	01+50		COR								X		COR AT BP AND BOLTS
F2	BOL 6	STEEL	01+58		COR/BENT								X		BENT TOWARDS WATER
F2	BOL 6 FDN	STEEL	01+58		COR								X		COR AT BP AND BOLTS
F2	BOL 7	STEEL	02+50		COR						X				
F2	BOL 7 FDN	STEEL	02+50		COR/PIT									X	COR AT BP AND BOLTS
F2	BOL 8	STEEL	02+60		COR						X				
F2	BOL 8 FDN	STEEL	02+60		COR							X			COR AT BP AND BOLTS
F2	BOL 9	STEEL	03+15		COR						X				
F2	BOL 9 FDN	STEEL	03+15		COR						X				
F2	BOL 10	STEEL	03+20		COR						X				
F2	BOL 10 FDN	STEEL	03+20		COR						X				
F2	BOL 11	STEEL	03+70		COR							X			

INSPECTION RECORD - APPURTENANCES

LOCATION: COMMERCIAL PORT, PITI GUAM | **WSP JOB NO:** 30901541B | **INSPECTORS:** MAD, CRE

STRUCTURE ID: F2-F6

*BOLDED DAMAGE NOTES INDICATES POST TYPHOON MAWAR (MAY 2023) DAMAGES

STRUCTURE	DESCRIPTION	MATERIAL	STA ID	DAMAGE LOCATION	DAMAGE TYPE	DAMAGE SIZE (IN)			DAMAGE RATING						COMMENTS
						LENGTH	WIDTH	DEPTH	NI	ND	MN	MD	MJ	SV	
F2	BOL 11 FDN	STEEL	03+70		COR						X				CONC PAD
F2	BOL 12	STEEL	03+90		COR							X			
F2	BOL 12 FDN	STEEL	03+90		COR						X				CONC PAD
F2	BOL 13	STEEL	04+75		COR						X				COR AND COATING DAMAGE
F2	BOL 13 FDN	STEEL	04+75		COR/SCALE									X	COR AT BP AND BOLTS
F2	BOL 14	STEEL	04+80		COR						X				COR AND COATING DAMAGE
F2	BOL 14 FDN	STEEL	04+80		COR									X	COR AT BOLTS
F2	BOL 15	STEEL	05+45		COR/SCALE									X	COR AND MISSING HORNS
F2	BOL 15 FDN	STEEL	05+45							X					
F2	BOL 16	STEEL	05+55		COR						X				COR AND COATING DAMAGE
F2	BOL 16 FDN	STEEL	05+55		COR									X	BOLT HEADS GONE
F2	BOL 17	STEEL	05+80		COR						X				
F2	BOL 17 FDN	STEEL	05+80								X				
F2	BOL 18	STEEL	06+00		COR							X			
F2	BOL 18 FDN	STEEL	06+00		COR/SCALE									X	BOLT HEADS GONE
F2	BOL 19	STEEL	06+45		COR							X			
F2	BOL 19 FDN	STEEL	06+45								X				CONC PAD
F2	BOL 20	STEEL	06+70		COR							X			
F2	BOL 20 FDN	STEEL	06+70								X				CONC PAD
F2	FLOAT FNDR 1	RUBBER	02+45		ABR						X				
F2	FLOAT FNDR 2	RUBBER	03+15		ABR/GOUG							X			VISIBLE BELTING MULT LOCS
F2	FLOAT FNDR 3	RUBBER	03+80		ABR							X			
F2	FLOAT FNDR 4	RUBBER	04+20		ABR/WORN							X			BELTING VISIBLE MULT LOCS
F2	FLOAT FNDR 5	RUBBER	04+70		ABR						X				

INSPECTION RECORD - APPURTENANCES

LOCATION: COMMERCIAL PORT, PITI GUAM | **WSP JOB NO:** 30901541B | **INSPECTORS:** MAD, CRE

STRUCTURE ID: F2-F6

*BOLDED DAMAGE NOTES INDICATES POST TYPHOON MAWAR (MAY 2023) DAMAGES

STRUCTURE	DESCRIPTION	MATERIAL	STA ID	DAMAGE LOCATION	DAMAGE TYPE	DAMAGE SIZE (IN)			DAMAGE RATING						COMMENTS
						LENGTH	WIDTH	DEPTH	NI	ND	MN	MD	MJ	SV	
F3	BOL	STEEL	00+08		COR						X				
F3	CAVEL	STEEL	00+62		COR						X				
F3	BOL	STEEL	01+16		COR						X				
F3	CAVEL	STEEL	01+70		COR						X				
F3	BOL	STEEL	02+24		COR						X				
F3	CAVEL	STEEL	02+78		COR						X				
F3	BOL	STEEL	03+30		COR						X				
F3	CAVEL	STEEL	03+85		COR							X			
F3	BOL	STEEL	04+40		COR						X				
F3	CAVEL	STEEL	04+95		COR/SCL							X			
F3	BOL	STEEL	05+48		COR						X				
F3	CAVEL	STEEL	06+03		COR/SCL							X			
F3	BOL	STEEL	06+56		COR						X				
F3	CAVEL	STEEL	07+11		COR/SCL							X			
F4	BOL	STEEL	07+92		COR						X				
F4	CAVEL	STEEL	08+48		COR						X				
F4	BOL	STEEL	09+04		COR						X				
F4	**CAVEL**	**STEEL**	**09+54**		**COR**									**X**	**MISSING**
F4	BOL	STEEL	10+18		COR						X				
F4	CAVEL	STEEL	10+68		COR								X		CCS AT CAVEL PERIMETER
F4	BOL	STEEL	11+22		COR						X				
F4	CAVEL	STEEL	11+78		COR							X			
F4	BOL	STEEL	12+32		COR						X				
F4	CAVEL	STEEL	12+86		COR								X		

INSPECTION RECORD - APPURTENANCES

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STRUCTURE ID: F2-F6

*BOLDED DAMAGE NOTES INDICATES POST TYPHOON MAWAR (MAY 2023) DAMAGES

STRUCTURE	DESCRIPTION	MATERIAL	STA ID	DAMAGE LOCATION	DAMAGE TYPE	DAMAGE SIZE (IN)			DAMAGE RATING						COMMENTS
						LENGTH	WIDTH	DEPTH	NI	ND	MN	MD	MJ	SV	
F4	BOL	STEEL	13+40		COR						X				
F4	CAVEL	STEEL	13+95		COR							X			
F5	BOL	STEEL	14+50		COR							X			
F5	CAVEL	STEEL	15+07		COR							X			
F5	BOL	STEEL	15+63		COR							X			
F5	CAVEL	STEEL	16+18		COR							X			
F5	BOL	STEEL	16+74		COR						X				
F5	CAVEL	STEEL	17+35		COR						X				
F5	BOL	STEEL	17+99		COR						X				DOUBLE BITT
F5	CAVEL	STEEL	18+45		COR							X			
F5	BOL	STEEL	19+00		COR							X			DOUBLE BITT
F5	CAVEL	STEEL	19+54		COR							X			
F5	BOL	STEEL	20+08		COR							X			DOUBLE BITT
F6	CAVEL	STEEL	20+68		COR							X			
F6	BOL	STEEL	21+22		COR						X				DOUBLE BITT
F6	CAVEL	STEEL	21+77		COR						X				
F6	BOL	STEEL	22+31		COR						X				DOUBLE BITT
F6	CAVEL	STEEL	23+44		COR						X				
F6	BOL	STEEL	23+98		COR						X				
F6	CAVEL	STEEL	24+53		COR						X				
F6	BOL	STEEL	25+08		COR						X				
F6	CAVEL	STEEL	25+63		COR						X				
F6	BOL	STEEL	26+19		COR						X				
F6	CAVEL	STEEL	26+75		COR						X				

INSPECTION RECORD - APPURTENANCES

LOCATION: COMMERCIAL PORT, PITI GUAM | **WSP JOB NO:** 30901541B | **INSPECTORS:** MAD, CRE

STRUCTURE ID: F2-F6

*BOLDED DAMAGE NOTES INDICATES POST TYPHOON MAWAR (MAY 2023) DAMAGES

STRUCTURE	DESCRIPTION	MATERIAL	STA ID	DAMAGE LOCATION	DAMAGE TYPE	DAMAGE SIZE (IN)			DAMAGE RATING						COMMENTS
						LENGTH	WIDTH	DEPTH	NI	ND	MN	MD	MJ	SV	

APPENDIX C

DAMAGE MAPS

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NOTES:

1. FOR ELEVATION VIEW OF DAMAGES AT BERTH F2, SEE FIG-10 THROUGH FIG-16.
2. FOR ELEVATION VIEW OF DAMAGES AT BERTH F3, SEE FIG-17 THROUGH FIG-24

1 / - **GENERAL SITE PLAN - COMMERCIAL PORT**
SCALE: NTS

CONCEPTUAL - NOT FOR CONSTRUCTION

MARK	REVISION DESCRIPTION	BY	APP.	DATE
1	UPDATED DAMAGES AND NOTES	AMC	MAD	9/20/24

WSP USA Inc.
590 S. Marine Corps Dr.
Suite 421
Tamuning, GU 96913
TEL: (671) 646-6872
FAX: (671) 646-6873

PORT OF GUAM

DRAWN BY JDM
DESIGN BY LC
CHECK BY MAD
PROJ MGR MAD

PORT AUTHORITY OF GUAM
PIER F2 - F6
ASSESSMENT REPORT

SITE PLAN

DRAWING NO. **FIG-1**
PROJECT NO. 30901541B.002
DATE: 9/30/24
SHEET NO. 1 OF 24

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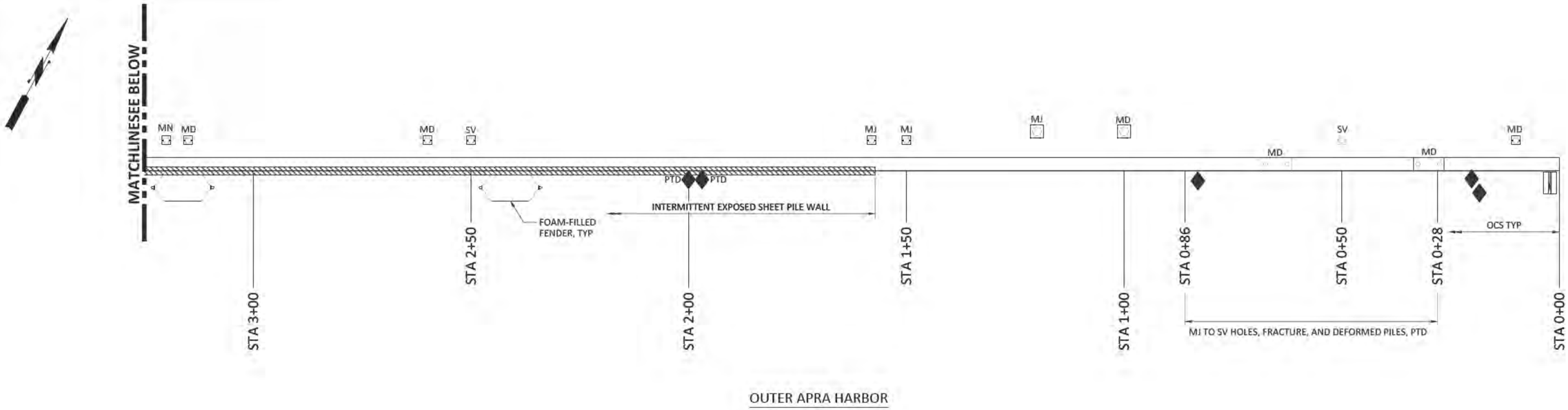

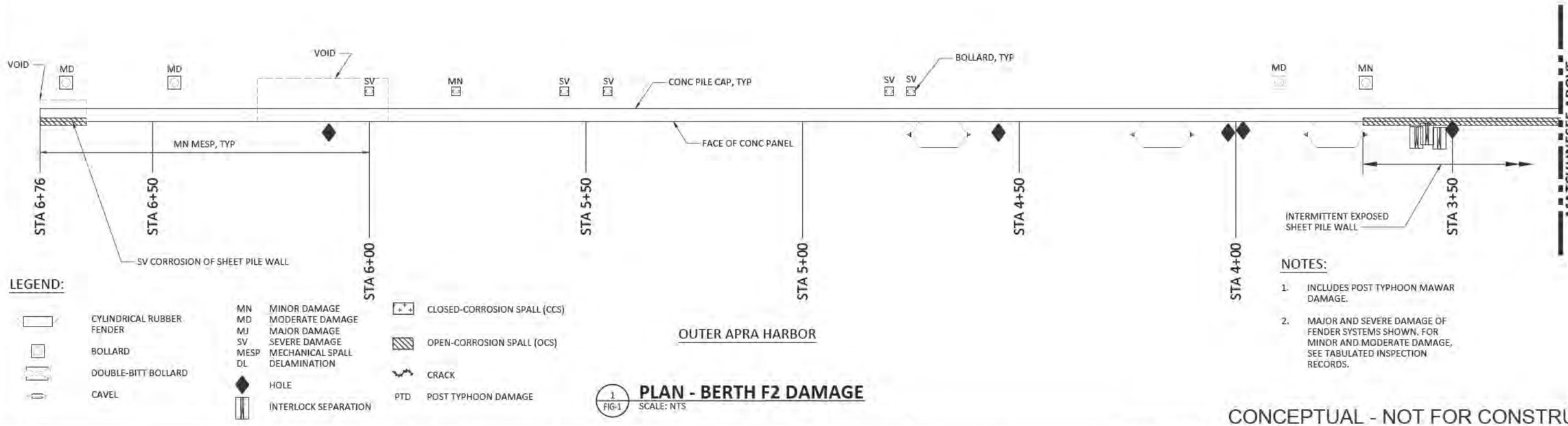

LEGEND:

- CYLINDRICAL RUBBER FENDER
- BOLLARD
- DOUBLE-BITT BOLLARD
- CAVEL
- MN MINOR DAMAGE
- MD MODERATE DAMAGE
- MJ MAJOR DAMAGE
- SV SEVERE DAMAGE
- MESP MECHANICAL SPALL
- DL DELAMINATION
- HOLE
- INTERLOCK SEPARATION
- CLOSED-CORROSION SPALL (CCS)
- OPEN-CORROSION SPALL (OCS)
- CRACK
- PTD POST TYPHOON DAMAGE

NOTES:

1. INCLUDES POST TYPHOON MAWAR DAMAGE.
2. MAJOR AND SEVERE DAMAGE OF FENDER SYSTEMS SHOWN. FOR MINOR AND MODERATE DAMAGE, SEE TABULATED INSPECTION RECORDS.

1 / FIG-1 **PLAN - BERTH F2 DAMAGE**
SCALE: NTS

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DESIGN BY: LC
CHECK BY: MAD
PROJ MGR: MAD

PORT AUTHORITY OF GUAM
PIER F2 - F6
ASSESSMENT REPORT

BERTH F2

DRAWING NO. **FIG-2**
PROJECT NO. 30901541B.002
DATE: 9/30/24
SHEET NO. 2 OF 24

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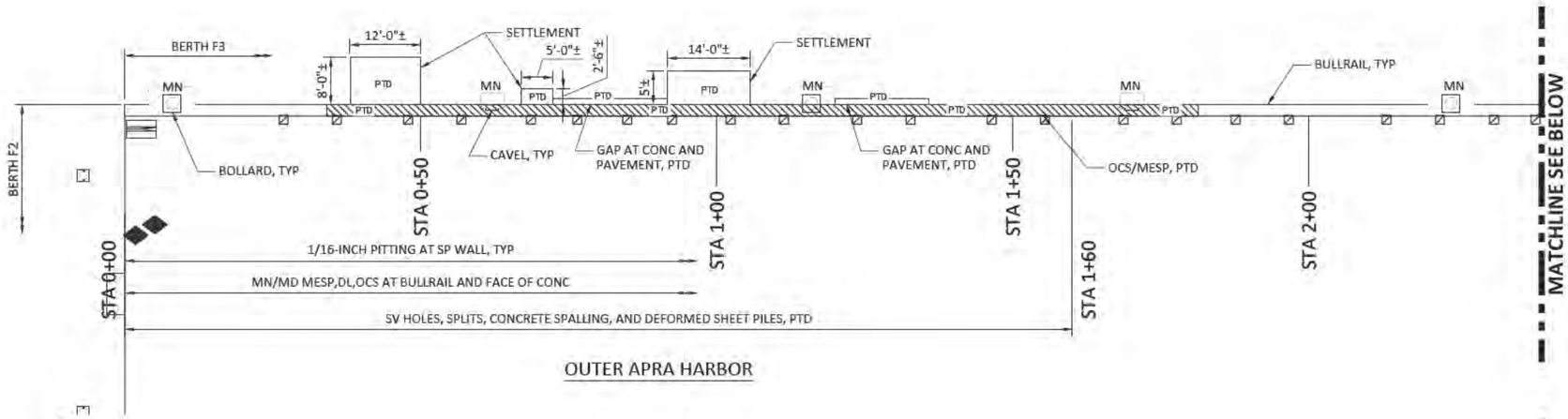

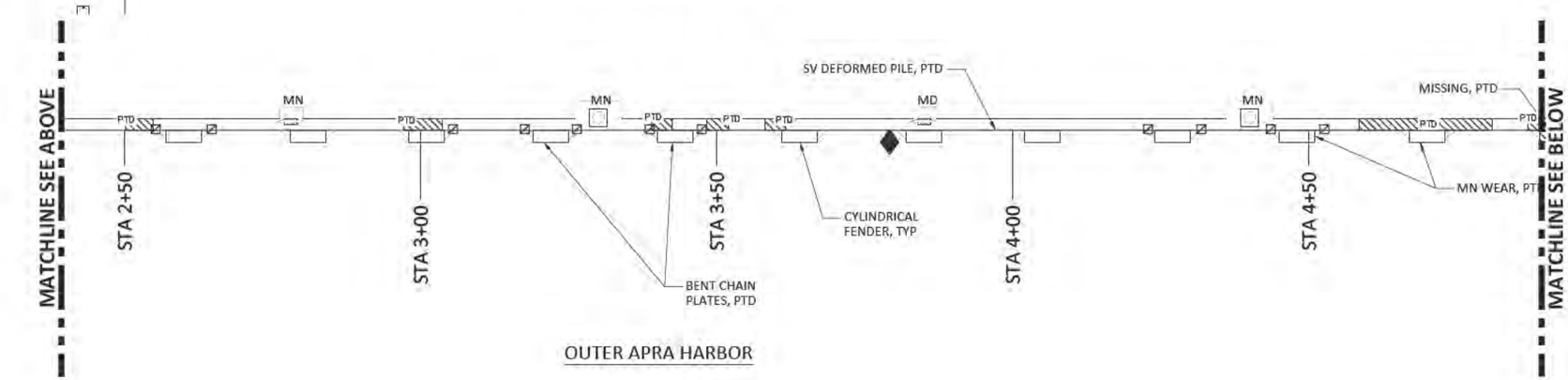

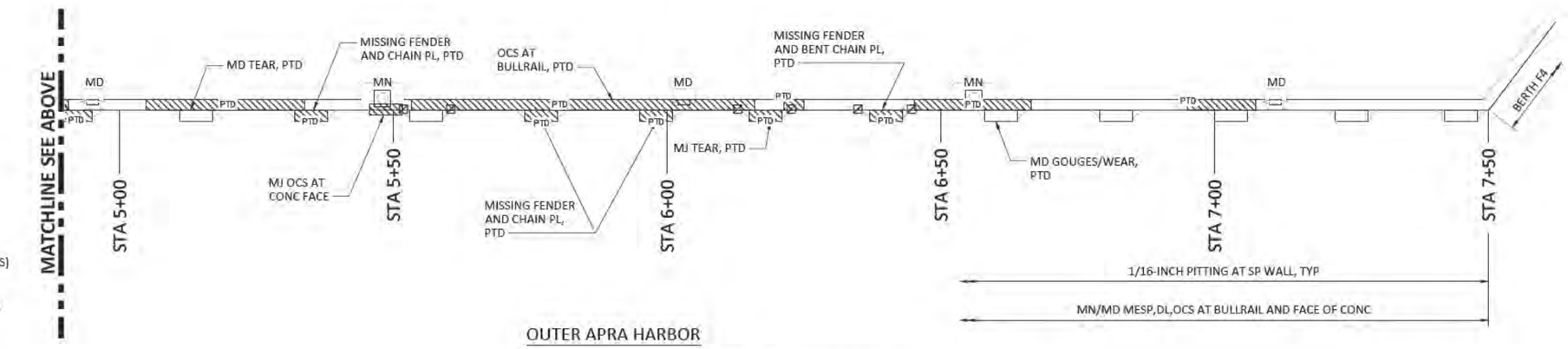

NOTES:

1. INCLUDES POST TYPHOON MAWAR DAMAGE.
2. MAJOR AND SEVERE DAMAGE OF FENDER SYSTEMS SHOWN. FOR MINOR AND MODERATE DAMAGE, SEE TABULATED INSPECTION RECORDS.

LEGEND:

- CYLINDRICAL RUBBER FENDER
- BOLLARD
- DOUBLE-BITT BOLLARD
- CAVEL

LEGEND:

MN	MINOR DAMAGE		CLOSED-CORROSION SPALL (CCS)
MD	MODERATE DAMAGE		OPEN-CORROSION SPALL (OCS)
MJ	MAJOR DAMAGE		CRACK
SV	SEVERE DAMAGE	PTD	POST TYPHOON DAMAGE
MESP	MECHANICAL SPALL		BENT CHAIN PL, PTD
DL	DELAMINATION		
	HOLE		
	INTERLOCK SEPARATION		

1 FIG-1 **PLAN - BERTH F3 DAMAGE**
SCALE: NTS

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CHECK BY: MAD
PROJ. MGR: MAD

PORT AUTHORITY OF GUAM
PIER F2 - F6
ASSESSMENT REPORT

BERTH F3

DRAWING NO. **FIG-3**
PROJECT NO. 30901541B.002
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SHEET NO. 3 OF 24

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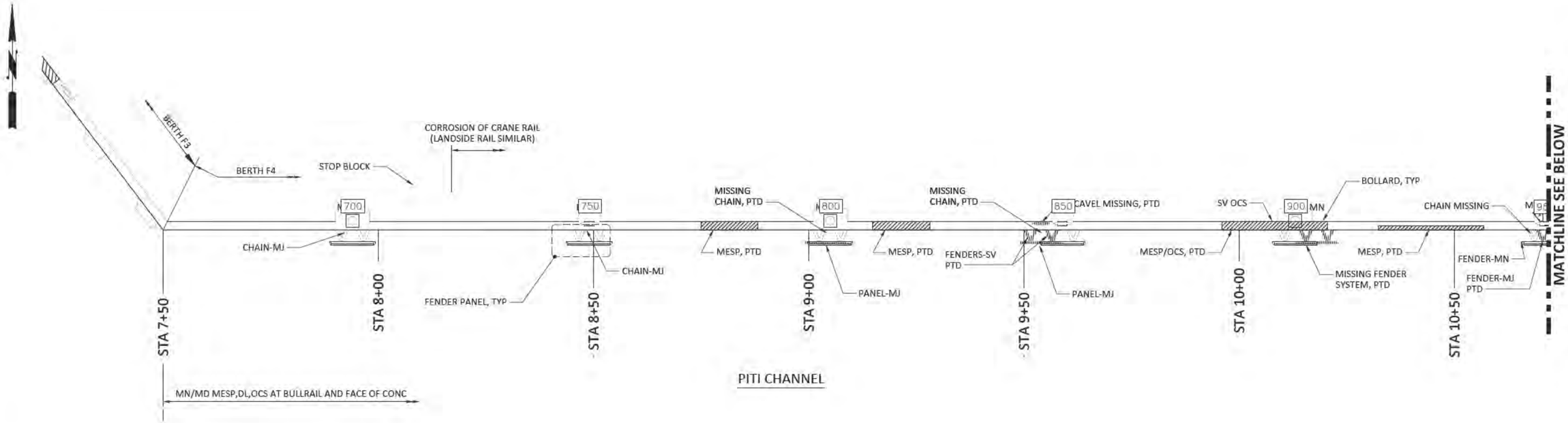

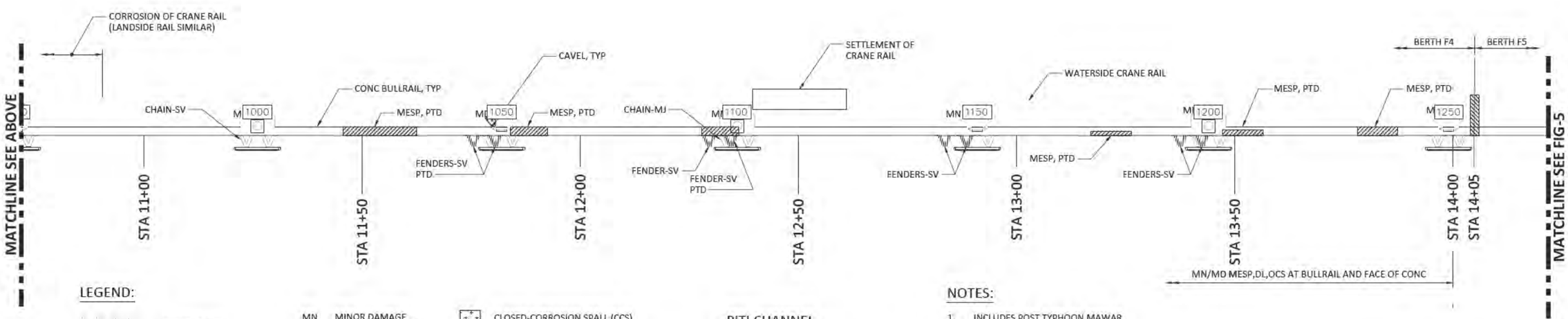

LEGEND:

- FENDER PANEL
- BOLLARD
- DOUBLE-BITT BOLLARD
- CAVEL
- HOLE
- INTERLOCK SEPARATION
- CLOSED-CORROSION SPALL (CCS)
- OPEN-CORROSION SPALL (OCS)
- CRACK

MN	MINOR DAMAGE
MD	MODERATE DAMAGE
MJ	MAJOR DAMAGE
SV	SEVERE DAMAGE
MESP	MECHANICAL SPALL
DL	DELAMINATION
PTD	POST TYPHOON DAMAGE

1 FIG-1 **PLAN - BERTH F4 DAMAGE**
SCALE: NTS

NOTES:

1. INCLUDES POST TYPHOON MAWAR DAMAGE.
2. MAJOR AND SEVERE DAMAGE OF FENDER SYSTEMS SHOWN. FOR MINOR AND MODERATE DAMAGE, SEE TABULATED INSPECTION RECORDS.

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PORT AUTHORITY OF GUAM
PIER F2 - F6
ASSESSMENT REPORT

BERTH F4

DRAWING NO. **FIG-4**
PROJECT NO. 30901541B.002
DATE: 9/30/24
SHEET NO. 4 OF 24

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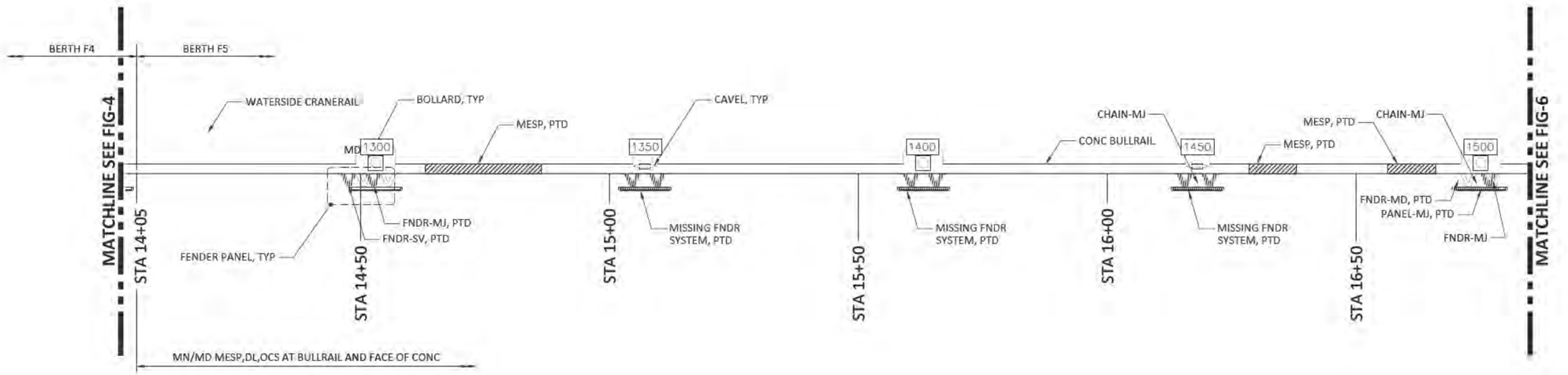

PITI CHANNEL

1 / FIG-1 PLAN - BERTH F5 DAMAGE

SCALE: NTS

00 38 50 00 50 00 50

NOTES:

1. INCLUDES POST TYPHOON MAWAR DAMAGE.
2. MAJOR AND SEVERE DAMAGE OF FENDER SYSTEMS SHOWN. FOR MINOR AND MODERATE DAMAGE, SEE TABULATED INSPECTION RECORDS.

LEGEND:

- FENDER PANEL
- BOLLARD
- DOUBLE-BITT BOLLARD
- CAVEL
- MN MINOR DAMAGE
- MD MODERATE DAMAGE
- MJ MAJOR DAMAGE
- SV SEVERE DAMAGE
- MESP MECHANICAL SPALL
- DL DELAMINATION
- HOLE
- INTERLOCK SEPARATION
- CLOSED-CORROSION SPALL (CCS)
- OPEN-CORROSION SPALL (OCS)
- CRACK
- PTD POST TYPHOON DAMAGE

CONCEPTUAL - NOT FOR CONSTRUCTION

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PROJ MGR: MAD

PORT AUTHORITY OF GUAM
PIER F2 - F6
ASSESSMENT REPORT
BERTH F5

DRAWING NO: FIG-5
PROJECT NO: 30901541B.002
DATE: 9/30/24
SHEET NO: 5 OF 24

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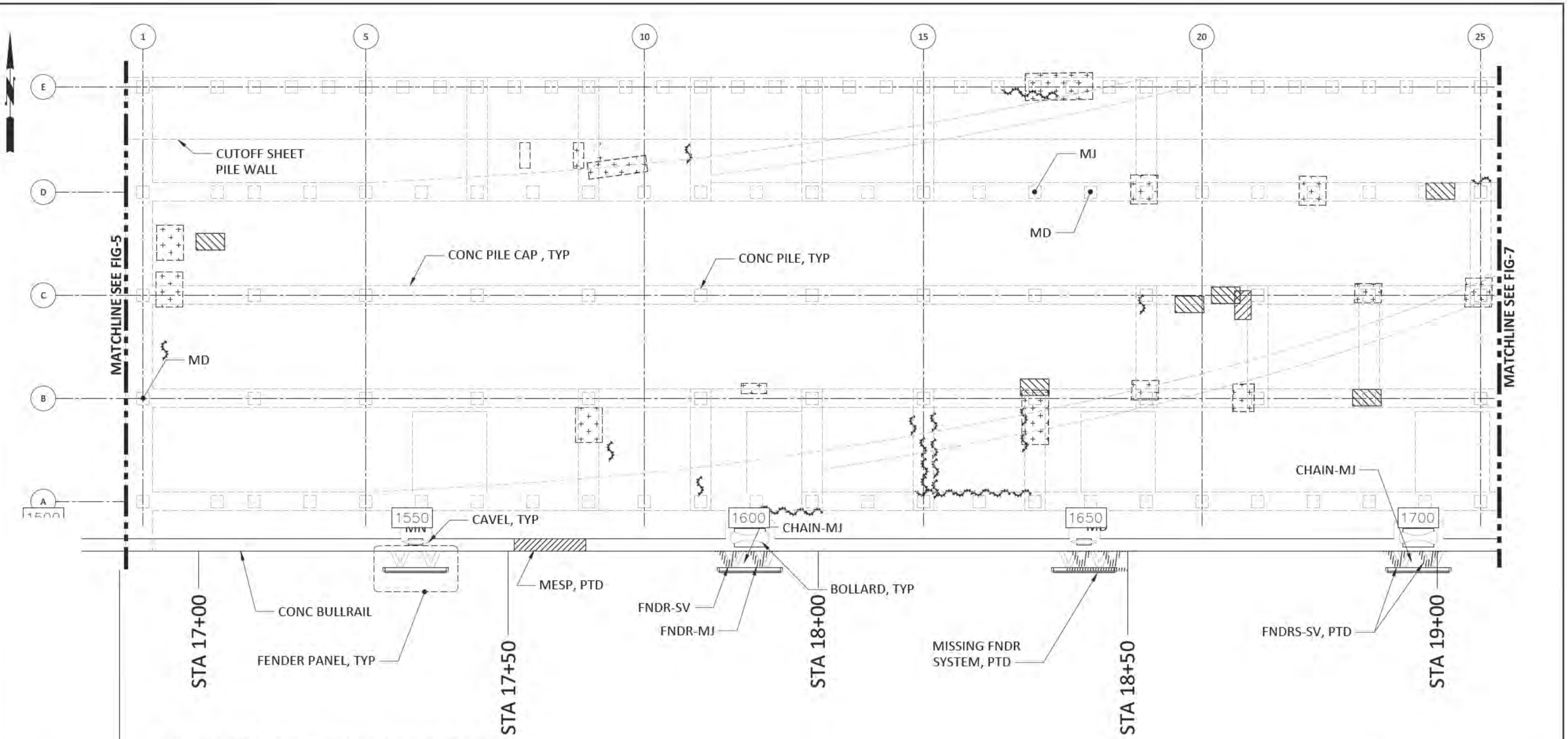

LEGEND:

- FENDER PANEL
- BOLLARD
- DOUBLE-BITT BOLLARD
- CAVEL

MN	MINOR DAMAGE
MD	MODERATE DAMAGE
MJ	MAJOR DAMAGE
SV	SEVERE DAMAGE
MESP	MECHANICAL SPALL
DL	DELAMINATION

- HOLE
- INTERLOCK SEPARATION
- CLOSED-CORROSION SPALL (CCS)
- OPEN-CORROSION SPALL (OCS)
- CRACK
- PTD POST TYPHOON DAMAGE

1 / FIG-1 **PLAN - BERTH F5 DAMAGE**
SCALE: NTS

NOTES:

1. INCLUDES POST TYPHOON MAWAR DAMAGE.
2. MAJOR AND SEVERE DAMAGE OF FENDER SYSTEMS SHOWN. FOR MINOR AND MODERATE DAMAGE, SEE TABULATED INSPECTION RECORDS.

CONCEPTUAL - NOT FOR CONSTRUCTION

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PORT AUTHORITY OF GUAM
PIER F2 - F6
ASSESSMENT REPORT

BERTH F5 - PILE SUPPORTED WHARF

DRAWING NO. **FIG-6**
PROJECT NO. 30901541B.002
DATE: 9/30/24
SHEET NO. 6 OF 24

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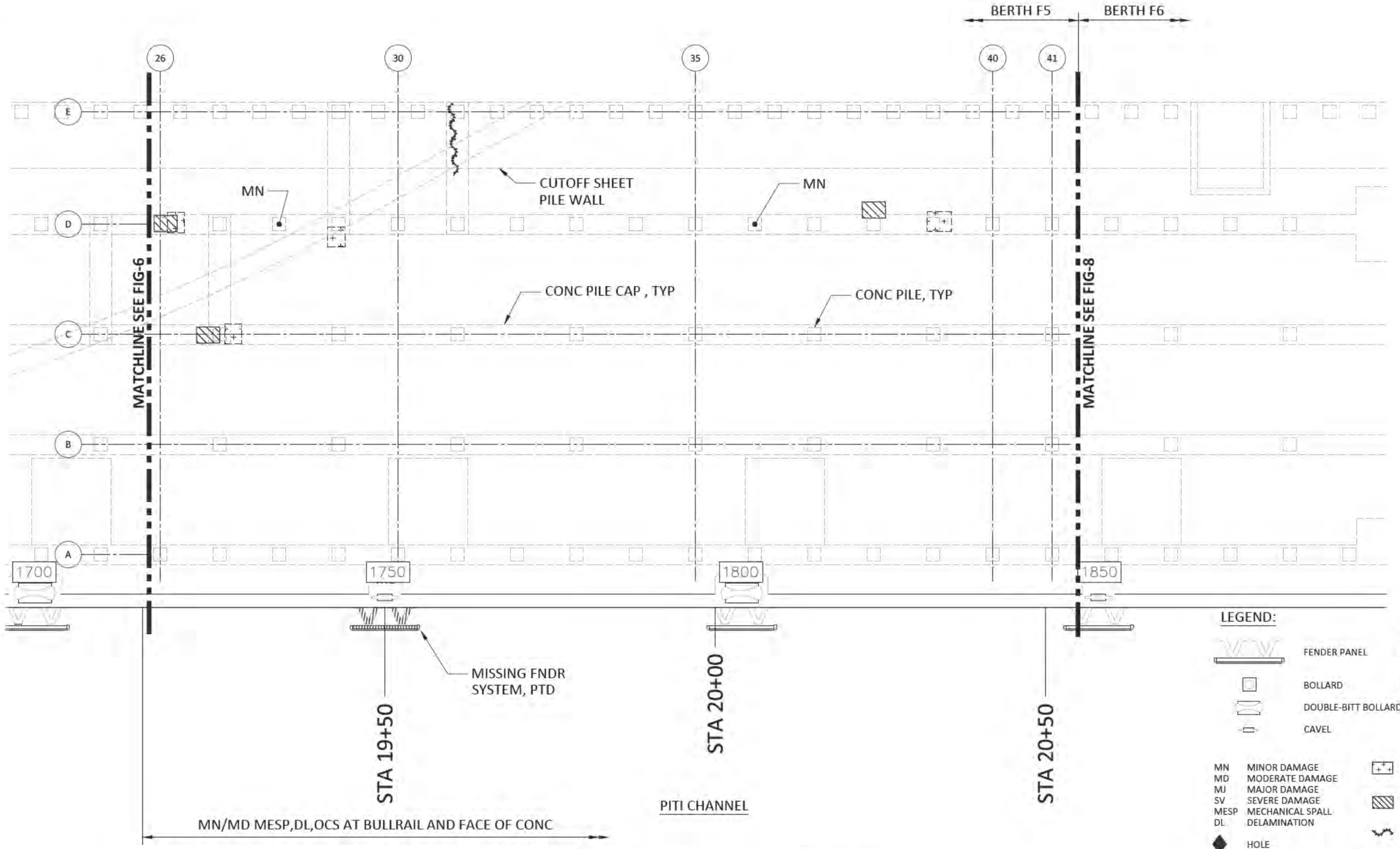

LEGEND:

- FENDER PANEL
- BOLLARD
- DOUBLE-BITT BOLLARD
- CAVEL

NOTES:

1. INCLUDES POST TYPHOON MAWAR DAMAGE.
2. MAJOR AND SEVERE DAMAGE OF FENDER SYSTEMS SHOWN. FOR MINOR AND MODERATE DAMAGE, SEE TABULATED INSPECTION RECORDS.

MN	MINOR DAMAGE
MD	MODERATE DAMAGE
MJ	MAJOR DAMAGE
SV	SEVERE DAMAGE
MESP	MECHANICAL SPALL
DL	DELAMINATION

- HOLE
- INTERLOCK SEPARATION
- CLOSED-CORROSION SPALL (CCS)
- OPEN-CORROSION SPALL (OCS)
- CRACK
- PTD POST TYPHOON DAMAGE

1 / FIG-1 **PLAN - BERTH F5 DAMAGE**
SCALE: NTS

CONCEPTUAL - NOT FOR CONSTRUCTION

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PORT AUTHORITY OF GUAM
PIER F2 - F6
ASSESSMENT REPORT

BERTH F5 - PILE SUPPORTED WHARF

DRAWING NO. FIG-7
PROJECT NO. 30901541B.002
DATE: 9/30/24
SHEET NO. 7 OF 24

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BERTH F5 BERTH F6

42 45 50 55 60 63

E D C B A

MATCHLINE SEE FIG-7

MATCHLINE SEE FIG-7

CUTOFF SHEET PILE WALL

CONC PILE CAP , TYP

CONC PILE, TYP

1850 1900 1950 2000

CHAIN-MJ

MISSING FNDR SYSTEM, PTD

STA 21+00 STA 21+50 STA 22+00 STA 22+50

MN/MD MESP,DL,OCS AT BULLRAIL AND FACE OF CONC

PITI CHANNEL

LEGEND:

- FENDER PANEL
- BOLLARD
- DOUBLE-BITT BOLLARD
- CAVEL

MN	MINOR DAMAGE
MD	MODERATE DAMAGE
MJ	MAJOR DAMAGE
SV	SEVERE DAMAGE
MESP	MECHANICAL SPALL
DL	DELAMINATION

- HOLE
- INTERLOCK SEPARATION
- CLOSED-CORROSION SPALL (CCS)
- OPEN-CORROSION SPALL (OCS)
- CRACK
- PTD POST TYPHOON DAMAGE

NOTES:

1. INCLUDES POST TYPHOON MAWAR DAMAGE.
2. MAJOR AND SEVERE DAMAGE OF FENDER SYSTEMS SHOWN. FOR MINOR AND MODERATE DAMAGE, SEE TABULATED INSPECTION RECORDS.

1 / FIG-1 **PLAN - BERTH F6 DAMAGE**

SCALE: NTS

CONCEPTUAL - NOT FOR CONSTRUCTION

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1	UPDATED DAMAGES AND NOTES	AMC	MAD	9/20/24

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PROJ MGR MAD

PORT AUTHORITY OF GUAM
PIER F2 - F6
ASSESSMENT REPORT

BERTH F6 - PILE SUPPORTED WHARF

DRAWING NO. **FIG-8**
PROJECT NO. 30901541B.002
DATE: 9/30/24
SHEET NO. 8 OF 24

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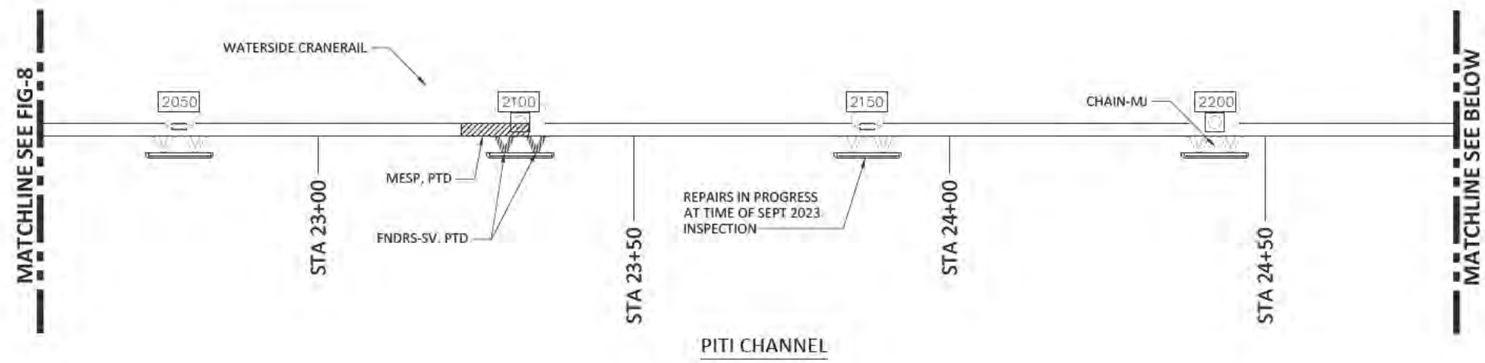

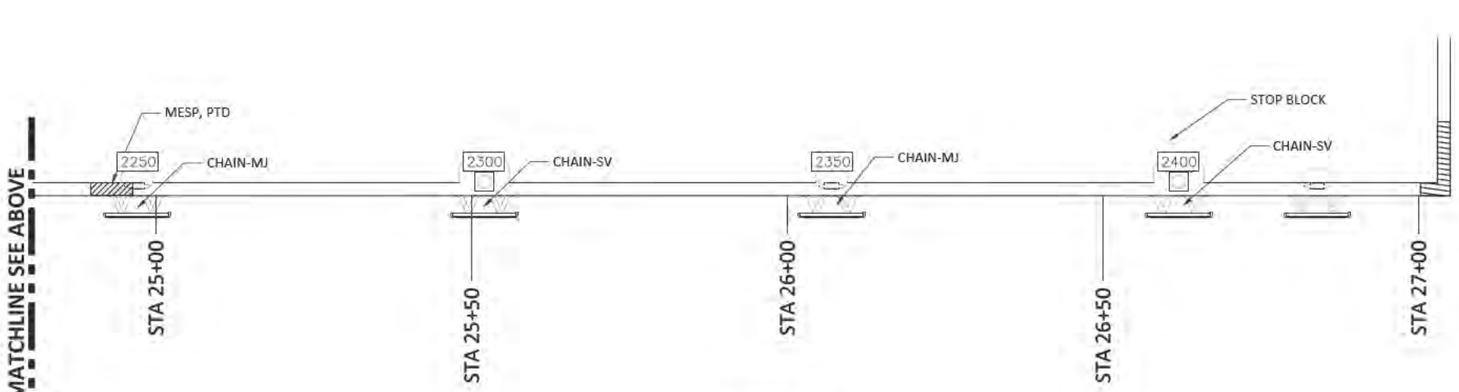

NOTES:

1. INCLUDES POST TYPHOON MAWAR DAMAGE.
2. MAJOR AND SEVERE DAMAGE OF FENDER SYSTEMS SHOWN. FOR MINOR AND MODERATE DAMAGE, SEE TABULATED INSPECTION RECORDS.

LEGEND:

- FENDER PANEL
- BOLLARD
- DOUBLE-BITT BOLLARD
- CAVEL
- HOLE
- INTERLOCK SEPARATION
- CLOSED-CORROSION SPALL (CCS)
- OPEN-CORROSION SPALL (OCS)
- CRACK

MN	MINOR DAMAGE
MD	MODERATE DAMAGE
MJ	MAJOR DAMAGE
SV	SEVERE DAMAGE
MESP	MECHANICAL SPALL
DL	DELAMINATION
PTD	POST TYPHOON DAMAGE

1 / FIG-1 PLAN - BERTH F6 DAMAGE
SCALE: NTS

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1	UPDATED DAMAGES AND NOTES	AMC	MAD	9/20/24

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PROJ MGR: MAD

PORT AUTHORITY OF GUAM
PIER F2 - F6
ASSESSMENT REPORT

BERTH F6

DRAWING NO: **FIG-9**
PROJECT NO: 30901541B.002
DATE: 9/30/24
SHEET NO: 9 OF 24

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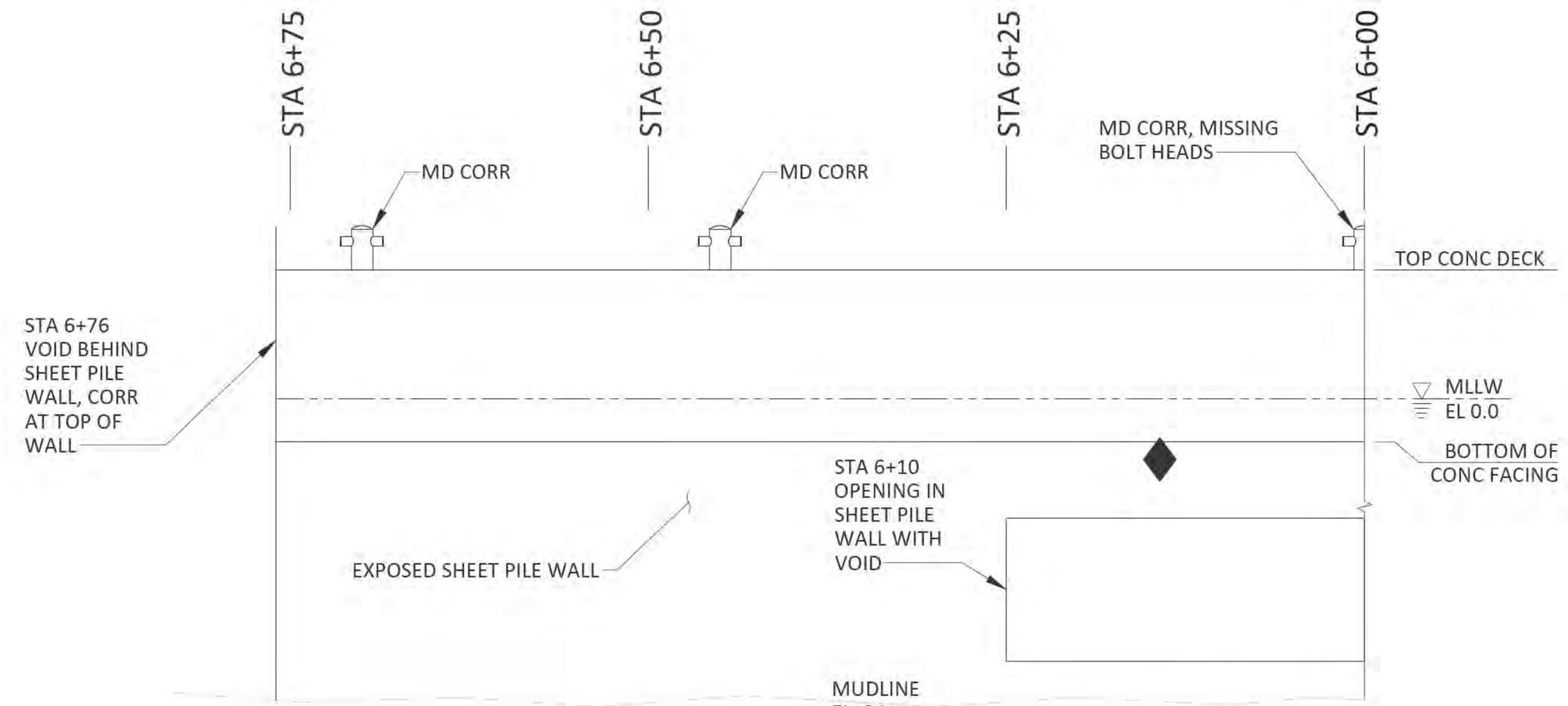

LEGEND:

- SHEET PILE DENT
- SHEET PILE HOLE
- SHEET SEPARATION
- PTD POST TYPHOON DAMAGE
- DL DELAMINATION
- CRACK/GOUGE
- MECHANICAL SPALL
- OPEN-CORROSION SPALL
- CLOSED-CORROSION SPALL
- MISSING/DAMAGED ANODE

OUTER APRA HARBOR

ELEVATION - BERTH F2 DAMAGE STA 6+00 TO STA 6+76

SCALE: NTS

NOTE:
DAMAGE TO STEEL SHEET PILE, CONCRETE CAP, AND BULLRAIL SHOWN. SEE FIG-17 THROUGH FIG-23 FOR DAMAGE AT MOORING HARDWARE AND FENDERS.

CONCEPTUAL - NOT FOR CONSTRUCTION

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PIER F2 - F6
ASSESSMENT REPORT

BERTH F2 - ELEVATION

DRAWING NO: **FIG-10**
PROJECT NO: 30901541B.002
DATE: 9/30/24
SHEET NO: 10 OF 24

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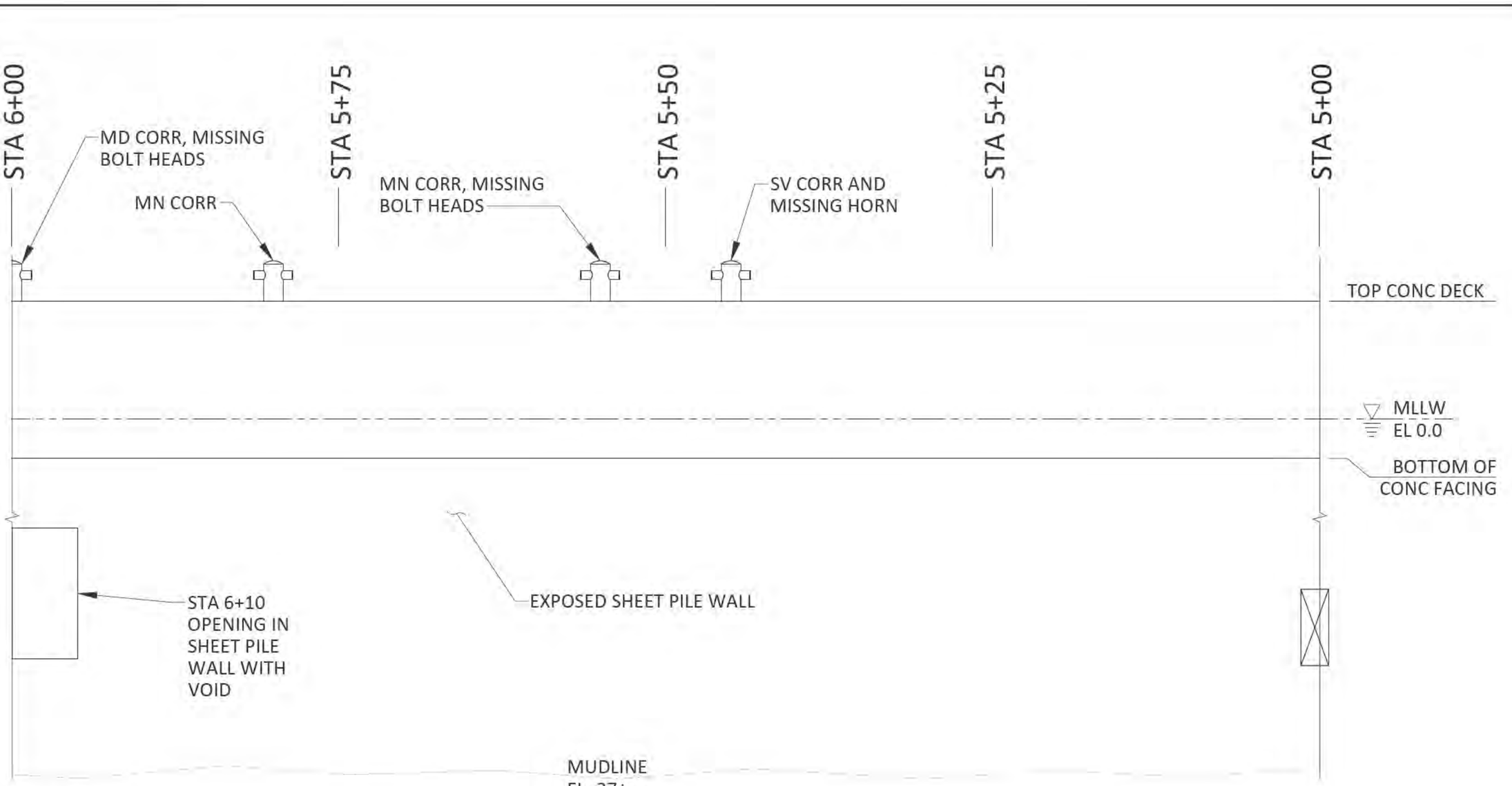

LEGEND:

- SHEET PILE DENT
- SHEET PILE HOLE
- SHEET SEPARATION
- PTD POST TYPHOON DAMAGE
- DL DELAMINATION
- CRACK/GOUGE
- MECHANICAL SPALL
- OPEN-CORROSION SPALL
- CLOSED-CORROSION SPALL
- MISSING/DAMAGED ANODE

OUTER APRA HARBOR

ELEVATION - BERTH F2 DAMAGE STA 5+00 TO STA 6+00

SCALE: NTS

NOTE:

DAMAGE TO STEEL SHEET PILE, CONCRETE CAP, AND BULLRAIL SHOWN. SEE FIG-17 THROUGH FIG-23 FOR DAMAGE AT MOORING HARDWARE AND FENDERS.

CONCEPTUAL - NOT FOR CONSTRUCTION

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PROJ MGR: MAD

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PIER F2 - F6
ASSESSMENT REPORT

BERTH F2 - ELEVATION

DRAWING NO.: **FIG-11**
PROJECT NO.: 30901541B.002
DATE: 9/30/24
SHEET NO.: 11 OF 24

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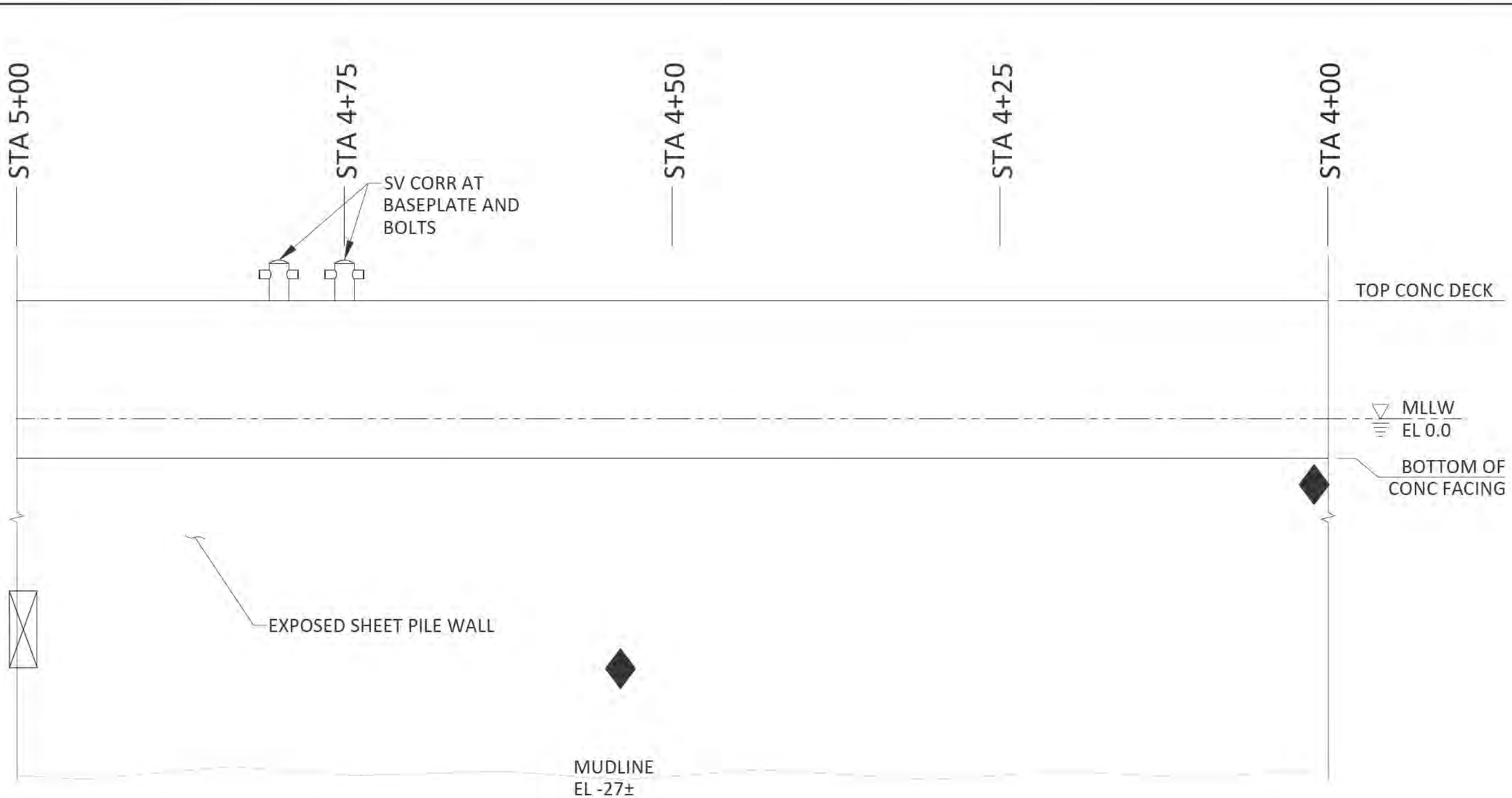

LEGEND:

- SHEET PILE DENT
- SHEET PILE HOLE
- SHEET SEPARATION
- PTD POST TYPHOON DAMAGE
- DL DELAMINATION
- CRACK/GOUGE
- MECHANICAL SPALL
- OPEN-CORROSION SPALL
- CLOSED-CORROSION SPALL
- MISSING/DAMAGED ANODE

OUTER APRA HARBOR

ELEVATION - BERTH F2 DAMAGE STA 4+00 TO STA 5+00

SCALE: NTS

NOTE:
DAMAGE TO STEEL SHEET PILE, CONCRETE CAP, AND BULLRAIL SHOWN. SEE FIG-17 THROUGH FIG-23 FOR DAMAGE AT MOORING HARDWARE AND FENDERS.

CONCEPTUAL - NOT FOR CONSTRUCTION

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PROJ MGR MAD

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ASSESSMENT REPORT

BERTH F2 - ELEVATION

DRAWING NO. **FIG-12**
PROJECT NO. 30901541B.002
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SHEET NO. 12 OF 24

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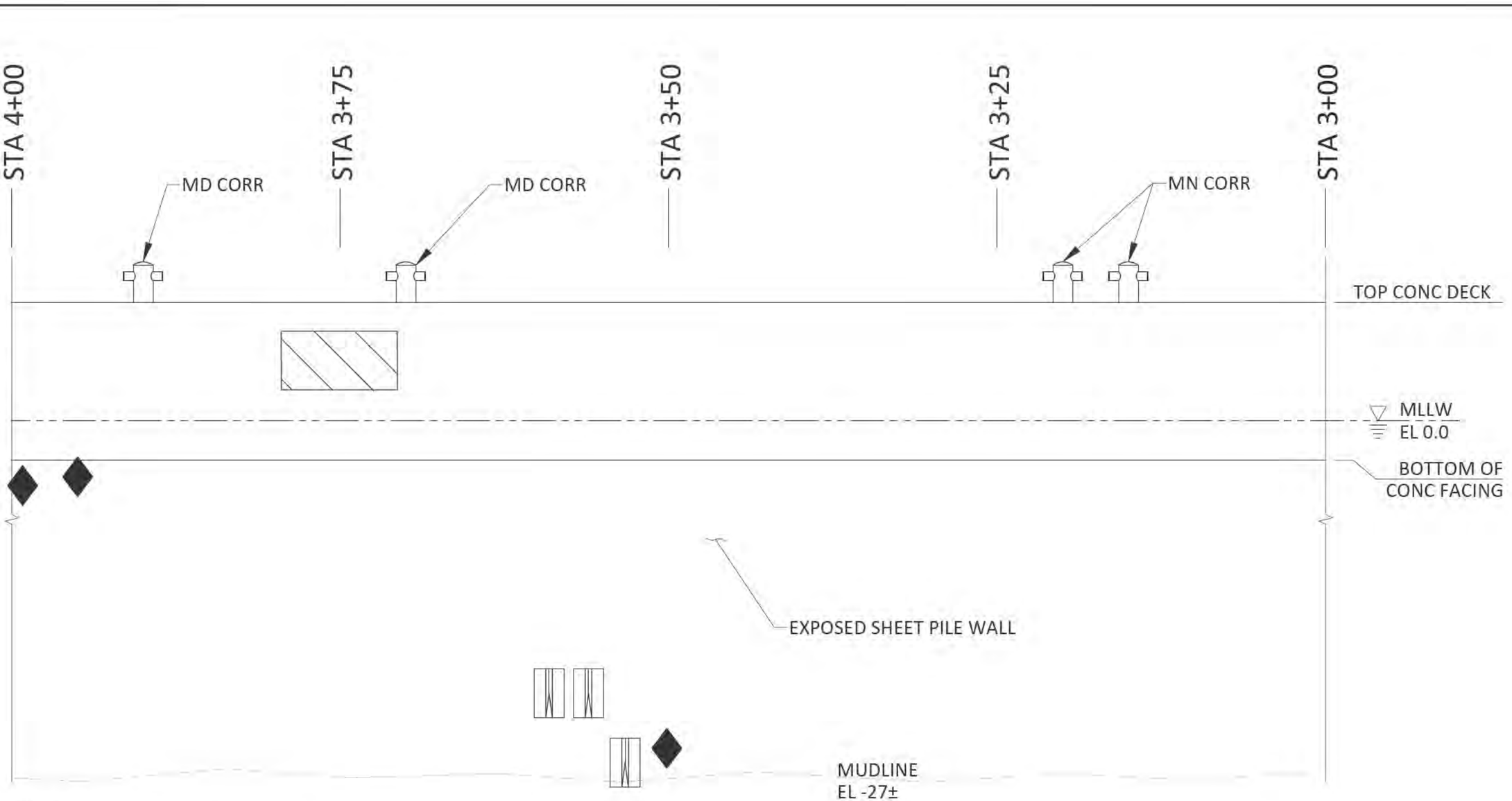

LEGEND:

- SHEET PILE DENT
- SHEET PILE HOLE
- SHEET SEPARATION
- PTD POST TYPHOON DAMAGE
- DL DELAMINATION
- CRACK/GOUGE
- MECHANICAL SPALL
- OPEN-CORROSION SPALL
- CLOSED-CORROSION SPALL
- MISSING/DAMAGED ANODE

OUTER APRA HARBOR

ELEVATION - BERTH F2 DAMAGE STA 3+00 TO STA 4+00

SCALE: NTS

NOTE:
DAMAGE TO STEEL SHEET PILE, CONCRETE CAP, AND BULLRAIL SHOWN. SEE FIG-17 THROUGH FIG-23 FOR DAMAGE AT MOORING HARDWARE AND FENDERS.

CONCEPTUAL - NOT FOR CONSTRUCTION

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FAX: (671) 646-6873

PORT OF GUAM

DRAWN BY DRW
DESIGN BY DRW
CHECK BY MAD
PROJ MGR MAD

PORT AUTHORITY OF GUAM
PIER F2 - F6
ASSESSMENT REPORT

BERTH F2 - ELEVATION

DRAWING NO. **FIG-13**
PROJECT NO. 30901541B.002
DATE: 9/30/24
SHEET NO. 13 OF 24

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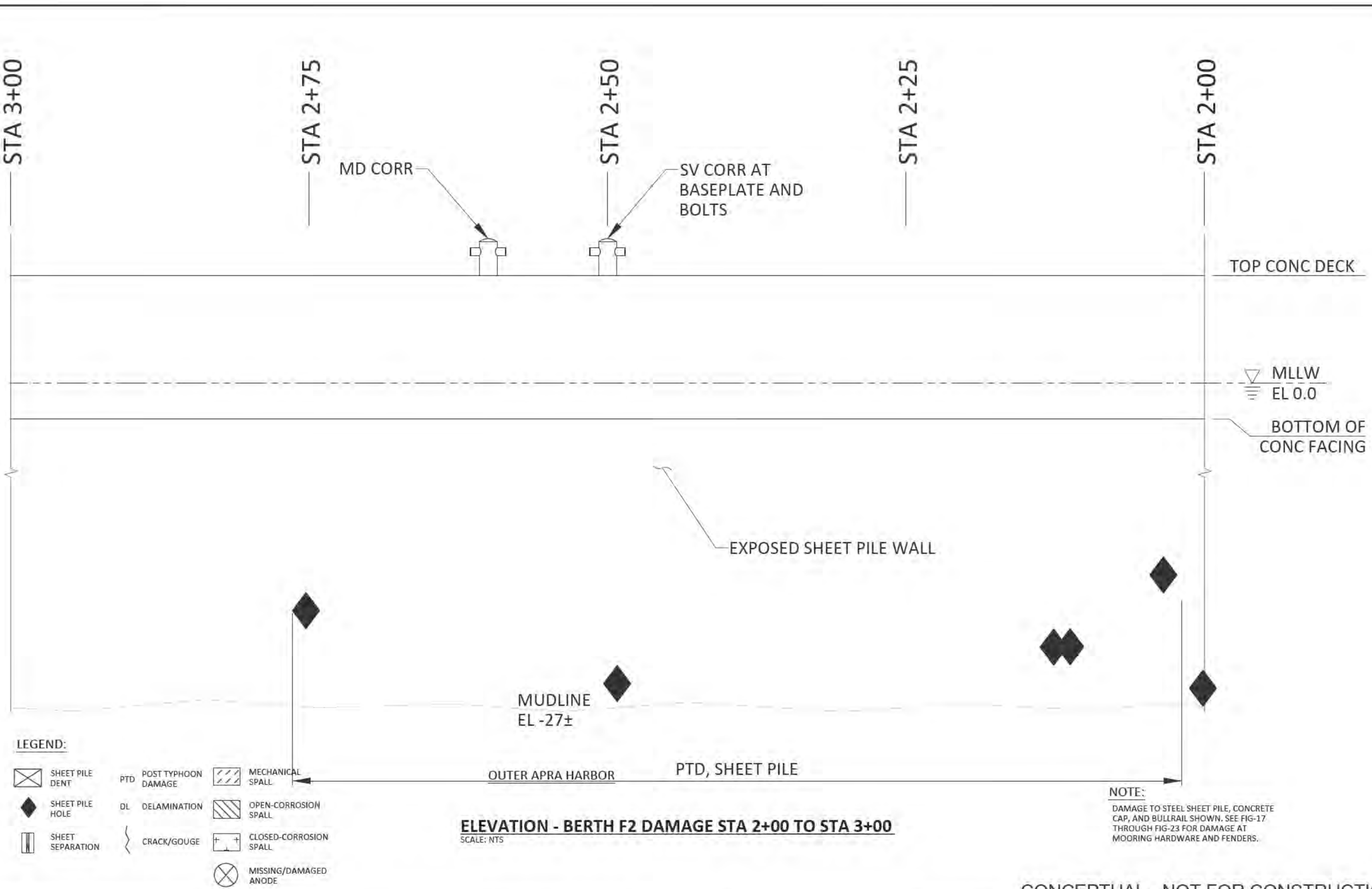

ELEVATION - BERTH F2 DAMAGE STA 2+00 TO STA 3+00
SCALE: NTS

NOTE:
DAMAGE TO STEEL SHEET PILE, CONCRETE CAP, AND BULLRAIL SHOWN. SEE FIG-17 THROUGH FIG-23 FOR DAMAGE AT MOORING HARDWARE AND FENDERS.

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ASSESSMENT REPORT

BERTH F2 - ELEVATION

DRAWING NO. **FIG-14**
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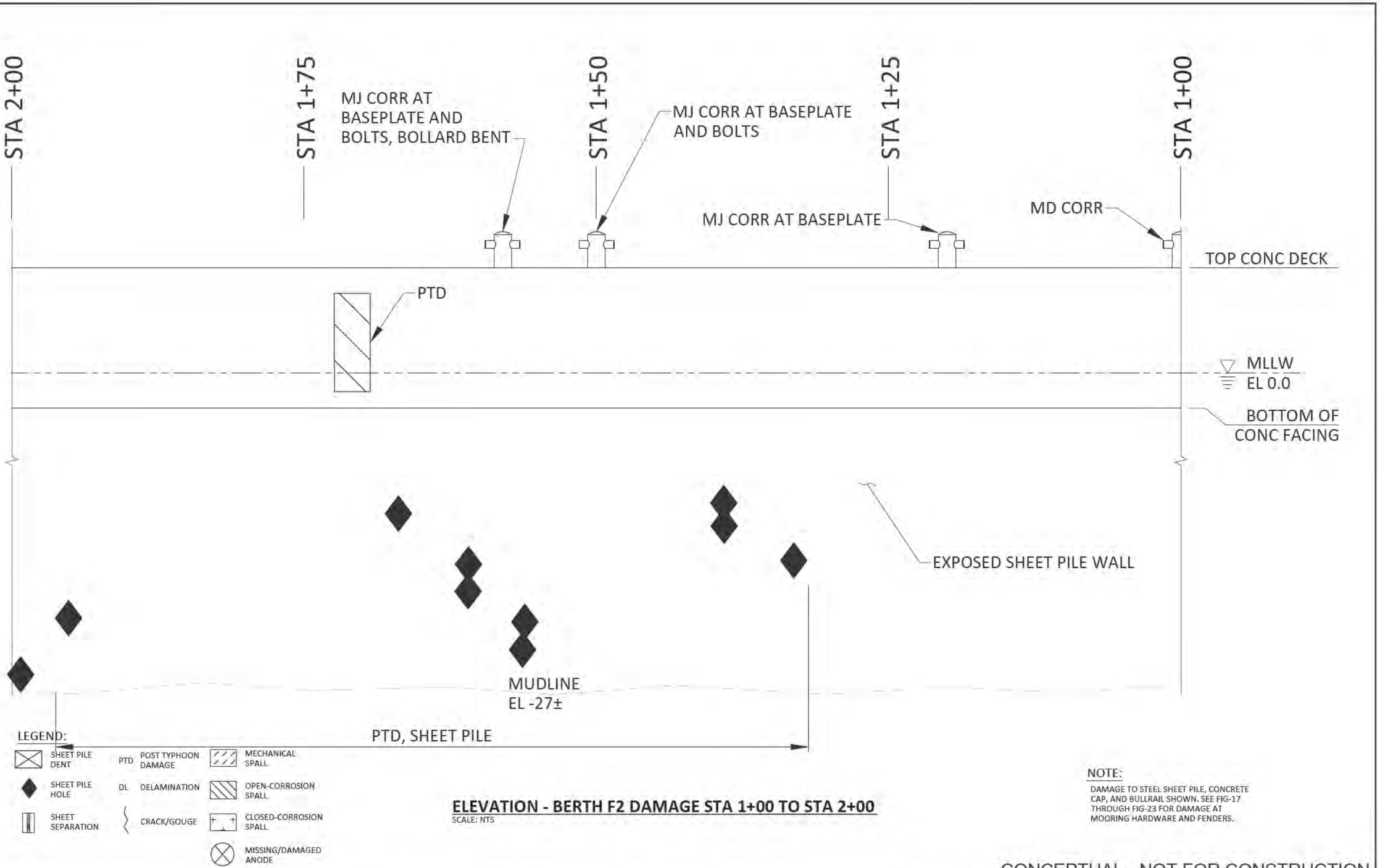

ELEVATION - BERTH F2 DAMAGE STA 1+00 TO STA 2+00
SCALE: NTS

NOTE:
DAMAGE TO STEEL SHEET PILE, CONCRETE CAP, AND BULLRAIL SHOWN. SEE FIG-17 THROUGH FIG-23 FOR DAMAGE AT MOORING HARDWARE AND FENDERS.

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PIER F2 - F6
ASSESSMENT REPORT

BERTH F2 - ELEVATION

DRAWING NO. **FIG-15**
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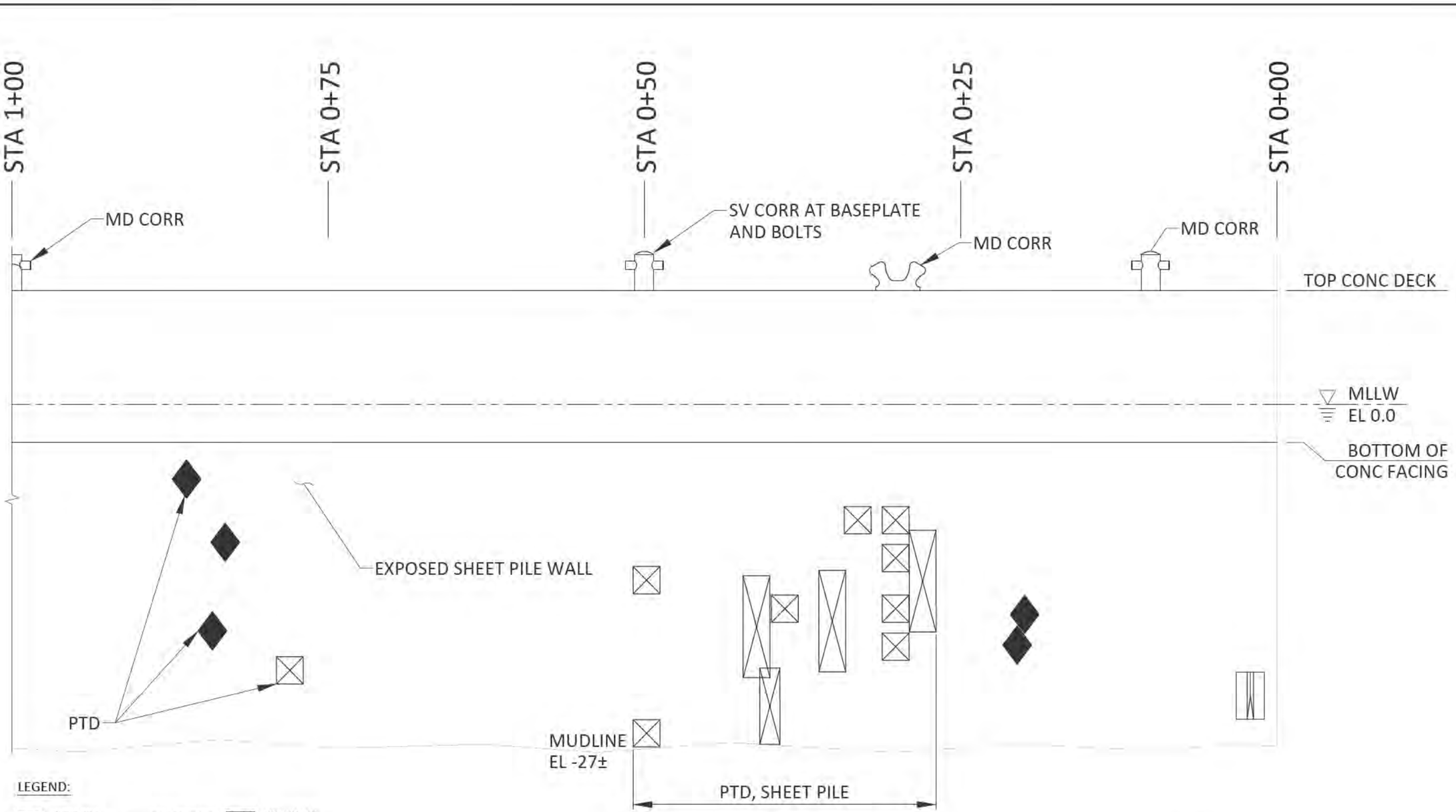

LEGEND:

- SHEET PILE DENT
- SHEET PILE HOLE
- SHEET SEPARATION
- PTD — POST TYPHOON DAMAGE
- DL — DELAMINATION
- CRACK/GOUGE
- MECHANICAL SPALL
- OPEN-CORROSION SPALL
- CLOSED-CORROSION SPALL
- MISSING/DAMAGED ANODE

ELEVATION - BERTH F2 DAMAGE STA 0+00 TO STA 1+00

SCALE: NTS

NOTE:

DAMAGE TO STEEL SHEET PILE, CONCRETE CAP, AND BULLRAIL SHOWN. SEE FIG-17 THROUGH FIG-23 FOR DAMAGE AT MOORING HARDWARE AND FENDERS.

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CHECK BY MAD
PROJ MGR MAD

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PIER F2 - F6
ASSESSMENT REPORT

BERTH F2 - ELEVATION

DRAWING NO. **FIG-16**
PROJECT NO. 30901541B.002
DATE: 9/30/24
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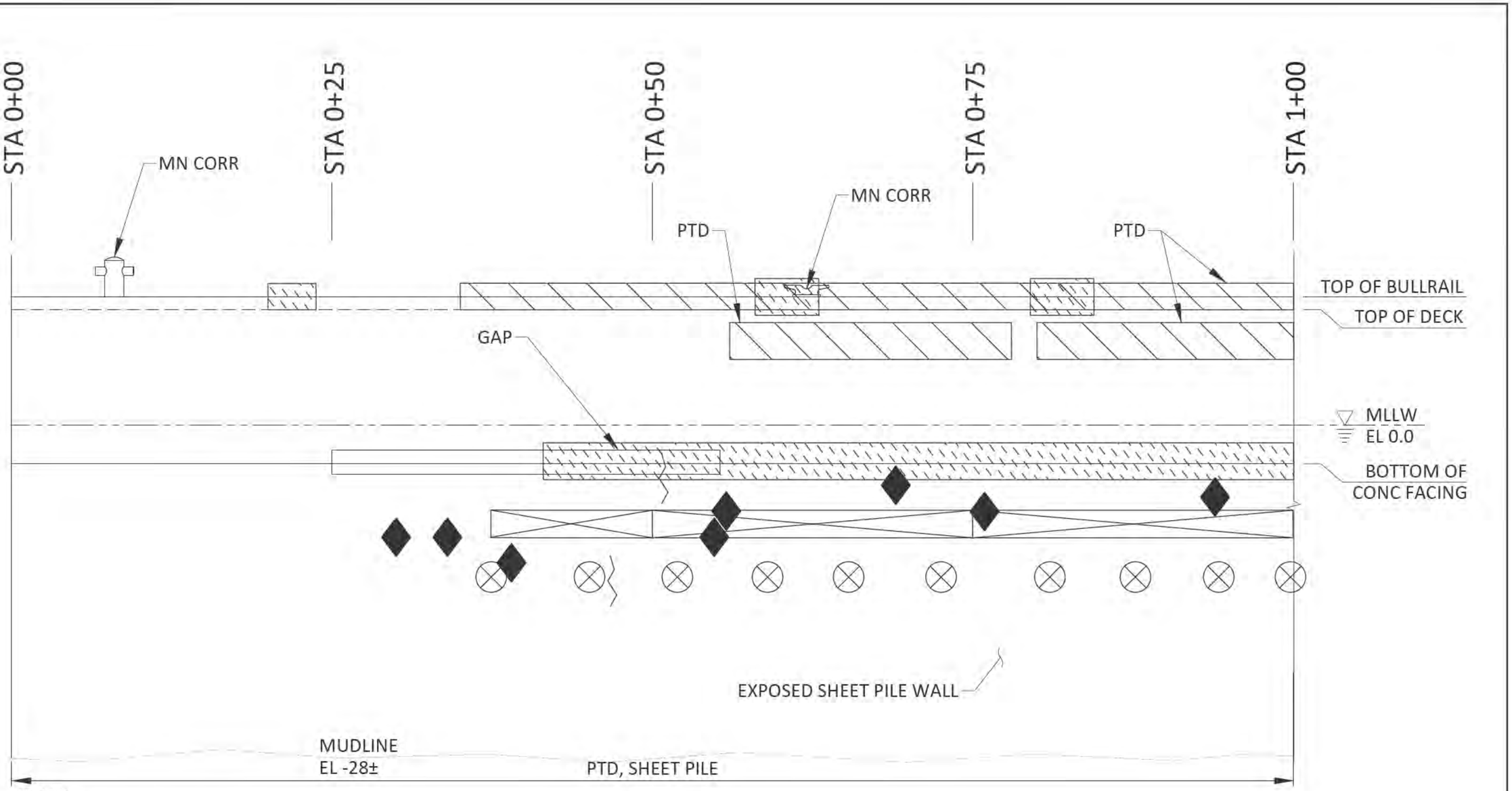

LEGEND:

- SHEET PILE DENT
- SHEET PILE HOLE
- SHEET SEPARATION
- PTD POST TYPHOON DAMAGE
- DL DELAMINATION
- CRACK/GOUGE
- MECHANICAL SPALL
- OPEN-CORROSION SPALL
- CLOSED-CORROSION SPALL
- MISSING/DAMAGED ANODE

OUTER APRA HARBOR

ELEVATION - BERTH F3 DAMAGE STA 0+00 TO STA 1+00

SCALE: NTS

NOTE:

DAMAGE TO STEEL SHEET PILE, CONCRETE CAP, AND BULLRAIL SHOWN. SEE FIG-32 THROUGH FIG-39 FOR DAMAGE AT MOORING HARDWARE AND FENDERS.

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PORT AUTHORITY OF GUAM
PIER F2 - F6
ASSESSMENT REPORT

BERTH F3 - ELEVATION

DRAWING NO. **FIG-17**
PROJECT NO. 30901541B.002
DATE: 9/30/24
SHEET NO. 17 OF 24

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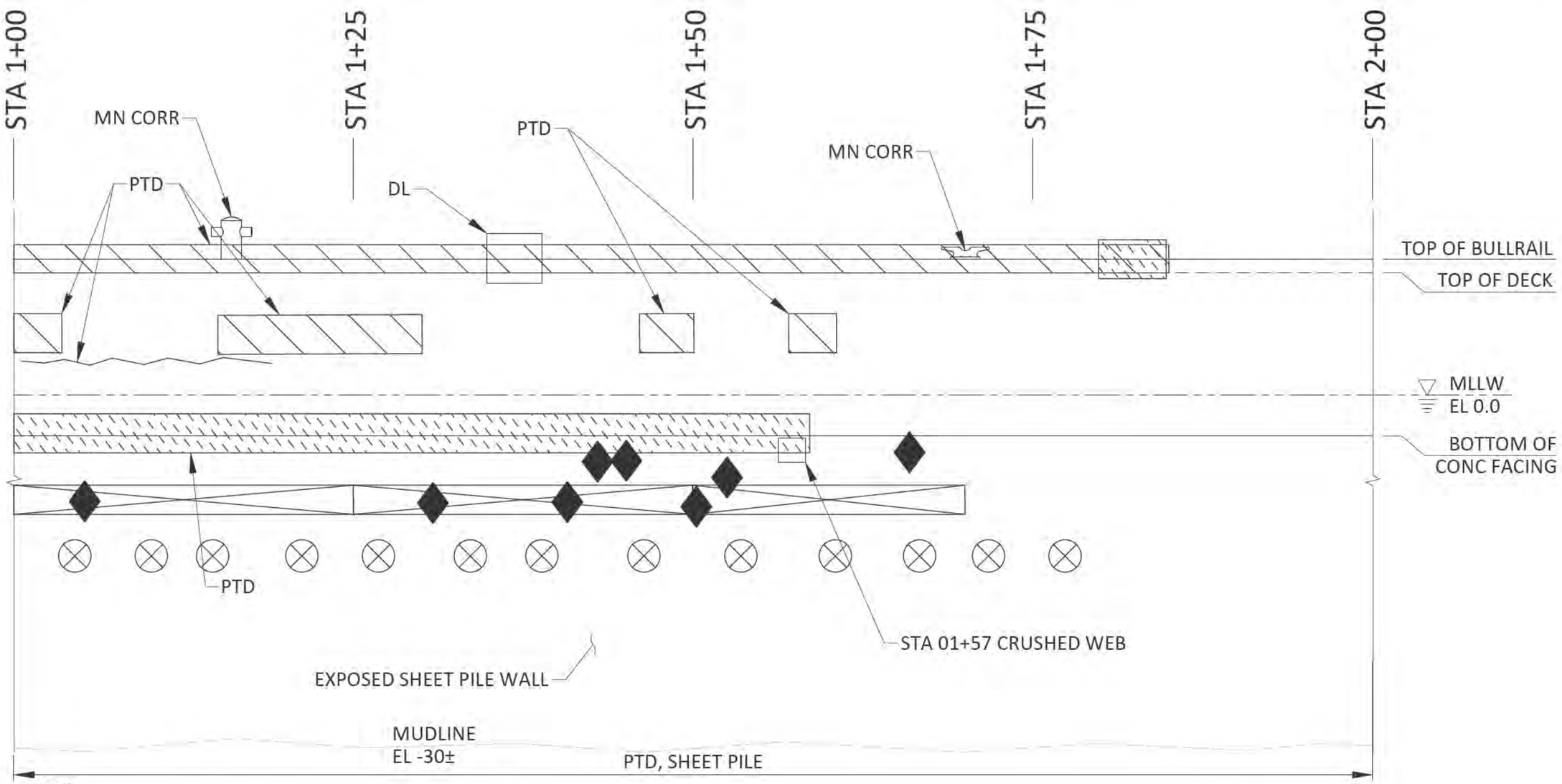

LEGEND:

- SHEET PILE DENT
- SHEET PILE HOLE
- SHEET SEPARATION
- PTD POST TYPHOON DAMAGE
- DL DELAMINATION
- CRACK/GOUGE
- MECHANICAL SPALL
- OPEN-CORROSION SPALL
- CLOSED-CORROSION SPALL
- MISSING/DAMAGED ANODE

OUTER APRA HARBOR

ELEVATION - BERTH F3 DAMAGE STA 1+00 TO STA 2+00

SCALE: NTS

NOTE:

DAMAGE TO STEEL SHEET PILE, CONCRETE CAP, AND BULLRAIL SHOWN. SEE FIG-32 THROUGH FIG-39 FOR DAMAGE AT MOORING HARDWARE AND FENDERS.

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PORT AUTHORITY OF GUAM
PIER F2 - F6
ASSESSMENT REPORT

BERTH F3 - ELEVATION

DRAWING NO: **FIG-18**
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SHEET NO: 18 OF 24

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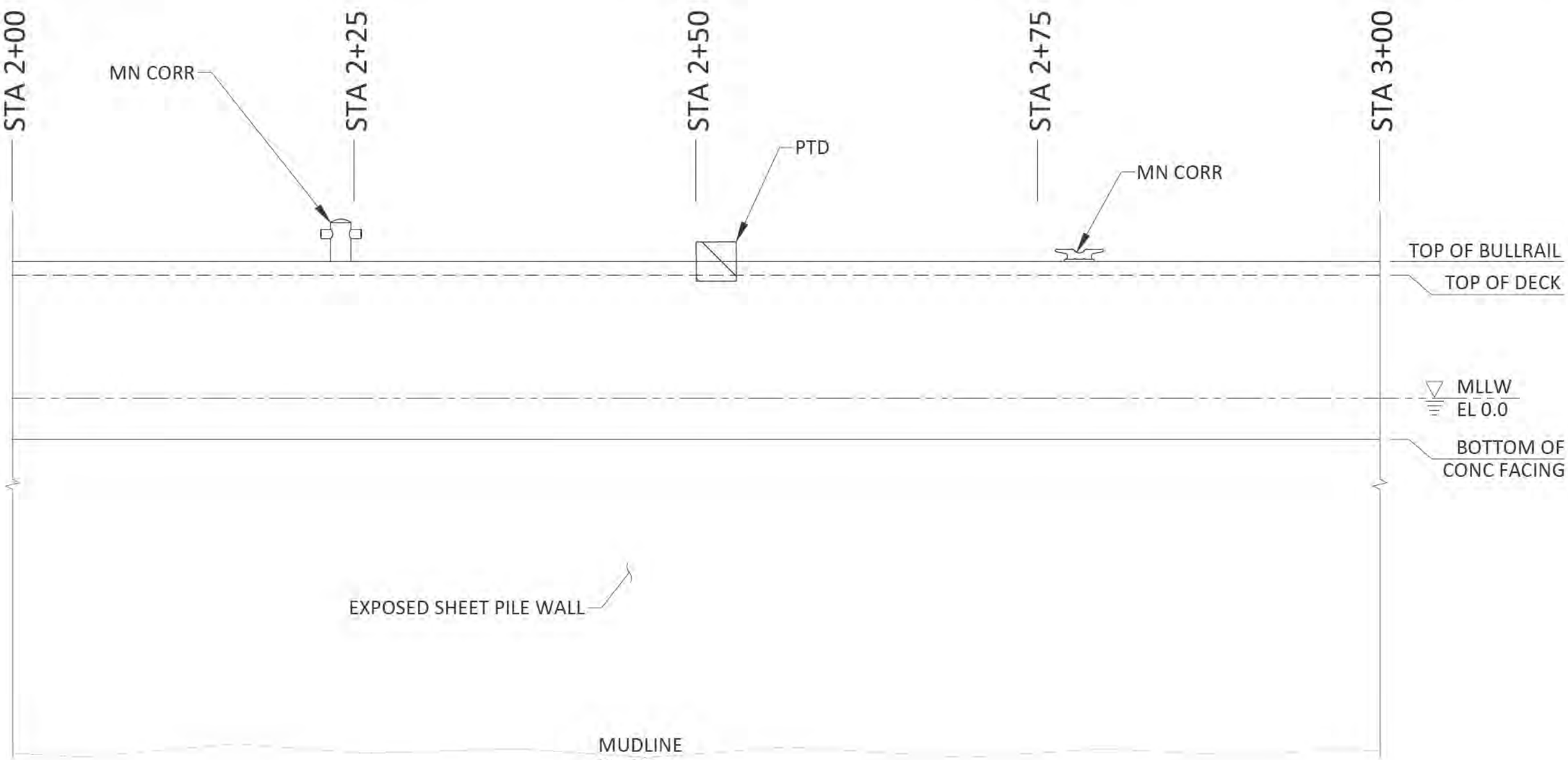

LEGEND:

- SHEET PILE DENT
- SHEET PILE HOLE
- SHEET SEPARATION
- PTD POST TYPHOON DAMAGE
- DL DELAMINATION
- CRACK/GOUGE
- MECHANICAL SPALL
- OPEN-CORROSION SPALL
- CLOSED-CORROSION SPALL
- MISSING/DAMAGED ANODE

OUTER APRA HARBOR

ELEVATION - BERTH F3 DAMAGE STA 2+00 TO STA 3+00

SCALE: NTS

NOTE:

DAMAGE TO STEEL SHEET PILE, CONCRETE CAP, AND BULLRAIL SHOWN. SEE FIG-32 THROUGH FIG-39 FOR DAMAGE AT MOORING HARDWARE AND FENDERS.

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PORT AUTHORITY OF GUAM
PIER F2 - F6
ASSESSMENT REPORT

BERTH F3 - ELEVATION

DRAWING NO: **FIG-19**
PROJECT NO: 30901541B.002
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SHEET NO: 19 OF 24

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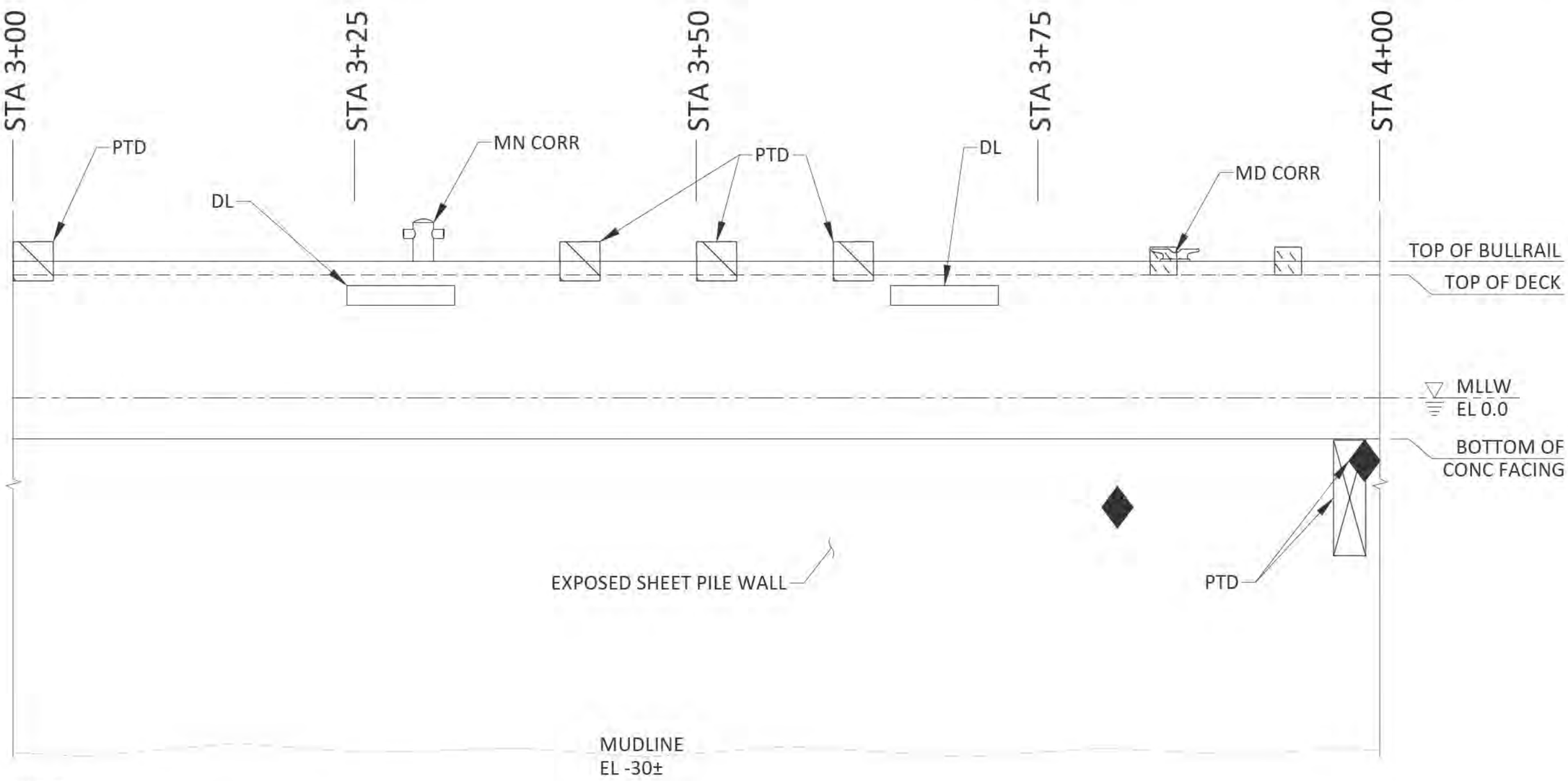

LEGEND:

- SHEET PILE DENT
- SHEET PILE HOLE
- SHEET SEPARATION
- PTD POST TYPHOON DAMAGE
- DL DELAMINATION
- CRACK/GOUGE
- MECHANICAL SPALL
- OPEN-CORROSION SPALL
- CLOSED-CORROSION SPALL
- MISSING/DAMAGED ANODE

OUTER APRA HARBOR

ELEVATION - BERTH F3 DAMAGE STA 3+00 TO STA 4+00

SCALE: NTS

NOTE:

DAMAGE TO STEEL SHEET PILE, CONCRETE CAP, AND BULLRAIL SHOWN. SEE FIG-32 THROUGH FIG-39 FOR DAMAGE AT MOORING HARDWARE AND FENDERS.

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PIER F2 - F6
ASSESSMENT REPORT

BERTH F3 - ELEVATION

DRAWING NO: **FIG-20**
PROJECT NO: 30901541B.002
DATE: 9/30/24
SHEET NO: 20 OF 24

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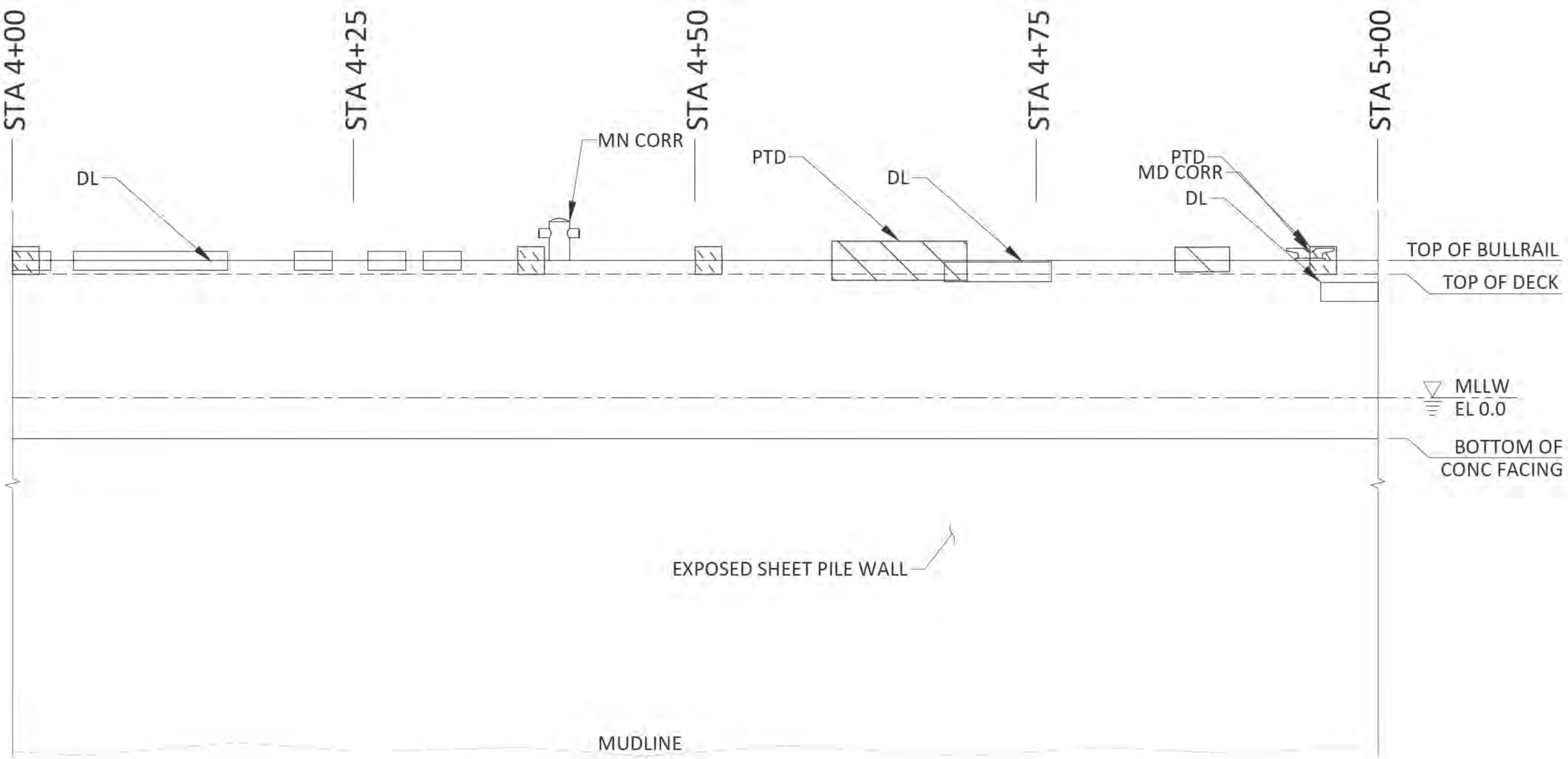

LEGEND:

- SHEET PILE DENT
- SHEET PILE HOLE
- SHEET SEPARATION
- PTD POST TYPHOON DAMAGE
- DL DELAMINATION
- CRACK/GOUGE
- MECHANICAL SPALL
- OPEN-CORROSION SPALL
- CLOSED-CORROSION SPALL
- MISSING/DAMAGED ANODE

OUTER APRA HARBOR

ELEVATION - BERTH F3 DAMAGE STA 4+00 TO STA 5+00

SCALE: NTS

NOTE:

DAMAGE TO STEEL SHEET PILE, CONCRETE CAP, AND BULLRAIL SHOWN. SEE FIG-32 THROUGH FIG-39 FOR DAMAGE AT MOORING HARDWARE AND FENDERS.

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PIER F2 - F6
ASSESSMENT REPORT

BERTH F3 - ELEVATION

DRAWING NO. **FIG-21**
PROJECT NO. 30901541B.002
DATE: 9/30/24
SHEET NO. 21 OF 24

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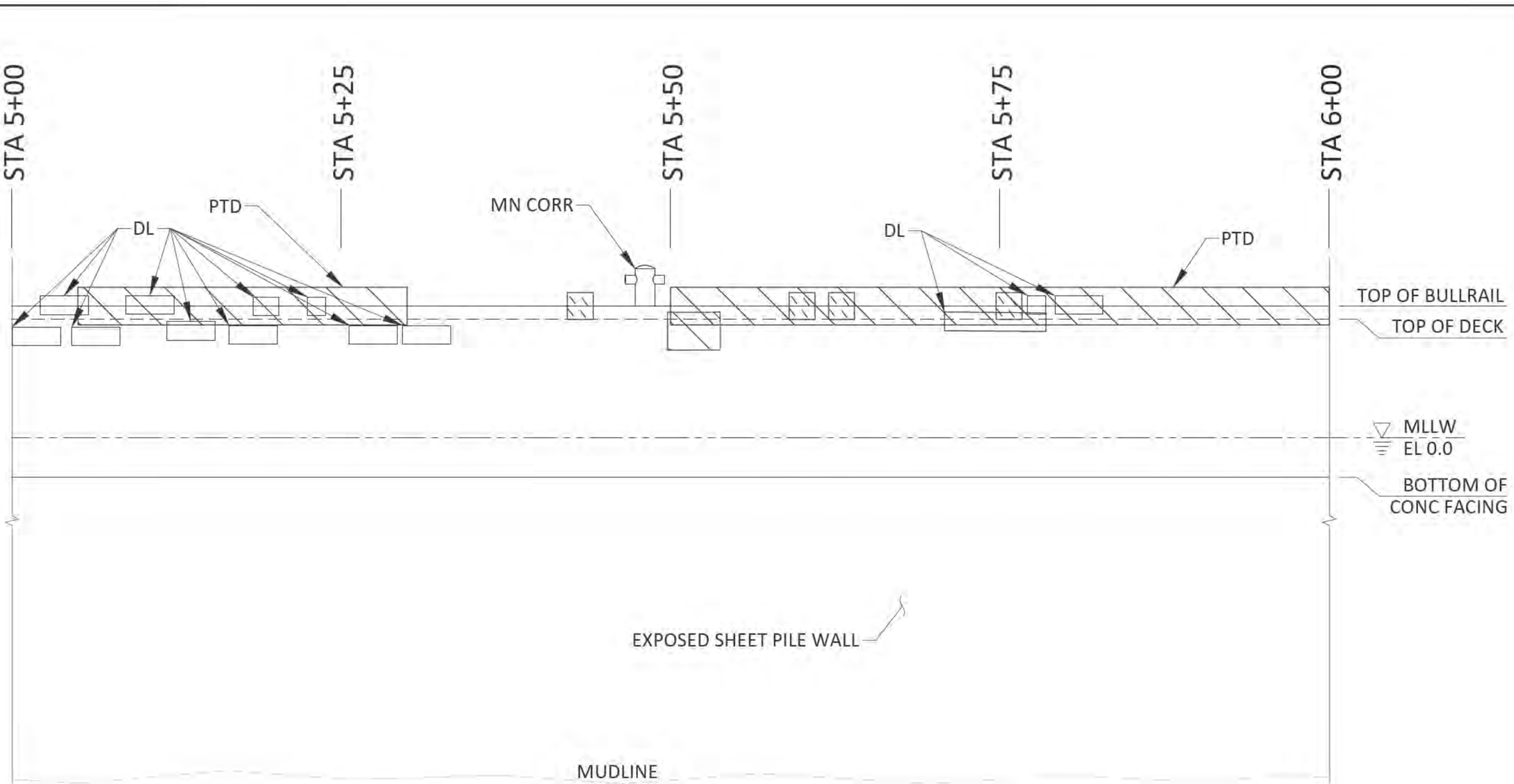

LEGEND:

- SHEET PILE DENT
- SHEET PILE HOLE
- SHEET SEPARATION
- PTD POST TYPHOON DAMAGE
- DL DELAMINATION
- CRACK/GOUGE
- MECHANICAL SPALL
- OPEN-CORROSION SPALL
- CLOSED-CORROSION SPALL
- MISSING/DAMAGED ANODE

OUTER APRA HARBOR

ELEVATION - BERTH F3 DAMAGE STA 5+00 TO STA 6+00

SCALE: NTS

NOTE:

DAMAGE TO STEEL SHEET PILE, CONCRETE CAP, AND BULLRAIL SHOWN. SEE FIG-32 THROUGH FIG-39 FOR DAMAGE AT MOORING HARDWARE AND FENDERS.

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PIER F2 - F6
ASSESSMENT REPORT

BERTH F3 - ELEVATION

DRAWING NO: **FIG-22**
PROJECT NO: 30901541B.002
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SHEET NO: 22 OF 24

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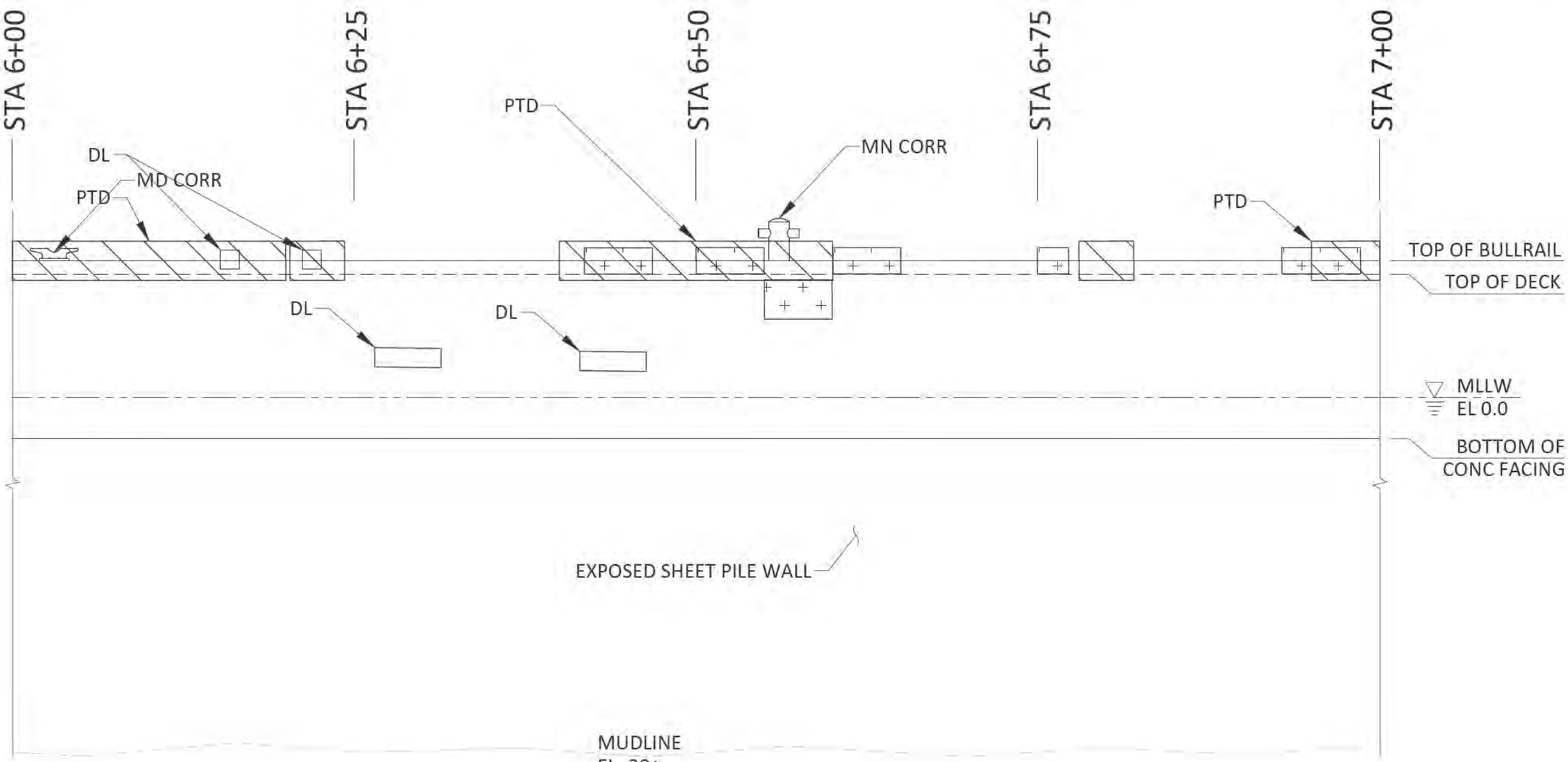

LEGEND:

- SHEET PILE DENT
- SHEET PILE HOLE
- SHEET SEPARATION
- PTD POST TYPHOON DAMAGE
- DL DELAMINATION
- CRACK/GOUGE
- MECHANICAL SPALL
- OPEN-CORROSION SPALL
- CLOSED-CORROSION SPALL
- MISSING/DAMAGED ANODE

OUTER APRA HARBOR

ELEVATION - BERTH F3 DAMAGE STA 6+00 TO STA 7+00

SCALE: NTS

NOTE:

DAMAGE TO STEEL SHEET PILE, CONCRETE CAP, AND BULLRAIL SHOWN. SEE FIG-32 THROUGH FIG-39 FOR DAMAGE AT MOORING HARDWARE AND FENDERS.

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PIER F2 - F6
ASSESSMENT REPORT

BERTH F3 - ELEVATION

DRAWING NO. **FIG-23**
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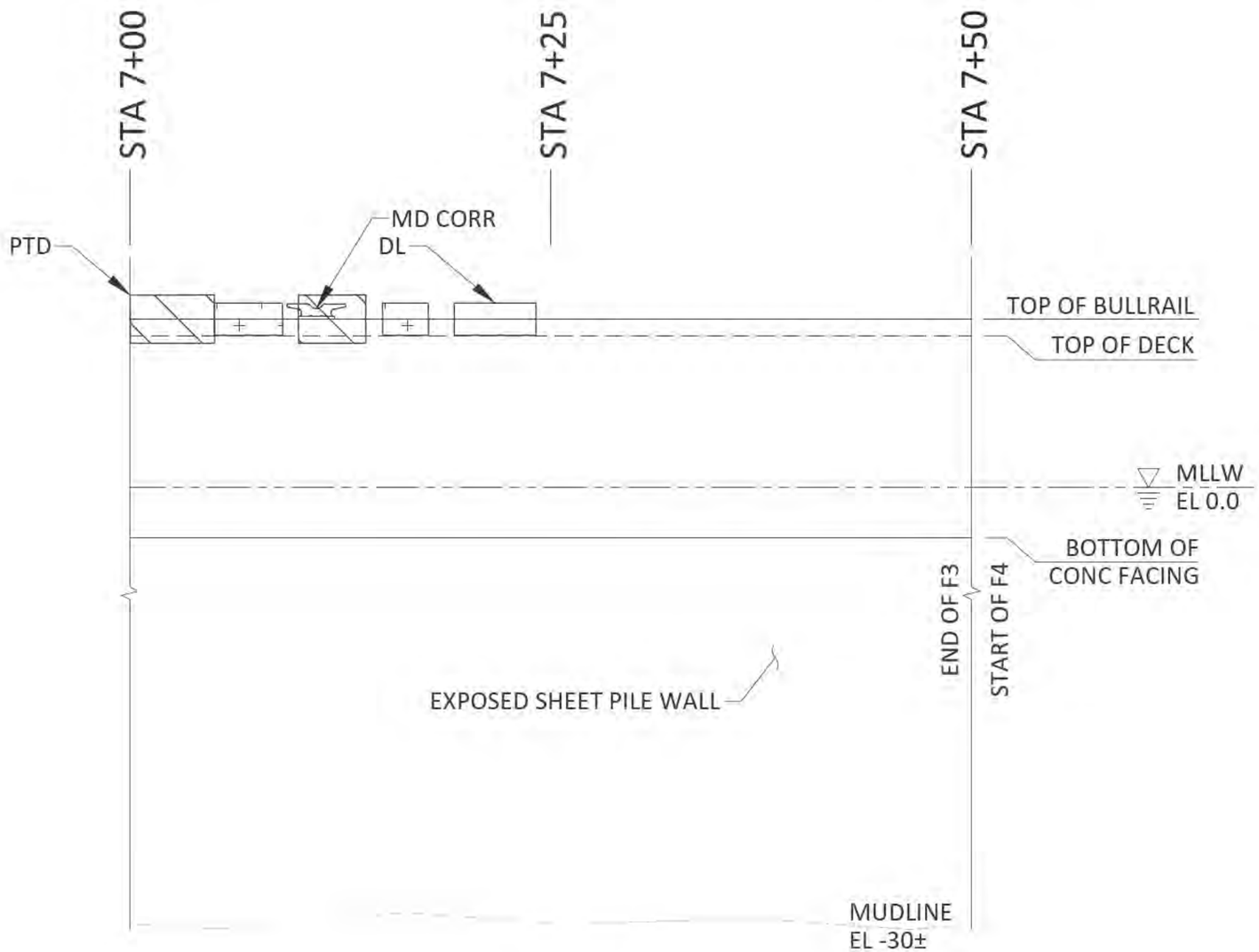

LEGEND:

- SHEET PILE DENT
- SHEET PILE HOLE
- SHEET SEPARATION
- PTD POST TYPHOON DAMAGE
- DL DELAMINATION
- CRACK/GOUGE
- MECHANICAL SPALL
- OPEN-CORROSION SPALL
- CLOSED-CORROSION SPALL
- MISSING/DAMAGED ANODE

OUTER APRA HARBOR

ELEVATION - BERTH F3 DAMAGE STA 7+00 TO STA 7+50

SCALE: NTS

NOTE:

DAMAGE TO STEEL SHEET PILE, CONCRETE CAP, AND BULLRAIL SHOWN. SEE FIG-32 THROUGH FIG-39 FOR DAMAGE AT MOORING HARDWARE AND FENDERS.

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PIER F2 - F6
ASSESSMENT REPORT

BERTH F3 - ELEVATION

DRAWING NO. **FIG-24**
PROJECT NO. 30901541B.002
DATE: 9/30/24
SHEET NO. 24 OF 24

APPENDIX D

WHARF F3 SHEET PILE INSPECTION

Wharf F3 Sheet Pile Inspection conducted by T&T

Date of Dive: Tuesday, February 20, 2024
Time: 9:20 AM to 10:20 AM
Location: Wharf F3 Station 0+00 to 1+60

Summary:
T&T conducted an inspection of the sheet pile wall at Wharf F3 from Station 0+00 to Station 1+60.
The following observations were made. The items highlighted in red are areas in which a hole in the sheet pile wall exists.

1. Observable Indentation/Dent on sheet pile wall. Approximately 8ft below the water line. The damage begins roughly at station 0+25 and ends at station 1+60. Approximately 135’ in length and 22” in height.
2. Observed several cracks in the sheet pile. Directly below the dented area. Locations vary.
3. Observed a small hole in the sheet pile Roughly 2” x 2” in Size. Approx. Location station 0+30.
4. Observed a crack/hole in the sheet pile. Approx. 2"× 1/4" in size. Approx. location station 0+35.
5. Observed a crack in the sheet pile. Located directly below the concrete cap. Location station 0+50.
6. Observed a gap between the concrete cap and the sheet pile. Then size of the gap varies. The gap is located between station 0+25 and station 0+60.
7. Observed what appears to be a crack in the sheet pile directly below the dent.
8. Observed cracked at the at the base of concrete cap. Concrete material broken away leaving rebar exposed and broken in some areas. The damaged concrete is located between station 0+40 and station 0+60.
9. Observed two (2) holes in the sheet pile. Roughly 3.5" × 3.5" in size. Approximately 8 ft below the water line at Station 0+55.
10. Observed cracked at the at the base of concrete cap. Concrete material broken away leaving rebar exposed and broken in some areas. The damaged concrete is located between station 0+70 and station 1+30.
11. Observed a gap between the transition from the concrete cap and sheet pile. The gap various is size from 1-/4” up to 1-1/2”. The gap begins at station 0+70 and extends up to station 1+00.
12. Observed damaged anodes at station 0+80. Several anodes have been detached or partially detached from the sheet pile wall.
13. Observed a hole in sheet pile wall roughly 16" × 4" in size. Approx. location station 0+80.
14. Observed missing anodes at station 1+00 and station 1+10.
15. Observed a small hole beneath the concrete cap that is roughly 3"× 3". Approx. 8 feet below the waterline at station 1+30.
16. Observed cloudy liquid flowing out of the gap between the concrete cap and sheet pile. Approx. location is station 1+35.
17. Observed two (2) sheet pile holes approx. 6"×3" & 16" × 12" in size respectfully. Approximately 8 feet below the waterline at station 1+40.
18. Observed missing anodes at station 1+45 and 1+50.
19. Observed sheet pile hole that is roughly 4.5"×4.5" in size. Located roughly 8 ft beneath the water line at station 1+50.

Figure 1: Dent in Sheet Pile Wall

Figure 2: Dent extends from Station 0+25 to 1+60

Figure 3: Anode has been pressed into the sheet pile wall.

Figure 4: Dent is roughly 22" in height.

Figure 5: Gap between the sheet pile and concrete cap.

Figure 6: Appears to be a crack in the sheet pile directly below the dent.

Figure 7: Hole in the sheet pile. Roughly 2" x 2". Station 0+30

Figure 8: Damage to the bottom corner of the concrete cap.

Figure 9: 2.5" x 0.25" Crack/Hole in the sheet pile. Station 0+35

Figure 10: Crack in sheet pile below concrete cap. Station 0+50.

Figure 11: Damage to the bottom corner of the concrete cap. Rebars exposed. Station 0+55.

Figure 12: Two (2) holes in the sheet pile wall. Station 0+55

Figure 13: Exposed and Damaged Rebar located at the bottom of concrete cap.

Figure 14: Broken Anode directly below the Stormwater Outfall. the

Figure 15: 16" x 4 " hole in the sheet pile wall. Station 0+80.

Figure 16: 16' x 4" hole in the sheet pile wall. Station 0+80.

Figure 17: Appears to be a crack in the sheet pile wall.

Figure 18: 3" x 3" hole in the sheet pile beneath the concrete cap. Station 1+30.

Figure 19: Cloudy liquid flowing from the gap between the concrete cap and sheet pile. Station 1+35.

Figure 20: 6” x 3” hole in the sheet pile. Station 1+40.

Figure 21: 16" x 12" hole in the sheet pile. Station 1+40.

Figure 22: Broken anode. Station 1+50

Figure 23: Broken anode. Station 1+50

Figure 24: 4.5” x 4.5” hole in the sheet pile. Station 1+50.

APPENDIX E

PORT AUTHORITY OF GUAM RESPONSE TO TYPHOON MAWAR SUPPORTING PHOTOGRAPHS

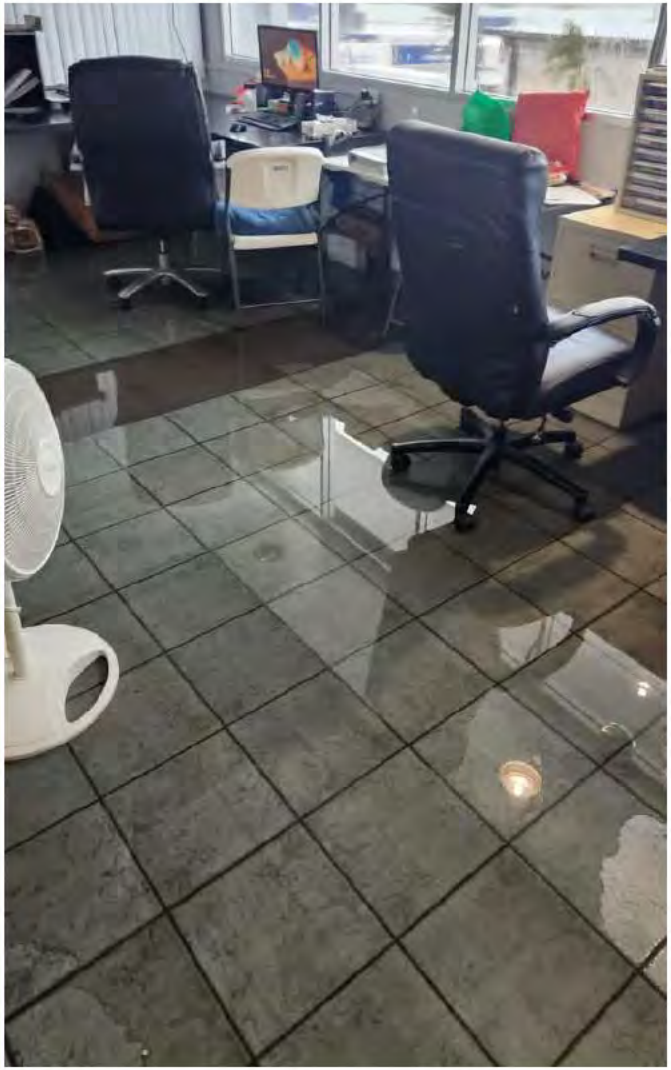
PORT *DAMAGE ASSESSMENT* at a GLANCE

Port Authority of Guam Response to Typhoon Mawar
Supporting Photographs

PORT OF GUAM

PORT OF GUAM

Admin. Harbor Master Office

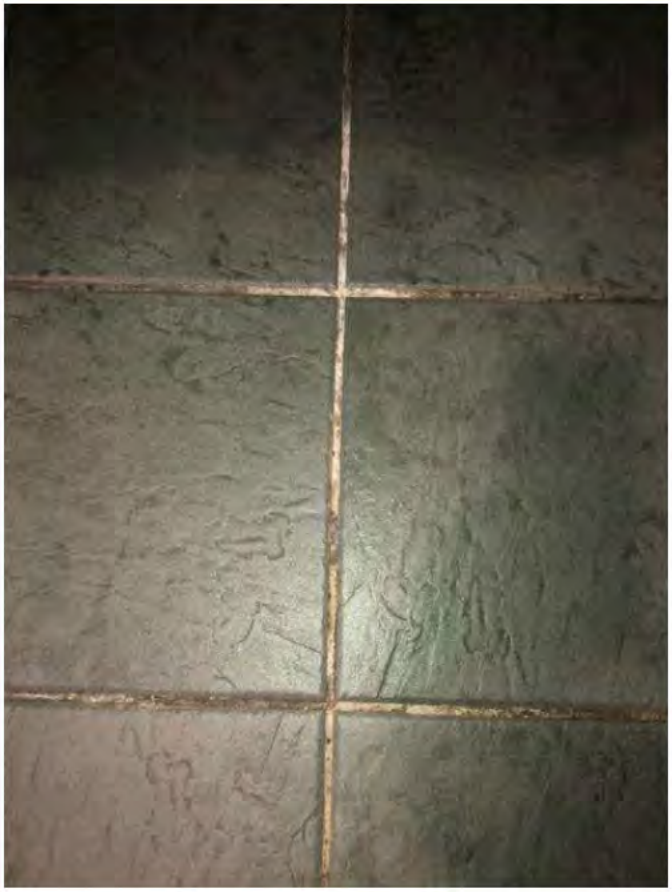


PORT OF GUAM

Admin. Harbor Master Office

PORT OF GUAM

Admin. Harbor Master Office



PORT OF GUAM

Admin. Harbor Master Office

PORT OF GUAM

Admin. Harbor Master Office

PORT OF GUAM

Admin. Harbor Master Office

PORT OF GUAM

Admin. Harbor Master Office

PORT OF GUAM

Admin. Marketing Office

PORT OF GUAM

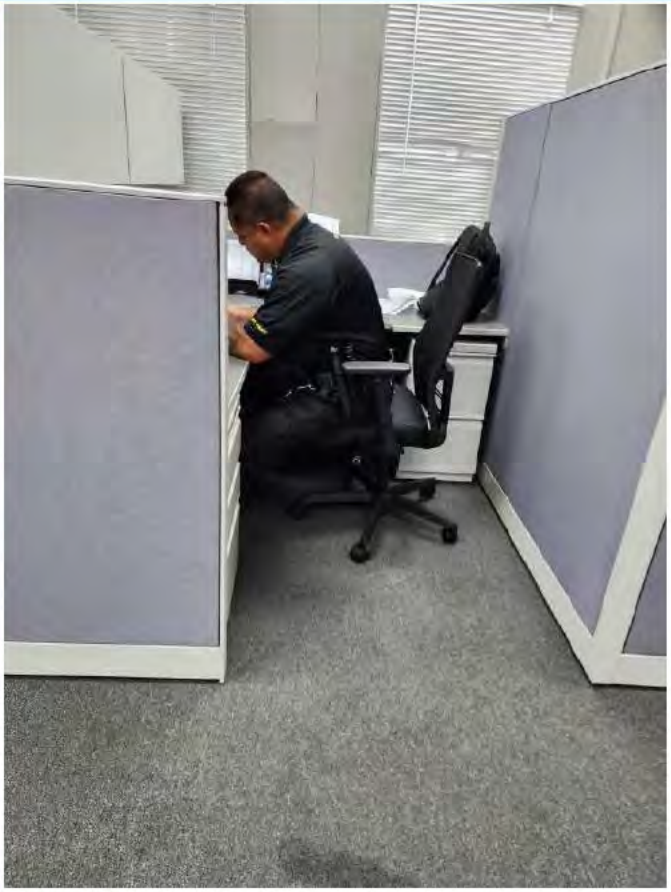
Admin. Marketing Office

PORT OF GUAM

Admin. Port Police Office

PORT OF GUAM

Admin. Port Police Office



PORT OF GUAM

CFS Building

PORT OF GUAM

Engineering Office

PORT OF GUAM

Engineering Office

PORT OF GUAM

Engineering Office

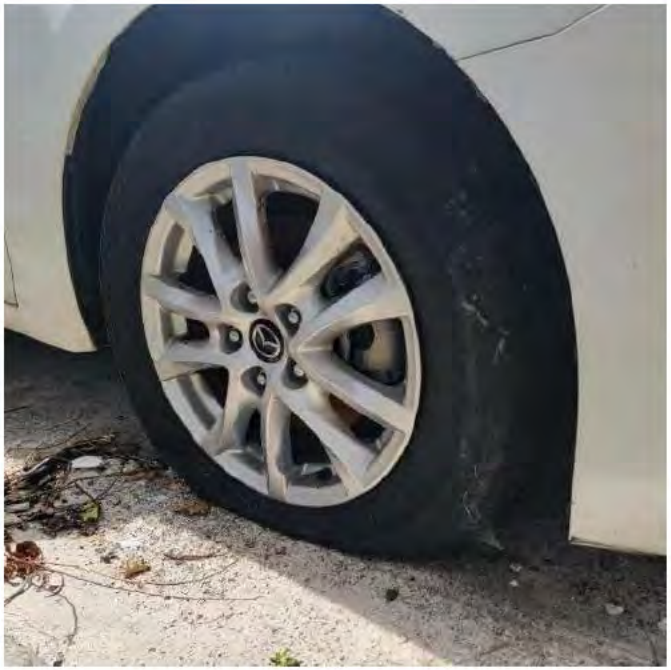
Engineering Office

PORT OF GUAM

Engineering Office

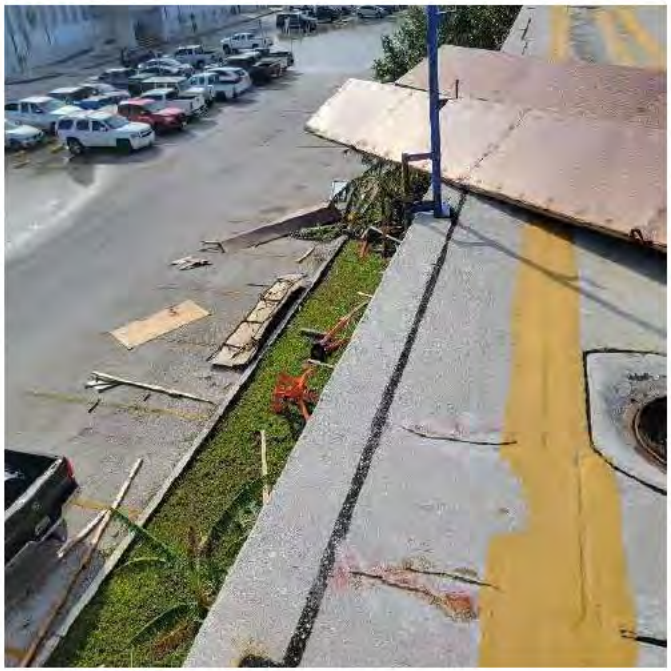
PORT OF GUAM

Engineering Office



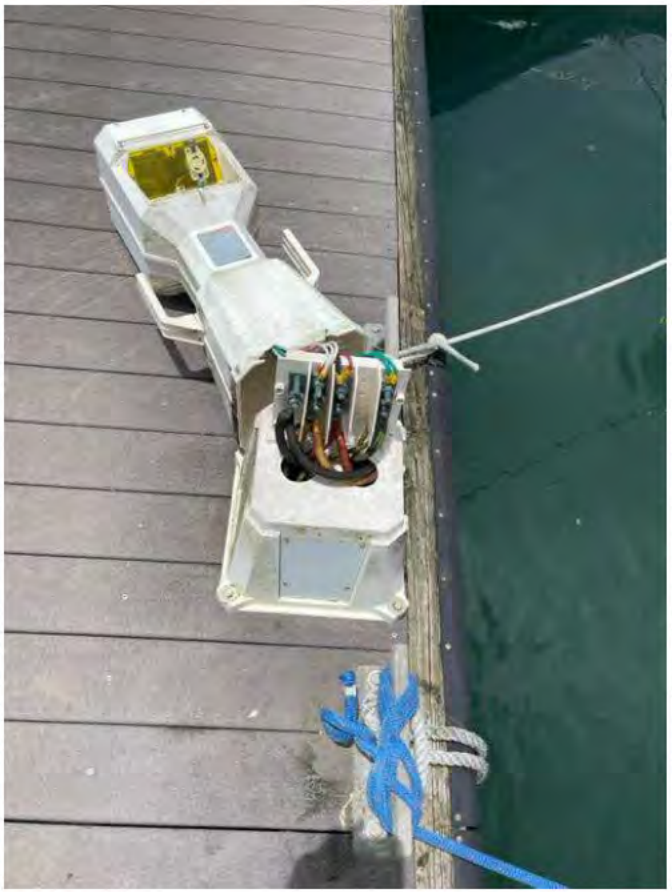
PORT OF GUAM

EQMR



PORT OF GUAM

Agat Marina



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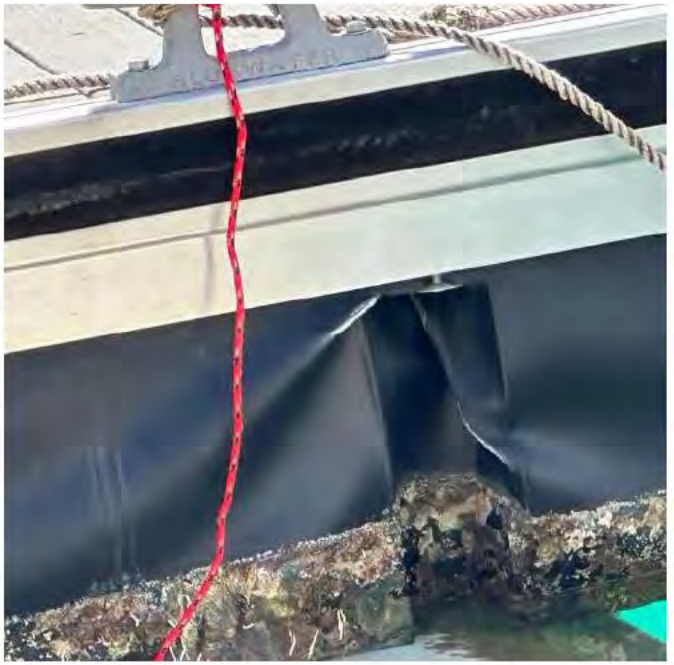

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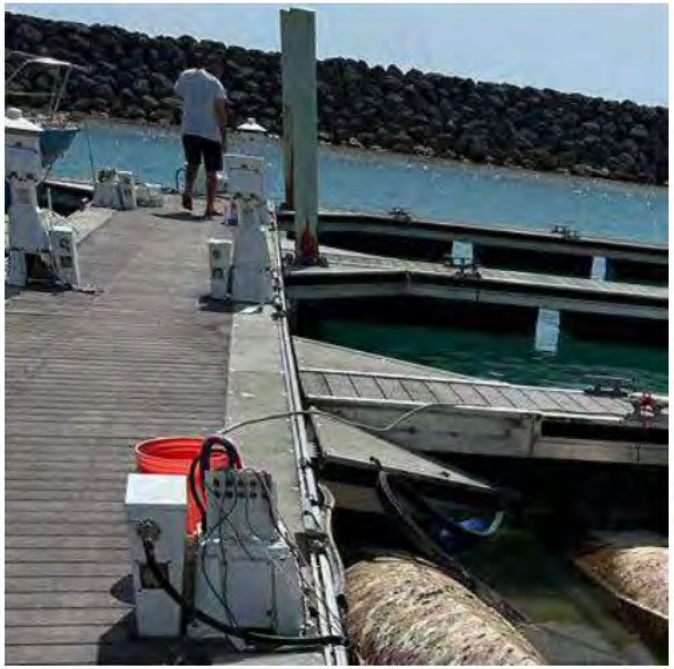

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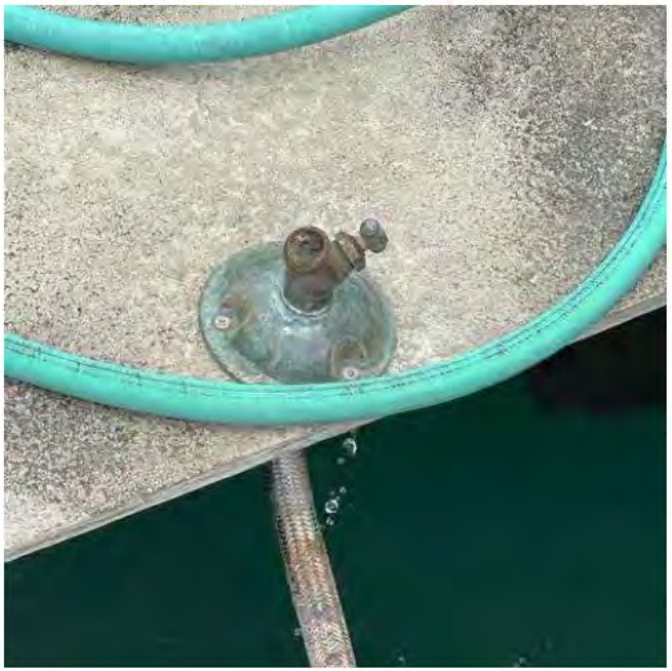


Hagatna Marina

PORT OF GUAM

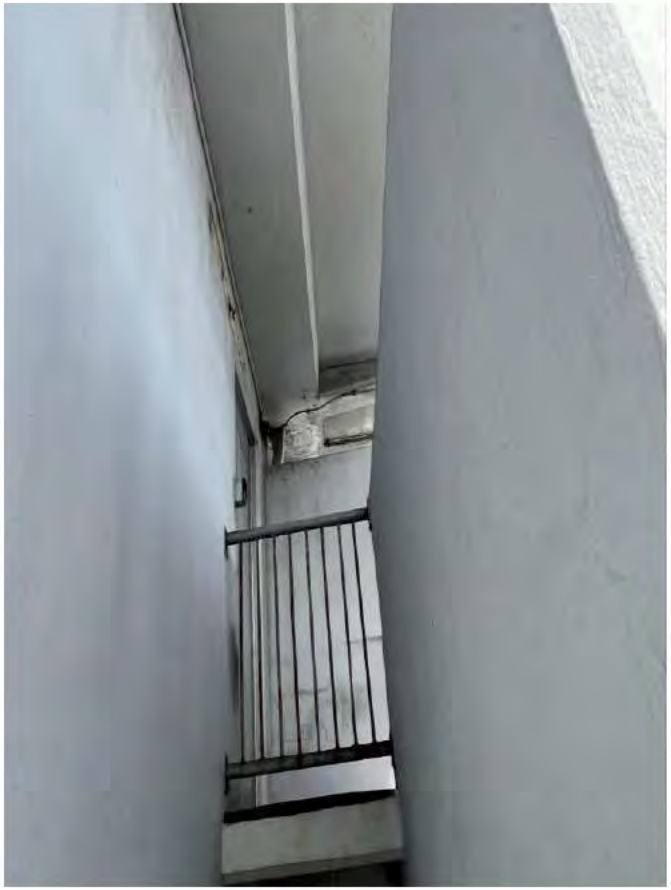
Harbor of Refuge

PORT OF GUAM

Harbor of Refuge

PORT OF GUAM

High Tower

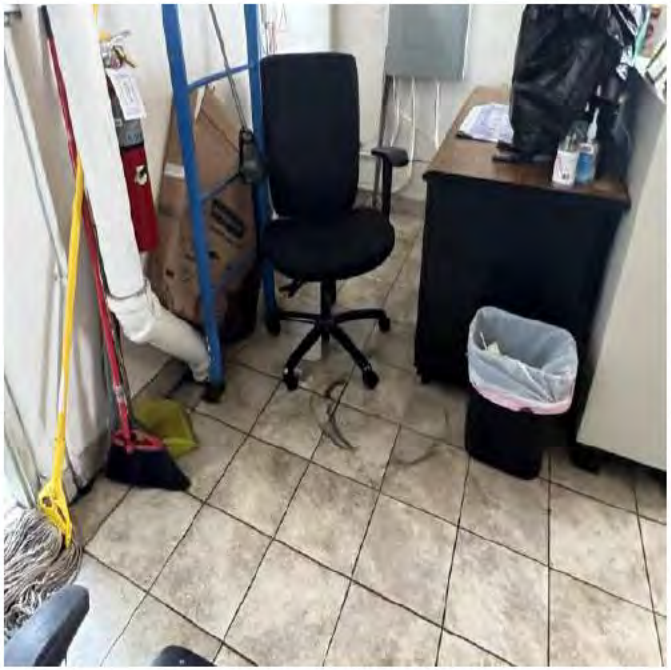


PORT OF GUAM

High Tower

PORT OF GUAM

High Tower



High Tower

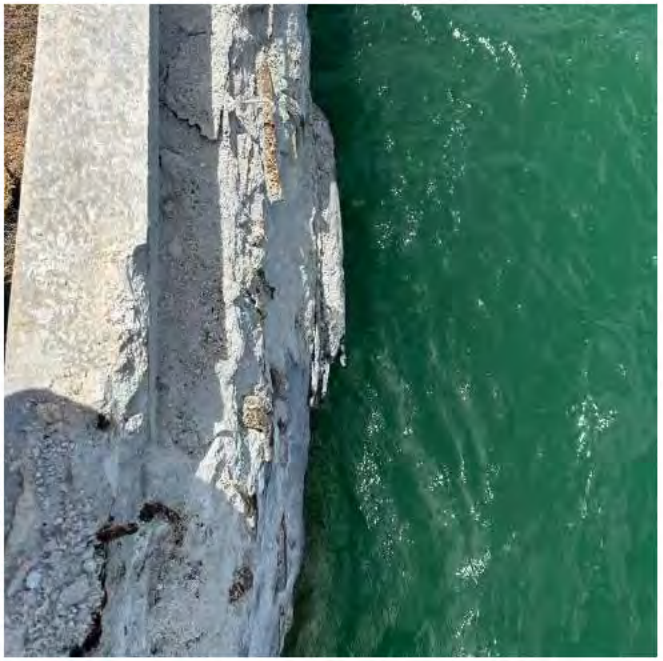
PORT OF GUAM

High Tower

High Tower

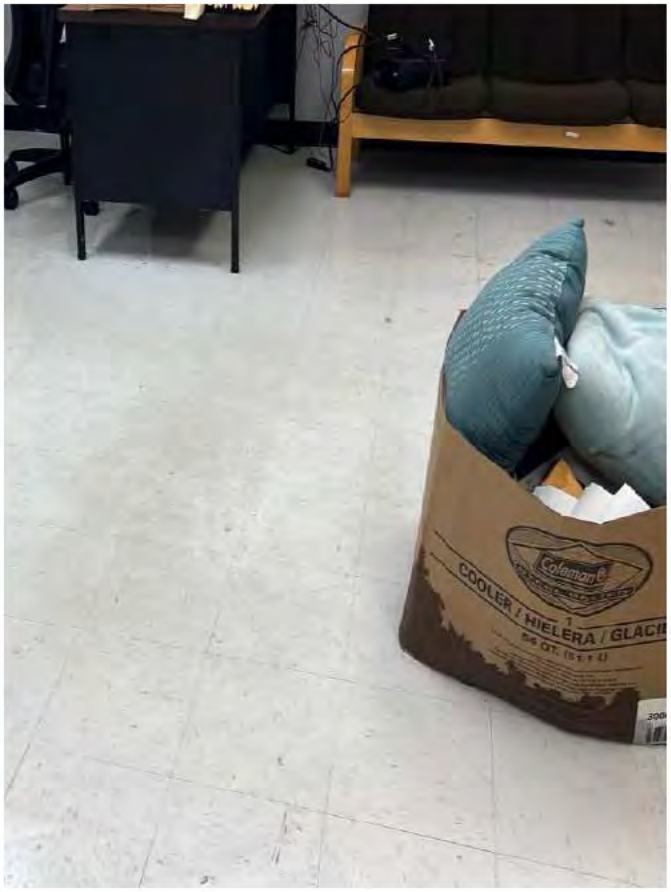
PORT OF GUAM

Hotel Wharf



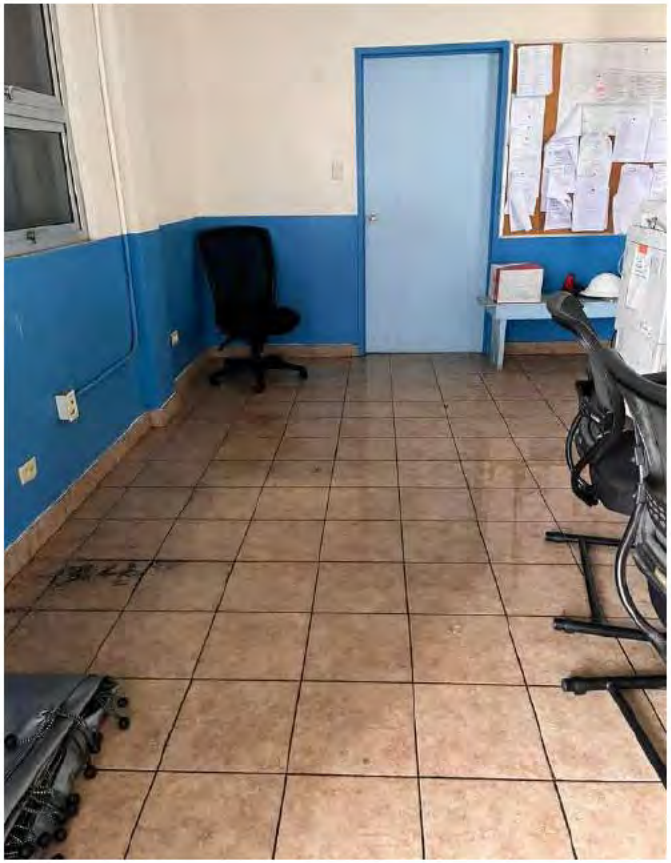
PORT OF GUAM

Low Tower



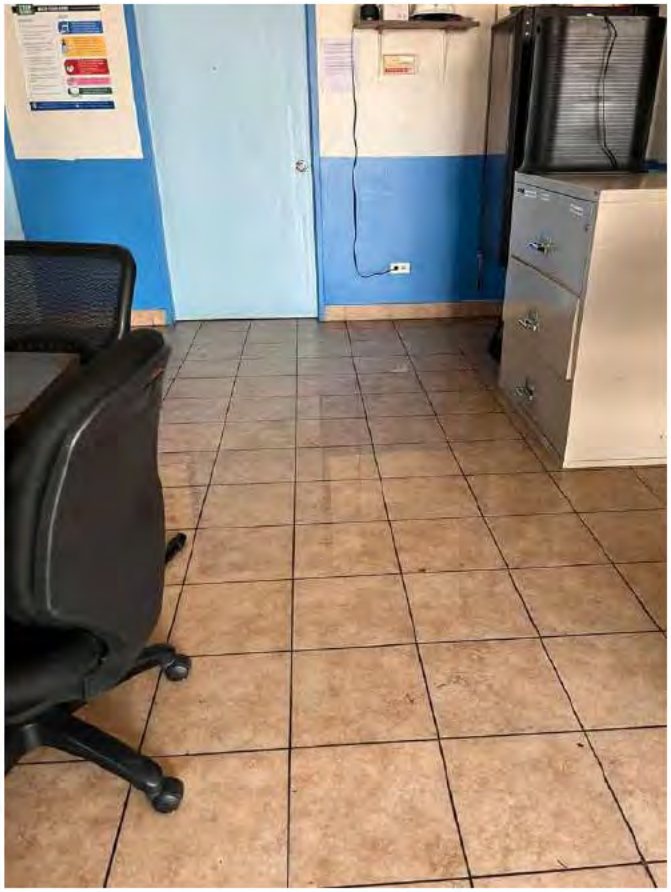
PORT OF GUAM

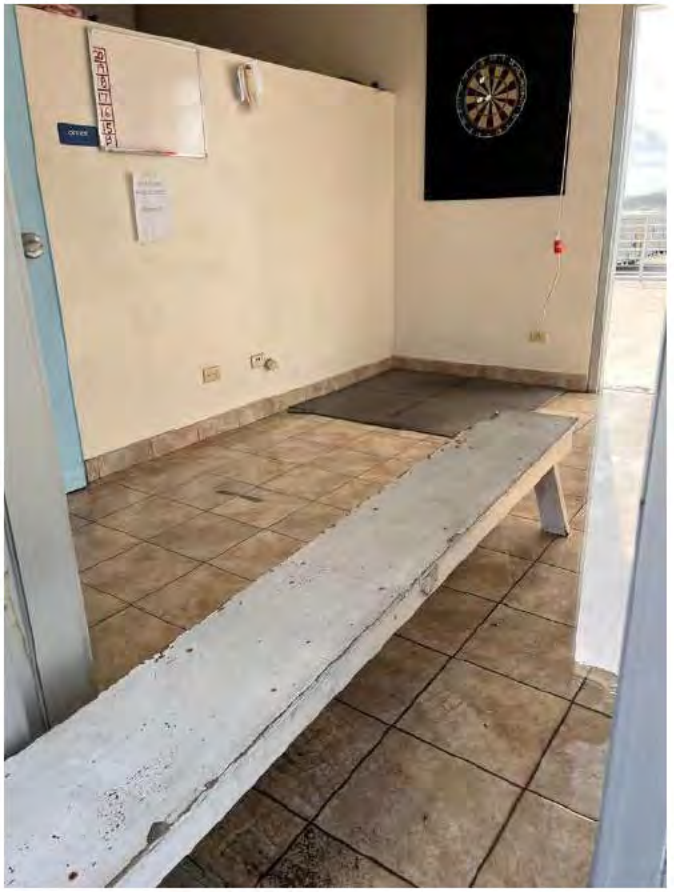
Low Tower



PORT OF GUAM

Low Tower





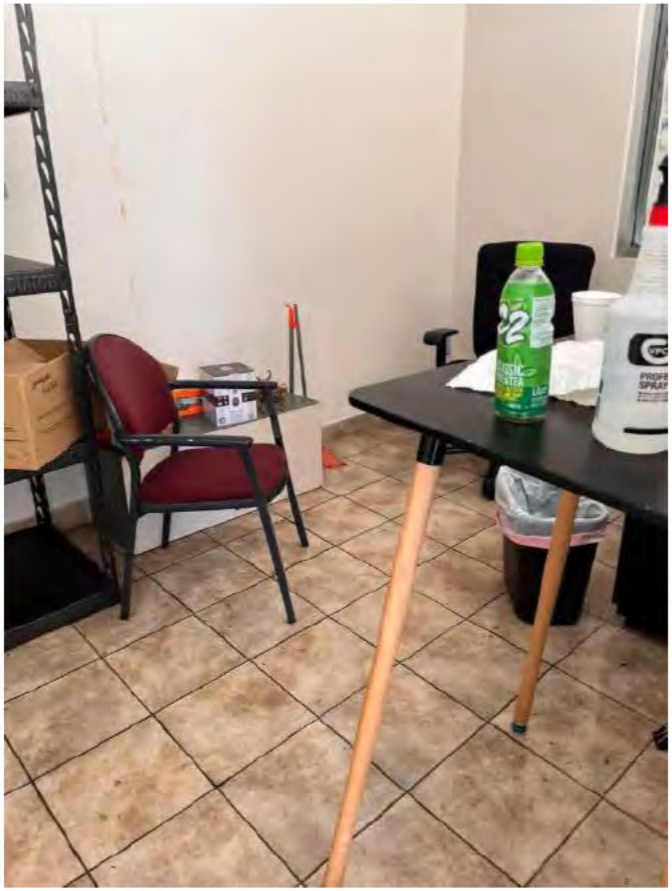
Low Tower

PORT OF GUAM

Low Tower

PORT OF GUAM

Low Tower



PORT OF GUAM

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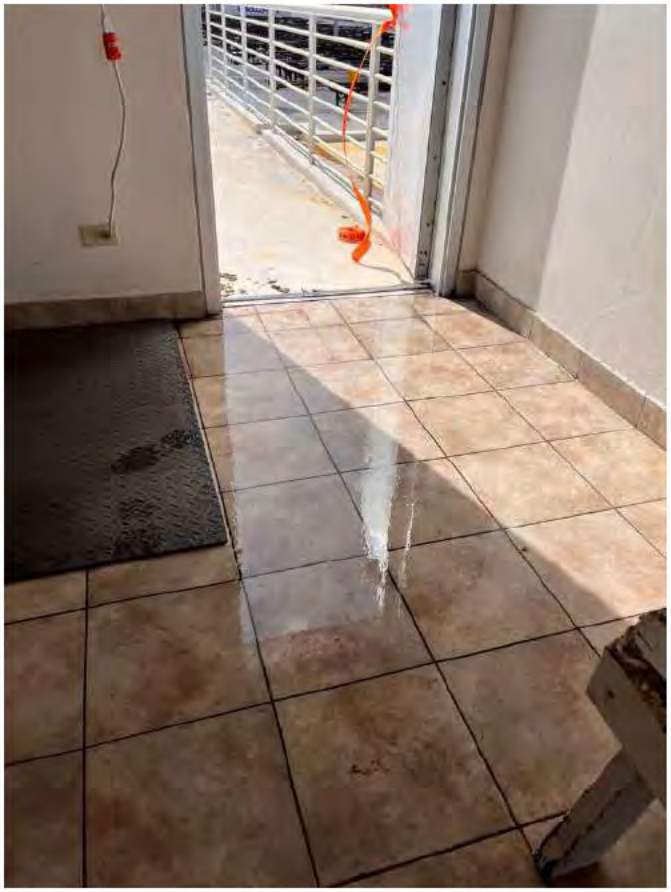
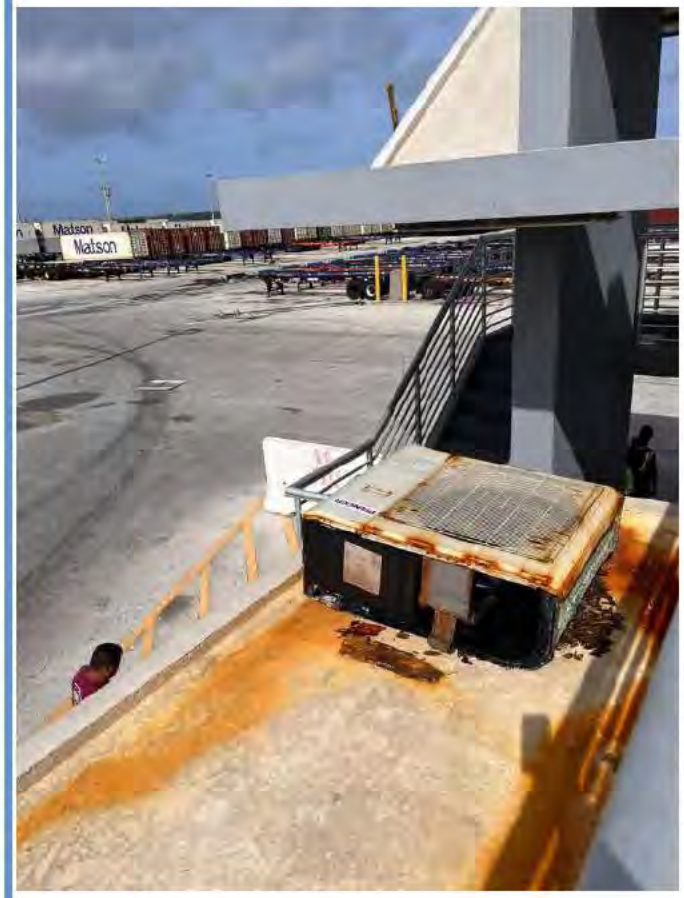


PORT OF GUAM

Low Tower



PORT OF GUAM

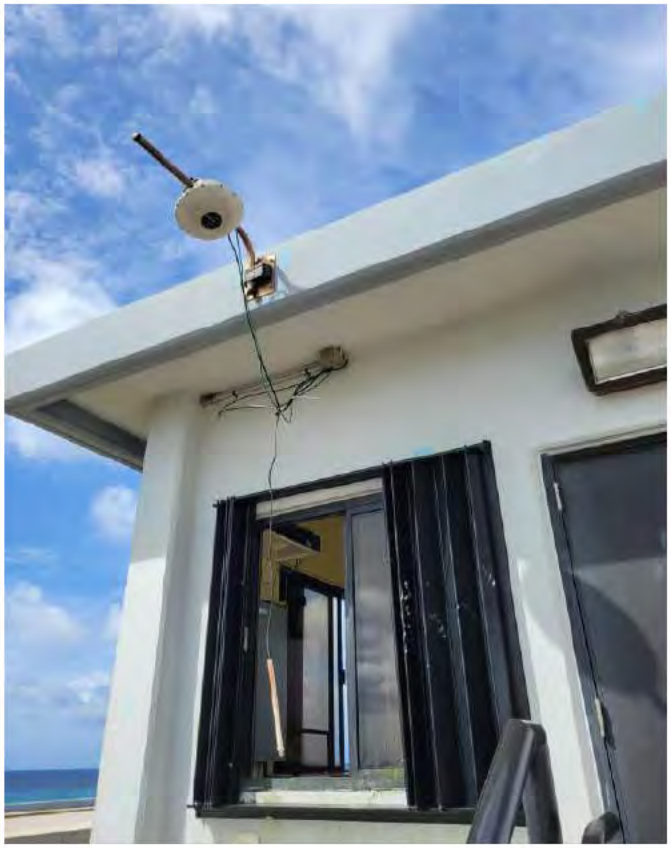
Main Gate 1 Sentry Office

PORT OF GUAM

Main Gate 1 Sentry Office

PORT OF GUAM

Main Gate 2 Sentry Office



PORT OF GUAM

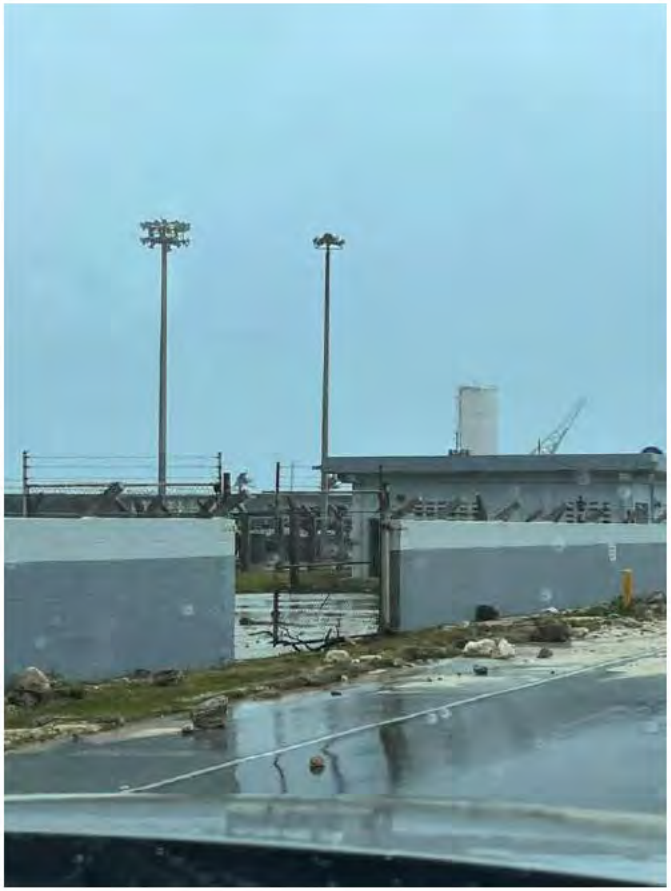
Main Gate 2 Sentry Office

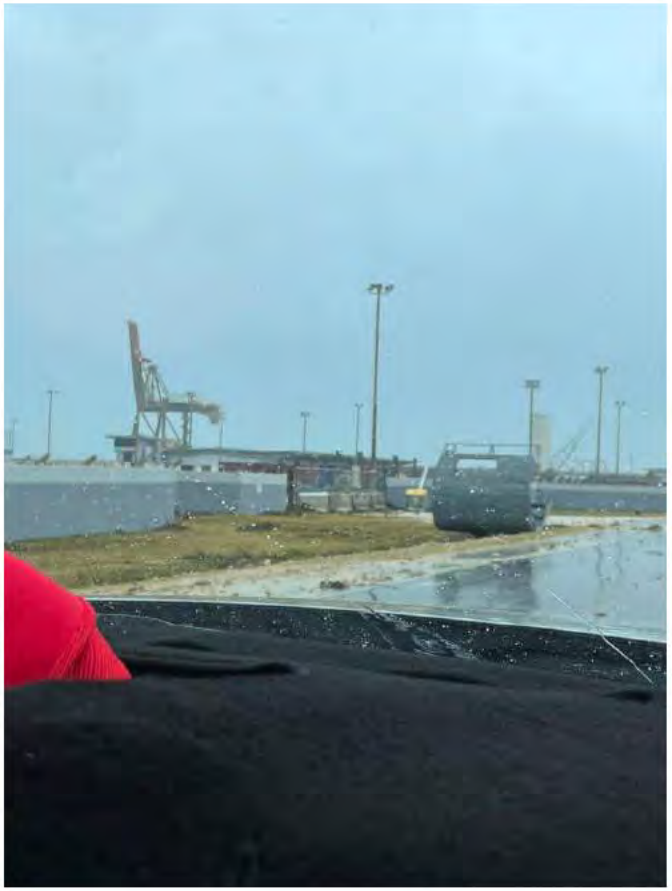
PORT OF GUAM

Main Gate 2 Sentry Office

PORT OF GUAM

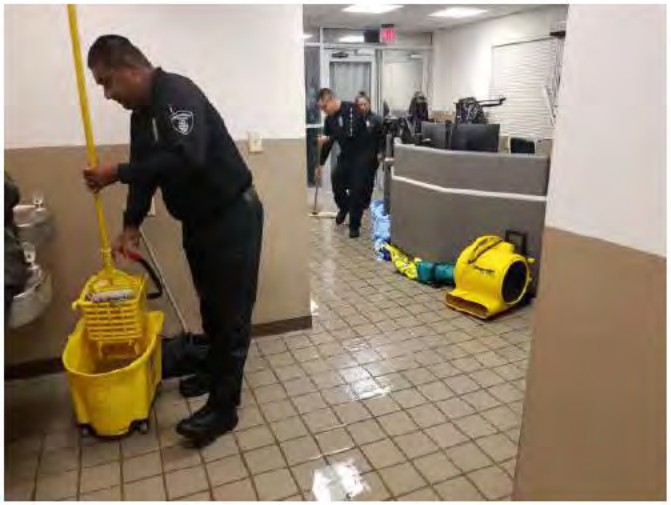
Perimeter Fence





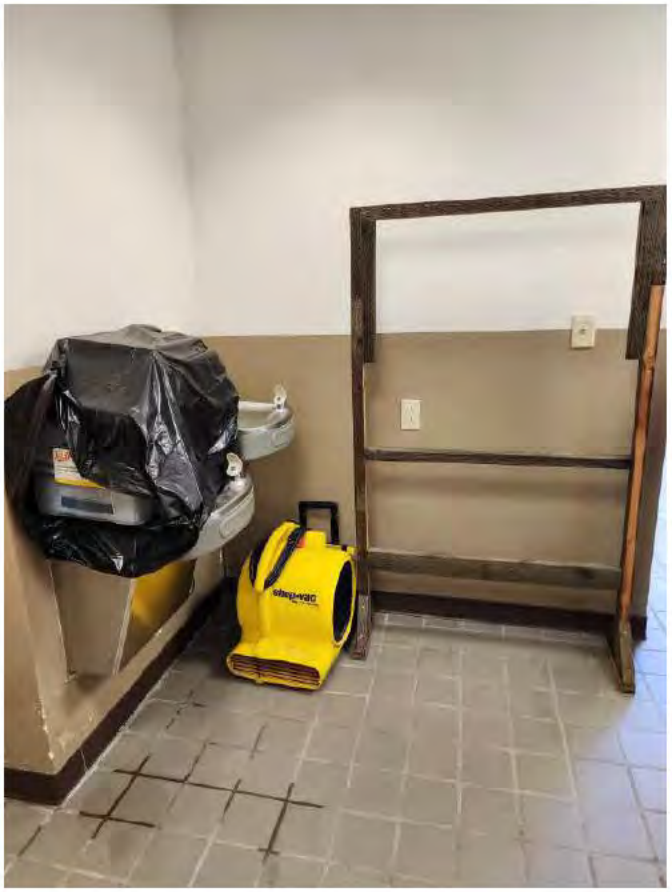
Perimeter Fence

Port Command Center



PORT OF GUAM

Port Command Center



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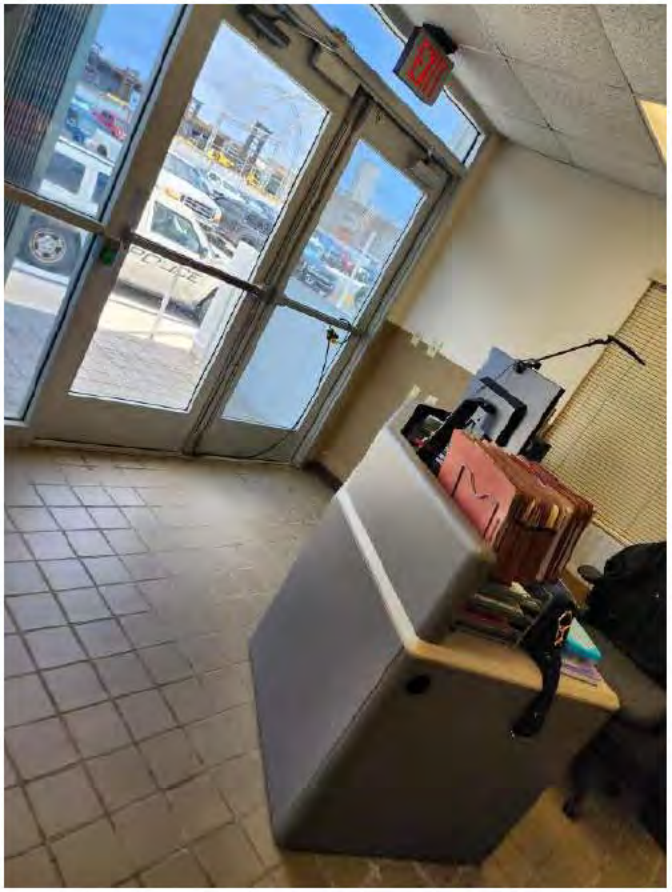
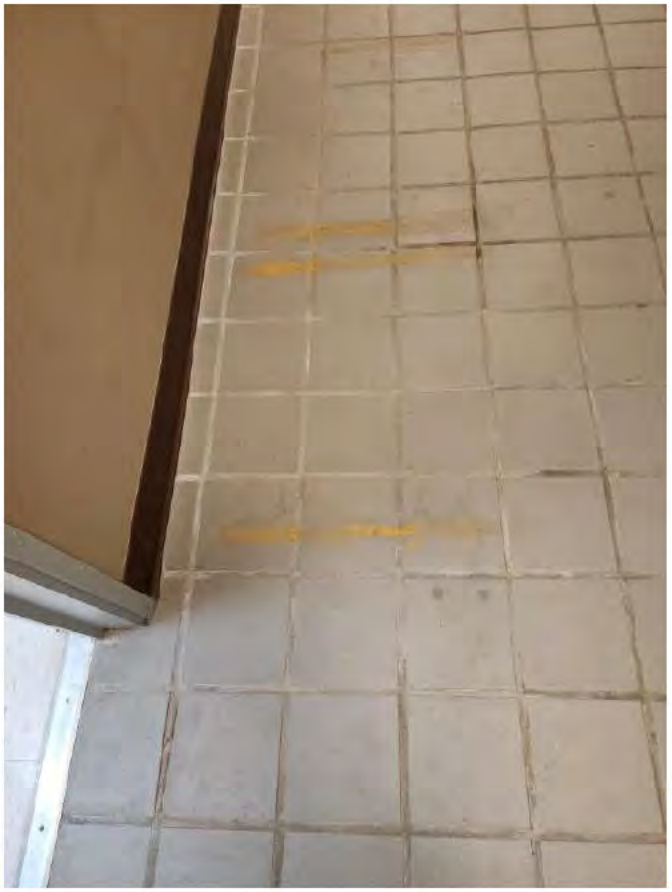
Port Command Center





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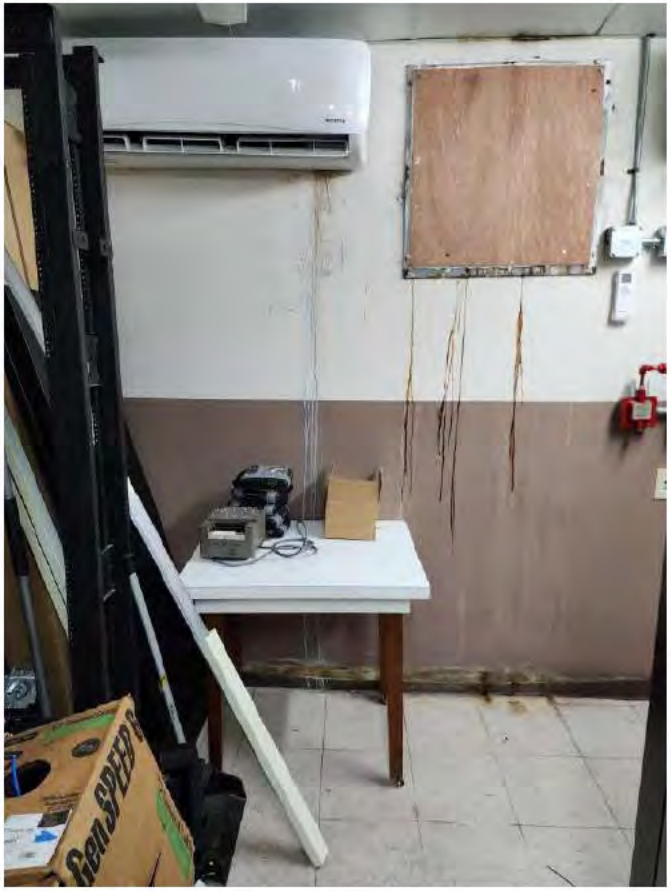

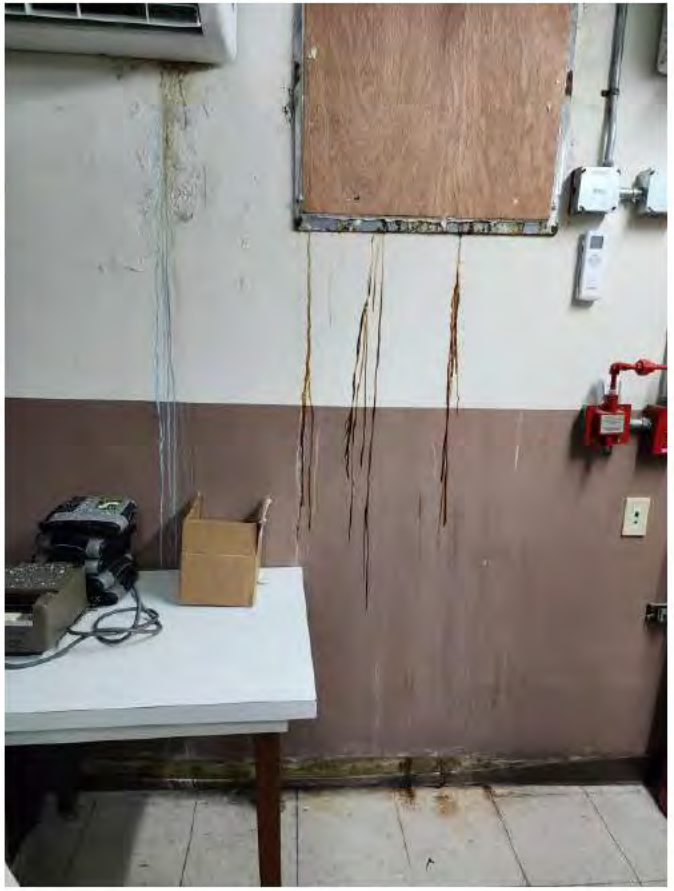

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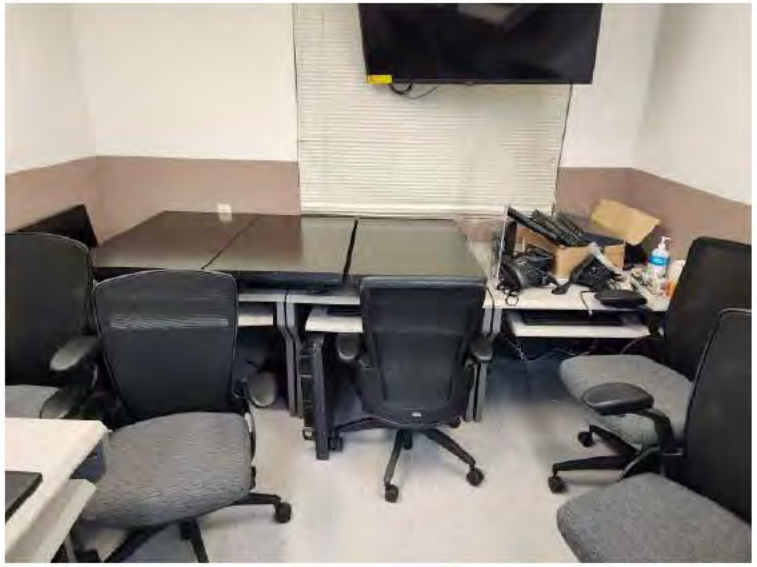

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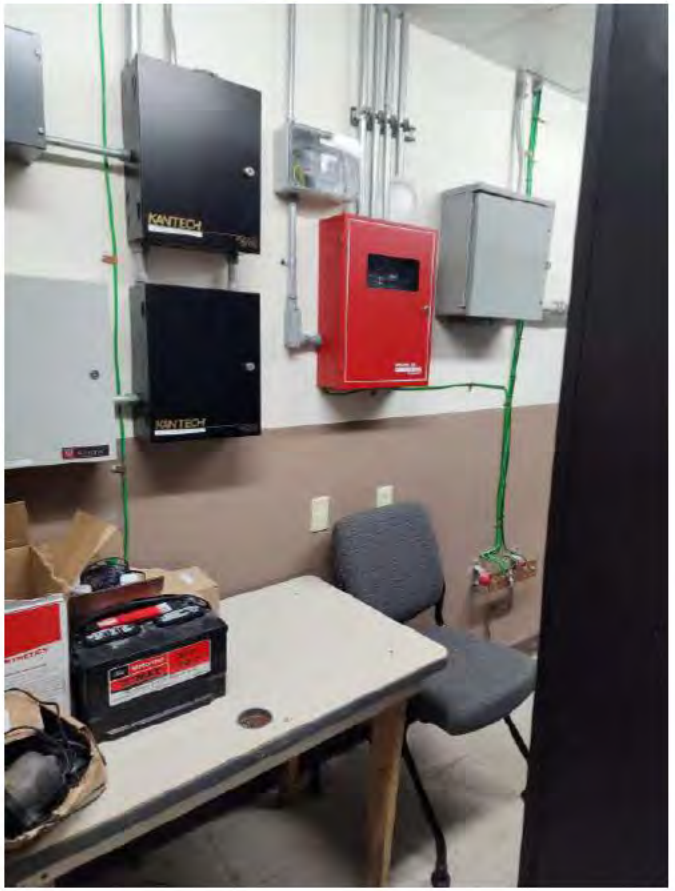
Port Command Center



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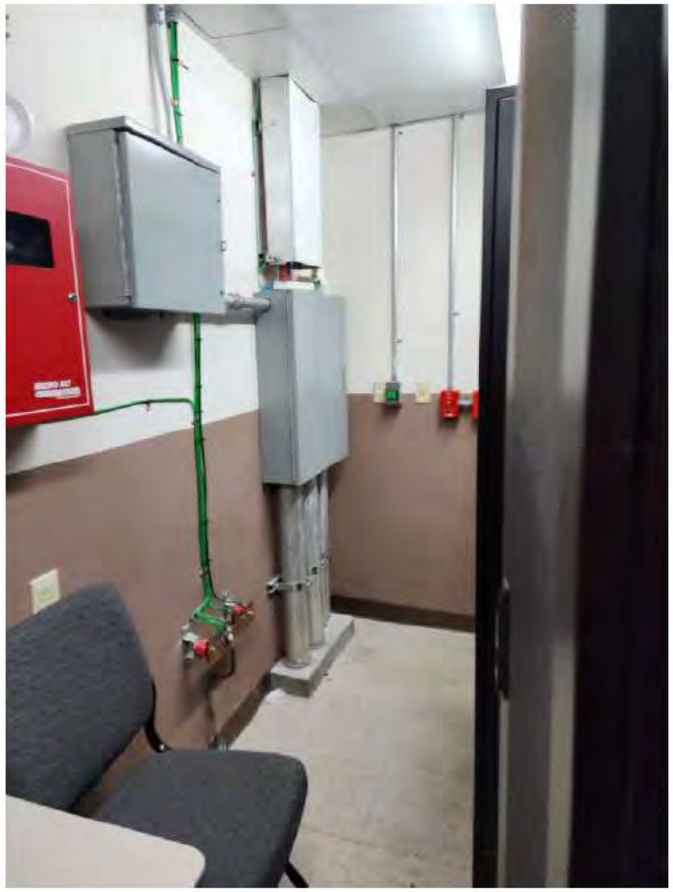
Port Command Center



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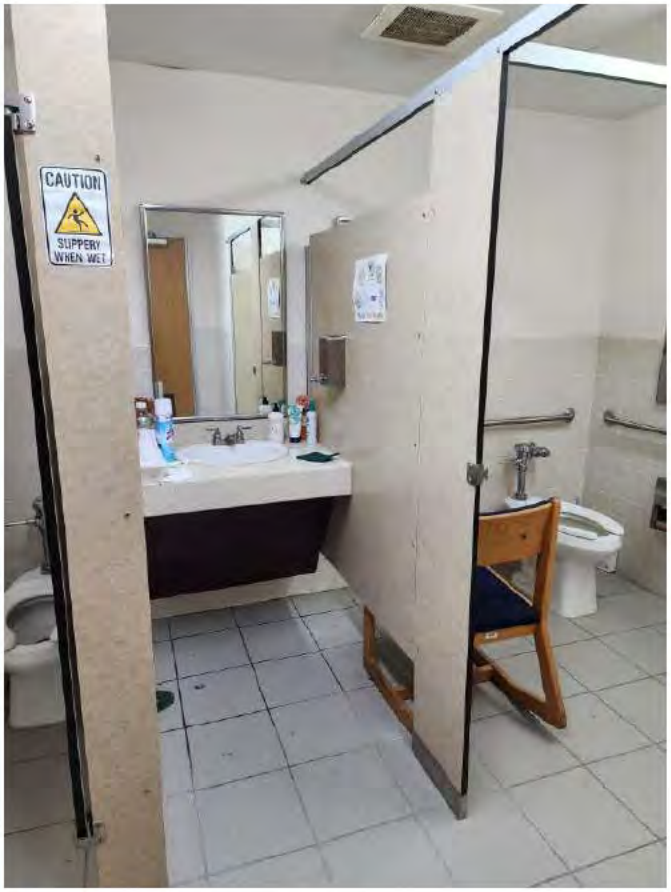
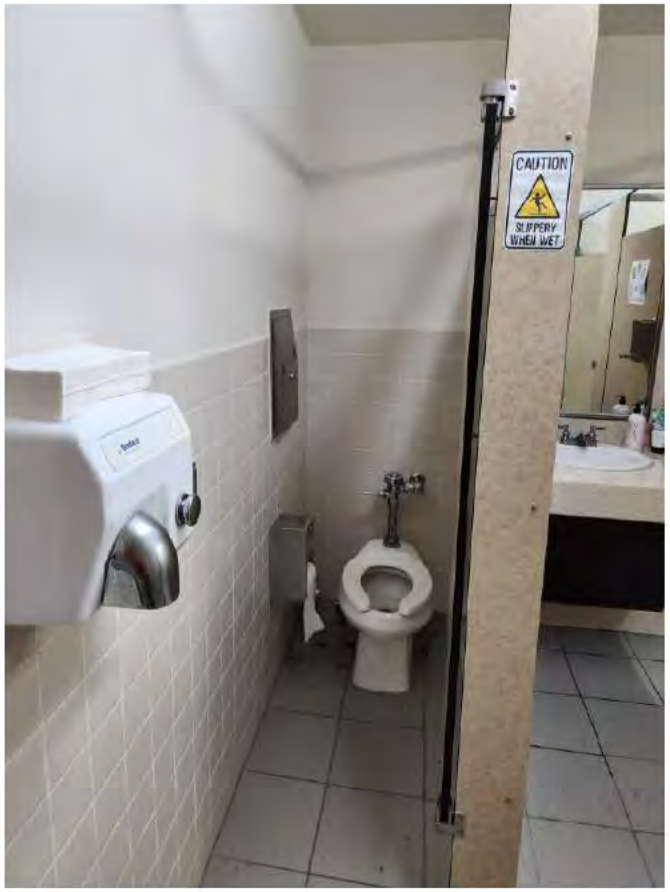
Port Command Center





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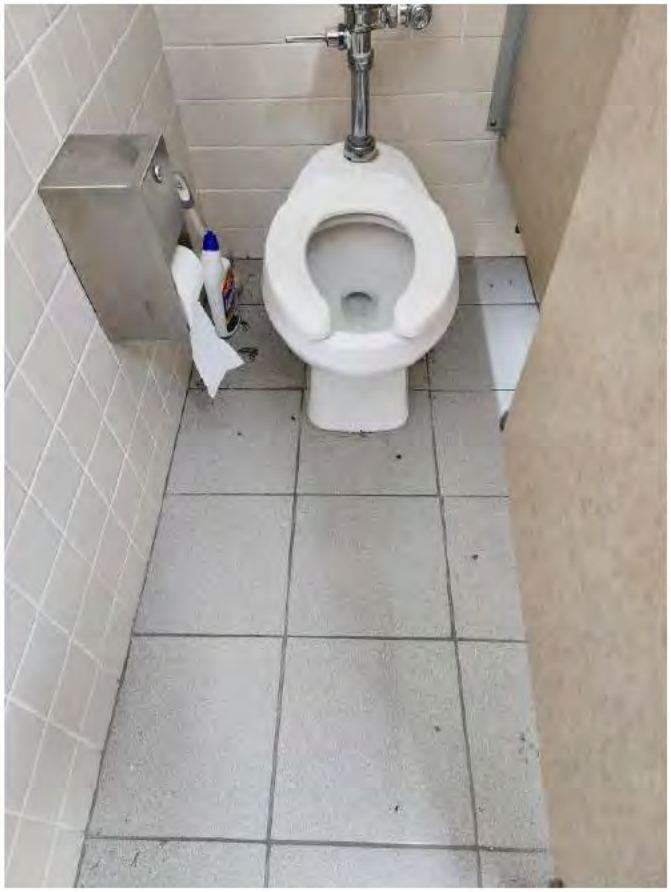
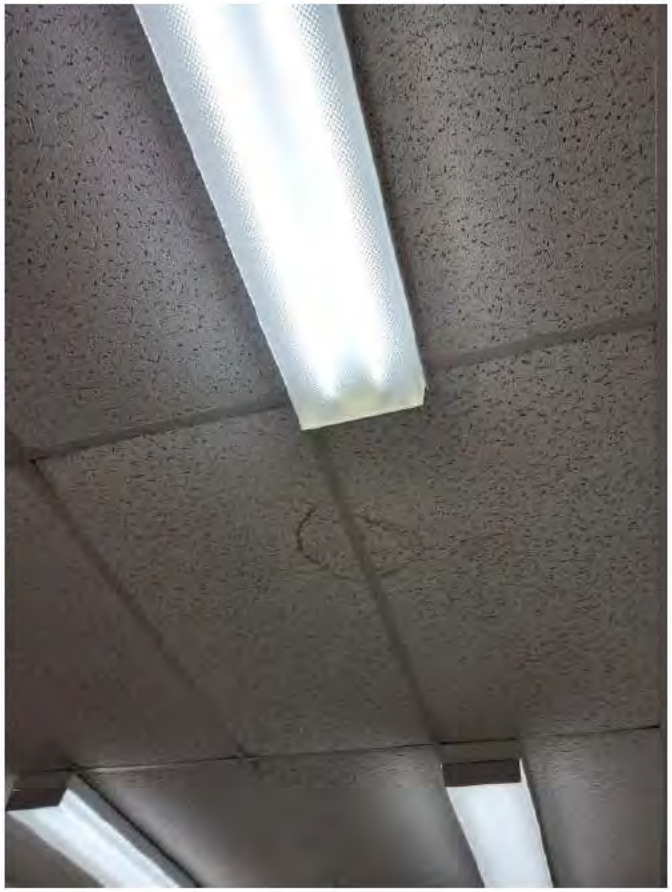


Port Command Center

PORT OF GUAM

Port Command Center



Port Police Vehicle

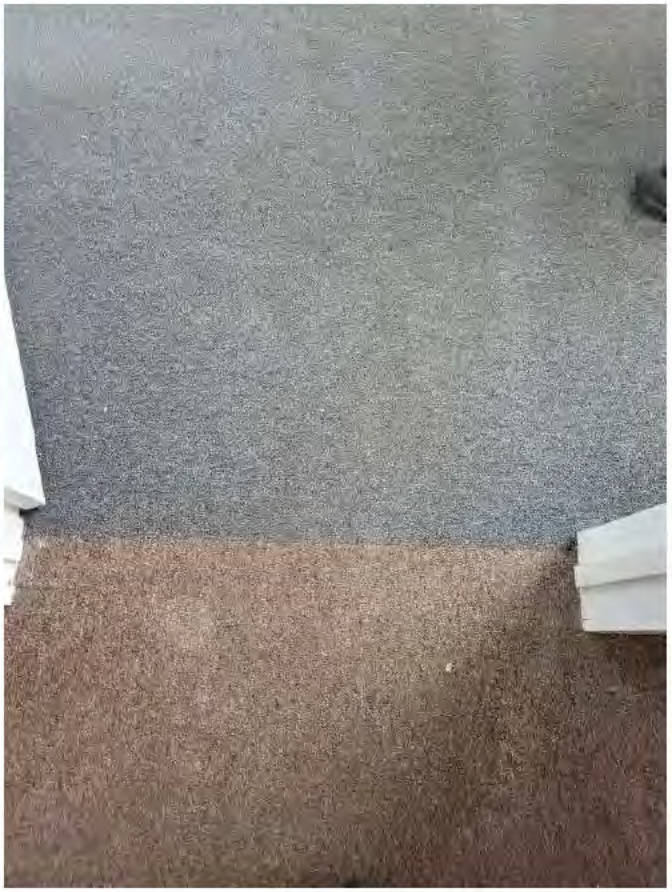
PORT OF GUAM

Port Police Vehicle

Seawall

PORT OF GUAM

Training Room

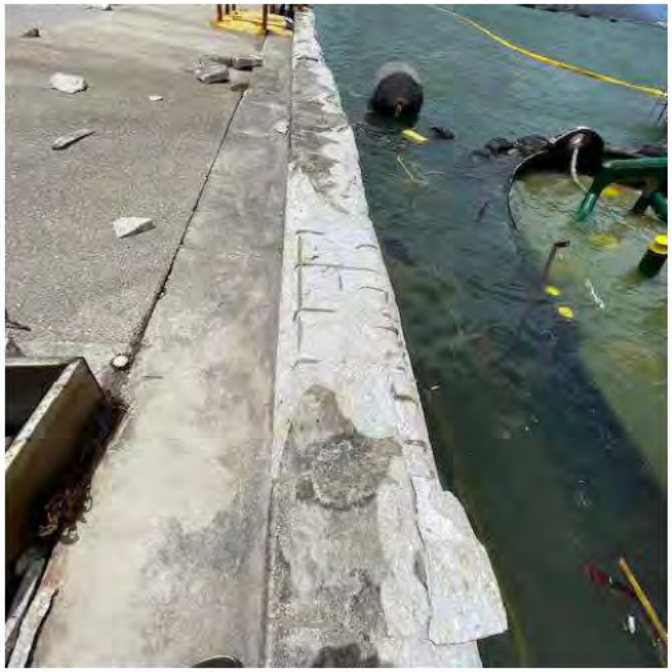


PORT OF GUAM

Training Room

PORT OF GUAM

Wharf F3

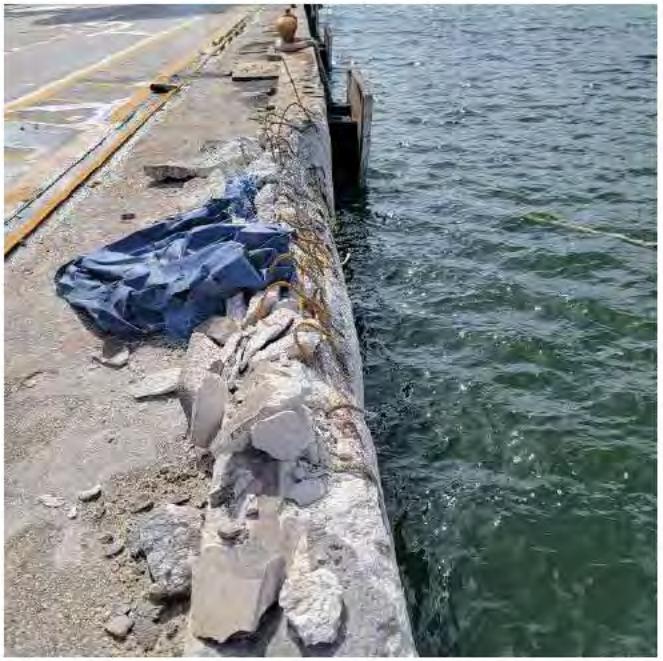


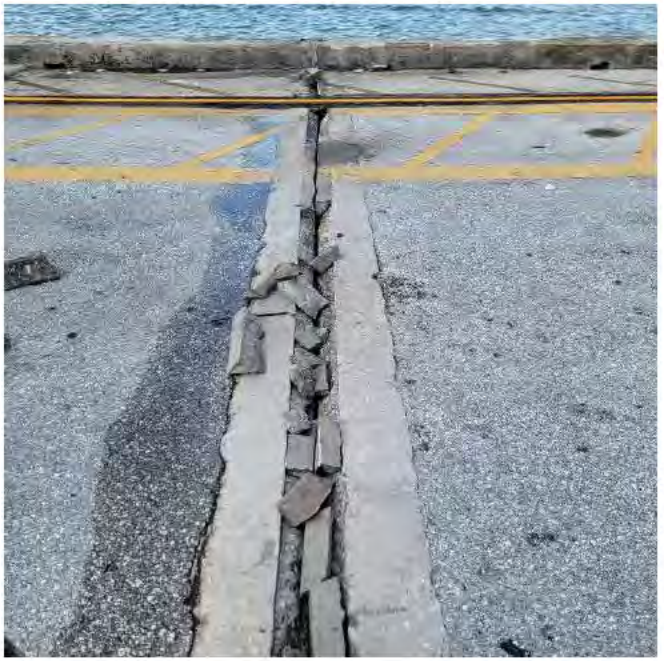
PORT OF GUAM

Wharf F3

PORT OF GUAM

Wharf F4 to F6





PORT OF GUAM

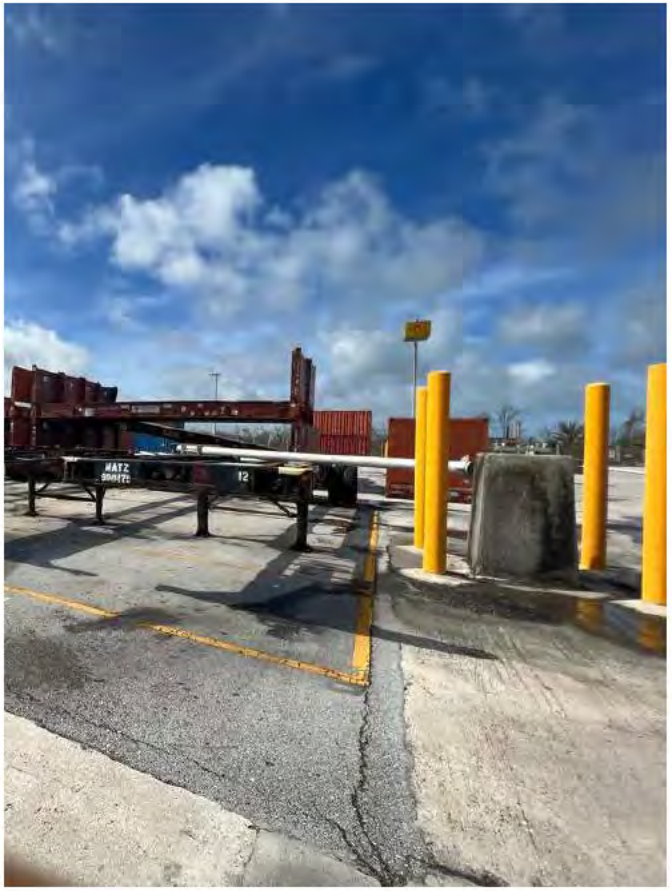
Wharf F4 to F6

PORT OF GUAM

Wharf F4 to F6

PORT OF GUAM

Yard



PORT OF GUAM

Yard

PORT OF GUAM

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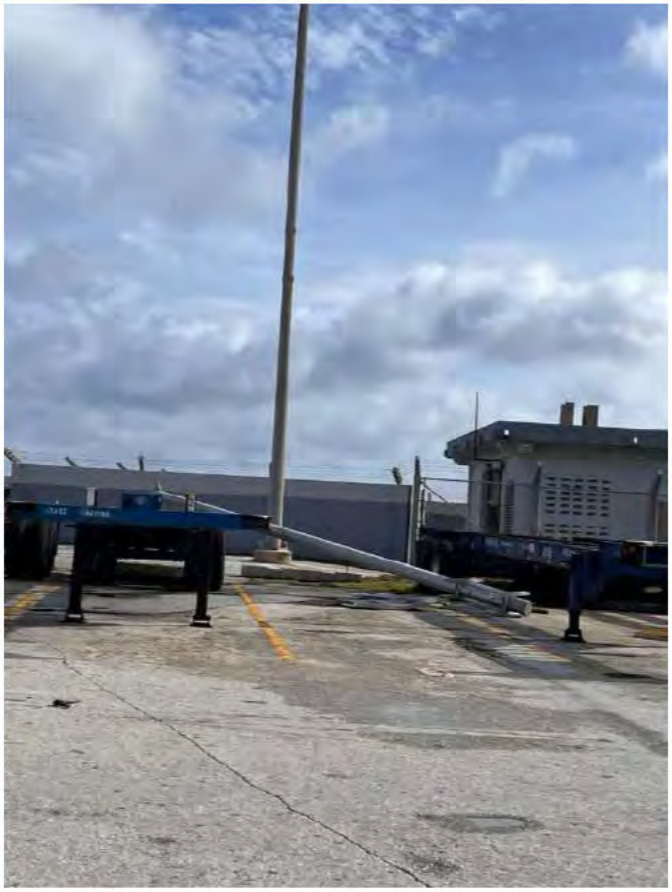

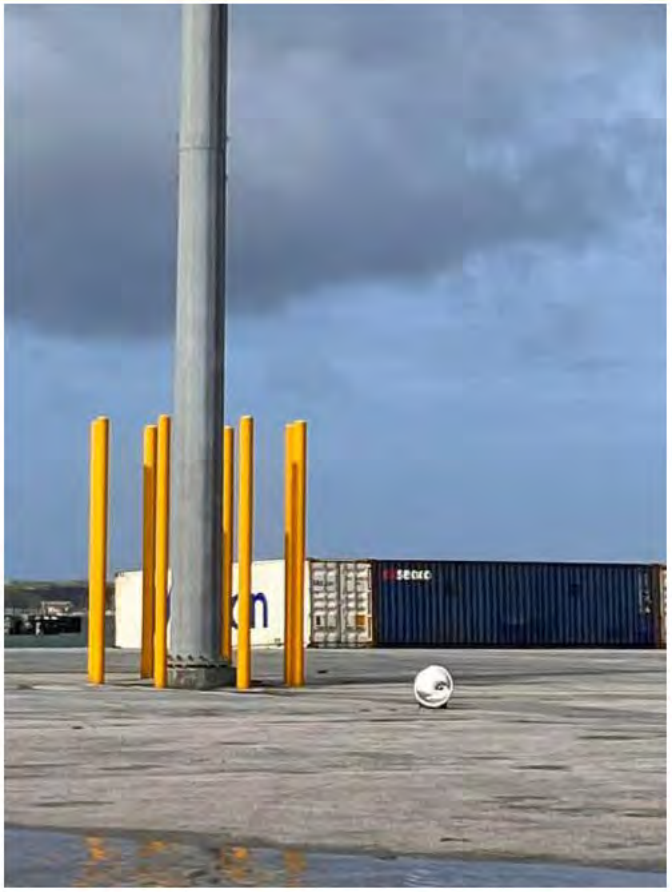

PORT OF GUAM

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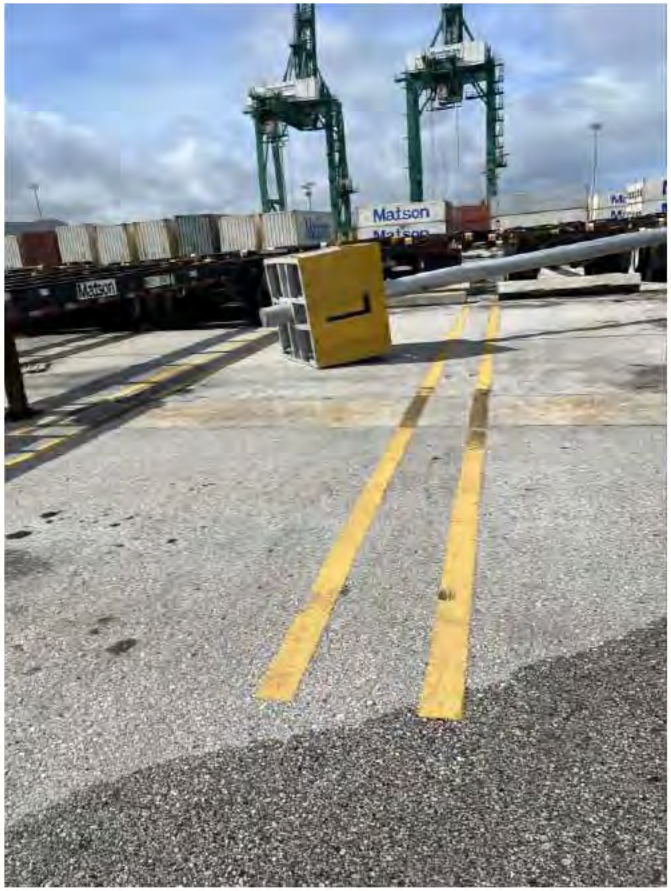

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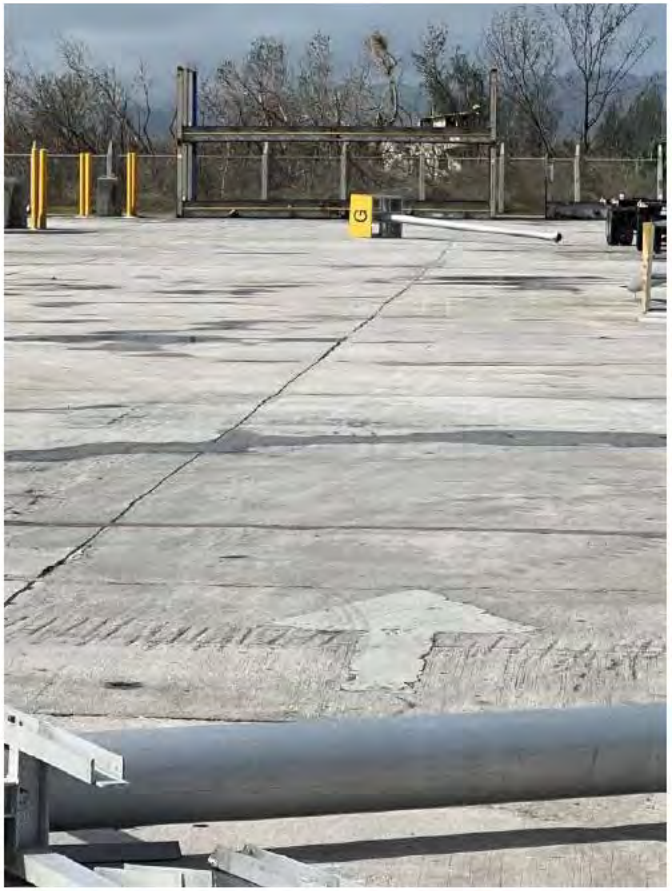
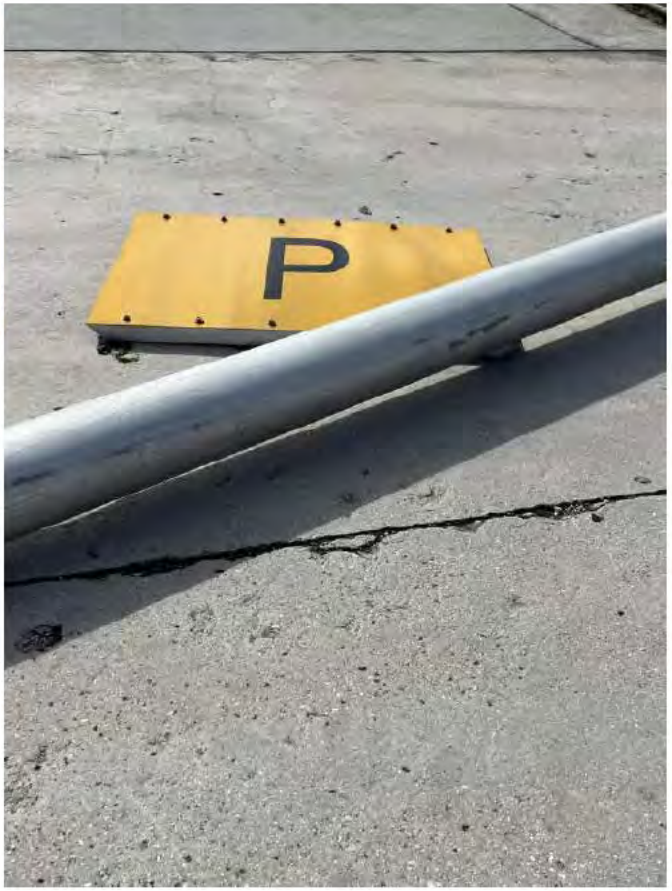


Yard

PORT OF GUAM

Yard



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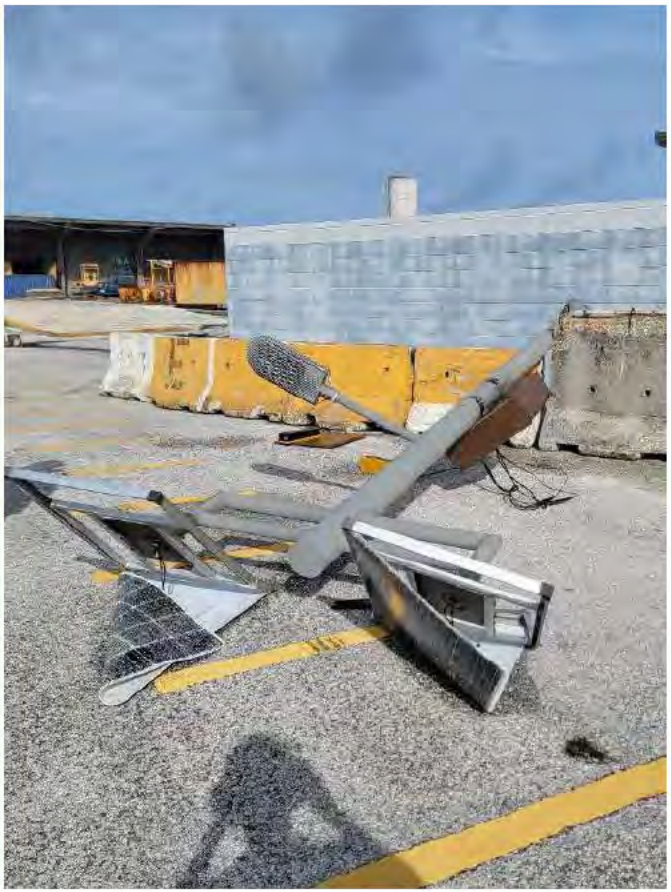

APPENDIX F

REPAIR CONCEPTS

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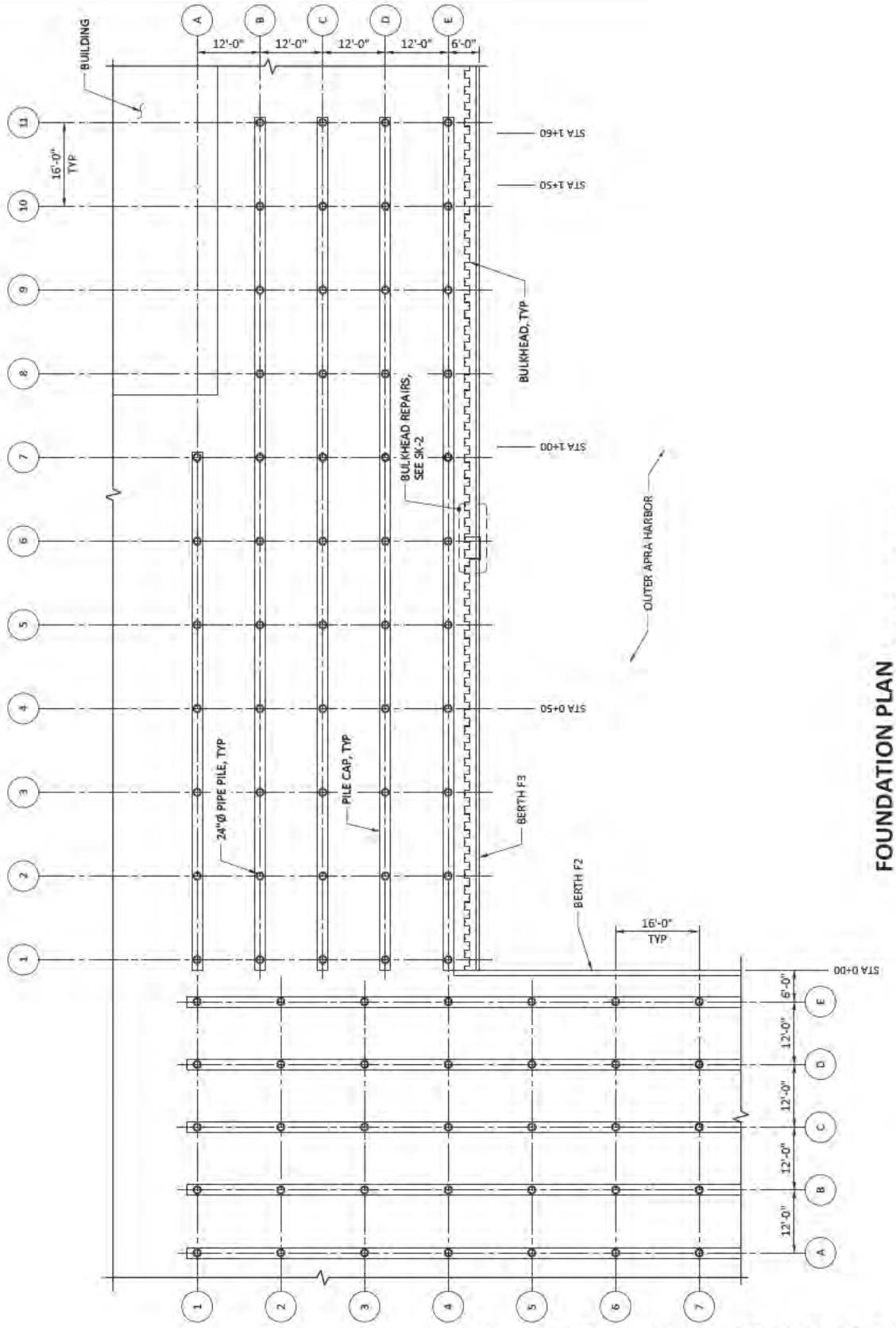

FOUNDATION PLAN
F2 AND F3 BULKHEAD "A" REPAIR
SCALE: 1" = 150' scale 150 0 150 300 feet

CONCEPTUAL - NOT FOR CONSTRUCTION

WSP USA Inc.
590 S. Marine Corps Dr.
Suite 421
Tamuning, GU 96913
TEL: (671) 646-6872
FAX: (671) 646-6873

PORT AUTHORITY OF GUAM

BERTHS F2 & F3 REPAIRS

FOUNDATION PLAN
F3 BULKHEAD "A" REPAIR

DRAWING NO.	SK-1
PROJECT NO.	30901541B.002
DATE:	9/30/24
SHEET NO.	1 OF 7

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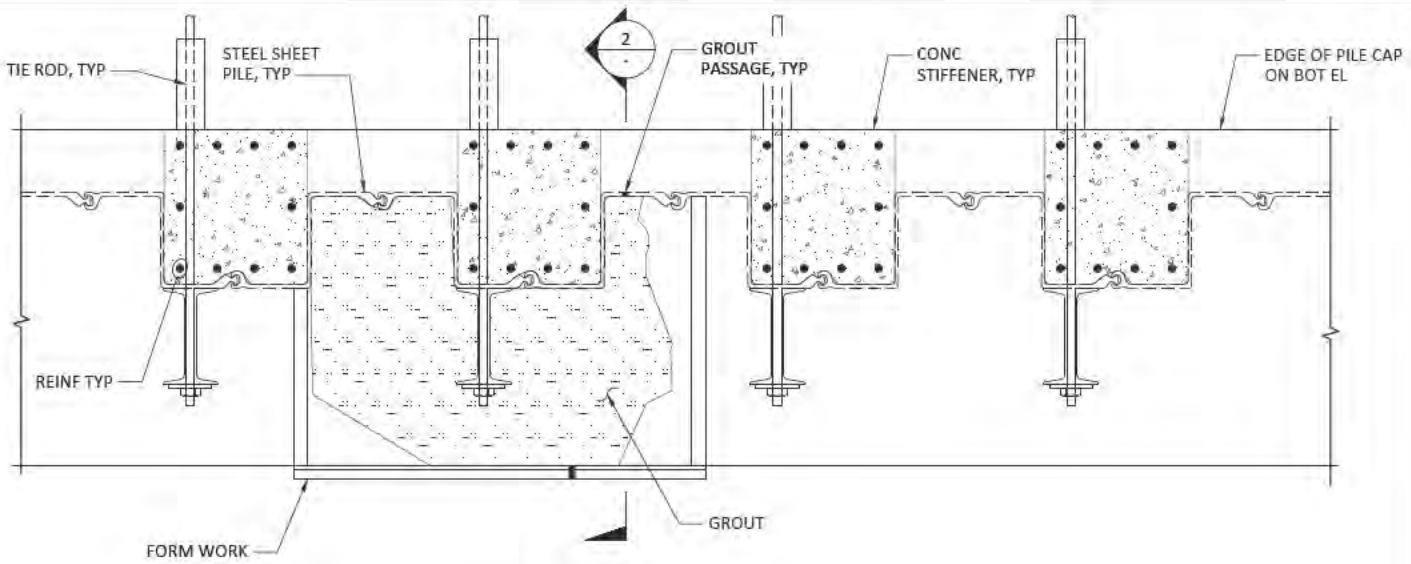
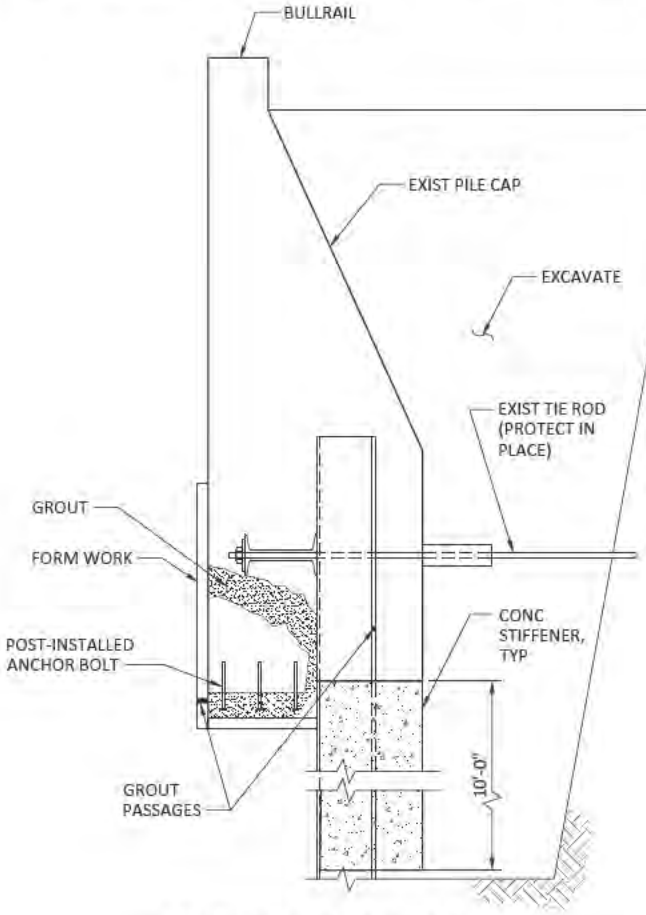


1 PLAN - BULKHEAD SPALL REPAIR AND STIFFENING

SCALE: NTS



SEQUENCE:

1. EXCAVATE
2. CUT UNBONDED REINF
3. INSTALL HEADED STUDS/BOLTS
4. INSTALL FORMWORK.
5. PUMP IN CONC GROUT
6. DEWATER EXCAVATION DURING AND AFTER REPAIR
7. REMOVE FORMS
8. BACKFILL
9. INSTALL PILES
10. INSTALL PILE CAPS
11. INSTALL DECK
12. INSTALL PAVEMENT
13. PAVEMENT STRIPING

2 SECTION - BULKHEAD SPALL REPAIR AND STIFFENING

SCALE:

CONCEPTUAL - NOT FOR CONSTRUCTION

WSP USA Inc.
590 S. Marine Corps Dr.
Suite 421
Tamuning, GU 96913
TEL: (671) 646-6872
FAX: (671) 646-6873

PORT AUTHORITY OF GUAM

BERTHS F2 & F3 REPAIRS

PLAN AND SECTION
BULKHEAD REPAIRS

DRAWING NO.	SK-2
PROJECT NO.	30901541B.002
DATE:	9/30/24
SHEET NO.	2 OF 7

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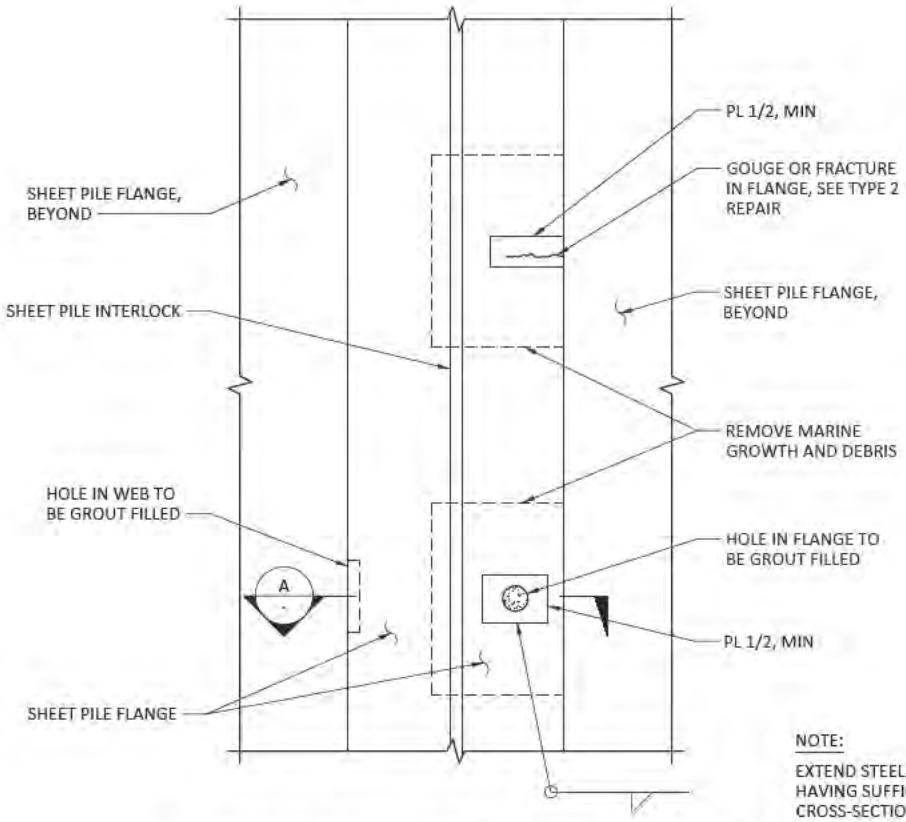
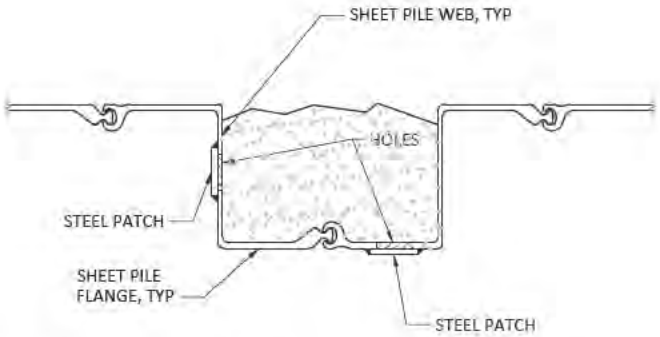


1 - **ELEVATION - TYPE 1 PLATE REPAIR**
SCALE: NTS



2 - **SECTION - TYPE 1 PLATE REPAIR**
SCALE: NTS

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590 S. Marine Corps Dr.
Suite 421
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TEL: (671) 646-6872
FAX: (671) 646-6873

PORT AUTHORITY OF GUAM
BERTHS F2 & F3 REPAIRS
ELEVATION AND SECTION
TYPE 1 PLATE REPAIR

DRAWING NO.	SK-3
PROJECT NO.	30901541B.002
DATE:	9/30/24
SHEET NO.	3 OF 7

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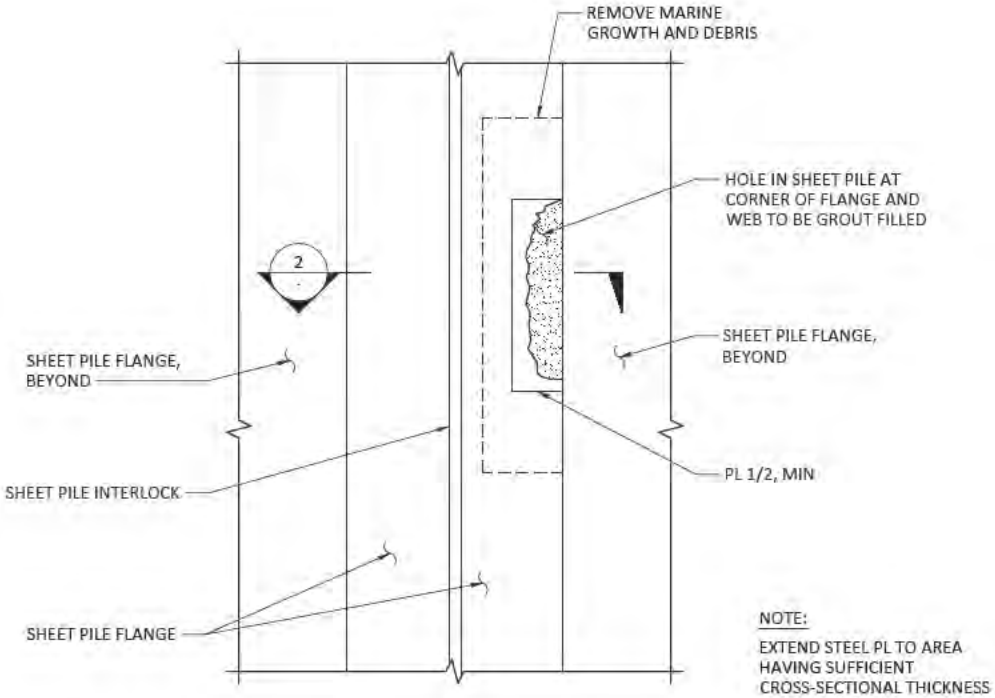
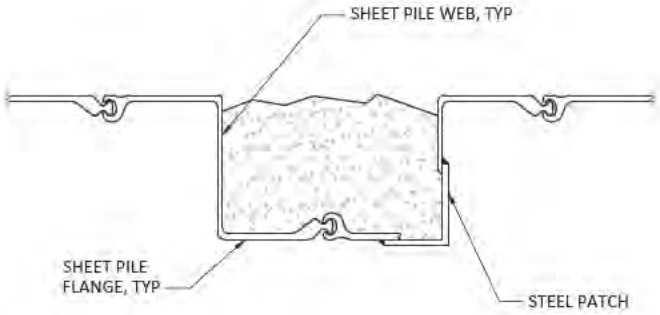


1 - ELEVATION - TYPE 2 PLATE REPAIR

SCALE: NTS



2 - SECTION - TYPE 2 PLATE REPAIR

SCALE: NTS

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Suite 421
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BERTHS F2 & F3 REPAIRS

ELEVATION AND SECTION
TYPE 2 PLATE REPAIR

DRAWING NO.	SK-4
PROJECT NO.	30901541B.002
DATE:	9/30/24
SHEET NO.	4 OF 7

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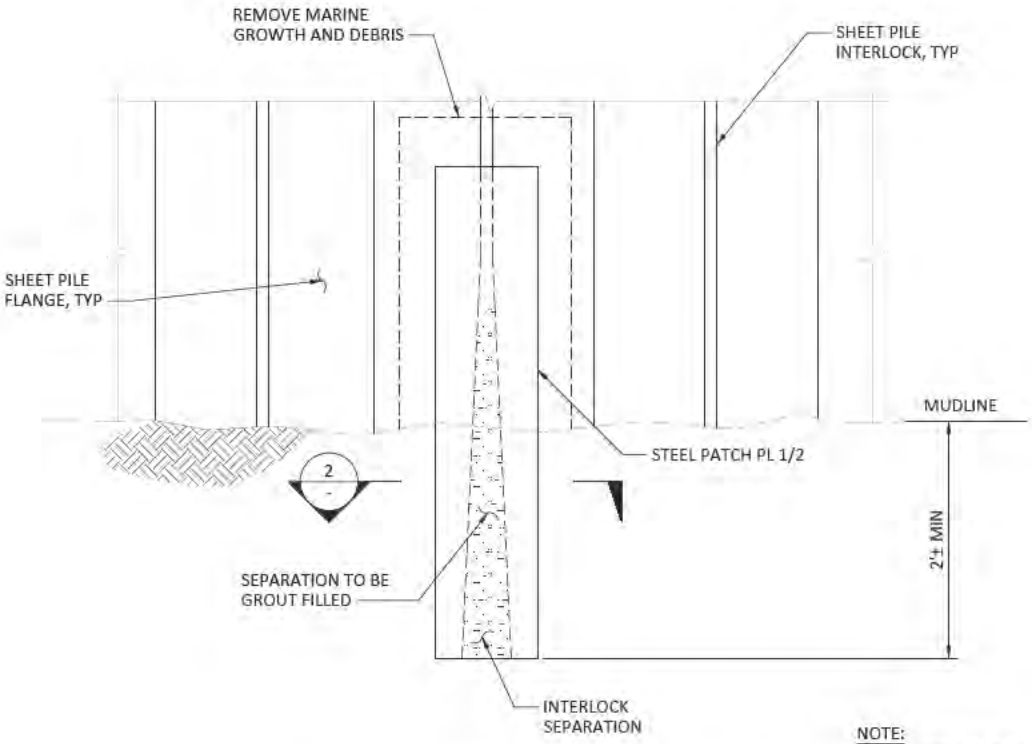
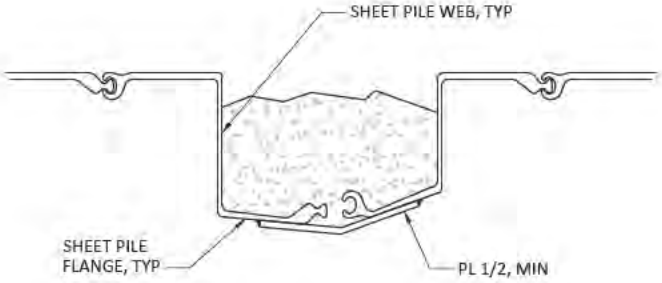


NOTE:
EXTEND STEEL PL TO AREA HAVING SUFFICIENT CROSS-SECTIONAL THICKNESS

1 - **ELEVATION - TYPE 2 PLATE REPAIR**
SCALE: NTS



2 - **SECTION - INTERLOCK REPAIR**
SCALE: NTS

CONCEPTUAL - NOT FOR CONSTRUCTION

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590 S. Marine Corps Dr.
Suite 421
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TEL: (671) 646-6872
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BERTHS F2 & F3 REPAIRS
ELEVATION AND SECTION
INTERLOCK REPAIR

DRAWING NO.	SK-5
PROJECT NO.	30901541B.002
DATE:	9/30/24
SHEET NO.	5 OF 7

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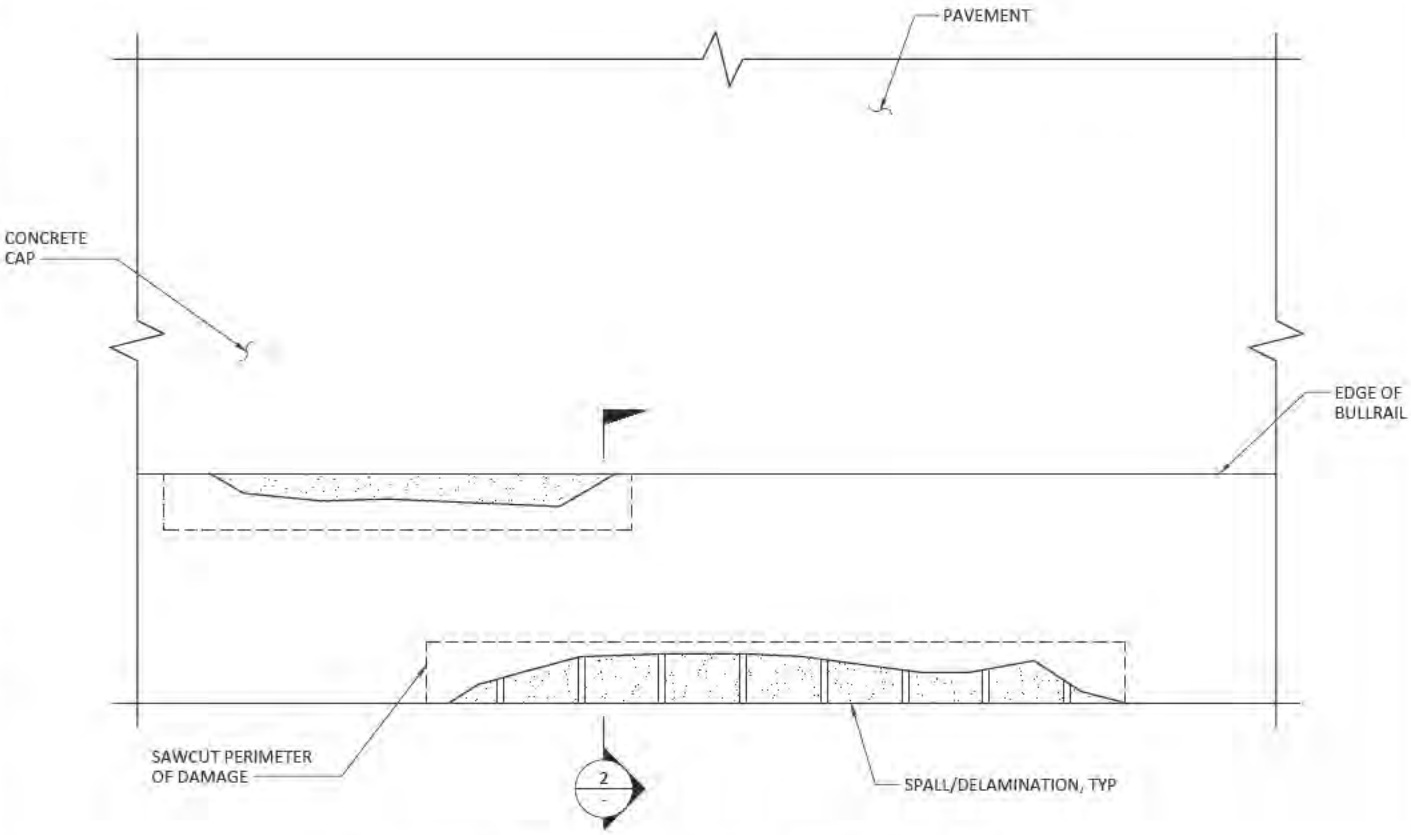
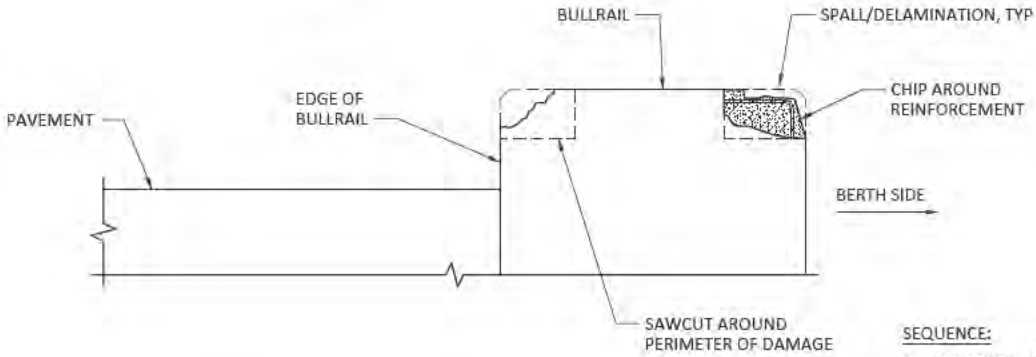


1 ELEVATION - BULLRAIL SPALL REPAIR
SCALE: NTS



2 SECTION - BULLRAIL SPALL REPAIR
SCALE: NTS

SEQUENCE:

1. REMOVE LOOSE CONCRETE AND DEBRIS.
2. SAWCUT PERIMETER OF DAMAGED CONCRETE.
3. WHERE REINFORCEMENT IS EXPOSED, REMOVE CONCRETE TO A DEPTH OF 1" BELOW REINFORCEMENT.
4. ROUGHEN CONCRETE SURFACE.
5. CLEAN AND INSTALL FORMWORK.
6. INSTALL CONCRETE.
7. REMOVE FORMWORK.

CONCEPTUAL - NOT FOR CONSTRUCTION

WSP USA Inc.
590 S. Marine Corps Dr.
Suite 421
Tamuning, GU 96913
TEL: (671) 646-6872
FAX: (671) 646-6873

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BERTHS F2 & F3 REPAIRS

ELEVATION AND SECTION
BULLRAIL SPALL REPAIR

DRAWING NO.	SK-6
PROJECT NO.	30901541B.002
DATE:	9/30/24
SHEET NO.	6 OF 7

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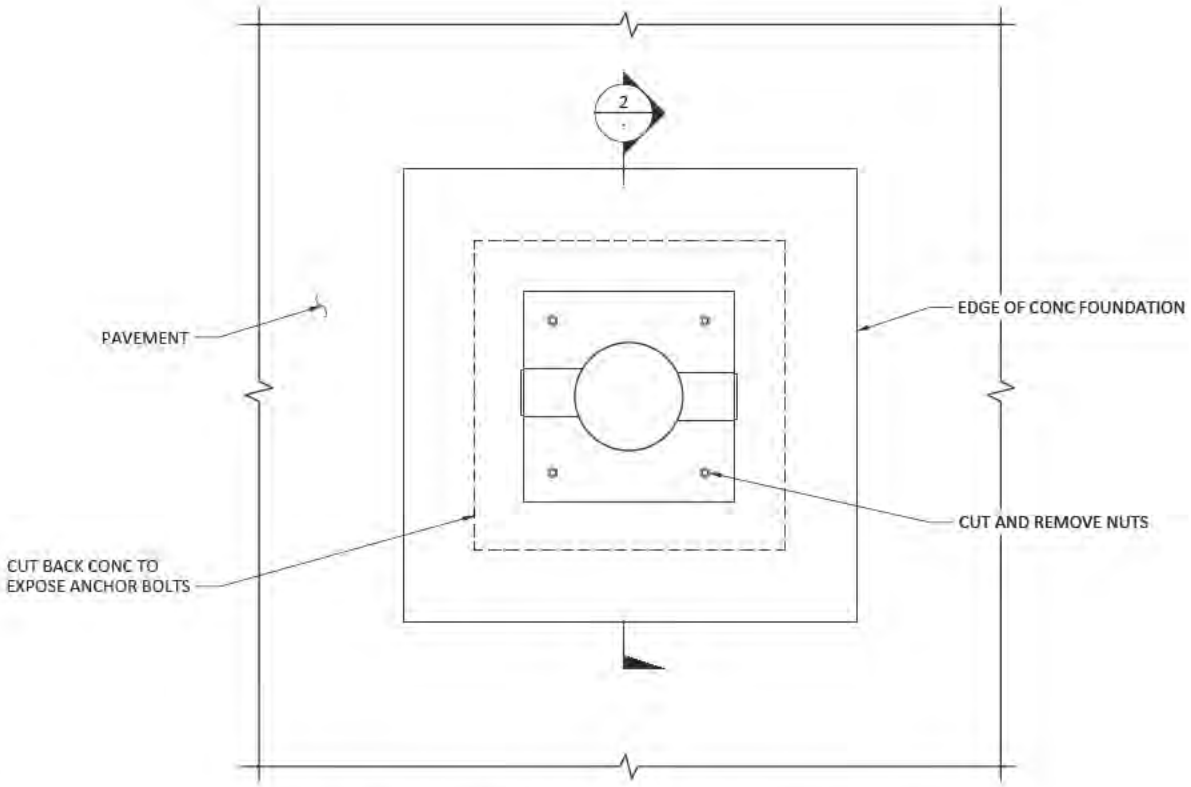
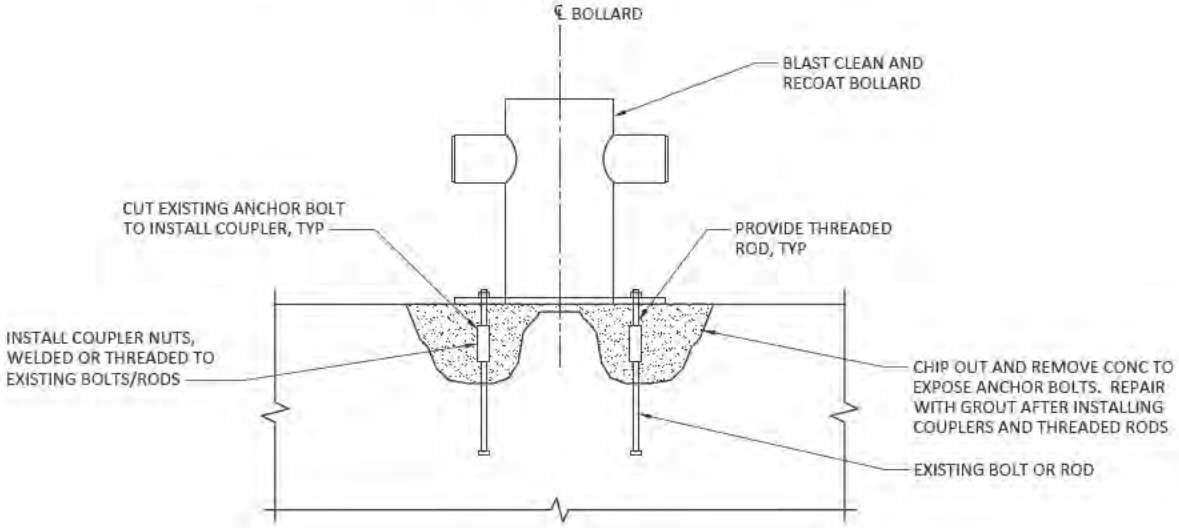


1 PLAN - BOLLARD REHABILITATION
SCALE: NTS



2 SECTION - BOLLARD REHABILITATION
SCALE: NTS

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WSP USA Inc.
590 S. Marine Corps Dr.
Suite 421
Tamuning, GU 96913
TEL: (671) 646-6872
FAX: (671) 646-6873

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BERTHS F2 & F3 REPAIRS

PLAN AND SECTION
BOLLARD REHABILITATION

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PROJECT NO.	30901541B.002
DATE:	9/30/24
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Appendix C – Crane Rail Condition Assessment Report

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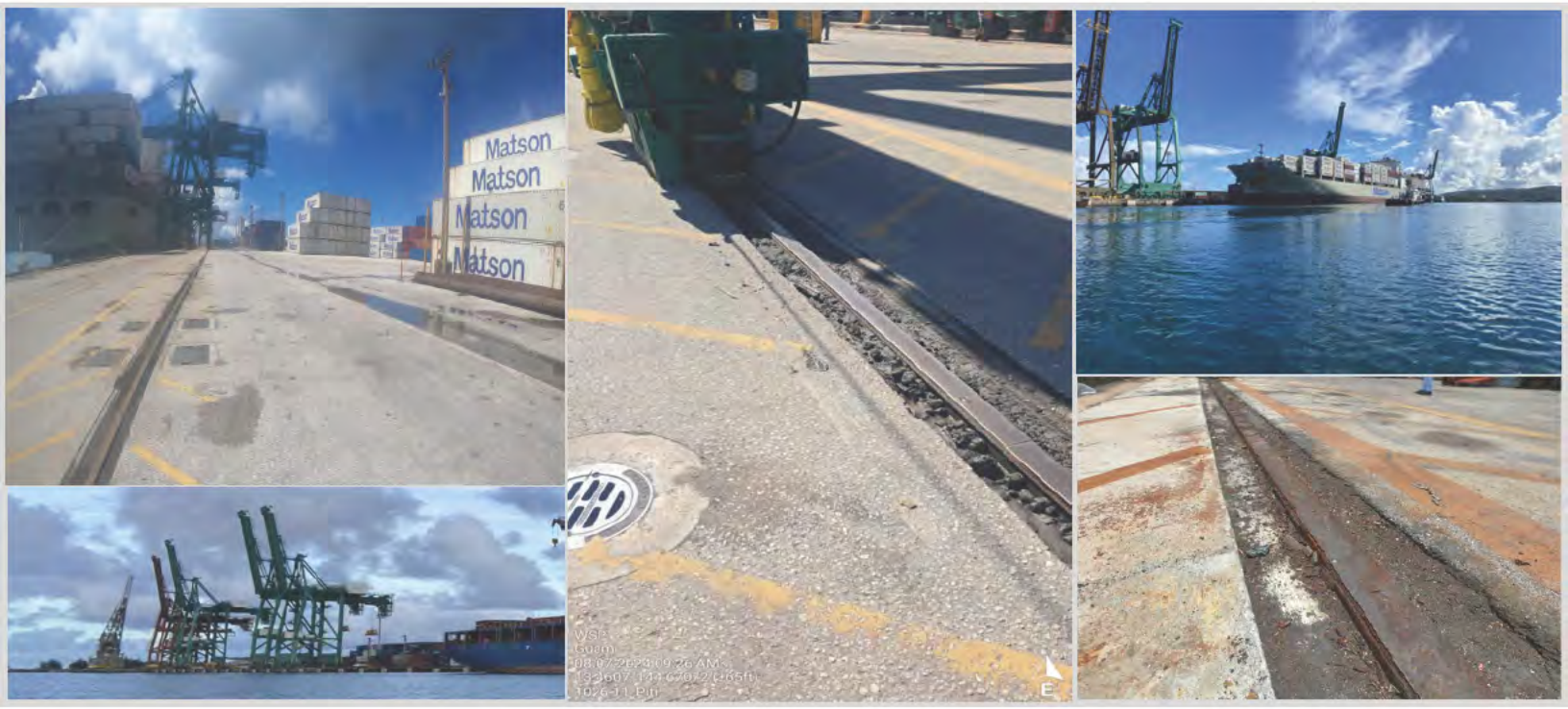
590 Marine Corps Drive
Suite 421
Tamuning, Guam 96913

Final Submittal



Port Authority of Guam

Crane Rail Inspection Report

Submitted to
Port Authority of Guam
Piti, Guam

This study was prepared under contract with the Port Authority of Guam (PAG), with financial support from the Office of Local Defense Community Cooperation (OLDCC). The content reflects the views of the PAG and does not necessarily reflect the views of OLDCC.

30901541D.004

November 2024

STS CRANE RAIL EVALUATION REPORT - FINAL

Port Authority of Guam
COMMERCIAL PORT CRANE RAIL

Submitted to

Port Authority of Guam
Piti, Guam

30 November 2024

Submitted by

WSP USA Inc.
590 South Marine Corps Drive
Suite 421
Tamuning, Guam 96913

30901541D

FINAL
STS CRANE RAIL EVALUATION REPORT
COMMERCIAL PORT OF GUAM

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EXECUTIVE SUMMARY

This report presents the overall condition of the STS gantry crane rail and associated infrastructure at the Commercial Port of Guam. In general, moderate to severe damage and deterioration are present at multiple locations along the landside and waterside crane rails. At Berth F4, the western 260 feet of both rails is severely corroded; likely due to its age and inactive use over the past several years. At Berth F5, the inspection effort found several locations where the leveling grout has failed; resulting in settlement of the rail and broken/loose asphalt pavement. At Berth F6, its estimated that the grout beneath the leveling plates is beginning to fail; evidenced by localized areas of damaged asphalt.

Given the current condition of the crane rail and understanding that the PAG is preparing procurements documents to replace the aged STS gantry cranes, it's recommended that the waterside and landside crane rails are replaced. In addition to repairing/replacing the rail, it is also recommended that wharf upgrade repairs are performed concurrently with this work. These repairs consist of new tie-downs, pin sockets, crane girder upgrades, and crane stops to accommodate loads from future/new STS cranes.

Total Wharf Upgrade Cost Estimate: $32,429,000

1.0 INTRODUCTION

As part of Service Agreement FY021-003 dated 4 November 2020, the Port Authority of Guam authorized Task Order No. 14, Supplemental OAE Services. As part of this task order, WSP USA Inc. (WSP) performed an inspection and condition assessment of the Ship -to-shore (STS) gantry crane rail at Berths F4, F5, and F6. Observations and findings from the field inspection effort are summarized in this facility condition assessment report. The purpose of this effort was to evaluate the condition of the crane rail and associated appurtenances and to identify assets in need of repair/replacement.

1.1 FACILITY DESCRIPTION

The Port of Guam (Port) is located on the western side of the island of Guam and encompasses over 1,000 acres of land. Strategically located along major Pacific shipping and air routes, the Port serves as an important transportation hub for the Commonwealth of the Northern Marianas, the Micronesian islands, and markets to the east and west. As the region's only major commercial port, the Port serves as a major hub for shipment and transshipment of containerized, bulk, and break-bulk cargo.

Following construction of the Commercial Port in 1970, the first STS crane was put into service in 1971; the second in 1979. It is unknown when the third STS crane was installed. Currently, Berths F4, F5, and F6 are equipped with three 50-ft gage STS gantry cranes that operate on approximately 1,833 feet of 171-pound/yard crane rail. These cranes, which replaced the three original gantry cranes, were constructed in 1983 and rehabilitated in 2009. See Figure 1. Over the past several decades, multiple repairs and modifications to the crane rail and supporting structures have been completed.

Figure 1: Commercial Port of Guam (Berths F4, F5, and F6)

Following a major earthquake in 1993 that resulted in severe damage to the Commercial Port, a major repair effort was performed in 1996. This effort involved reconstructing a portion of Berths F5 and F6 as pile-supported wharves and partial replacement of the crane rail. In 2008 under PAG Project 06-013, the Port completed a major crane rail repair project that included replacement of approximately 3,666 feet of rail, repairs to leveling plates, structural elements, and the wharf fender system. The purpose of this repair project was to prepare infrastructure for recently refurbished STS cranes; now nearing the end of their services lives.

The main crane rails, parallel to the wharf have been documented as a CR-171 rail. The manufacturer of the rail is unknown. In general, rail sections are typically 38-feet long and connected with 6-bolt splice connection plates. Adjacent the pile-supported wharf, rail sections are approximately 20-feet long which span across the joint.

The crane rail system extends from STA 8+17 to STA 26+50 for 1,833 feet and is supported by reinforced concrete pile caps that span between steel and concrete piles. The rail is situated in a recessed trough on top of the pile caps and supported by grout pads and regularly spaced leveling plates at various intervals from 1- to 3- feet on-center. At each leveling plate, anchor bolts are present and secure the rail to the support pile cap. Splices generally consist of two steel plates each side of the rails connected with a series of bolts. The clip intervals are documented in the drawings titled, “Design Plans – Replacement of Wharf Gantry Rail System and Wharf Upgrade Project”. It appears that splice plates have been used instead of specialized rail splices for joining the rail during the 2008 replacement.

A lightweight rail spur between stations 17+00 and 20+00 was constructed in 1998 as part of the earthquake repair project. Portions of this spur have been dismantled outside the limits of the main crane rails during the 2008 upgrade work. However, there is no documentation on the limits of this removal.

2.0 INSPECTION AND CONDITION ASSESSMENT

2.1 INSPECTION AND CONDITION ASSESSMENT APPROACH

On August 7th 2024, WSP performed an inspection of the waterside and landside crane rails at Berths F4, F5, and F6. The inspection effort included visual observation of crane-rails, pavement adjacent to the rail, and visible portions of splice plates/hardware, grout pads, and concrete. Because the Port is preparing to replace the three STS cranes in the coming year(s) which will require new tie-downs, pin sockets, girder upgrades, and crane stops, these elements were not inspected.

The inspection was performed by walking along the surface of the wharfs and visually observing the condition of the elements. The following standard was used as a guide for performing the inspection work and classifying the level of observed damage. This standard was selected to provide a qualitative description of an elements damage.

- American Society of Civil Engineers Manuals and Reports on Engineering Practice No. 130, "*Waterfront Facilities Inspection and Assessment*" (ASCE MOP 130).

2.2 FACILITY CONDITION ASSSESSMENT METHODOLOGY

Evaluation of elements included both visual observation and limited hands-on assessment. Because the recessed rail troughs have been infilled with asphalt pavement, observation of rails and splice plates were limited to those that were visible at the time of the inspection. Prior to the inspection work, select areas of the rail were pressure washed by Port personnel to remove dirt and debris.

In accordance with ASCE MOP 130, steel elements were assigned an element-level damage rating, with damages defined as minor, moderate, major, or severe. These damage ratings are defined in Chapter 2 of ASCE MOP 130 and have been standardized to provide a qualitative and consistent description of an elements level of damage. With respect to asphalt pavement, damage ratings for pavement are not defined in ASCE MOP 130. For this reason, a generalized system similar to that of reinforced concrete was used to quantify and rate the level of damage observed with the asphalt pavement. Abbreviated element level damage rating tables for steel and concrete from ASCE MOP 130 are provided in Appendix A for reference. Similarly, reference photographs showing the type and severity of asphalt pavement defects are also provided in Appendix A.

Following completion of the field work, element level damage ratings in combination with visual observations were used to assign condition assessment ratings for each berth. In accordance with Table 2-14 of ASCE MOP 130, a summary of the facility condition assessment ratings is provided below.

Table 1: Facility Condition Assessment Ratings

Rating	Description
Good	No visible damage or only minor damage noted. Structural elements may show very minor deterioration, but no overstressing observed. No repairs are required.
Satisfactory	Limited minor to moderate defects or deterioration observed but no overstressing observed. No repairs are required.
Fair	All primary structural elements are sound but minor to moderate defects or deterioration observed. Localized areas of moderate to advanced deterioration may be present but do not significantly reduce the load-bearing capacity of the structure. Repairs are recommended, but the priority of the recommended repairs is low.
Poor	Advanced deterioration or overstressing observed on widespread portions of the structure but does not significantly reduce the load-bearing capacity of the structure. Repairs may need to be carried out with moderate urgency.
Serious	Advanced deterioration, overstressing, or breakage may have significantly affected the load-bearing capacity of the primary structural components. Local failures are possible and loading restrictions may be necessary. Repairs may need to be carried out on a high-priority basis with urgency.
Critical	Very advanced deterioration, overstressing, or breakage has resulted in localized failure(s) of primary structural components. Failures that are more widespread are possible or likely to occur, and load restrictions should be implemented as necessary. Repairs may need to be carried out on a very high-priority basis with strong urgency.

3.0 FINDINGS AND OBSERVATIONS

Findings from the inspection effort and element ratings are described in the following sections. Ratings have been assigned based on field observations and element-level damage ratings for individual elements.

3.1 BERTH F4

Rail Length: 588 feet
Rail Stationing: 08+17 to 14+05
Leveling Plates: 18-inch on-center from 8+12 to 15+50
Note: At the time of this inspection, direct access between STA 8+12 and 10+70 was limited due to on-going demolition activities for gantry cranes 2 and 3 and barge dismantling activities.

3.1.1 Crane Rail

The waterside and landside crane rails are in **poor** condition. Widespread corrosion, pitting, and scaling of the steel rails were observed at multiple locations between STA 8+12 and 10+70. At these locations, the crane rail has remaining unused for several years. Minor defects such as corrosion and gouges were observed at the remaining sections of rail from STA 10+70 to STA 14+05. See Photo 1.

3.1.2 Crane Rail Foundation

The crane rail foundation appears to be **fair** condition. At the waterside rail near STA 12+60, the rail has settled; evidenced by ponding water over top of the rail. See Photo 2. Damage such as exposed, broken, or loose grout were not observed.

3.1.3 Asphalt Pavement

The asphalt pavement adjacent to the crane rail is in **satisfactory** condition. Minor defects such as cracks and depressions were observed at multiple locations.

Photo 1: Berth F4 Typical Crane Rail

Photo 2: Berth F4 Station 12+60

3.2 BERTH F5

Rail Length: 650 feet
Rail Stationing: 14+05 to 20+55
Leveling Plates: 18-inch on-center from 14+00 to 15+50
and 36-inch on-center from 15+50 to 20+50.
Note: Pile-supported wharf between 16+87 and 20+50.

3.2.1 Crane Rail

The crane rail is in **fair** condition. In general, minor defects such as corrosion and gouges were observed. At isolated locations where splice plates were visible, splice plate bolts were loose and could be turned by hand. In general, rail joints were found to be tight. See Photo 3 and Photo 4.

3.2.2 Crane Rail Foundation

The crane rail foundation is in **poor** condition. At the pile-supported area of the wharf, vertical movement of the rail was observed during movement of an STS crane; indicating failure of the grout pads beneath the leveling plates. At one location, the leveling grout was found to be loose and easily dislodged from its location. See Photo 5.

3.2.3 Asphalt Pavement

The asphalt pavement adjacent to the crane rail is in **poor** condition. At multiple locations, asphalt within the recessed rail trough was broken/shattered. At some locations, section of asphalt were loose and could be removed by hand.

Photo 3: Berth F5 Exposed Splice Plate

Photo 4: Berth F5 Typical Splice Joint

Photo 5: Failed Leveling Grout

3.3 BERTH F6

Rail Length: 600 feet
Rail Stationing: 20+55 to 26+55
Leveling Plates: 36-inch on-center from 20+50 to 23+20, 12-inch on-center from 23+20 to 24+10, and 18-inch on-center from 24+10 to 26+50.
Note: Pile-supported wharf between 20+50 to 22+46

3.3.1 Crane Rail

The crane rail is in **satisfactory** condition. In general, minor defects such as corrosion and gouges were observed. See Photo 6.

3.3.2 Crane Rail Foundation

The crane rail foundation appears to be **satisfactory** condition. Damage such as exposed, broken, or loose grout were not observed. However, damage to the adjacent asphalt pavement suggests that grout below the leveling plates is beginning to fail.

3.3.3 Asphalt Pavement

The asphalt pavement adjacent to the crane rail is in **fair** condition. At the waterside rail, cracked/broken sections of asphalt were observed at six locations; primarily near STA 22+46.

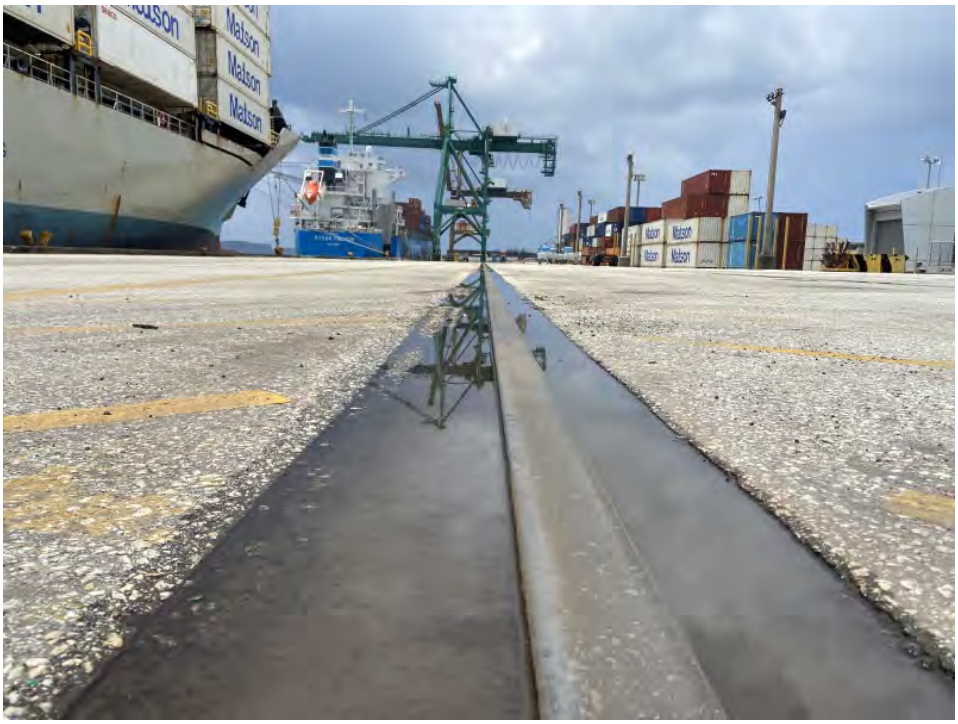


Photo 6: Berth F6 Typical Crane Rail

4.0 OVERALL CONDITION ASSESSMENT RATING

Condition assessment ratings for the crane rail at Berths F4, F5, and F6 are summarized in Table 2. Assessment ratings were assigned based on visual observations and element level damage ratings. The overall ratings were determined by considering the following.

- Total number of observed damages
- Severity of observed damages
- Distribution of observed damages
- Sensitivity of affected elements
- Location of damages
- Serviceability

Table 2: Berths F4 – F6 Crane Rail Condition Assessment Ratings

Berth Identification	Condition Assessment Rating
F4 Rail	**Poor**
F5 Rail	**Poor**
F6 Rail	**Fair/Satisfactory**

5.0 DISCUSSION AND RECOMMENDATIONS

In general, moderate to severe damage and deterioration are present at multiple locations of the landside and waterside crane rail at Berths F4, F5, and F6. At Berth F4, the western 260 feet of both rails is severely corroded; likely due to its age and inactive use of the past several years. At Berth F5, the inspection effort found several locations where the leveling grout has failed; resulting in settlement of the rail and broken/loose asphalt pavement. At Berth F6, its estimated that the grout beneath the leveling plates is beginning to break down; evidenced by localized areas of damaged asphalt.

Given the current condition of the crane rail, it's recommended that a comprehensive crane rail repair program is performed. As discussed earlier in this report, the current STS cranes are nearing the end of their service lives. For this reason, the Port is actively preparing to replace these cranes with new cranes that can operate on the 50-foot gage rail. To prepare the Commercial Port for delivery of the new cranes, it's recommended that the crane rail repair program is completed prior to delivery of the new cranes. In addition to repairing/replacing the rail, it is also recommended that wharf upgrade repairs are performed concurrently with this work. These repairs consist of new tie-downs, pin sockets, crane girder upgrades, and crane stops for the future/new STS cranes.

In preparation for the new/future STS cranes and considering that the most recent crane rail upgrades have been in service for 16 years, it's recommended that the full extent of crane rail is replaced at the waterside and landside rails. Replacement of the rail, which also includes hardware such as leveling plates, grout, clips, bolts, and splice plates will repair deficient elements and eliminate the need to perform a second round of rail repairs following delivery of the new crane(s).

5.1 REPAIR RECOMMENDATIONS

5.1.1 Berth F4

- Crane Rail Replacement: Remove and replace the crane rail for both the waterside and landside rails. Provide new leveling plates, grout, leveling nuts, washers, clips, bolts, and splice plates.
- Remove and replace the crane stops.

5.1.2 Berth F5

- Crane Rail Replacement: Remove and replace the crane rail for both the waterside and landside rails. Provide new leveling plates, grout, leveling nuts, washers, clips, bolts, and splice plates.

5.1.3 Berth F6

- Crane Rail Replacement: Remove and replace the crane rail for both the waterside and landside rails. Provide new leveling plates, grout, leveling nuts, washers, clips, bolts, and splice plates.

- Remove and replace the crane stops.

5.1.4 Stowage Location Upgrades

- Provide three new stowage structure(s), consisting of pin sockets and tie-downs. Final stowage locations to be determined.
- At crane stowage locations, upgrade the waterside and landside crane girders.

Design and construction of new stowage structures and upgrade of existing concrete crane girders should be performed to meet or exceed the structural demand requirements shown in the technical specifications for PAG's STS Gantry Crane Replacement Program.

6.0 REPAIR COST ESTIMATES

The cost estimate for repair of deficient elements and replacement of infrastructure as described in Section 5.0 is provided in Table 3. These costs are intended to provide a rough order of magnitude and include labor, materials, equipment, mobilization/demobilization, material shipment, contractor overhead and profit, permitting, environmental monitoring, and gross receipts tax. Soft costs including contingency, management and administration, design, permitting, construction management, and design services during construction are also included. A detailed breakdown showing units rates for each construction activity is provided in Appendix B.

Table 3: Crane Rail Wharf Upgrade Cost Estimate (FY2026)

ITEM	DESCRIPTION	COST
1	Administrative and Legal Expenses (5% of 8 & 9)	$879,885
2	Land, Structures, Rights-of-Way, Appraisals, etc	$0
3	Relocation Expenses and Payments	$0
4	Architectural and Engineering Fees (8% of 8 & 9)	$1,407,816
5	Other Architectural and Engineering Fees (10% of 8 & 9)	$1,759,770
6	Project Inspection Fees (12% of 8 & 9)	$2,111,724
7	Site Work	$0
8	Demolition and Removal	$2,601,400
9	Construction	$14,996,300
10	SUBTOTAL (sum lines 1-11)	**$23,756,895**
11	Contingencies (30%)	$7,127,069
12	SUBTOTAL (sum lines 12 and 13)	**$30,883,964**
13	Miscellaneous, GRT (5%)	$1,544,198
14	TOTAL PROJECT COSTS (line 14 minus 15)	**$32,428,162**
15	**TOTAL PROJECT COST (ROUNDED)**	**$32,429,000**

Notes:

1. Assumes a specialized contractor in crane rail demo/construction
2. Project is Buy America
3. Concrete and asphalt sourced locally. Crane rail is shipped from the west coast.
4. Work performed in FY2026.

APPENDIX A

ASCE MOP 130
ELEMENT LEVEL DAMAGE RATING SYSTEM

Table 2-5. Damage Ratings for Steel Elements*

Damage Rating		Existing Damage[a]	Exclusions [Defects Requiring Elevation to the Next Higher Damage Rating(s)]
NI	Not Inspected	Not inspected, inaccessible, or passed by[b]	
ND	No Defects	• Protective coating or wrap intact • Light surface rust • No apparent loss of material	
MN	Minor	• Protective coating or wrap damaged and loss of thickness up to 15% of nominal at any location • Less than 50% of perimeter or circumference affected by corrosion at any elevation or cross section • Loss of thickness up to 15% of nominal at any location	Minor damage not appropriate if • Changes in straight line configuration or local buckling • Corrosion loss exceeding fabrication tolerances (at any location).
MD	Moderate	• Protective coating or wrap damaged and loss of thickness 15 to 30% of nominal at any location • More than 50% of perimeter or circumference affected by corrosion at any elevation or cross section • Loss of thickness 15 to 30% of nominal at any location	Moderate damage not appropriate if • Changes in straight line configuration or local buckling • Loss of thickness exceeding 30% of nominal at any location
MJ	Major	• Protective coating or wrap damaged and loss of nominal thickness 30 to 50% at any location • Partial loss of flange edges or visible reduction of wall thickness on pipe piles • Loss of nominal thickness 30 to 50% at any location	Major damage not appropriate if • Changes in straight line configuration or local buckling • Perforations or loss of wall thickness exceeding 50% of nominal
SV	Severe	• Protective coating or wrap damaged and loss of wall thickness exceeding 50% of nominal at any location • Structural bends or buckling, breakage, and displacement at supports, loose, or lost connections • Loss of wall thickness exceeding 50% of nominal at any location	

*Taken from ASCE Waterfront Facilities Inspection and Assessment Manual No. 130, 2015.
a = Any defect listed is sufficient to identify relevant damage grade.
b = If not inspected due to inaccessibility or passed by, note as such.

Table 2-6. Damage Ratings for Reinforced Concrete Elements*

Damage Rating		Existing Damage[a]	Exclusions [Defects Requiring Elevation to the Next Higher Damage Rating(s)]
NI	Not Inspected	Not inspected, inaccessible, or passed by[b]	
ND	No Defects	Good original hard surface, hard material, sound	
MN	Minor	• Mechanical or impact spalls up to 1 in. deep • Occasional corrosion stains or small pop-out corrosion spalls • General cracks up to 1/16 in. wide	Minor damage not appropriate if • Structural damage • Corrosion cracks • Chemical deterioration[c]
MD	Moderate	• Structural cracks up to 1/16 in. wide • Corrosion cracks up to 1/4 in. wide • Chemical deterioration: random cracks up to 1/16 in. wide; "Soft" concrete and/or rounding of corners up to 1 in. deep • Mechanical abrasion or impact spalls greater than 1 in. deep	Moderate damage not appropriate if • Structural breakage and/or spalls • Exposed reinforcement • Loss of cross section due to chemical deterioration beyond rounding of corner edges
MJ	Major	• Structural cracks 1/16 in. to 1/4 in. wide and partial breakage (through section cracking with structural spalls) • Corrosion cracks wider than 1/4 in. and open or closed corrosion spalls (excluding pop-outs) • Multiple cracks and disintegration of surface layer due to chemical deterioration • Mechanical abrasion or impact spalls exposing the reinforcing	Major damage not appropriate if • Loss of cross section exceeding 30% due to any cause
SV	Severe	• Structural cracks wider than 1/4in. wide or complete breakage • Complete loss of concrete cover due to corrosion of reinforcing steel with more than 30% of diameter loss for any main reinforcing bar • Loss of bearing and displacement at connections • Loss of concrete cover (exposed steel) due to chemical deterioration • Loss of more than 30% of cross section due to any cause	

*Taken from ASCE Waterfront Facilities Inspection and Assessment Manual No. 130, 2015.
a = Any defect listed is sufficient to identify relevant damage grade.
b = If not inspected due to inaccessibility or passed by, note as such.
c = Chemical deterioration: sulfate attack, alkali-silica reaction, alkali-aggregate reaction, alkali-carbonate reaction ettringite distress, or other chemical/concrete deterioration.

Table 2-14. Condition Assessment Ratings

Rating		Description
6	Good	No visible damage or only minor damage noted. Structural elements may show very minor deterioration, but no overstressing observed. No repairs are required.
5	Satisfactory	Limited minor to moderate defects or deterioration observed but no overstressing observed. No repairs are required.
4	Fair	All primary structural elements are sound but minor to moderate defects or deterioration observed. Localized areas of moderate to advanced deterioration may be present but do not significantly reduce the load-bearing capacity of the structure. Repairs are recommended, but the priority of the recommended repairs is low.
3	Poor	Advanced deterioration or overstressing observed on widespread portions of the structure but does not significantly reduce the load-bearing capacity of the structure. Repairs may need to be carried out with moderate urgency.
2	Serious	Advanced deterioration, overstressing, or breakage may have significantly affected the load-bearing capacity of the primary structural components. Local failures are possible and loading restrictions may be necessary. Repairs may need to be carried out on a high-priority basis with urgency.
1	Critical	Very advanced deterioration, overstressing, or breakage has resulted in localized failure(s) of primary structural components. More widespread failures are possible or likely to occur, and load restrictions should be implemented as necessary. Repairs may need to be carried out on a very high-priority basis with strong urgency.

*Taken from ASCE Waterfront Facilities Inspection and Assessment Manual No. 130, 2015.

Damage Ratings for Asphalt Pavement - Defect Examples

TRANSVERSE CRACK

A crack that follows a course approximately at right angles to the pavement centerline. Typically caused by movement in pavement beneath the asphalt pavement layer.
Minor to Moderate damage shown in photograph.

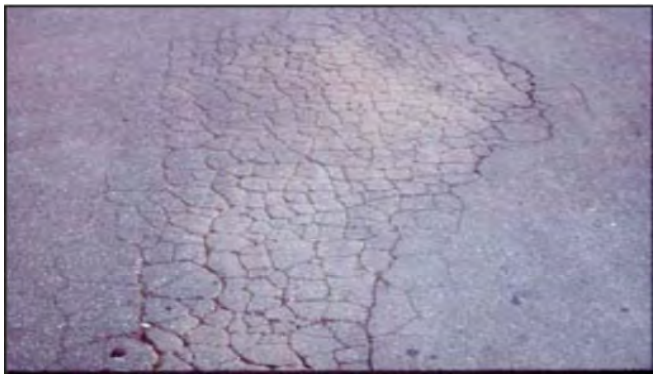
LONGITUDINAL CRACK

A crack that follows a course approximately parallel to the centerline. This type of damage typically occurs from a weak joint between paving lines. Two closely-spaced longitudinal cracks in a wheel path may indicate bending stress induced rutting.
Minor to moderate damage shown in photograph.

BLOCK CRACKING

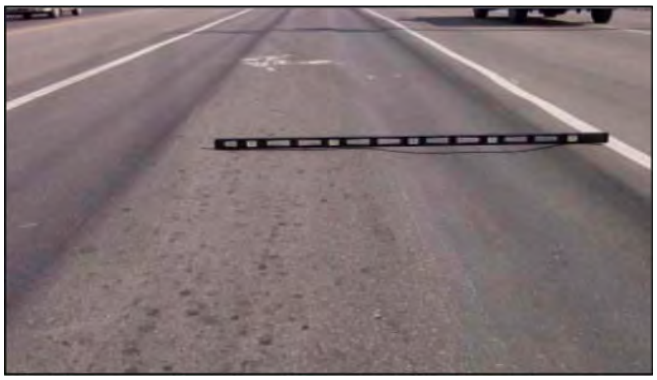
A pattern of cracks that divides the pavement into rectangular pieces. This type of cracking is often the result of transverse and longitudinal cracking becoming interconnected.
Moderate damage shown in photograph.

ALLIGATOR CRACKING
Interconnected cracks forming a series of small, irregular-shaped polygons; the pattern resembling an alligator's skin. This type of cracking is a load related structural distress typically found in areas that see frequent wheel loads.
Moderate to Major damage shown in photograph.



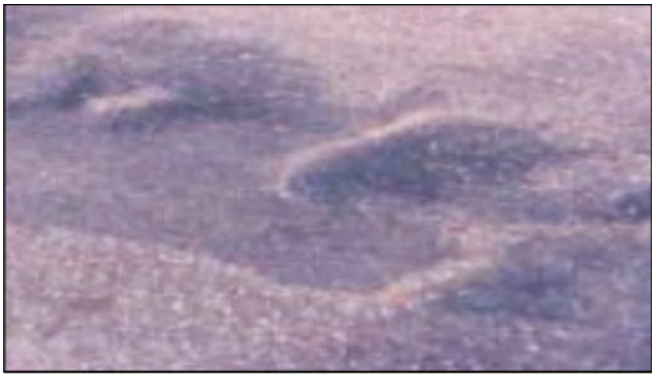
SHRINKAGE CRACKING
Interconnected cracks forming a series of large polygons that usually have sharp angles at the corners.,
Minor damage shown in photograph.

RUTTING
Longitudinal depressions that form in the wheel paths of vehicles. Ruts are typically formed due to consolidation or lateral movement of soil layers.
Major rutting damage shown in photograph.



RAVELING
Progressive disintegration from the surface download, or edges inward by the displacement of aggregate.
Moderate raveling damage shown in photograph.

SHOVING
Lateral displacement of paving material due to traffic; generally resulting in bulging of the surface.
Major shoving damage shown in photograph.



POT HOLES
Bowl-shaped holes of varying sizes often resulting from progressive deterioration such as alligator cracking.
Major damage shown in photograph.

APPENDIX B

COST ESTIMATE

PROJECT:		WSP PROJECT NO.	PAGE:
Port Authority of Guam **Commercial Port Berths F4-F6**		**30901541D**	1 OF 1
OPERATION:		ESTIMATOR:	DATE:
Crane Rail Wharf Upgrades		**MAD**	

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	UNIT COST	TOTAL COST
ADMINISTRATIVE COSTS					
1	Administrative and Legal Expenses (5% of 7-9)				$879,885
2	Land, Structures, Right-of-Ways, Appraisals, etc				
3	Relocation Expenses and Payments				
4	Architectural and Engineering Fees (8% of 7-9)				$1,407,816
5	Other Architectural and Engineering Fees (10% of 7-9)				$1,759,770
6	Project Inspection Fees (12% of 7-9)				$2,111,724
CONSTRUCTION COSTS					
7	Site Work				
8	Demo Waterside Crane Rail	LF	1,833	$700	$1,283,100
	Demo Landside Crane Rail	LF	1,833	$700	$1,283,100
	Demo Crane Stops	EA	4	$8,800	$35,200
9	Mobilization/Demobilization (15%)	LS	1	$2,289,000	$2,289,000
	Material Shipment	LS	1	$3,969,000	$3,969,000
	Install Waterside Crane Rail, hardware, and Asphalt	LF	1,833	$1,300	$2,382,900
	Install Landside Crane Rail, Hardware, and Asphalt	LF	1,833	$1,300	$2,382,900
	Install New Crane Stops	EA	4	$41,700	$166,800
	Mods / Rerouting Utilities	LS	1	$275,700	$275,700
	Paint and Striping	LS	1	$50,000	$50,000
	CRANE STOWAGE STRUCTURES				
	Install New Pin Sockets (2 sets of 2 at each crane)	EA	3	$26,000	$78,000
	Install New Tie-Down Structures (4 sets of 2 at each crane)	EA	3	$688,000	$2,064,000
	Crane Girder Upgrades (2 upgrades per crane)	EA	3	$446,000	$1,338,000
10				**SUBTOTAL**	**$23,756,895**
11	Contigency (30% of 10)				$7,127,069
12				**SUBTOTAL**	**$30,883,964**
13	Miscellaneous (GRT at 5% of 12)				$1,544,198
14				**CONSTRUCTION SUBTOTAL (12+13)**	**$32,428,162**
15				**TOTAL PROJECT COST (ROUNDED)**	**$32,429,000**

Notes:

1. Assumes contractor specializing in crane rail demo/construction and renting local equipment
2. Project is Buy America
3. Crane rail shipped from west coast.
4. Costs escalated to FY2026
5. Costs to excavate and pour conc at pin sockets and tie-downs is included in girder upgrade cost.

Appendix D – Pier F1 Inspection and Feasibility Study Report

WSP USA
590 Marine Corps Drive
Suite 421
Tamuning, Guam 96913

Final Submittal (REV2)

Port Authority of Guam

Pier F1 Condition Assessment and Feasibility Study Report

Submitted to
Port Authority of Guam
Piti, Guam

This study was prepared under contract with the Port Authority of Guam (PAG), with financial support from the Office of Local Defense Community Cooperation (OLDCC). The content reflects the views of the PAG and does not necessarily reflect the views of OLDCC.

30901541B.002

September 2024

Pier F1 Condition Assessment and Feasibility Study Report – Final (REV2)

Port Authority of Guam
PIER F1

Submitted to

Port Authority of Guam
Piti, Guam

30 September 2024

Submitted by

WSP USA
590 South Marine Corps Drive, Suite 421
Tamuning, Guam 96913

30901541B

FINAL(REV2)
CONDITION ASSESSMENT AND FEASIBILITY STUDY REPORT
PORT AUTHORITY OF GUAM – PIER F1

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EXECUTIVE SUMMARY

This report presents the overall condition assessment rating of Pier F1, a summary of observations and findings from the inspection efforts performed in 2022, 2023, and 2024, and presents concepts and associated cost estimates for near-term repairs and full replacement of Pier F1. The inspection effort was performed in October 2022 by WSP and included above-deck, below-deck/above-water, and underwater inspections of structural components. To evaluate damage from Typhoon Mawar, a follow-on cursory assessment and underwater inspection were performed in September 2023 and May of 2024, respectively. WSP also reviewed photos from the Port Authority of Guam (PAG) and the Tristar report titled, "Notification of Damages Sustained at the F1 Dock due to Typhoon Mawar" dated 12 June 2023 which provides photos and a general description of typhoon-related damages.

Overall, Pier F1 is in **serious** condition. Several elements have severe damage consisting of spalled concrete, open corrosion spalls, bent piles, sheared piles, and non-functional fender systems. At multiple locations, failed pile repairs were observed at the pile to pile cap interfaces. Open- and closed-corrosion spalls were also observed at the main pier, trestle, and dolphins. At Breasting Dolphins C and D, major to severe damage is present at approximately 40 percent of the piles.

In its current condition, Pier F1 is at an increased risk for localized structural failures that may result in damage to personnel, vessels, the pier, and/or the environment, primarily at dolphin locations. In 2021, a berthing and mooring analysis was performed by WSP and determined that the demand to capacity ratios for steel piles is exceeded at multiple locations for the current vessels that use the facility. For this reason, the 2021 Berthing and Mooring Analysis Report recommended temporary berthing and mooring restrictions until such time that Pier F1 could be repaired or replaced.

Due to the severity and extent of observed damages and the high percentage of previously repaired piles exhibiting severe damage and/or failure, it is recommended that priority is given to the near-term replacement of Pier F1. Therefore, a concept for replacement of Pier F1 has been developed and is briefly described below and in Section 8.0 of this report. Until such time that the structure can be reconstructed, near-term repair recommendations are provided in Section 7.0.

The replacement concept consists of full replacement of the Main Pier, Trestle, and dolphins in a similar location as the existing structure. Unlike the existing facility, the concept structure includes two mooring dolphins located east of the Main Pier. This arrangement allows for vessel lines to be secured and released without the use of a boat or walking lines along the shoreline to existing Mooring Dolphins E and F.

During demolition and reconstruction of the pier, it will be necessary to temporarily relocate fuel tankers until construction is complete. In reference to the report titled, "Golf Pier Inspection and Feasibility Study Report" revision 6 dated September 30, 2024, tankers can be temporarily relocated to the newly constructed Golf Pier while Pier F1 is rehabilitated. Reconstruction of Pier F1 can be performed in a single Phase (demolition and reconstruction) or broken out into multiple phases depending on funding constraints. After completion, Pier F1 will have the capacity to service local small-, medium-, and large-sized vessels as described in Section 6.0.

The total cost estimate for replacement of Pier F1 is shown below and is based on the midpoint of construction, FY 2028. This estimate is intended to provide a rough order of magnitude (ROM) and includes construction, design, planning, business privilege tax, contingency, and adjustments for inflation, labor shortages, and the surplus of current and future construction project on Guam.

Replacement Concept: $83,919,192 (2028)

The replacement concept consists of full replacement of the Main Pier, Trestle, dolphins, and overwater piping network. Similar to the existing structures, the concept assumes the use of pile-supported structures comprised of steel pipe piles, cast-in-place concrete pile caps, and precast concrete deck panels. With exception of the east mooring dolphins, the replacement structure can be located in a similar footprint to the existing pier.

Near-Term Repairs: $6,981,369 (2026)

Near-term repairs consist of prioritized elements from the 2022 inspection effort and elements damaged from Typhoon Mawar. These repairs are intended to be a short-term solution to help ensure that Pier F1 remains operational until such time that the structure can be replaced.

1.0 INTRODUCTION

As part of Service Agreement FY021-003 dated 4 November 2020, the Port Authority of Guam authorized Task Order No. 12 (FY23-001), In-Water Inspection and Feasibility Study. As part of this task order, WSP USA performed above-water and underwater inspections and a facility condition assessment of Pier F1. Observations and findings from the field inspection effort are summarized in this facility condition assessment report. Condition assessment ratings were assigned to primary structural components: Main Pier, Trestle, and dolphins. Using this information, a comprehensive facility condition assessment rating was then assigned to the entirety of the pier.

The purpose of the inspection and assessment effort was to evaluate the current condition of Pier F1 and develop repair recommendations and a conceptual replacement concept based on the observed deficiencies. The replacement concept developed for Pier F1 incorporated dead loads, live loads, seismic loads, and berthing/mooring forces for current vessels that use the facility. In addition, a conceptual basis of design was developed to summarize the load assumptions and codes and is presented within this report.

1.1 FACILITY DESCRIPTION

The Port of Guam (Port) is located on the western side of the island of Guam and encompasses over 1,000 acres of land. Strategically located along major Pacific shipping and air routes, the Port serves as an important transportation hub for the Commonwealth of the Northern Marianas, the Micronesian islands, and markets to the east and west. Maritime facilities at the Port consist of the following facilities. Note that this FCAR is limited to evaluation of Pier F1. Figure 1.

- **Pier F1 (Apra Harbor)**
- Berths F2 through F6 (Apra Harbor)
- Hotel Wharf (Apra Harbor)
- Golf Pier (Apra Harbor)
- Family Beach (Apra Harbor)
- Pier Dog (Apra Harbor)
- Harbor of Refuge
- Agat Marina
- Perez Marina (Boat Basin)

Figure 1 – Apra Harbor

1.2 PIER F1

Pier F1 is located within the Port's Marine Industrial Complex and sits on the eastern end of Outer Apra Harbor. Currently, Pier F1 is leased to Tristar for loading and unloading of petroleum-based products. Due to draught constraints at Golf Pier, Pier F1 is currently used by Mobil to service tankers.

Pier F1 is comprised of a main pier, approach trestle, mooring and breasting dolphins, and a peninsula constructed on reclaimed land that supports two storage tanks. The main pier is approximately 135 feet long by 45 feet wide and is constructed with a series of precast double-tee girders that span between concrete pile caps. Pile caps are supported by a combination of 16- and 22-inch steel pipe piles with wall thicknesses of 0.375-inches. Jackets are present at all piles and extend approximately 10-feet below mean lower-low water (MLLW).

The trestle is approximately 90 feet long by 35 feet wide and provides direct access to the Main Pier. The west side of the Trestle is approximately 15-feet wide and is constructed of a concrete deck with three integrated/longitudinal beams that span between concrete pile caps. Pile caps are supported by 16-inch x 0.375-inch jacketed

steel pipe piles. The east side is approximately 20-feet wide and supports a series of fuel pipes that extend from the shore to the Main Pier. Fuel pipes span between concrete pile caps that are supported by steel pipe piles.

Mooring Dolphins A and B are located northwest of the main pier and consist of concrete pile caps supported by steel piles. Breasting Dolphins C, D, G, and H are located on the southwest and northeast sides of the main pier and are of similar construction to the mooring dolphins. At the dolphins, all piles consist of 22-inch x 0.375-inch jacketed steel pipe piles. Access to the dolphins is provided by a series of interconnected steel-truss walkways with wood decking. Between Dolphins A/B, B/C, and D/shoreline, walkways are supported by intermediate piles caps with steel H-pile batter piles. Two landside dolphins, E and F, are located northeast of Breasting Dolphin D and are equipped with 100-ton quick-release hooks. The peninsula is founded on reclaimed land and located northwest of the main pier. See Figure 2.

Throughout Pier F1, piles at the Main Pier, Trestle, and dolphins are comprised of 16- and 22-inch diameter steel pipe piles.

Figure 2: Pier F1 Site Plan

2.0 FACILITY CONDITION ASSESSMENT

2.1 CONDITION ASSESSMENT APPROACH

WSP performed a routine condition assessment of above-deck, below-deck/above-water, and underwater elements at Pier F1. Inspections were performed in accordance with the American Society of Civil Engineers (ASCE) Manuals and Reports on Engineering Practice No. 130, *"Waterfront Facilities Inspection and Assessment" (ASCE MOP 130)*

2.2 FACILITY CONDITION ASSESSMENT METHODOLOGY

Condition assessment of elements included both visual observation and limited hands-on assessment. In accordance with ASCE MOP 130, elements were assigned an element-level damage rating, with damages defined as minor, moderate, major, or severe. These damage ratings are defined in Chapter 2 of ASCE MOP 130 and have been standardized to provide a qualitative and consistent description of an elements level of damage. Abbreviated element level damage rating tables from ASCE MOP 130 are provided in Appendix A for reference.

Following completion of the field work, element-level damage ratings in combination with visual observations were used to assign facility condition assessment ratings to each primary structural component. In accordance with Table 2-14 of ASCE MOP 130, a summary of the facility condition assessment ratings is provided below.

Table 1: Facility Condition Assessment Ratings

Rating	Description
Good	No visible damage or only minor damage noted. Structural elements may show very minor deterioration, but no overstressing observed. No repairs are required.
Satisfactory	Limited minor to moderate defects or deterioration observed but no overstressing observed. No repairs are required.
Fair	All primary structural elements are sound but minor to moderate defects or deterioration observed. Localized areas of moderate to advanced deterioration may be present but do not significantly reduce the load-bearing capacity of the structure. Repairs are recommended, but the priority of the recommended repairs is low.
Poor	Advanced deterioration or overstressing observed on widespread portions of the structure but does not significantly reduce the load-bearing capacity of the structure. Repairs may need to be carried out with moderate urgency.
Serious	Advanced deterioration, overstressing, or breakage may have significantly affected the load-bearing capacity of the primary structural components. Local failures are possible, and loading restrictions may be necessary. Repairs may need to be carried out on a high-priority basis with urgency.
Critical	Very advanced deterioration, overstressing, or breakage has resulted in localized failure(s) of primary structural components. Failures that are more widespread are possible or likely to occur, and load restrictions should be implemented as necessary. Repairs may need to be carried out on a very high-priority basis with strong urgency.

2.2.1 Above-Deck Inspection

The initial above-deck inspection was performed on 31 October 2022 and evaluated the general condition of the deck surface, mooring hardware, fender system, and miscellaneous appurtenances. The inspection was performed by walking along the deck surface/walkways and visually observing the condition of the elements.

2.2.2 Below-Deck Inspection

The initial below-deck inspection was performed on 31 October 2022 and evaluated the general condition of deck soffit, pile caps, stringers, abutment, dolphin soffits, and exposed portions of the steel piles. Concrete elements were visually assessed for damage such as cracks, mechanical damage, and corrosion spalls. Steel elements were visually assessed for corrosion damage such as pitting, flaking, and loss of cross-sectional thickness. The below-deck assessment was performed using our inspection boat at low tidal elevations, which allows the inspection crew direct visual and hands-on access to structural elements.

A follow-on cursory assessment was performed on 15 September 2023. For this effort, the general condition of the structure was assessed using a small skiff to navigate under and around the pier, trestle, and dolphins.

2.2.3 Underwater Inspection

The initial underwater inspection assessed 100 percent of the structural plumb and batter piles. For this effort, WSP's in-house engineer dive team performed dive operations using self-contained underwater breath apparatus (SCUBA) procedures. The engineer dive team consist of a four-person crew: dive supervisor, safety diver/tender, and two divers.

All piles included in this work received a Level I/visual inspection in accordance with ASCE MOP 130. This level of inspection is essentially a "swim-by" over the entire length of the pile. The diver relies primarily on visual and/or tactile observations (depending on water clarity) to make condition assessments. A Level II inspection was performed on approximately 10 percent of the piles that were visually inspected. This level of effort involves removing the marine growth in a 12-inch-hing band around the pile at three elevations: mudline, near the water surface, and mid-water column. In addition to an overall visual inspection of the piles, removal of marine growth allows the diver a more in-depth examination at three locations. A Level III inspection was performed on approximately 5 percent of the inspected piles. This highly detailed level of inspection consisted of using an ultrasonic thickness gauge to measure the cross-sectional thickness of piles at Level II locations.

A follow-on underwater inspection was performed on 20 May 2024 and included inspection of batter piles at Mooring Dolphin A. Based on reports of a vessel making contact with this dolphin during Typhoon Mawar, priority was given to inspecting the piles at this structure.

3.0 INITIAL CONDITION ASSESSMENT FINDINGS

Findings from the inspection effort and ratings for above-deck, below-deck/above-water, and underwater elements are described in the following sections. Ratings have been assigned based on field observations and element-level damage ratings for individual elements. Observations and findings have been tabulated and are provided in Appendix B. Similarly, a damage map showing the type and location of damage is provided in Appendix C.

3.1 MAIN PIER

3.1.1 Steel Piles

The steel piles and associated pile jackets are in **poor** condition. Above-water, minor corrosion and split/torn jackets in the upper tidal zone was observed at multiple locations. Underwater, moderate corrosion and pitting were observed at 75-percent of the piles. Measurements at Level II locations and Level III steel thickness readings found that pile cross-sectional thickness has been reduced by 15- to 40-percent; an indication of moderate to major damage. See Photo 1.

3.1.2 Concrete Pile Caps

The concrete pile caps are in **poor** condition. Open-corrosion spalls and closed-corrosion spalls are present at multiple locations. Exposed and corroded steel reinforcement was observed at several locations. See Photo 2.

3.1.3 Concrete Stringers

The concrete stringers are in **serious** condition. Open-corrosion spalls, closed-corrosion spalls, and cracks are present at multiple locations. Similar to the concrete pile caps, exposed and corroded steel reinforcement was observed at multiple locations. See Photo 2.

3.1.4 Concrete Deck

The concrete deck is in **fair** condition. Open- and close-corrosion spalls were observed at multiple locations on the deck soffit. Minor cracks and surface irregularities are present on the top “wearing” surface of the deck. See Photo 2.

3.1.5 Concrete Curb

The concrete curb is in **satisfactory** condition. Minor spalls and cracks were observed at multiple locations.

3.1.6 Appurtenances

Appurtenances are in **satisfactory** condition. Minor corrosion is present at the ladder.

Photo 1: Main Pier - Typical Moderate Pile Damage

Photo 2: Main Pier - Typical Underdeck Conditions

3.2 APPROACH TRESTLE

3.2.1 Steel Piles

The steel piles and associated pile wraps are in **fair** condition. Above-water, minor corrosion was observed at isolated locations. Underwater, full-height jackets were present at 44 percent of the piles and limited visual observations. At the remaining piles, visual observations found minor and moderate damage consisting of corrosion and pitting at several locations. Level III steel thickness readings found that pile cross-sectional thickness has been reduced by 15- to 25-percent on average; an indication of moderate damage. A previous inspection report by others found pitting and section loss at three locations: consistent with moderate to severe damage (assuming an original pile wall thickness of 0.375-inches). See Photo 3.

3.2.2 Concrete Pile Caps

The concrete pile caps are in **fair** condition. Minor cracks, open-, and closed-corrosion spalls were observed at multiple locations. Severe open-corrosion spalling is present on the west end of Bent 1. See Photo 4.

3.2.3 Concrete Stringers

In general, the concrete stringers are in **fair** condition. Observed damage was limited to minor cracks.

3.2.4 Concrete Deck

The concrete deck is in **satisfactory** condition. No damages were observed.

3.2.5 Bullrail

The concrete bullrail is in **satisfactory** condition. Minor spalls and cracks were observed at multiple locations.

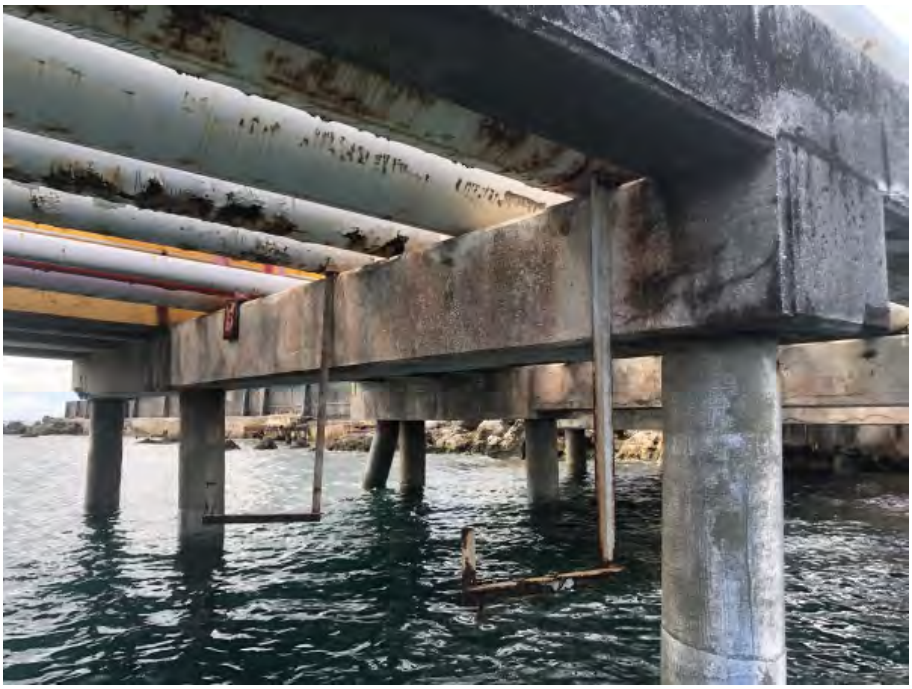

Photo 3: Trestle – Typical Pile

Photo 4: Trestle – Open-Corrosion Spalling at Bent 1

3.3 MOORING DOLPHIN A

3.3.1 Piles

The steel piles and associated pile wraps are in **serious** condition. Moderate, major, and severe corrosion damage was observed at multiple locations. Torn and missing pile wraps were observed at several locations. Pile No. 9 is missing. Pile No. 5 is disconnected from the dolphin and has shifted approximately 12-inches to the west. At Pile No. 13, a 1-inch gap is present between the pile and dolphin. Major to severe corrosion is present at steel collars; located at the pile to pile cap interface. See Photo 5.

3.3.2 Concrete Dolphin

The concrete dolphin is in **fair** condition. Minor closed corrosion spalling was observed along the north, east, and sides of the dolphin. Steel plates partially embedded into the top surface were observed at multiple locations. See Photo 5.

3.3.3 Mooring Hardware

The mooring bollard (quick-release hook) and attachment to the dolphin are in **satisfactory** condition. Minor to moderate corrosion is present at the hooks and anchor bolts. See Photo 6.

3.3.4 Walkway

The walkway between Mooring Dolphin A and B is in **satisfactory** condition. Minor weathering of the paint was observed at multiple locations. Similarly, weathering of the timber deck boards was observed along the full length of the walkway.

3.3.5 Intermediate Walkway Support

The intermediate walkway support between Mooring Dolphin A and B is in **fair** condition. Moderate corrosion was observed on all faces of the steel H-pile support piles.

3.3.6 Appurtenances

The appurtenances are in **satisfactory** condition. Within the inner-tidal zone, moderate corrosion is present on the ladder framing. A guardrail is not present on the north, west, and east sides of the dolphin.

Photo 5: Dolphin A – Soffit Condition

Photo 6: Dolphin A – Typical Deck Conditions

3.4 MOORING DOLPHIN B

3.4.1 Piles

The steel piles and associated pile wraps are in **poor** condition. Moderate, major, and severe corrosion was observed at multiple locations; primarily within the top 3-feet of the piles. Torn pile wraps were observed at several locations. Moderate to major corrosion is present at the steel collars. See Photo 7.

3.4.2 Concrete Dolphin

The concrete dolphin is in **fair** condition. Moderate closed corrosion spalling is present along the south face at the top and bottom of the dolphin. See Photo 7.

3.4.3 Mooring Hardware

The mooring bollard (quick-release hook) and attachment to the dolphin are in **satisfactory** condition. Minor to moderate corrosion is present at the hooks and anchor bolts. See Photo 8.

3.4.4 Walkway

The walkway between Mooring Dolphin B and Breasting Dolphin C is in **satisfactory** condition. Minor weathering of the paint was observed at multiple locations. Similarly, weathering of the timber deck boards was observed along the full length of the walkway.

3.4.5 Intermediate Walkway Support

The intermediate walkway support between Mooring Dolphin B and C is in **fair** condition. Moderate corrosion was observed on all faces of the steel H-pile support piles.

Photo 7: Dolphin B – Typical Soffit Condition

Photo 8: Dolphin B – Typical Deck Condition

3.5 BREASTING DOLPHIN C

3.5.1 Piles

The steel piles and associated pile wraps are in **serious** condition. Major to severe damage consisting of corrosion within the top 3-feet of piles was observed at ten locations. At six of these locations, the pile to dolphin connections are broken and piles are disconnected from the dolphin. Damage ranging from minor to major corrosion is present at the remaining piles. Torn pile wraps were observed at several locations. Moderate to major corrosion is present at steel collars; located at the pile dolphin interface. See Photo 9.

3.5.2 Concrete Dolphin

The concrete dolphin is in **poor** condition. Cracking, open-, and closed-corrosion spalling are present at multiple locations. See Photo 9.

3.5.3 Mooring Hardware

The mooring bollard (quick-release hook) and attachment to the dolphin are in **fair** condition. Moderate corrosion is present at the hook and anchor bolts. See Photo 10.

3.5.4 Fender System

The fender system is in **poor** condition. Two sections of UHMW-PE are missing from the fender panel face. Severe corrosion is present at the steel fender panel framing. The rubber cell fender has minor weathering. Weight chains and shear chains are not present. See Photo 10.

3.5.5 Walkway

The walkway between Mooring Dolphin C and the Main Pier is in **satisfactory** condition. Minor weathering of the paint was observed at multiple locations. Similarly, weathering of the timber deck boards was observed along the full length of the walkway.

3.5.6 Appurtenances

The appurtenances are in **poor** condition. Severe corrosion is present along the length of the wide-flange bullrail. Holes within the web were observed at three locations.

Photo 9: Dolphin C – Typical Soffit Condition

Photo 10: Dolphin C – Typical Deck Condition

3.6 BREASTING DOLPHIN D

3.6.1 Piles

The steel piles and associated pile wraps are in **serious** condition. Major to severe corrosion is present at approximately 40 percent of the piles. At four locations, the pile to dolphin connections are broken and piles are disconnected from the dolphin. Torn and split pile wraps were observed at several locations. At three locations, severe damage consisting of spalling and cracking is present at pile sub caps. Underwater, Pile No. 8 is sheared. See Photo 11.

3.6.2 Concrete Dolphin

The concrete dolphin is in **poor** condition. Cracking, open-, and closed-corrosion spalling are present at multiple locations. At three locations, severe cracking is present at concrete pedestals. See Photo 12.

3.6.3 Mooring Hardware

The mooring bollard (quick-release hook) and attachment to the dolphin are in **fair** condition. Moderate corrosion is present at the hook and anchor bolts. See Photo 13.

3.6.4 Fender System

The fender system is in **poor** condition. Two sections of UHMW-PE are missing from the fender panel face. Severe corrosion is present at the steel fender panel framing. The rubber cell fender has minor weathering. Weight chains and shear chains are not present. See Photo 14.

3.6.5 Walkways

The walkways between the Main Pier/Breasting Dolphin D and Breasting Dolphin D/Shoreline are in **satisfactory** condition. Minor corrosion was observed at select locations.

3.6.6 Intermediate Walkway Support

The intermediate walkway support between Mooring Dolphin D and the shoreline is in **fair** condition. Moderate corrosion was observed on all faces of the steel H-pile support piles.

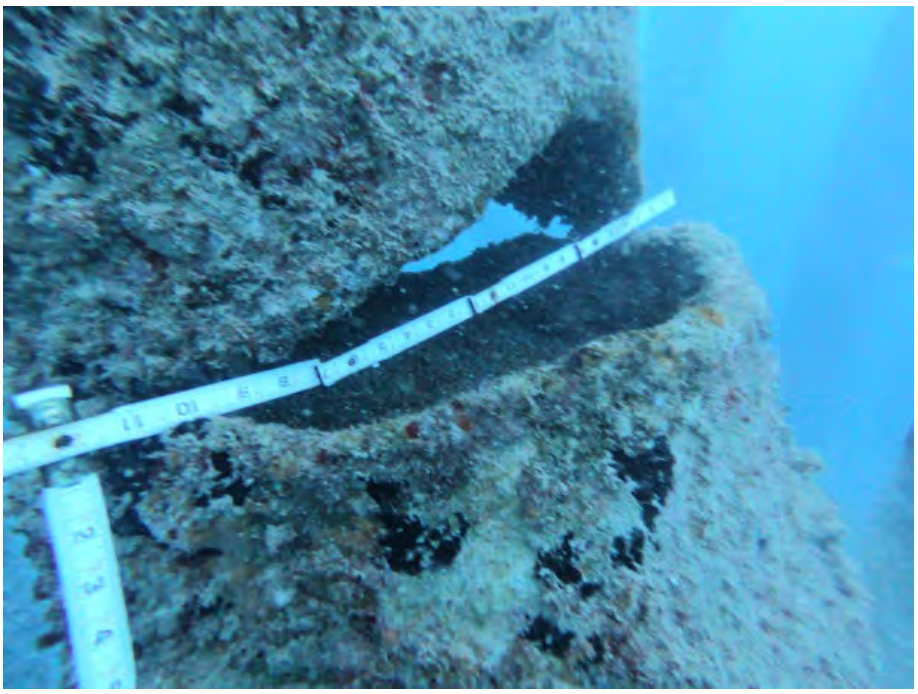

Photo 11: Dolphin D – Sheared Pile No. 8

Photo 12: Dolphin D – Pedestal Cracking at Pile No. 25

Photo 13: Dolphin D – Typical Deck Condition

Photo 14: Dolphin D – Fender Panel

3.7 MOORING DOLPHIN E

3.7.1 Mooring Hardware

The mooring bollard (quick-release hook) and attachment to the concrete foundation are in **satisfactory** condition. Moderate corrosion is present at the hooks and anchor bolts. See Photo 15.

3.7.2 Concrete Foundation

The concrete foundation is in **satisfactory** condition. Minor damages consisting of hairline cracks and spalling were observed. See Photo 15.

Photo 15: Dolphin E

3.8 MOORING DOLPHIN F

3.8.1 Mooring Hardware

The mooring bollard (quick-release hook) and attachment to the concrete foundation are in **satisfactory** condition. Moderate corrosion is present at the hooks and anchor bolts. See Photo 16.

3.8.2 Concrete Foundation

The concrete foundation is in **satisfactory** condition. Minor damages consisting of hairline cracks and spalling were observed. See Photo 16.

Photo 16: Dolphin F

3.9 BREASTING DOLPHIN G

3.9.1 Piles

The steel piles and associated pile wraps are in **serious** condition. Major and severe damage are present at approximately 65 percent of the piles. At two locations, the pile to dolphin connections are broken and piles are disconnected from the dolphin. Torn pile wraps were observed at several locations. Torn pile wraps were observed at several locations. Moderate corrosion is present at all steel collars. See Photo 17.

3.9.2 Concrete Dolphin

The concrete dolphin is in **poor** condition. Open-corrosion spalling is present on the dolphin soffit. At one location, multiple bars are exposed, corroded, and are no longer attached to the concrete substrate. See Photo 17.

3.9.3 Fender System

The fender system is in **poor** condition. Major corrosion damage is present at the fender support bracket and fender panel. The UHMW-PE panels are severely worn. Minor cracking of the rubber element fenders was observed at isolated locations. See Photo 18.

3.9.4 Walkway

The walkway between Breasting Dolphin G and the Main Pier is in **good** condition. Damage was not observed.

Photo 17: Dolphin G – Typical Soffit Condition

Photo 18: Dolphin G – Fender System

3.10 BREASTING DOLPHIN H

3.10.1 Piles

The steel piles and associated pile wraps are in **serious** condition. Major and severe damage are present at approximately 64 percent of the piles. At Piles 12, 13, and 14, the pile to dolphin connections are broken and piles are disconnected from the dolphin. Pile 3 is permanently bent approximately 15 below MLLW. Torn pile wraps were observed at several locations. Moderate corrosion is present at all steel collars. See Photo 19.

3.10.2 Concrete Dolphin

The concrete dolphin is in **serious** condition. Open- and close-corrosion spalls are present at multiple locations on the soffit and sides of the dolphin. Spalling and delamination of cementitious material (likely from previous repairs) was observed at multiple locations. See Photo 19.

3.10.3 Fender System

The fender system is non-functional and in **critical** condition. At present, a large-diameter tire is suspended from the dolphin face. See Photo 20.

3.10.4 Walkway

The walkway between Breasting Dolphin H and the Main Pier is in **good** condition. Damage was not observed.

Photo 19: Dolphin H: Damage at NW Corner

Photo 20: Dolphin H – Fender System

3.11 PENINSULA

Slope armoring along the north and south sides of the peninsula is in **poor** condition. Loss of rip rap is present at multiple locations on the north and south sides; approximately 200-feet on both sides. At multiple locations, steel framing from sunken barges is visible. From conversations with Port staff and on-site observations, it is understood that the peninsula area west of the trestle was constructed on reclaimed land and is founded on sunken barges. North of Fuel Tank 1929, seawater is present below the slab; evidence by two holes in the concrete slab-on-grade. See Photo 21 and Photo 22.

Photo 21: Peninsula – Undermining Damage

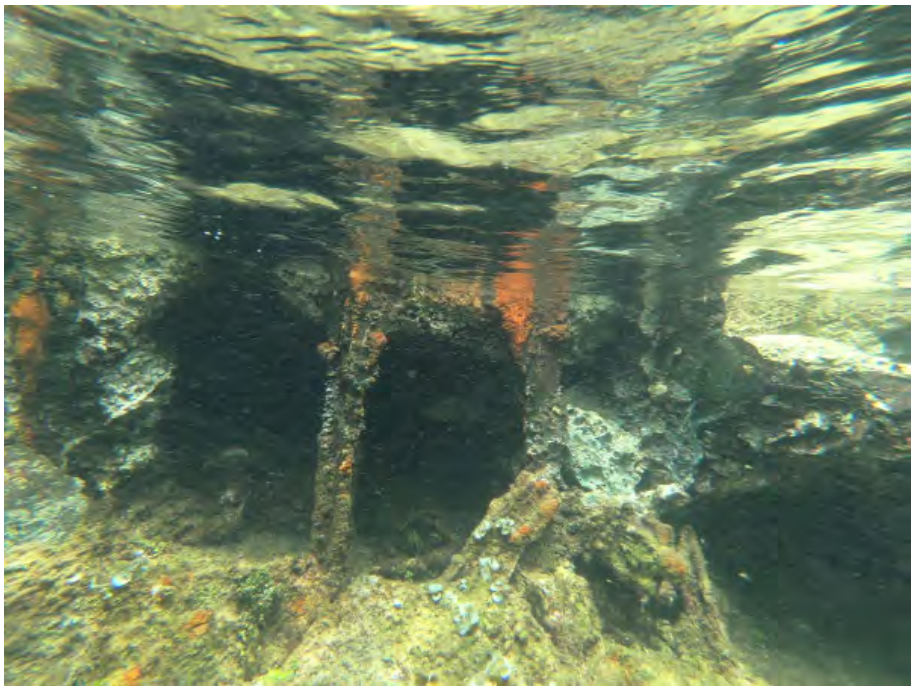

Photo 22: Peninsula – Undermining Damage

4.0 POST TYPHOON MAWAR CONDITION ASSESSMENT FINDINGS

On 24 May 2023, the island of Guam experienced severe winds, wind-driven rain, and storm surges resulting from Typhoon Mawar. As a result, several of the PAG's maritime and upland assets experienced severe damage. Therefore, WSP performed a post-typhoon cursory above-water assessment and underwater inspection at limited locations. In addition, WSP also reviewed photos from PAG and the report titled, "Notification of Damages Sustained at the F1 Dock due to Typhoon Mawar" dated 12 June 2023. A brief description of post-typhoon damages are provided below.

- Main Pier: Severe crack with CCS of the concrete edge beam at Pile Row C from Bents 7 to 9.
- Trestle: Severe crack with CCS of the concrete edge beam at Pile Row E from Bents 4 to 6.
- Dolphin A: Severely damaged ladder
- Dolphin C: Missing (1) UHMW-PE panel
- Dolphin D
  - Missing (1) UHMW-PE panel
  - OCS at the pedestal for Pile 8 (previously CCS)
- Fire Hose Shack: Damage to the walls and siding.
- Dolphin Gangway Damage: The walkways leading from the Main Pier to Dolphins G and H are missing and no longer in place.
- Life Ring and Stand: The life ring is missing and the supporting base is damaged.
- Lighting Damage: The lights and poles at five locations are damaged.
- Signboard Damage: Descriptive signs are damaged and supporting steel elements are permanently bent.
- Tank 1929: At the top of the tank, a portion of the guardrail is broken/damaged.
- Security Fence Line: The front gate and chain link fence are damaged.
- Tank Berm Area: Severe damage to the concrete slab and loss of soil beneath the concrete slab northeast of Tank 1929.
- Shoreline: Slope protection (rip rap) and erosion of soil along the north and south shores of the peninsula.
- Security Office: Doors are delaminated and in need of replacement.
- Container Break Room: The 24k btu A/C unit is damaged.
- Dock Pad: The drainpipe, valve, and end cap are damaged and were pulled from their mount.

Photo 23: Dolphin A (Pre- and Post-Typhoon Condition)

Photo 24: Dolphin C (Pre- and Post-Typhoon Condition)

Photo 25: Dolphin D (Pre- and Post-Typhoon Condition)

Photo 26: Dolphin D (Pile 8 Pedestal)

Photo 27: Peninsula at Tank 1929 (Pre- and Post-Typhoon Condition)

Photo 28: Peninsula Southwest Corner

5.0 OVERALL FACILITY CONDITION ASSESSMENT RATING

Condition assessment ratings for marine components at Pier F1 are summarized in Table 2. Assessment ratings were assigned based on visual observations and element level damage ratings. Damage resulting from Typhoon Mawar were also considered when assigning ratings for each component. The overall rating was determined by considering the following.

- Total number of observed damages
- Severity of observed damages
- Distribution of observed damages
- Sensitivity of affected elements
- Location of damages
- Serviceability

Table 2: Pier F1 Condition Assessment Ratings

Component Identification	Condition Assessment Rating
Main Pier	Poor
Trestle	Fair
Mooring Dolphin A	Serious
Mooring Dolphin B	Poor
Breasting Dolphin C	Serious
Breasting Dolphin D	Serious
Dolphin E	Satisfactory
Dolphin F	Satisfactory
Breasting Dolphin G	Serious
Breasting Dolphin H	Critical
Peninsula	Poor
Pier F1 Overall Condition Assessment Rating	
Overall Facility Condition Assessment Rating	**Serious**

6.0 BERTHING AND MOORING ANALYSIS

In 2021, WSP performed a berthing and mooring analysis of the mooring and breasting dolphins at Pier F1. The purpose of this effort was to analyze the dolphins based on the level/extent of identified damages and to determine if the dolphins were loaded beyond their capacity for berthing and mooring forces. To evaluate the current level of damage, WSP relied upon data from previous inspection reports and a cursory assessment of the structures that was performed by WSP in May of 2021. For each dolphin, structural models were created and berthing/mooring load demands were applied to evaluate the dolphins. See Appendix D. This effort considered three vessels that regularly berth at Pier F1.

- Eco Galaxy (small) with DWT = 8,034 LT
- Nord Joy (medium) with DWT = 49,874 LT
- NS Concept (large) with DWT = 109,857 LT

Results from the berthing and mooring analysis found that several steel piles at Dolphins A, C, D, and H become overstressed for berthing and/or mooring loads for the vessels listed above. At these locations, the load demand was found to exceed the code-prescribed capacity of the piles and resulted in demand-to-capacity (DCR) ratios larger than 1.0. Although the analysis found that pile DCRs at Dolphins B and G were less than 1.0, the 2022 above-water and underwater inspection effort found additional damage that was not included in the berthing and mooring analysis.

At Dolphin B, the 2021 analysis assumed moderate damage for all piles. Findings from the 2022 inspection effort found that over 50-percent of the piles have major to severe damage.

At Dolphin G, the 2021 analysis assumed moderate to major corrosion of steel piles. Findings from the 2022 inspection effort found that six piles have severe damage. At two of these locations, the pile to dolphin connection is compromised and cannot be relied upon to provide a sound load path.

For Dolphins, A, C, D, and H, the 2022 inspection effort identified additional pile and pile cap damage that was not incorporated into the 2021 dolphin analysis. By inspection, incorporation of these additional damages into the structural models will increase the DCRs for piles that are already operating beyond their code-prescribed capacity.

7.0 DISCUSSION

7.1 PIER F1 REPLACEMENT

Widespread advanced deterioration, corrosion, and breakage have resulted in localized failures of primary structural framing elements. Multiple piles have severe damage consisting of corrosion and breakage at the pile to concrete connections. At several locations, the pile to dolphin connections are structurally compromised and no longer provide a sound load path. Considering the current level/extent of damages, analyses show that the berthing and mooring dolphins are deficient for the environmental loads and vessels that regularly berth at Pier F1. Therefore, it is recommended that Pier F1 is replaced within the near future. The Pier F1 replacement concept is further discussed and presented in Section 8.0.

Pier F1 represents one of two liquid bulk import facilities on Guam that provide the island with fuel. The other fuel pier, Golf Pier, is in critical condition and also in need of replacement. A concept for replacement of Golf Pier has been developed and will allow for Pier F1 vessels to temporarily berth at the new Golf Pier terminal while Pier F1 is replaced. For this reason, it is recommended that Golf Pier is replaced prior to Pier F1.

7.2 PIER F1 NEAR-TERM REPAIRS

It is recommended that near-term repair of assets identified in Section 4.0 and select assets from Section 3.0 are performed at Pier F1 to help ensure that the pier remains operational until such time that it can be replaced. Restrictions consisting of reduced berthing velocities and restriction of large vessels should continue until such time that Pier F1 is replaced. A description of the recommended repairs is provided below.

PRE- AND POST-TYPHOON DAMAGE REPAIRS

- Repair of Open-Corrosion Spalls
  In general, these open spalls will be repaired by removing damaged concrete down to sound concrete. Exposed reinforcement will be cleaned to remove excess corrosion byproducts and additional reinforcement will be added where necessary. Small repairs will be accomplished using a concrete repair mortar, while larger repairs will be accomplished using traditional concrete.

- Structural Pile Repairs
  Many steel piles supporting the dolphins have become disconnected from the concrete cap above. These will be repaired by removing remnants of the pile jacket, cleaning corrosion byproducts from the pile, and roughening the soffit of the cap. Reinforcement will be embedded into the cap to create a cage around the top of the pile. Subsequently, falsework and forms will be erected and concrete placed to securely fasten the top of the pile to the concrete cap.

- Replacement of Missing UHMW-PE Panels

The two missing UHMW-PE panels on each of these dolphins will be replaced in kind.

- Crack Repair
  These cracks are essentially indicating a CCS along the length of a longitudinal bar. Repairs will remove material down to sound concrete. The resulting surface will be prepped and appropriate concrete repair mortar will be applied.

- Ladder Replacement at Dolphin A
  Remove and dispose of the ladder and sawcut anchor bolts flush with the surface of the concrete. Install a new ladder.

- Fire Hose Shack
  Removal of the existing shack and replacement with a new galvanized or painted structure.

- Gangways to Dolphins G and H
  Fabricate and install new gangways at Dolphins G and H.

- Life Ring and Stand
  Fabricate and install a new stand and life ring.

- Light Poles and Associated Lights
  Remove and replace the damaged light poles and lights.

- Signage and Associated Posts
  Replace the signs and post in-kind.

- Tank 1929 Guardrail
  Remove and replace the damaged guardrail at the tank perimeter with in-kind materials.

- Security Fence and Gate
  Remove and replace damaged sections of the chain-link fence and gate. At some locations, it may be necessary to pour new concrete foundations. Install a topping of gravel to prevent erosion of the soil.

- Security Door
  Remove and replace the security door in-kind.

- Break Room

Remove and replace damaged portions of the breakroom flooring, walls, and ceiling with in-kind materials. Remove and replace the damaged air conditioning units in-kind.

- Drain Pipe
  Remove the damage PVC drain pipe and replace in-kind.

- Tank Berm
  Until such time that a detailed GPR survey can be performed, this repair procedure involves removal of the damage concrete, installation of formwork and removal of seawater, installation of a granular soil material or compact density fill (CDF), and removal of the forms. Once this effort is complete, the area should be reinforced with slope armoring to help protect the newly installed material from eroding.

- Slope Protection
  Install slope protection around the perimeter of the peninsula and at the tank berm repair area. Due to obstructed access to the peninsula, it is assumed that use of a crane barge and shallow draft materials barge will be needed for placement of the material at high tidal elevations.

7.3 ADDITIONAL INSPECTION

At the peninsula, the 2022 inspection effort found undermining to be present along the north and south shorelines; having averages depths of 36- to 48-inches. Observations from the May 2024 underwater inspection and photos from the PAG and the Tristar report show an increase in undermining and severe damage to the concrete slab (adjacent to Tank 1929) following the typhoon.

Based on conversations with Port staff and observations from the inspection effort, the peninsula is founded on reclaimed land and sunken barges which are visible at low tides. Because the extent of undermining and loss of slope protection material remains largely unknown, it is recommended that a follow-up/specialized inspection be performed to identify the extent and location of undermining. This inspection should likely consist of a ground-penetrating-radar (GPR) survey followed by drilling in locations identified as voids by the GPR in order to fully identify those areas that require stabilization. However, in the near-term, it is recommended that slope protection (rip rap) is installed around the perimeter of the peninsula to help prevent further loss of fill material.

8.0 PIER F1 REPLACEMENT CONCEPT

8.1 REPLACEMENT CONCEPT (50-YEAR SERVICE LIFE)

The replacement concept consists of full replacement of the Main Pier, Trestle, and Dolphins and the near-term repair of assets in poor, serious, or critical condition. Although findings from the condition assessment effort found the Trestle to be in Fair condition, it is recommended that the Trestle is replaced. This inspection effort and previous inspection reports found damage ranging from moderate to severe at five locations where Level II and Level III inspections were performed. Given the age of the structure and the level of damage found at locations where in-depth inspections were performed, the probability of additional piles having major to severe damage is high. Therefore, it is recommended that the Trestle is replaced. See Figure 3.

Figure 3: Pier F1 Replacement Concept

Framing of the Main Pier and Trestle consists of a concrete topping supported by precast concrete deck panels that span between cast-in-place concrete pile caps that are supported by steel pipe piles. Fender panels, integrated into the Main Pier are located on the east and west ends of the structure and replace existing Dolphins G and H.

The conceptual mooring and breasting dolphins are located in a similar location to the existing dolphins and consist of concrete pile caps supported by steel batter piles. Access to the dolphins is provided by a series of interconnected aluminum walkways from the Main Pier. The replacement concept also includes two mooring dolphins and associated walkways east of the terminal. These dolphins can be used by all vessels and eliminate the need for a boat to haul mooring lines to upland dolphins E and F. However, use of Dolphin F will still be utilized for mooring large vessels similar in size to the STI Dama.

At all pile locations, the replacement concept includes the use of sacrificial anodes and durability jackets to protect the steel piles. Sacrificial anodes are effective at providing corrosion protection at the submerged locations of piles. Within the upper tidal zone (splash zone), durability jackets form a barrier between the salt spray and steel cross section and prevent corrosion from occurring. Use of these corrosion mitigation measures will help ensure that the new structures are able to withstand the harsh tropical marine environment for the design service life. See Appendix E.

Regarding utility lines, the concept includes installation of fuel, LPG, and fire water lines. These lines will extend from the manifold located on the Main Pier to nearshore tie-in points. The concept assumes that existing on-shore piping can be reused. A listing of the piping and associated equipment included in the concept and cost estimate are provided below.

- 4”Ø Fire Water Line (x1)
- 4”Ø Miscellaneous Lines (x2)
- 4”Ø LPG Vapor Line (x1)
- 6” LPG Liquid Line (x1)
- 12” Fuel Line (x3)
- 16” Fuel Line (x2)
- Rubber Flanged Hoses
- LPG Vapor Recovery System
- Gasoline Vapor Recovery System (Vapor Balancing Piping)

8.2 CONSTRUCTION PHASING

During reconstruction of Pier F1, it will be necessary to temporarily relocate fuel tankers to an alternate location. As discussed in Section 7.0, fuel tankers can temporarily relocate to Golf Pier once it has been reconstructed; estimated to occur in 2027/2028. Once reconstruction of Pier F1 is complete, fuel tankers can relocate back to Pier F1. A conceptual phasing plan for replacement of Pier F1 is provided below.

- Pier F1 Reconstruction:
  - Phase 0 (2026): Perform near-term repairs.
  - Phase 1 (2028): Relocate all vessels to Golf Pier (provided Golf Pier has been reconstructed). Demolish all marine structures and overwater piping systems. Shift

- Phase 2 (2028): Construct the new marine terminal. Once construction is complete and all piping systems are online, relocate vessels to Pier F1.

Prior to shifting vessels from Pier F1 to Golf Pier, it will be necessary to complete the Port's Fuel Connectivity Project. This project consists of installing additional piping along Route 11 and will allow for vessels at both Golf Pier and Pier F1 to offload/load product from either marine terminal to adjacent tank farms. Note that the Fuel Connectivity Project is Port funded and not included in the Section 10.0 cost estimate. In addition, it will also be necessary to install vapor and liquid LPG lines between Pier F1 and Golf Pier. Because Golf Pier does not currently service LPG, it is recommended that installation of liquid and vapor LPG lines are added to the scope of the Fuel Connectivity Project. Costs to install LPG lines between Golf Pier and Pier F1 are not included in the Section 10.0 cost estimate.

9.0 BASIS OF DESIGN

9.1 CODES AND CRITERIA

The concept described in Section 8.0 was developed in accordance with the following codes and regulations. New versions of these codes may be in effect during future design phases, which may affect the findings of this report. A review of applicable codes and regulations is recommended during the detailed design phase.

Note that the seismic design procedures outlined in ASCE 7-61 were not utilized for this concept study but should be considered for the detailed design phase. For the concept study, seismic demands were estimated using force-based design procedures per ASCE 7-16 and seismic design parameters from the ATC Hazards by Location website. Ultimate load demands were determined using load combinations from ASCE 7-16 (dead and live load) and ASCE 7-61 (seismic). Similarly, load combinations for berthing and mooring forces per UFC 4-152-01 were also utilized.

- UFC 4-152-01 Design: Piers and Wharves, 24 January 2017
- UFC 4-159-03 Moorings, 12 March 2020
- 2016 California Building Code, Chapter 31F – Marine Oil Terminals (MOTEMS)
- ASCE 7-16: Minimum Design Loads for Buildings and Other Structures
- ASCE 7-61: Seismic Design of Piers and Wharves
- AISC Steel Construction Manual, 14th Edition
- ACI 318-19: Building Code Requirements for Structural Concrete

9.2 SUSTAINABILITY AND RESILIENCY

9.2.1 Sustainability

1. Employ integrated design principles, which includes considering the environment when siting the structure; use a collaborative, integrated process to plan, design, and construct; and employ commissioning to optimize and verify performance of the structure.
2. Pursue outreach to stakeholders that may be affected by the proposed location.
3. Protect and conserve water by reducing stormwater runoff and discharges or polluted water to protect natural hydrology and watershed health.
4. Reduce the environmental impact by specifying materials that have a lesser or reduced effect on human health and the environment.
5. Assess and consider climate change risks by assessing potential impacts and vulnerabilities due to weather events and chronic climate change.
6. Evaluate strategies for implementing Port-related zero emission initiatives.

9.2.2 Resiliency

Resiliency from earthquakes and subsequent tsunamis is an important component of sustainable development. New facilities should be constructed to modern building

codes that address mitigating risks from these natural disasters. Please note that evaluation of tsunami surge loads was not included in this concept design effort.

A possible scenario is that a future earthquake could catastrophically damage the existing infrastructure but leave the new pier repairable. Although the new pier could be repaired relatively quickly, the more severe damage to existing infrastructure (upland piping and cement silos) would essentially render the new pier unusable until access and utilities could be restored.

Use of a high-performance coating system, pile jackets, and sacrificial anode cathodic protection should be incorporated into the detailed design effort. These systems are important measures that protect steel elements located below MLLW, within the splash zone, and within the upper tidal zone. If left unprotected, primarily within the splash zone and upper tidal zone, the aggressive nature of the tropical marine environment will increase the growth rate of corrosion and thereby and may reduce the service life of the element and/or structure.

9.3 STRUCTURAL DESIGN LOADS

The following design loads were used to evaluate the size and strength of structural elements for the concept pier.

- Dead Load: Actual weight of construction materials
- Live Loads: 250 psf
- Seismic Design Parameters:
  - Site Class: D
  - Seismic Design Category III
  - Importance Factor: 1.25
  - SDS: 2.756
  - SD1: 0.674
  - PGA: 0.882
  - R = 3
- Design Vessel Criteria
  - Small: LCT/Cement Vessel
    - DWT = 12,283 LT
    - Berthing Velocity = 1.55 knots
  - Medium: Fuel Tanker
    - DWT = 49,990 LT
    - Berthing Velocity = 1.13 knots
  - Large: Fuel Tanker
    - DWT = 109,857 LT
    - Berthing Velocity = 1.13 knots

- Vessel Vacate Wind Speed (30-second gust)
  - Small and Medium Vessels: 50 knots
  - Large Vessels: 30 knots
- Significant Wave Height: 1.5 feet
- Current: 1.5 knots
- Mooring Dolphin Capacity: 100 tons

10.0 COST ESTIMATES

10.1 NEAR-TERM REPAIR COST ESTIMATE

The cost estimate for near-term repair of damaged elements described in Section 7.0 is provided in Table 3. This estimate includes repair of prioritized elements from the 2022 inspection effort and elements damaged from Typhoon Mawar. These costs are intended to provide a rough order of magnitude and include construction, planning, administration, business privilege tax, GPR inspection of the peninsula, and contingency as shown below.

Table 3. Near-Term FY2026 Repair Cost Estimate

ITEM	DESCRIPTION	COST
1	Administrative and Legal Expenses (5% of 8 & 9)	$189,428
2	Land, Structures, Rights-of-Way, Appraisals, etc	$0
3	Relocation Expenses and Payments	$0
4	Architectural and Engineering Fees (8% of 8 & 9)	$303,085
5	Other Architectural and Engineering Fees (10% of 8 & 9)	$378,856
6	Project Inspection Fees (12% of 8 & 9)	$454,627
7	Site Work	$0
8	Demolition and Removal	$0
9	Construction	$3,788,560
10	Equipment	$0
11	Miscellaneous	$255,728
12	SUBTOTAL (sum lines 1-11)	**$5,370,284**
13	Contingencies (30%)	$1,611,085
14	SUBTOTAL (sum lines 12 and 13)	**$6,981,369**
15	Project (program) Income	$0
16	TOTAL PROJECT COSTS (line 14 minus 15)	**$6,981,369**

Notes:

1. Project is Buy America utilizing a local marine contractor.
2. Rip Rap and concrete sourced locally.
3. Repairs performed in (2026).

10.2 REPLACEMENT COST ESTIMATE

The cost estimate for replacement of Pier F1 is summarized in Table 4. These costs are intended to provide a rough order of magnitude and include construction, planning, administration, business privilege tax, and contingency as shown below.

Table 4: Pier F1 FY2028 Replacement Concept ROM Cost Estimate

ITEM	DESCRIPTION	COST
1	Administrative and Legal Expenses (5% of 8 & 9)	$2,277,010
2	Land, Structures, Rights-of-Way, Appraisals, etc	$0
3	Relocation Expenses and Payments	$0
4	Architectural and Engineering Fees (8% of 8 & 9)	$3,643,216
5	Other Architectural and Engineering Fees (10% of 8 & 9)	$4,554,019
6	Project Inspection Fees (12% of 8 & 9)	$5,464,823
7	Site Work	$0
8	Demolition and Removal	$4,486,694
9	Construction	$41,053,500
10	Equipment	
11	Miscellaneous	**$3,073,963**
12	SUBTOTAL (sum lines 1-11)	$64,553,225
13	Contingencies (30%)	**$19,365,967**
14	SUBTOTAL (sum lines 12 and 13)	$83,919,192
15	Project (program) Income	**$0**
16	TOTAL PROJECT COSTS (line 14 minus 15)	**$83,919,192**

Notes:

1. Project is Buy America and the marine contractor mobilizes from Hawai'i.
2. Steel piles, steel reinforcement, and misc steel sourced from west coast.
3. Concrete sourced locally.
4. Based on midpoint of construction (2028).

APPENDIX A

ASCE MOP 130
ELEMENT LEVEL DAMAGE RATING SYSTEM

Table 2-8. Damage Ratings for Mooring Hardware*

Damage Rating		Existing Damage[a]	Exclusions [Defects Requiring Elevation to the Next Higher Damage Rating(s)]
NI	Not Inspected	Not inspected, inaccessible, or passed by[b]	
ND	No Defects	• Material sound, surfaces smooth without indications of corrosion, surface coating in good condition, connections sound • Bolt countersinks grouted or sealed	No Defects Rating not appropriate if • Surface coatings worn or damaged • Visible corrosion on fasteners
MN	Minor	• Fitting has surface corrosion over 10 to 25% of its area. • Minor wear marks or pitting on surface of fittings are less than 1/8-in. deep • Fasteners have minor corrosion with no significant loss of section.	Minor damage not appropriate if • Deep pits, gouges, or wear on fitting surfaces • Any noticeable loss of section on fasteners threads, if visible
MD	Moderate	• Fitting has moderate surface corrosion with loose scale over less than 50% of its area • Significant surface wear marks or pitting on fitting are up to 1/4-in. deep • Fasteners have corrosion with less than 25% loss of section	Moderate damage not appropriate if • Loose scale on fasteners • Inability to remove fasteners due to heavy corrosion, if accessible
MJ	Major	• Fitting has surface corrosion with loose scale over 50% or more of its surface area and/or less than 25% section loss • Significant surface wear marks or pitting on fitting 1/4-in. deep or greater • Fasteners have corrosion with loose scale or loss of section greater than 25%	Major damage not appropriate if • Displaced, damaged, or broken fitting components • Loose or missing fasteners
SV	Severe	• Fitting has heavy surface corrosion and loose scale with greater than 25% loss of section at critical areas of the fitting • Structural displacement, deformation, or rotation of the fitting are present; fitting components are broken, cracked, or delaminated • Loose, broken, or missing fasteners	

*Taken from ASCE Waterfront Facilities Inspection and Assessment Manual No. 130, 2015.
a = Any defect listed is sufficient to identify relevant damage grade.
b = If not inspected due to inaccessibility or passed by, note as such.

Table 2-9. Damage Ratings for Mooring Foundations*

Damage Rating		Existing Damage[a]	Exclusions [Defects Requiring Elevation to the Next Higher Damage Rating(s)]
NI	Not Inspected	Not inspected, inaccessible, or passed by[b]	
ND	No Defects	• Good original hard surface, hard material, sound	No Defects Rating not appropriate if • Weathering on timber, steel, or composite fenders • Hairline cracks in concrete elements
MN	Minor	• Timber Foundations: Weathered timber; evidence of fungal decay; minor checks, splits, and gouges up to 1/4-in. wide • Steel Foundations: Weathering of steel coating, light surface corrosion • Concrete Foundations: No significant section loss to load-bearing areas, hairline cracking of the concrete due to corrosion of the mooring hardware • Composites: Weathered surfaces	Minor damage not appropriate if • Load-bearing areas around mooring hardware not sound • Displacement, loss of bearing, or connections • Fungal decay, insect infestation within or adjacent to the bearing area on timber elements • Corrosion loss exceeding fabrication tolerances (at any location) • Structural damage or corrosion cracking or concrete elements
MD	Moderate	• Timber cracked and checked up to 1/2-in. wide; weathered surfaces; fungal decay under or adjacent to the mooring hardware, with loss of section (max 1 in.) • Corrosion of steel with less than 10 to 25% section loss at any location • Noticeable cracking of concrete, larger than hairline but with no loss of interlock	Moderate damage not appropriate if • Displacements, loss of bearing, or connections • Changes in straight-line configuration or local buckling • Loss of thickness exceeding 30% of nominal at any location for steel elements • Structural breakage, spalls, or corrosion cracks in concrete elements • Chemical deterioration[c] or “softening” of concrete elements
MJ	Major	• Timber cracked and checked greater than 1/2-in. wide; weathered; fungal decay present (max 3 in. depth); up to 25% loss of bearing • Steel corrosion with 25 to 50% section loss at any location • Noticeable cracking of concrete, resulting in loss of interlock • Composite elements cracked or split	Major damage not appropriate if • Breakage or displacement of any element • Exposed steel strands in prestressed concrete elements • Perforations or loss of section exceeding 50% on steel elements

Table 2-9. Damage Ratings for Mooring Foundations (Continued)*

Damage Rating		Existing Damage[a]	Exclusions [Defects Requiring Elevation to the Next Higher Damage Rating(s)]
SV	Severe	• Displacement/yielding of any support members • Loss of full bearing of fitting under hardware • Fungal decay of timber members (greater than 3 in. depth) • Significant corrosion of steel members with greater than 50% section loss at any location • Cracking or spalling of concrete based under hardware • Composite broken or damaged	

*Taken from ASCE Waterfront Facilities Inspection and Assessment Manual No. 130, 2015.
a = Any defect listed is sufficient to identify relevant damage grade.
b = If not inspected due to inaccessibility or passed by, note as such.
c = Chemical deterioration: Sulfate attack, alkali-silica reaction, alkali-aggregtate reaction, alkali-carbonate reaction ettringite distress, or other chemical/concrete deterioration.

Table 2-11. Damage Ratings for Pneumatic, Foam-Filled, and Hydropneumatic Fenders*

Damage Rating		Existing Damage[a]	Exclusions [Defects Requiring Elevation to the Next Higher Damage Rating(s)]
NI	Not Inspected	Not inspected, inaccessible, or passed by[b]	
ND	No Defects	• Good original surfaces • Components sound • All hardware intact and operable	No Defects Rating not appropriate if • Components are weathered, worn, or torn
MN	Minor	• Wear on the fender unit with no visible belting • Hardware intact with visible surface corrosion, but less than 10% section loss • Swivel operable but binding	
MD	Moderate	• Wear on the fender, belting visible to a maximum depth of 1 inch • Hardware intact with 10 to 25% section loss • Swivel heavily corroded and or bound	Moderate damage not appropriate if • Fender unit permanently set or deformed
MJ	Major	• Wear on the fender, belting visible to a maximum depth of 2 inches • Permanent deformation of unit • Hardware loose or heavily corroded with between 25 and 50% section loss • Swivel heavily corroded and or bound, or with 25 to 50% section loss • Air pressure inflation and valves do not appear operable	Major damage not appropriate if • Components missing or broken
SV	Severe	• Considerable wear on the fender, belting visible to a depth greater than 2 inches • Punctures, tears, or holes in fender; foam exposed • Hardware heavily corroded with greater than 50% section loss or missing or broken • Swivel heavily corroded and or bound, or with greater than 50% section loss or broken • Air pressure inflation and valves are broken or damaged[c]	

*Taken from ASCE Waterfront Facilities Inspection and Assessment Manual No. 130, 2015.
a = Any defect listed is sufficient to identify relevant damage grade.
b = If not inspected due to inaccessibility or passed by, note as such.
c = For pneumatic and hydropneumatic fenders, an assessment of the air pressure and inflation/pressurization system should be confirmed.

Table 2-12. Damage Ratings for Rubber Fender Elements*

Damage Rating		Existing Damage[a]	Exclusions [Defects Requiring Elevation to the Next Higher Damage Rating(s)]
NI	Not Inspected	Not inspected, inaccessible, or passed by[b]	
ND	No Defects	• Good original surface, sound • Connections intact and tight	No Defects Rating not appropriate if • Noticeable abrasion or wear of rubber surfaces
MN	Minor	• Small gouges or surface defects present less than 10% of nominal depth • Connection intact, tight with light corrosion (less than 10% section loss at any location)	Minor damage not appropriate if • Surface cracking or degradation of rubber components
MD	Moderate	• Gouges, wear, or tears less than 25% of nominal depth • Rubber damaged at the connectors or connection plates • Connections loose, a bolt missing, or corrosion with 10 to 25% section loss at any location	Moderate damage not appropriate if • Permanent deformation or misalignment of rubber elements
MJ	Major	• Cracks, gouges, or tears between 25 and 50% of nominal depth • Rubber torn at the connectors or connection plates • Connections loose, two bolts missing, or corrosion with 25 to 50% section loss at any location	Major damage not appropriate if • Rubber element is split or torn through
SV	Severe	• Cracks, gouges, or tears greater than 50% of nominal depth • Rubber torn through at the connectors or connection plates • Connections with loose or missing bolts, or corrosion with greater than 50% section loss at any location	

*Taken from ASCE Waterfront Facilities Inspection and Assessment Manual No. 130, 2015.
a = Any defect listed is sufficient to identify relevant damage grade.
b = If not inspected due to inaccessibility or passed by, note as such.

Table 2-13. Damage Ratings for Fender Panels*

Damage Rating		Existing Damage[a]	Exclusions [Defects Requiring Elevation to the Next Higher Damage Rating(s)]
NI	Not Inspected	Not inspected, inaccessible, or passed by[b]	
ND	No Defects	• Good original surfaces • All connections intact • Backing panel sound	No Defects Rating not appropriate if • Coatings damaged • Visible surface corrosion
MN	Minor	• Small cracks or gouges (less than 10% of nominal) • 90% of panel connections intact • Backing frame with surface corrosion with no significant loss of section • Support chains intact with light surface corrosion	Minor Rating not appropriate if • Panels displaced or misaligned • Any loose or missing hardware
MD	Moderate	• Cracks or gouges (less than 25% of nominal) • 75% of panel connections intact • Panels displaced from the backing panel • Backing frame corroded • Support chains intact, with less than 25% section loss	Moderate Rating not appropriate if • Panels displaced or misaligned • Any loose or missing hardware
MJ	Major	• Cracks or gouges (less than 50% of nominal) • 50% of the panel connections intact or multiple panels displaced from the backing panel • Backing frame corroded with loose scale, but panel substantially in place • Support chains heavily corroded with more than 25% section loss	Major Rating not appropriate if • Panel/frame system sagging, misaligned, or with limited bearing
SV	Severe	• Cracks or gouges (greater than 50% of nominal) • Less than 50% of the panel connections intact or multiple panels displaced from the backing panel • Backing frame heavily corroded with loose scale • Sagging/displacement of panel/frame system • Support chains heavily corroded with loose scale and/or missing or broken	

*Taken from ASCE Waterfront Facilities Inspection and Assessment Manual No. 130, 2015.
a = Any defect listed is sufficient to identify relevant damage grade.
b = If not inspected due to inaccessibility or passed by, note as such.

Table 2-14. Condition Assessment Ratings

Rating		Description
6	Good	No visible damage or only minor damage noted. Structural elements may show very minor deterioration, but no overstressing observed. No repairs are required.
5	Satisfactory	Limited minor to moderate defects or deterioration observed but no overstressing observed. No repairs are required.
4	Fair	All primary structural elements are sound but minor to moderate defects or deterioration observed. Localized areas of moderate to advanced deterioration may be present but do not significantly reduce the load-bearing capacity of the structure. Repairs are recommended, but the priority of the recommended repairs is low.
3	Poor	Advanced deterioration or overstressing observed on widespread portions of the structure but does not significantly reduce the load-bearing capacity of the structure. Repairs may need to be carried out with moderate urgency.
2	Serious	Advanced deterioration, overstressing, or breakage may have significantly affected the load-bearing capacity of the primary structural components. Local failures are possible and loading restrictions may be necessary. Repairs may need to be carried out on a high-priority basis with urgency.
1	Critical	Very advanced deterioration, overstressing, or breakage has resulted in localized failure(s) of primary structural components. More widespread failures are possible or likely to occur, and load restrictions should be implemented as necessary. Repairs may need to be carried out on a very high-priority basis with strong urgency.

*Taken from ASCE Waterfront Facilities Inspection and Assessment Manual No. 130, 2015.

Table 2-5. Damage Ratings for Steel Elements*

Damage Rating		Existing Damage[a]	Exclusions [Defects Requiring Elevation to the Next Higher Damage Rating(s)]
NI	Not Inspected	Not inspected, inaccessible, or passed by[b]	
ND	No Defects	• Protective coating or wrap intact • Light surface rust • No apparent loss of material	
MN	Minor	• Protective coating or wrap damaged and loss of thickness up to 15% of nominal at any location • Less than 50% of perimeter or circumference affected by corrosion at any elevation or cross section • Loss of thickness up to 15% of nominal at any location	Minor damage not appropriate if • Changes in straight line configuration or local buckling • Corrosion loss exceeding fabrication tolerances (at any location).
MD	Moderate	• Protective coating or wrap damaged and loss of thickness 15 to 30% of nominal at any location • More than 50% of perimeter or circumference affected by corrosion at any elevation or cross section • Loss of thickness 15 to 30% of nominal at any location	Moderate damage not appropriate if • Changes in straight line configuration or local buckling • Loss of thickness exceeding 30% of nominal at any location
MJ	Major	• Protective coating or wrap damaged and loss of nominal thickness 30 to 50% at any location • Partial loss of flange edges or visible reduction of wall thickness on pipe piles • Loss of nominal thickness 30 to 50% at any location	Major damage not appropriate if • Changes in straight line configuration or local buckling • Perforations or loss of wall thickness exceeding 50% of nominal
SV	Severe	• Protective coating or wrap damaged and loss of wall thickness exceeding 50% of nominal at any location • Structural bends or buckling, breakage, and displacement at supports, loose, or lost connections • Loss of wall thickness exceeding 50% of nominal at any location	

*Taken from ASCE Waterfront Facilities Inspection and Assessment Manual No. 130, 2015.
a = Any defect listed is sufficient to identify relevant damage grade.
b = If not inspected due to inaccessibility or passed by, note as such.

Table 2-6. Damage Ratings for Reinforced Concrete Elements*

Damage Rating		Existing Damage[a]	Exclusions [Defects Requiring Elevation to the Next Higher Damage Rating(s)]
NI	Not Inspected	Not inspected, inaccessible, or passed by[b]	
ND	No Defects	Good original hard surface, hard material, sound	
MN	Minor	• Mechanical or impact spalls up to 1 in. deep • Occasional corrosion stains or small pop-out corrosion spalls • General cracks up to 1/16 in. wide	Minor damage not appropriate if • Structural damage • Corrosion cracks • Chemical deterioration[c]
MD	Moderate	• Structural cracks up to 1/16 in. wide • Corrosion cracks up to 1/4 in. wide • Chemical deterioration: random cracks up to 1/16 in. wide; "Soft" concrete and/or rounding of corners up to 1 in. deep • Mechanical abrasion or impact spalls greater than 1 in. deep	Moderate damage not appropriate if • Structural breakage and/or spalls • Exposed reinforcement • Loss of cross section due to chemical deterioration beyond rounding of corner edges
MJ	Major	• Structural cracks 1/16 in. to 1/4 in. wide and partial breakage (through section cracking with structural spalls) • Corrosion cracks wider than 1/4 in. and open or closed corrosion spalls (excluding pop-outs) • Multiple cracks and disintegration of surface layer due to chemical deterioration • Mechanical abrasion or impact spalls exposing the reinforcing	Major damage not appropriate if • Loss of cross section exceeding 30% due to any cause
SV	Severe	• Structural cracks wider than 1/4in. wide or complete breakage • Complete loss of concrete cover due to corrosion of reinforcing steel with more than 30% of diameter loss for any main reinforcing bar • Loss of bearing and displacement at connections • Loss of concrete cover (exposed steel) due to chemical deterioration • Loss of more than 30% of cross section due to any cause	

*Taken from ASCE Waterfront Facilities Inspection and Assessment Manual No. 130, 2015.
a = Any defect listed is sufficient to identify relevant damage grade.
b = If not inspected due to inaccessibility or passed by, note as such.
c = Chemical deterioration: sulfate attack, alkali-silica reaction, alkali-aggregate reaction, alkali-carbonate reaction ettringite distress, or other chemical/concrete deterioration.

APPENDIX B

TABULATED FIELD DATA

INSPECTION RECORD - PILES

LOCATION: COMMERCIAL PORT, PITI GUAM

STRUCTURE ID: PIER F1 - MAIN PIER

DEPTH REFERENCE: X DATUM ☐ GUAGE ☐ TIDE

WSP JOB NO: 30901541B

MATERIAL: STEEL

PILE TYPE	PILE #	BENT #	ML ELEV ±	DAMAGE ELEV	DAMAGE		NI	DAMAGE RATING					COMMENTS
					TYPE	SIZE (in)		ND	MN	MD	MJ	SV	
PLUMB	1	1	-33.25		COR				X				
BATTER	2	1	-38.25		COR					X			1/8-INCH DEEP PITTING, LOCALIZED
BATTER	3	1	-64.25		COR						X		1/8-INCH DEEP PITTING AT MID-WATER COLUMN
PLUMB	4	1	-43.25		COR						X		COR AT PILE TOP
BATTER	5	1	-51.25		COR					X			1/16-INCH PITTING AT MID-WATER COLUMN
PLUMB	6	1	-51.25		COR					X			COR AT SOFFIT
PLUMB	7	2	-50.25		COR				X				
PLUMB	8	3	-39.75		COR					X			
PLUMB	9	4	-46.75		COR					X			
PLUMB	10	5	-45.75		COR					X			
PLUMB	11	6	-47.75		COR					X			
PLUMB	12	7	-44.75		COR					X			
PLUMB	13	8	-46.75		COR					X			
PLUMB	14	9	-46		COR					X			
PLUMB	15	10	-43		COR					X			
BATTER	16	10	-43		COR					X			
BATTER	17	10	-36		COR					X			
BATTER	18	10	-34		COR					X			
BATTER	19	10	-32		COR						X		1/8-INCH DEEP PITTING AT MID-WATER COLUMN
PLUMB	20	10	-32		COR					X			
PLUMB	21	9	-33		COR					X			

INSPECTION RECORD - PILES

LOCATION: COMMERCIAL PORT, PITI GUAM

STRUCTURE ID: PIER F1 - MAIN PIER

DEPTH REFERENCE: X DATUM ☐ GUAGE ☐ TIDE

WSP JOB NO: 30901541B

MATERIAL: STEEL

PILE TYPE	PILE #	BENT #	ML ELEV ±	DAMAGE ELEV	DAMAGE		NI	DAMAGE RATING					COMMENTS
					TYPE	SIZE (in)		ND	MN	MD	MJ	SV	
PLUMB	22	8	-33.75		COR					X			
PLUMB	23	7	-31.75	-9	COR,PIT						X		LVL2, LVL3: 0.355, 0.220
PLUMB	24	6	-31.75		COR					X			
PLUMB	25	5	-34.75		COR, PIT						X		1/8-INCH DEEP PITTING AT MID-WATER COLUMN
PLUMB	26	4	-32.75		COR					X			
PLUMB	27	3	-32.75		COR					X			
PLUMB	28	2	-37		COR					X			
BATTER	29	2	-36.413333		COR						X		LVL2, LVL3: 0.265, 0.310, 0.220, BULGING JACKET
PLUMB	30	2	-43		COR					X			
PLUMB	31	3	-36.75		COR					X			
BATTER	32	3	-45.75		COR					X			
BATTER	33	4	-33.75		COR					X			
PLUMB	34	4	-37.75		COR					X			
PLUMB	35	5	-34.75		COR							X	1/4-INCH PITTING AT MID-WATER COLUMN
BATTER	36	5	-39.75		COR					X			
BATTER	37	6	-30.75		COR					X			
PLUMB	38	6	-36.75		COR					X			
BATTER	39	7	-34		COR					X			
PLUMB	40	7	-32.75		COR					X			
BATTER	41	7	-40.75		COR					X			
BATTER	42	8	-34.75		COR					X			

INSPECTION RECORD - PILES

LOCATION: COMMERCIAL PORT, PITI GUAM

STRUCTURE ID: PIER F1 - MAIN PIER

DEPTH REFERENCE: X DATUM ☐ GUAGE ☐ TIDE

WSP JOB NO: 30901541B

MATERIAL: STEEL

PILE TYPE	PILE #	BENT #	ML ELEV ±	DAMAGE ELEV	DAMAGE TYPE	DAMAGE SIZE (in)	NI	DAMAGE RATING ND	MN	MD	MJ	SV	COMMENTS
PLUMB	43	8	-35					X					
BATTER	44	8	-42.75		COR					X			LVL2
BATTER	45	9	-34		COR						X		LVL2, LVL3: 0.26, 0.40
PLUMB	46	9	-35		COR					X			
BATTER	47	9	-41		COR					X			SPLIT JACKET 1' DOWN
PLUMB	48	10	-36						X				
PLUMB	49	10	-36		COR, PIT						X		1/4-INCH DEEP PITTING AT MID-WATER COLUMN
BATTER	50	10	-33						X				
BATTER	51	10	-40		COR					X			COR, TORN/BULGING JACKET 2' DOWN

INSPECTION RECORD - PILES

LOCATION: COMMERCIAL PORT, PITI GUAM

STRUCTURE ID: PIER F1 - TRESTLE

DEPTH REFERENCE: X DATUM ☐ GUAGE ☐ TIDE

WSP JOB NO: 30901541B

MATERIAL: STEEL

PILE TYPE	PILE #	BENT #	ML ELEV ±	DAMAGE ELEV	DAMAGE TYPE	DAMAGE SIZE (in)	NI	DAMAGE RATING ND	MN	MD	MJ	SV	COMMENTS
PLUMB	1	1	-1					X					FULL HT JACKET
PLUMB	2	1	-2					X					FULL HT JACKET
PLUMB	3	1	-2					X					FULL HT JACKET
PLUMB	4	2	-4					X					FULL HT JACKET
PLUMB	5	2	-4					X					FULL HT JACKET
PLUMB	6	2	-3					X					FULL HT JACKET
BATTER	7	3	-8					X					FULL HT JACKET
PLUMB	8	3	-7									X	FULL HT JACKET, PREVIOUS REPORT STATES 0.183-INCH PILE WALL THICKNESS AT MUDLINE
PLUMB	9	3	-6					X					FULL HT JACKET
PLUMB	10	3	-4					X					FULL HT JACKET
BATTER	11	3	-4					X					FULL HT JACKET
PLUMB	12	4	-15							X			LVL2, LVL3: 0.280, 0.375, 25% SECTION LOSS
PLUMB	13	4	-12								X		PREVIOUS REPORT STATES 0.125-INCH PITTING AT MUDLINE
PLUMB	14	4	-8					X					FULL HT JACKET
BATTER	15	5	-25					X					
PLUMB	16	5	-24							X			LVL2, LVL3: 0.320, 0.330, 15% SECTION LOSS
PLUMB	17	5	-21					X					
PLUMB	18	5	-18						X				LVL2
BATTER	19	5	-18								X		PREVIOUS REPORT STATES 0.125-INCH PITTING AT MUDLINE AND 0.275-INCH WALL THICKNESS AT ML, MID-HEIGHT, AND WATERLINE
PLUMB	20	6	-31					X					
PLUMB	21	6	-29					X					
PLUMB	22	6	-33							X			
BATTER	23	7	-33					X					
PLUMB	24	7	-32					X					

INSPECTION RECORD - PILES

LOCATION: COMMERCIAL PORT, PITI GUAM

STRUCTURE ID: PIER F1 - TRESTLE

DEPTH REFERENCE: X DATUM ☐ GUAGE ☐ TIDE

WSP JOB NO: 30901541B

MATERIAL: STEEL

PILE TYPE	PILE #	BENT #	ML ELEV ±	DAMAGE ELEV	DAMAGE		NI	DAMAGE RATING					COMMENTS
					TYPE	SIZE (in)		ND	MN	MD	MJ	SV	
PLUMB	25	7	-31					X					
PLUMB	26	7	-33							X			
BATTER	27	7	-33							X			LVL2

INSPECTION RECORD - PILES

LOCATION: COMMERCIAL PORT, PITI GUAM

STRUCTURE ID: PIER F1 - DOLPHINS

DEPTH REFERENCE: X DATUM ☐ GUAGE ☐ TIDE

WSP JOB NO: 30901541B

MATERIAL: STEEL

PILE TYPE	PILE #		ML ELEV ±	DAMAGE ELEV	DAMAGE		NI	DAMAGE RATING					COMMENTS
					TYPE	SIZE (in)		ND	MN	MD	MJ	SV	
BREASTING DOLPHIN A													
PLUMB	1		-73		COR					X			COR AT TOP OF PILE
BATTER	2		-68		COR						X		COR AT TOP OF PILE
BATTER	3		-68		COR						X		LVL2. COR AT TOP OF PILE
PLUMB	4		-66		COR					X			COR AT TOP OF PILE
BATTER	5		-59	-48	COR							X	(2) HOLES, SV COR AT TOP OF PILE, PILE DISCONNECTED
BATTER	6		-64		COR					X			MISSING RETAINER RING AT TOP
PLUMB	7		-65		COR						X		MJ COR AT TOP
BATTER	8		-71		COR					X			
BATTER	9				COR							X	MISSING
PLUMB	10		-70		COR							X	COR AT TOP OF PILE
BATTER	11		-61		COR							X	FAILED REPAIR AT TOP OF PILE
PLUMB	12		-73		COR					X			LVL2, MD COR AT TOP OF PILE (RING)
BATTER	13		-67		COR							X	LVL2, LVL3: 0.390, 0.340, 1/2" GAP AT TOP OF PILE
PLUMB	14		-69		COR					X			MD COR AT TOP OF PILE (RING)
BATTER	15		-46		COR					X			H-PILE AT WALKWAY SUPPORT (NORTH)
BATTER	16		-53		COR					X			H-PILE AT WALKWAY SUPPORT (SOUTH)
BREASTING DOLPHIN B													
BATTER	1		-6							X			COR AT PILE TOP
BATTER	2		-6									X	COR AT PILE TOP
BATTER	3		-8									X	COR AT TOP
PLUMB	4		-8		COR					X			COR AT TOP
BATTER	5		-12							X			
BATTER	6		-53		COR,PIT					X			LVL2, MISSING RETAINER RING
BATTER	7		-62							X			COR AT TOP

INSPECTION RECORD - PILES

LOCATION: COMMERCIAL PORT, PITI GUAM

STRUCTURE ID: PIER F1 - DOLPHINS

DEPTH REFERENCE: X DATUM ☐ GUAGE ☐ TIDE

WSP JOB NO: 30901541B

MATERIAL: STEEL

PILE TYPE	PILE #		ML ELEV ±	DAMAGE ELEV	DAMAGE TYPE	DAMAGE SIZE (in)	NI	DAMAGE RATING ND	MN	MD	MJ	SV	COMMENTS
PLUMB	8		-10		COR						X		MJ COR AT PILE TOP
BATTER	9		-51		COR						X		MJ COR AT PILE TOP
BATTER	10		-39		COR						X		JACKET TO -7
PLUMB	11		-21		COR						X		MJ COR AT PILE TOP
BATTER	12		-6								X		COR AT PILE TOP
BATTER	13		-7									X	COR AT PILE TOP
BATTER	14		-45		COR, PIT					X			LVL2, LVL3: 0.380, 0.430, 0.410, SV COR AT PILE TOP
PLUMB	15		-6							X			MD COR AT PILE TOP
PLUMB	16		-6							X			MD COR AT PILE TOP
PLUMB	17		-7							X			MD COR AT PILE TOP
PLUMB	18		-6								X		COR AT PILE TOP
BATTER	19		-26		COR					X			H-PILE AT WALKWAY SUPPORT (NORTH)
BATTER	20		-34		COR					X			H-PILE AT WALKWAY SUPPORT (SOUTH)
BREASTING DOLPHIN C													
PLUMB	1		-34		COR					X			LVL2
BATTER	2		-36		COR							X	1" GAP AT TOP OF PILE
BATTER	3		-36		COR				X				
BATTER	4		-48		COR				X				
BATTER	5		-50		COR					X			COR AT PILE TOP
PLUMB	6		-53		COR					X			COR AT PILE TOP
BATTER	7		-38		COR							X	DISCONNECTED
BATTER	8		-36						X				
BATTER	9		-54		COR					X			
BATTER	10		-33		COR							X	DISCONNECTED
BATTER	11		-32		COR							X	DISCONNECTED

INSPECTION RECORD - PILES

LOCATION: COMMERCIAL PORT, PITI GUAM

STRUCTURE ID: PIER F1 - DOLPHINS

DEPTH REFERENCE: X DATUM ☐ GUAGE ☐ TIDE

WSP JOB NO: 30901541B

MATERIAL: STEEL

PILE TYPE	PILE #		ML ELEV ±	DAMAGE ELEV	DAMAGE		NI	DAMAGE RATING					COMMENTS
					TYPE	SIZE (in)		ND	MN	MD	MJ	SV	
BATTER	12		-32								X		COR AT PILE TOP
PLUMB	13		-37		COR					X			
PLUMB	14		-48		COR					X			
PLUMB	15		-55		COR					X			
BATTER	16		-39		COR							X	SV COR AT PILE TOP. PILE DISCONNECTED
BATTER	17		-40		COR				X				LVL2
BATTER	18		-58						X				COR AT PILE TOP
BATTER	19		-34		COR							X	DISCONNECTED
BATTER	20		-33									X	DISCONNECTED
BATTER	21		-33						X				
PLUMB	22		-35		COR				X				
BATTER	23		-39		COR					X			COR AT PILE TOP
BATTER	24		-45		COR					X			COR AT PILE TOP
BATTER	25		-54		COR					X			LVL2, LVL3: 0.410, 0.385, MD COR AT PILE TOP
BATTER	26		-56		COR							X	COR AT PILE TOP
PLUMB	27		-56		COR							X	COR AT PILE TOP
BREASTING DOLPHIN D													
PLUMB	1		-67.75		COR				X				LVL2
BATTER	2		-57.75		COR					X			COR AT PILE TOP
BATTER	3		-57.75		COR							X	LVL2, LVL3: 0.325, 0.305, 0.295, COR AT PILE TOP
BATTER	4		-57.75		COR					X			JACKET TO -10, MD CORR
BATTER	5		-51.75		COR					X			JACKET TO -10, MD CORR
PLUMB	6		-57.75		COR			X					JACKET TO -8, MD CORR
BATTER	7		-77.75					X					JACKET TO -10, HEAVY MARINE GROWTH
BATTER	8		-55.75		BROKEN							X	PILE FRACTURED AT -30

INSPECTION RECORD - PILES

LOCATION: COMMERCIAL PORT, PITI GUAM

STRUCTURE ID: PIER F1 - DOLPHINS

DEPTH REFERENCE: X DATUM ☐ GUAGE ☐ TIDE

WSP JOB NO: 30901541B

MATERIAL: STEEL

PILE TYPE	PILE #		ML ELEV ±	DAMAGE ELEV	DAMAGE TYPE	DAMAGE SIZE (in)	NI	DAMAGE RATING ND	MN	MD	MJ	SV	COMMENTS
BATTER	9		-58.75						X				CORR NEAR JACKET
BATTER	10		-59.75							X			JACKET TO -8, MD CORR
BATTER	11		-52.75								X		JACKET TO -8, MD CORR, MJ COR AT PILE TOP
PLUMB	12		-64.5		COR						X		LVL2, COR AT PILE TOP
BATTER	13		-58.5		COR							X	COR AT PILE TOP
PLUMB	14		-68.5		COR						X		COR AT PILE TOP
BATTER	15		-71.5		COR							X	COR AT PILE TOP, DISCONNECTED
BATTER	16		-70.5		COR							X	COR AT PILE TOP, DISCONNECTED
BATTER	17		-74.5		COR					X			COR AT PILE TOP
BATTER	18		-72.5		COR							X	COR AT PILE TOP, DISCONNECTED
PLUMB	19		-74.5		COR					X			LVL2, LVL3: 0.45, 0.45, 0.46, COR AT PILE TOP
BATTER	20		-66.5		COR				X				
PLUMB	21		-76.5	-10	COR						X		2" Ø HOLE
BATTER	22		-63.5		COR							X	DISCONNECTED
BATTER	23		-64.5		COR				X				
BATTER	24		-60.5		COR				X				
BATTER	25		-62.5		COR				X				
BATTER	26		-81.5		COR				X				
PLUMB	27		-73.5		COR				X				
BATTER	28		-30		COR					X			H-PILE AT WALKWAY SUPPORT
BATTER	29		-30		COR					X			H-PILE AT WALKWAY SUPPORT
BREASTING DOLPHIN G													
BATTER	1		-37.75		COR							X	COR AT PILE TOP
BATTER	2		-35.75		COR						X		COR AT PILE TOP
PLUMB	3		-47.75		COR							X	LVL2, COR AT PILE TOP

INSPECTION RECORD - PILES

LOCATION: COMMERCIAL PORT, PITI GUAM

STRUCTURE ID: PIER F1 - DOLPHINS

DEPTH REFERENCE: X DATUM ☐ GUAGE ☐ TIDE

WSP JOB NO: 30901541B

MATERIAL: STEEL

PILE TYPE	PILE #		ML ELEV ±	DAMAGE ELEV	DAMAGE TYPE	DAMAGE SIZE (in)	NI	DAMAGE RATING ND	MN	MD	MJ	SV	COMMENTS
BATTER	4		-52.75		COR							X	COR AT PILE TOP
PLUMB	5		-52.75		COR				X				
PLUMB	6		-52.75		COR				X				
BATTER	7		-39.75		COR							X	COR AT PILE TOP
BATTER	8		-39.75		COR						X		COR AT PILE TOP
PLUMB	9		-52.75		COR					X			LVL2
PLUMB	10		-53.75		COR					X			
BATTER	11		-38.75		COR					X			
PLUMB	12		-46.75		COR							X	COR AT PILE TOP, PILE DISCONNECTED
BATTER	13		-35.75		COR							X	COR AT PILE TOP
BATTER	14		-35.75		COR							X	COR AT PILE TOP, PILE DISCONNECTED
BREASTING DOLPHIN H													
BATTER	1		-48									X	COR AT PILE TOP
BATTER	2		-43		COR					X			COR AT PILE TOP
PLUMB	3		-58		COR, BENT							X	COR AT PILE TOP. PILE PERMANENTLY BENT -15' MLLW
BATTER	4		-58		COR						X		COR AT PILE TOP
PLUMB	5		-58		COR							X	COR AT PILE TOP, PILE BENT AT CON TO PILE CAP
PLUMB	6		-52		COR						X		COR AT PILE TOP
BATTER	7		-60		COR						X		COR AT PILE TOP
BATTER	8		-60		COR					X			LVL2, LVL3: 0.36, 0.355, 0.33, COR AT PILE TOP
PLUMB	9		-57		COR					X			COR AT PILE TOP
PLUMB	10		-57		COR					X			COR AT PILE TOP
BATTER	11		-57		COR					X			COR AT PILE TOP
PLUMB	12		-51		COR							X	LVL2, DISCONNECTED PILE
BATTER	13		-23		COR							X	DISCONNECTED PILE

INSPECTION RECORD - PILES

LOCATION: COMMERCIAL PORT, PITI GUAM

STRUCTURE ID: PIER F1 - DOLPHINS

DEPTH REFERENCE: X DATUM ☐ GUAGE ☐ TIDE

WSP JOB NO: 30901541B

MATERIAL: STEEL

PILE TYPE	PILE #		ML ELEV ±	DAMAGE ELEV	DAMAGE TYPE	DAMAGE SIZE (in)	NI	DAMAGE RATING ND	MN	MD	MJ	SV	COMMENTS
BATTER	14		-23		COR							X	DISCONNECTED PILE

INSPECTION RECORD - CONCRETE FRAMING ELEMENTS

LOCATION: COMMERCIAL PORT, PITI GUAM

WSP JOB NO: 30901541B

STRUCTURE ID: PIER F1 - FRAMING ELEMENTS AT PIER AND TRESTLE

STRUCTURE	DESCRIPTION	MATERIAL	BENT #	PILE ROW	DAMAGE LOCATION	DAMAGE TYPE	DAMAGE SIZE (IN)			NI	DAMAGE RATING					COMMENTS
							LENGTH	WIDTH	DEPTH		ND	MN	MD	MJ	SV	
MAIN PIER	PILE CAP	CONC	1	A-C	E,W,SOF	OCS	480		4						X	OCS ALL SIDES
MAIN PIER	PILE CAP	CONC	2	A	SOF	OCS	36	24	4						X	
MAIN PIER	PILE CAP	CONC	2	A.9	SOF	OCS	24	24	4							
MAIN PIER	PILE CAP	CONC	2	A.5	SOF	CCS	108	24						X		
MAIN PIER	PILE CAP	CONC	1	A	E,W,SOF	OCS	36	24	4						X	
MAIN PIER	PILE CAP	CONC	10	B	E,W,SOF	OCS	18	12	3						X	
MAIN PIER	PILE CAP	CONC	10	A	E,SOF	OCS	156	8	3						X	
MAIN PIER	FMB	CONC	10	A	N,SOF	OCS	108	8	4						X	
MAIN PIER	SOF	CONC	9.5	A.3	SOF	OCS	36	36	3					X		
MAIN PIER	SOF	CONC	9.2	A.3	SOF	CCS	36	36	2				X			
MAIN PIER	SOF	CONC	9.2	A.1	SOF	CCS	36	36	2				X			
MAIN PIER	STRINGER	CONC	9	A.2	N,S,SOF	CR	120	0.125	2				X			MULTIPLE CRACKS
MAIN PIER	STRINGER	CONC	9	A.5	N,S,SOF	OCS/CR	72	8	3					X		
MAIN PIER	STRINGER	CONC	9	A.8	N,S,SOF	CR	120	0.125					X			MULTIPLE CRACKS
MAIN PIER	STRINGER	CONC	9	B	N,S,SOF	CCS	120						X			
MAIN PIER	STRINGER	CONC	8	A.4	N,S,SOF	OCS	120	8	3						X	
MAIN PIER	STRINGER	CONC	8	A.6	N,S,SOF	OCS	120	8	3						X	
MAIN PIER	STRINGER	CONC	8	A.8	N,S,SOF	OCS	120	8	3						X	
MAIN PIER	STRINGER	CONC	8	A.2	N,S,SOF	OCS	36	8	3						X	
MAIN PIER	STRINGER	CONC	7	A.1	N,S,SOF	OCS	120	8	3						X	
MAIN PIER	STRINGER	CONC	7	A.2	N,S,SOF	OCS	120	8	3						X	
MAIN PIER	STRINGER	CONC	7	A.4	N,S,SOF	OCS	48	8	3						X	
MAIN PIER	SOF	CONC	8.2	A.2	SOF	CCS	36	36	2				X			
MAIN PIER	SOF	CONC	8.2	A.4	SOF	CCS	36	36	2				X			

INSPECTION RECORD - CONCRETE FRAMING ELEMENTS

LOCATION: COMMERCIAL PORT, PITI GUAM

WSP JOB NO: 30901541B

STRUCTURE ID: PIER F1 - FRAMING ELEMENTS AT PIER AND TRESTLE

STRUCTURE	DESCRIPTION	MATERIAL	BENT #	PILE ROW	DAMAGE LOCATION	DAMAGE TYPE	DAMAGE SIZE (IN)			NI	DAMAGE RATING					COMMENTS
							LENGTH	WIDTH	DEPTH		ND	MN	MD	MJ	SV	
MAIN PIER	SOF	CONC	8.2	A.6	SOF	CCS	36	12	2				X			
MAIN PIER	SOF	CONC	8.9	A.9	SOF	CCS	18	12	2			X				
MAIN PIER	SOF	CONC	8.9	A.6	SOF	CCS	36	18	2				X			
MAIN PIER	STRINGER	CONC	8.5	A.2	SOF	CR	48	0.125					X			
MAIN PIER	SOF	CONC	8.6	A.1	SOF	OCS	12	12	1				X			
MAIN PIER	SOF	CONC	7.5	A.5	SOF	OCS	36	18	2					X		
MAIN PIER	PILE CAP	CONC	7	A-B	E,W,SOF	CCS	144	24	2					X		
MAIN PIER	PILE CAP	CONC	9	B	E,W,SOF	CCS	72	24	2					X		
MAIN PIER	PILE CAP	CONC	7	B-C	W,SOF	OCS	108	8	3						X	
MAIN PIER	PILE CAP	CONC	7	B	E,SOF	OCS	36	8	3						X	
MAIN PIER	PILE CAP	CONC	6	B	SOF	CCS	24	24						X		
MAIN PIER	STRINGER	CONC	6.2	A.1	SOF	OCS	12	6	1				X			
MAIN PIER	STRINGER	CONC	6.2	A.2	SOF	OCS	12	6	1				X			
MAIN PIER	STRINGER	CONC	6.4	A.4	SOF	OCS	12	6	1				X			
MAIN PIER	SOF	CONC	6.8	A.8	SOF	OCS	12	12	1			X				
MAIN PIER	STRINGER	CONC	5	A	N,SOF	OCS	8	6	4						X	
MAIN PIER	STRINGER	CONC	5	A.2	SOF	OCS	12	6	1				X			
MAIN PIER	STRINGER	CONC	5.2	A.4	SOF	OCS	48	6	2						X	
MAIN PIER	SOF	CONC	5.2	A.2	SOF	OCS	18	18	1				X			
MAIN PIER	SOF	CONC	5.2	A.4	SOF	OCS	48	24	1					X		
MAIN PIER	SOF	CONC	5.2	A.6	SOF	OCS	48	12	1				X			
MAIN PIER	SOF	CONC	5.2	A.9	SOF	CCS	24	24	2				X			
MAIN PIER	PILE CAP	CONC	4	B	S,SOF	OCS	24	6	2					X		
MAIN PIER	SOF	CONC	4.2	A.8	SOF	OCS	12	12	1				X			
MAIN PIER	SOF	CONC	4.2	A.6	SOF	OCS	8	8	1			X				

INSPECTION RECORD - CONCRETE FRAMING ELEMENTS

LOCATION: COMMERCIAL PORT, PITI GUAM

WSP JOB NO: 30901541B

STRUCTURE ID: PIER F1 - FRAMING ELEMENTS AT PIER AND TRESTLE

STRUCTURE	DESCRIPTION	MATERIAL	BENT #	PILE ROW	DAMAGE LOCATION	DAMAGE TYPE	DAMAGE SIZE (IN)			NI	DAMAGE RATING					COMMENTS
							LENGTH	WIDTH	DEPTH		ND	MN	MD	MJ	SV	
MAIN PIER	SOF	CONC	4.4	A.4	SOF	OCS/CCS	48	36	1					X		
MAIN PIER	SOF	CONC	4.4	A.2	SOF	OCS	60	12	1					X		
MAIN PIER	STRINGER	CONC	4	A.4	SOF	CR	48	0.25						X		
MAIN PIER	STRINGER	CONC	4.5	A.8	N,SOF	CCS	24	12	2				X			
MAIN PIER	PILE CAP	CONC	3	A	N,SOF	OCS	120	8	3						X	
MAIN PIER	SOF	CONC	3.2	A.2	SOF	OCS	30	30	1					X		
MAIN PIER	SOF	CONC	3.2	A.4	SOF	OCS	30	30	1					X		
MAIN PIER	SOF	CONC	3.2	A.6	SOF	OCS	30	30	1					X		
MAIN PIER	SOF	CONC	3.4	A.8	SOF	OCS	30	18	1					X		
MAIN PIER	SOF	CONC	3.6	A.2	SOF	CCS	18	18	2				X			
MAIN PIER	SOF	CONC	3.5	A.6	SOF	CCS	18	18	2				X			
MAIN PIER	SOF	CONC	3.8	A.6	SOF	CCS	18	18	2				X			
MAIN PIER	STRINGER	CONC	2	A	N,SOF	CCS	8	8	2				X			
MAIN PIER	SOF	CONC	2.1	A.2	SOF	OCS	8	8	1			X				
MAIN PIER	SOF	CONC	2.1	A.4	SOF	OCS	60	12	1				X			
MAIN PIER	SOF	CONC	2.4	A.6	SOF	OCS	48	18	1					X		
MAIN PIER	STRINGER	CONC	2.1	A.6	SOF	CCS	48	8	2				X			
MAIN PIER	STRINGER	CONC	2.1	A.8	SOF	CCS	48	8	2				X			
MAIN PIER	PILECAP	CONC	2	A	N,SOF	OCS	120	8	3						X	
MAIN PIER	SOF	CONC	1.2	A.2	SOF	OCS	72	36	1					X		
MAIN PIER	SOF	CONC	1.2	A.4	SOF	CCS	60	36	2				X			
MAIN PIER	SOF	CONC	1.2	A.6	SOF	OCS	96	36	1					X		
MAIN PIER	SOF	CONC	1.8	A.8	SOF	OCS	48	36	1					X		
MAIN PIER	STRINGER	CONC	1	A.2	S,SOF	OCS	108	8	2						X	
MAIN PIER	STRINGER	CONC	1.8	A.4	S,SOF	OCS	24	8	1					X		
MAIN PIER	STRINGER	CONC	1	A	N,SOF	OCS/CR	36	6	1					X		

INSPECTION RECORD - CONCRETE FRAMING ELEMENTS

LOCATION: COMMERCIAL PORT, PITI GUAM

WSP JOB NO: 30901541B

STRUCTURE ID: PIER F1 - FRAMING ELEMENTS AT PIER AND TRESTLE

STRUCTURE	DESCRIPTION	MATERIAL	BENT #	PILE ROW	DAMAGE LOCATION	DAMAGE TYPE	DAMAGE SIZE (IN)			NI	DAMAGE RATING					COMMENTS
							LENGTH	WIDTH	DEPTH		ND	MN	MD	MJ	SV	
MAIN PIER	PILE CAP	CONC	10	B.1	E,SOF	OCS	96	24	3						X	
MAIN PIER	SOF	CONC	9.2	A.4	SOF	CCS	18	18	2				X			
MAIN PIER	PILE CAP	CONC	9	B.5	W,SOF	OCS	72	12	3						X	
MAIN PIER	PILE CAP	CONC	10	C	SOF	CCS	24	24	2				X			
MAIN PIER	EDGE BEAM	CONC	9	C	SOF	OCS	108	12	2						X	
MAIN PIER	SOF	CONC	9	B.8	SOF	OCS	8	8	1				X			
MAIN PIER	STRINGER	CONC	9	B.2	N,S,SOF	OCS	120	8	2						X	
MAIN PIER	STRINGER	CONC	9	B.4	N,S,SOF	OCS	120	8	2						X	1/4-INCH CR
MAIN PIER	STRINGER	CONC	9	B.6	N,S,SOF	OCS	120	8	2						X	
MAIN PIER	STRINGER	CONC	9	B.8	N,S,SOF	OCS	72	8	2						X	
MAIN PIER	SOF	CONC	9	B.6	SOF	CCS	60	36	2				X			
MAIN PIER	PILE CAP	CONC	8	B.8	SOF	CCS	24	24	2				X			
MAIN PIER	SOF	CONC	7.8	B.8	SOF	OCS	24	24	1					X		
MAIN PIER	SOF	CONC	7.8	B.6	SOF	OCS	12	12	1					X		
MAIN PIER	STRINGER	CONC	7.6	B.6	SOF	CR	60	0.625					X			
MAIN PIER	EDGE BEAM	CONC	7	C	S,SOF	OCS	84	10	3						X	
MAIN PIER	**EDGE BEAM**	**CONC**	**7 - 9**	**C**	**N,SOF**	**CR**	**288**	**0.5**	**3**						**X**	
MAIN PIER	STRINGER	CONC	6	B.6	N,SOF	OCS	24	8	2						X	
MAIN PIER	STRINGER	CONC	6	B.8	N,S,SOF	OCS	72	8	2						X	
MAIN PIER	STRINGER	CONC	6	C	S,SOF	OCS	48	8	2						X	
MAIN PIER	SOF	CONC	6	B.2	SOF	OCS	12	12	1				X			
MAIN PIER	SOF	CONC	6	B.4	SOF	OCS	12	12	1				X			
MAIN PIER	STRINGER	CONC	5	C	S,SOF	OCS	120	8	2						X	
MAIN PIER	SOF	CONC	5	B.6	SOF	OCS	12	12	1				X			
MAIN PIER	STRINGER	CONC	4	B.6	SOF	OCS	12	4	1				X			
MAIN PIER	SOF	CONC	4	B.2	SOF	CCS	24	24	2				X			

INSPECTION RECORD - CONCRETE FRAMING ELEMENTS

LOCATION: COMMERCIAL PORT, PITI GUAM | **WSP JOB NO:** 30901541B

STRUCTURE ID: PIER F1 - FRAMING ELEMENTS AT PIER AND TRESTLE

STRUCTURE	DESCRIPTION	MATERIAL	BENT #	PILE ROW	DAMAGE LOCATION	DAMAGE TYPE	DAMAGE SIZE (IN)			NI	DAMAGE RATING					COMMENTS
							LENGTH	WIDTH	DEPTH		ND	MN	MD	MJ	SV	
MAIN PIER	SOF	CONC	4	B.4	SOF	CCS	24	24	2				X			
MAIN PIER	SOF	CONC	4.5	B.5	SOF	OCS	12	12	1				X			
MAIN PIER	STRINGER	CONC	4.2	B.4	SOF	CR	18	0.1875					X			
MAIN PIER	SOF	CONC	4.2	B.1	SOF	OCS	12	12	1				X			
MAIN PIER	PILE CAP	CONC	4	B	SOF	CCS	24	24	2				X			
MAIN PIER	PILE CAP	CONC	4	C	E	CR	36	0.0625					X			
MAIN PIER	PILE CAP	CONC	4	C	SOF	CCS	24	24	2				X			
MAIN PIER	EDGE BEAM	CONC	3	C	S	CR	60	0.25							X	
MAIN PIER	SOF	CONC	2	B.4	SOF	CCS	12	12	2				X			
MAIN PIER	SOF	CONC	2	B.6	SOF	OCS	60	24	2						X	
MAIN PIER	SOF	CONC	2.2	B.6	SOF	OCS	12	12	1					X		
MAIN PIER	SOF	CONC	2	B.8	SOF	OCS	60	12	1					X		
MAIN PIER	STRINGER	CONC	2	C	S,SOF	OCS	96	8	2						X	
MAIN PIER	STRINGER	CONC	2	B.6	S	OCS	12	4	1					X		
MAIN PIER	STRINGER	CONC	2.4	B.4	N	CCS	12	4	2				X			
MAIN PIER	STRINGER	CONC	1	C	S	OCS	84	8	2						X	
MAIN PIER	EDGE BEAM	CONC	1	C	S	OCS	48	8	2					X		
MAIN PIER	SOF	CONC	1.8	B.6	SOF	OCS	48	48	1					X		
MAIN PIER	STRINGER	CONC	1.4	B.4	S,SOF	OCS	36	8	1					X		
MAIN PIER	STRINGER	CONC	1	B.2	S,SOF	OCS	36	8	1					X		
TRESTLE	PILE CAP	CONC	7	A	N,E,S,SOF	OCS	48	8	5						X	
TRESTLE	PILE CAP	CONC	7	B	SOF	CCS	24	24	2				X			
TRESTLE	PILE CAP	CONC	7	B	N,SOF	OCS	48	8	2					X		
TRESTLE	**PILE CAP**	**CONC**	**4 - 6**	**E**	**W,SOF**	**CR**	**360**	**0.5**	**2**						**X**	
TRESTLE	PILE CAP	CONC	6	A	N,SOF	OCS/CR	36	8	2					X		
TRESTLE	PILE CAP	CONC	6	B	S,SOF	CCS	36	8	2				X			

INSPECTION RECORD - CONCRETE FRAMING ELEMENTS

LOCATION: COMMERCIAL PORT, PITI GUAM

WSP JOB NO: 30901541B

STRUCTURE ID: PIER F1 - FRAMING ELEMENTS AT PIER AND TRESTLE

STRUCTURE	DESCRIPTION	MATERIAL	BENT #	PILE ROW	DAMAGE LOCATION	DAMAGE TYPE	DAMAGE SIZE (IN)			NI	DAMAGE RATING					COMMENTS
							LENGTH	WIDTH	DEPTH		ND	MN	MD	MJ	SV	
TRESTLE	PILE CAP	CONC	6	C	SOF	OCS	24	12	2				X			
TRESTLE	PILE CAP	CONC	5	A	N,S,SOF	OCS	60	12	3					X		
TRESTLE	PILE CAP	CONC	5	C	N,S,SOF	OCS	36	12	2					X		
TRESTLE	PILE CAP	CONC	5	D.9	N,S,SOF	OCS	48	12	2						X	
TRESTLE	PILE CAP	CONC	4	A	N,S	CR	24	HL				X				
TRESTLE	PILE CAP	CONC	4	C	N,S,SOF	OCS	24	24	2					X		
TRESTLE	PILE CAP	CONC	3	A	S	CR	120	HL				X				
TRESTLE	PILE CAP	CONC	2	A	S	CCS	24	8	2				X			
TRESTLE	PILE CAP	CONC	2	B	S	CCS	48	8	2				X			
TRESTLE	PILE CAP	CONC	1	A	S	CR	240	0.0625					X			
TRESTLE	PILE CAP	CONC	1	A	SOF	CCS	120	24	2				X			
TRESTLE	PILE CAP	CONC	1	C	N,S,SOF	OCS	96	24	4						X	
TRESTLE	PILE CAP	CONC	1	A.5	TOP	CCS	72	10	2					X		

INSPECTION RECORD - CONCRETE FRAMING ELEMENTS

LOCATION: COMMERCIAL PORT, PITI GUAM | **WSP JOB NO:** 30901541B

STRUCTURE ID: PIER F1 - FRAMING ELEMENTS AT DOLPHINS

STRUCTURE	DESCRIPTION	MATERIAL	QUAD	NEAREST PILE #	DAMAGE LOCATION	DAMAGE TYPE	DAMAGE SIZE (IN) LENGTH	WIDTH	DEPTH	NI	DAMAGE RATING ND	MN	MD	MJ	SV	COMMENTS
DOLPHIN A																
A	PILE CAP	CONC	A	3	SOF	OCS	12	12	2				X			
A	PILE CAP	CONC	C	8	S	CCS	144	12					X			TOP AND BTM CORNER OF CAP
A	PILE CAP	CONC	B,C	6,7,11	E	CCS	144	12					X			BTM CORNER OF CAP
A	PILE CAP	CONC	1	2	N	CCS	72	12				X				BTM CORNER OF CAP
DOLPHIN B																
B	PILE CAP	CONC	C,D	5,6,7	SOF	CCS	240	12					X			CORNER CCS AT BTM
B	PILE CAP	CONC	C,D	5,6,7	SOF	CCS	240	12					X			CORNER CCS AT TOP
B	PILE CAP	CONC	B,C	15,1,2,3,4	E	CR	240	HL				X				
DOLPHIN C																
C	PILE CAP	CONC	B	11	SOF	CCS	180	120						X		
C	PILE CAP	CONC	A,D	23,24,25,26	TOP	CCS	225	8					X			CORNER CCS ON TOP OF DOLPHIN
C	PILE CAP	CONC	C	8	SOF	CR	24	0.625					X			MULTIPLE CRACKS IN PEDESTAL
C	PILE CAP	CONC	C	7	SOF	CR	36	0.0625						X		(2) CRACKS EXTEND 36" UP SOUTH FACE, (1) CR EXTENDS TO PILE 6
C	PILE CAP	CONC	C	8	SOF	OCS	8	8	1			X				
C	PILE CAP	CONC	C	9	SOF	OCS	12	12	2					X		AT PILE PEDESTAL
C	PILE CAP	CONC	D	17	SOF	OCS/CR	18	12	3						X	AT PILE PEDESTAL
C	PILE CAP	CONC	D	15	S,SOF	CCS	72	24					X			
C	PILE CAP	CONC	D	16	TOP	CCS	96	12					X			TOP CORNER
C	PILE CAP	CONC	D	15	SOF	OCS	24	24	2				X			

INSPECTION RECORD - CONCRETE FRAMING ELEMENTS

LOCATION: COMMERCIAL PORT, PITI GUAM | **WSP JOB NO:** 30901541B

STRUCTURE ID: PIER F1 - FRAMING ELEMENTS AT DOLPHINS

STRUCTURE	DESCRIPTION	MATERIAL	QUAD	NEAREST PILE #	DAMAGE LOCATION	DAMAGE TYPE	DAMAGE SIZE (IN)			NI	DAMAGE RATING					COMMENTS
							LENGTH	WIDTH	DEPTH		ND	MN	MD	MJ	SV	
C	PILE CAP	CONC	D	16	SOF	CR	36	0.03125				X				
C	PILE CAP	CONC	A	14	SOF	CCS	18	18					X			
C	PILE CAP	CONC	A	21	SOF	CCS	12	12				X				AT PILE 21
C	PILE CAP	CONC	C,D	15	S	CR	288	0.1875					X			CR 3" DOWN ON SOUTH FACE
C	PILE CAP	CONC	A	20	SOF	OCS	48	48	2					X		
C	PILE CAP	CONC	D	15	SOF	CR	168	0.03125				X				BETWEEN PILES 15 AND 17
DOLPHIN D																
D	PILE CAP	CONC	C	26	SOF	CR	18	0.625						X		CR AT PEDESTAL, OCS AT BTM OF PEDEST
D	PILE CAP	CONC	C	20	SOF	CR, OCS	12	8	1					X		MULTIPLE HL CRACKS AT PEDESTAL
D	PILE CAP	CONC	C	25	SOF	CR,CCS									X	MULTIPLE CRACKS, BROKEN PEDESTAL
D	PILE CAP	CONC	C	21	SOF	CCS	12	12					X			CORNER OF PEDESTAL
D	**PILE CAP**	**CONC**	**D**	**8**	**SOF**	**CCS,CR**	**24**	**24**							**X**	**MULTIPLE CRACKS, BROKEN PEDESTAL**
D	PILE CAP	CONC	D	7	SOF	CCS	18	18					X			0.625" CR
D	PILE CAP	CONC	D	22	S	CCS	156	12					X			TOP CORNER OF PILE CAP
D	PILE CAP	CONC	C	20	S	OCS/CCS	204	12	3				X			TOP CORNER OF PILE CAP
D	PILE CAP	CONC	C	17,18,19	E	CCS	120	8					X			
D	PILE CAP	CONC	A	9	SOF	CCS	96	84					X			
D	PILE CAP	CONC	B	24	SOF	CCS	144	96					X			
D	PILE CAP	CONC	C,D	21	S	CR	432	0.03125				X				CR ALONG SOUTH FACE
DOLPHIN G																
G	PILE CAP	CONC	7		SOF	OCS/CR									X	PEDESTAL BROKEN
G	PILE CAP	CONC	13,14		N	CR	24	HL				X				MULTIPLE HL CRACKS
G	PILE CAP	CONC	10,11		W	CCS,CR	120	24					X			MULTIPLE HL CRACKS
G	PILE CAP	CONC	3-12		SOF	OCS	192	24	4						X	MULTIPLE EXPOSED BARS

INSPECTION RECORD - CONCRETE FRAMING ELEMENTS

LOCATION: COMMERCIAL PORT, PITI GUAM

WSP JOB NO: 30901541B

STRUCTURE ID: PIER F1 - FRAMING ELEMENTS AT DOLPHINS

STRUCTURE	DESCRIPTION	MATERIAL	QUAD	NEAREST PILE #	DAMAGE LOCATION	DAMAGE TYPE	DAMAGE SIZE (IN)			NI	DAMAGE RATING					COMMENTS
							LENGTH	WIDTH	DEPTH		ND	MN	MD	MJ	SV	
DOLPHIN H																
H	PILE CAP	CONC		10	W	CCS	120	60							X	PREVIOUS REPAIR FAILING
H	PILE CAP	CONC		5	W,SOF	OCS	60	60	6						X	
H	PILE CAP	CONC		6	SOF	OCS	48	36	4						X	
H	PILE CAP	CONC		2,4,58	E	CR	144	HL					X			MULTIPLE HL CRACKS AT BTM
H	PILE CAP	CONC		12	SOF	OCS	72	60	6						X	FAILED REPAIR
H	PILE CAP	CONC		12	SOF	FAIL									X	FAILED CONNECTION
H	PILE CAP	CONC	C		TOP	OCS	12	12	2				X			
H	PILE CAP	CONC	D		TOP	OCS	12	12	X				X			
H	PILE CAP	CONC	D		TOP	OCS	12	12	X				X			

INSPECTION RECORD - CONCRETE FRAMING ELEMENTS

LOCATION: COMMERCIAL PORT, PITI GUAM | **WSP JOB NO:** 30901541B

STRUCTURE ID: PIER F1 - APPURTENANCES

STRUCTURE	DESCRIPTION	MATERIAL			DAMAGE LOCATION	DAMAGE TYPE	DAMAGE SIZE (IN) LENGTH	WIDTH	DEPTH	NI	DAMAGE RATING ND	MN	MD	MJ	SV	COMMENTS
MAIN PIER AND TRESTLE																
MAIN PIER	LADDER	STEEL				COR						X				
MAIN PIER	CURB	CONC				MESP						X				MESP AT MULTIPLE LOCS
TRESTLE	BULLRAIL	CONC				MESP						X				
DOLPHIN A																
A	WALKWAY	STEEL				COR						X				A TO B
A	BOLLARD	STL/CI				COR						X				QUICK RELEASE HOOK AND INTEGRATED CAPSTAN
A	BOLLARD FND	CONC				SPALL						X				
A	**LADDER**	**STEEL**				**FAILED**									**X**	**NON-FUNCTIONAL**
DOLPHIN B																
B	WALKWAY	STEEL				COR						X				B TO C
B	BOLLARD	STL/CI				COR						X				QUICK RELEASE HOOK AND INTEGRATED CAPSTAN
B	BOLLARD FND	CONC				SPALL						X				
DOLPHIN C																
C	PANEL	STEEL				COR									X	
C	FACING	UHMW-PE				WORN							X			WORN
C	FACING	UHMW-PE				MISSING									X	MISSING x2
C	**FACING**	**UHMW-PE**				**WORN**									**X**	**MISSING x1**
C	FENDERS	RUBBER				CR						X				CRACKING
C	FNDR PL	STEEL				COR							X			
C	WALKWAY	STEEL				COR						X				MAIN PIER TO C
C	BOLLARD	STL/CI				COR						X				QUICK RELEASE HOOK AND INTEGRATED CAPSTAN
C	BOLLARD FND	CONC				SPALL						X				
DOLPHIN D																
D	PANEL	STEEL				COR									X	
D	FACING	UHMW-PE				WORN							X			WORN

INSPECTION RECORD - CONCRETE FRAMING ELEMENTS

LOCATION: COMMERCIAL PORT, PITI GUAM | **WSP JOB NO:** 30901541B

STRUCTURE ID: PIER F1 - APPURTENANCES

STRUCTURE	DESCRIPTION	MATERIAL			DAMAGE LOCATION	DAMAGE TYPE	DAMAGE SIZE (IN)			NI	DAMAGE RATING					COMMENTS
							LENGTH	WIDTH	DEPTH		ND	MN	MD	MJ	SV	
D	FACING	UHMW-PE				MISSING									X	MISSING x2
D	**FACING**	**UHMW-PE**				**WORN**									**X**	**MISSING x1**
D	FENDERS	RUBBER				CR							X			MISALIGNED ATTACHMENT CLIP, TEARING, DELAM, CRACKS
D	FNDR PL	STEEL				COR							X			
D	WALKWAY	STEEL				COR						X				SHORELINE TO D
D	WALKWAY	STEEL				COR						X				D TO H
D	BOLLARD	STL/CI				COR						X				QUICK RELEASE HOOK AND INTEGRATED CAPSTAN
D	BOLLARD FND	CONC				SPALL						X				
DOLPHIN E																
E	BOLLARD	STL/CI				COR						X				QUICK RELEASE HOOK AND INTEGRATED CAPSTAN
E	BOLLARD FND	CONC				SPALL						X				
DOLPHIN F																
F	BOLLARD	STL/CI				COR						X				QUICK RELEASE HOOK AND INTEGRATED CAPSTAN
F	BOLLARD FND	CONC									X					
DOLPHIN G																
G	PANEL	STEEL				COR								X		
G	FACING	UHMW-PE				WORN								X		WORN FACING
G	FENDERS	RUBBER				CR						X				
G	CHAINS	STEEL				COR					X					
G	CHAIN PL	STEEL				COR					X					
G	FNDR PL	STEEL				COR,SCL									X	
G	**WALKWAY**	**STEEL**				**MISSING**									**X**	**MISSING**
DOLPHIN H																
H	PANEL	STEEL													X	MISSING
H	FACING	UHMW-PE													X	MISSING
H	FENDERS	RUBBER													X	MISSING

INSPECTION RECORD - CONCRETE FRAMING ELEMENTS

LOCATION:	COMMERCIAL PORT, PITI GUAM	**WSP JOB NO:**	30901541B
STRUCTURE ID:	PIER F1 - APPURTENANCES		

STRUCTURE	DESCRIPTION	MATERIAL			DAMAGE LOCATION	DAMAGE TYPE	DAMAGE SIZE (IN)			NI	DAMAGE RATING					COMMENTS
							LENGTH	WIDTH	DEPTH		ND	MN	MD	MJ	SV	
H	CHAINS	STEEL									X					
H	CHAIN PL	STEEL									X					
H	FNDR PL	STEEL				COR									X	
H	**WALKWAY**	**STEEL**				**MISSING**									**X**	**MISSING**
MISC ELEMENTS																
TRESTLE	**PVC PIPE**					**BROKEN**									**X**	**DRAIN PIPE BROKEN**
DOLPHIN A	**LIFE RING**					**MISSING**									**X**	**RING MISSING, STAND DESTROYED**
UPLAND	**FIRE HOSE SHACK**					**COLLAPSE**									**X**	
MISC	**LIGHTING**					**DESTROY**									**X**	**LIGHT POLES AND FIXTURES DAMAGED**
MISC	**SIGNAGE**					**DESTROY**									**X**	**x3**
TANK 1929	**GUARDRAIL**					**DESTROY**									**X**	
FENCE	**FENCE AND GATE**					**BENT**									**X**	**GRAVEL EROSION AND FENCE/GATE DAMAGE**
OFFICE	**DOOR**					**DELAM**								**X**		
BREAK RM	**INTERIOR**					**WATER DMG**									**X**	
BREAK RM	**A/C UNIT**					**BROKEN**									**X**	

INSPECTION RECORD - SLOPE ARMORING AND BULKHEAD

LOCATION: COMMERCIAL PORT, PITI GUAM

STRUCTURE ID: PIER F1 - PENINSULA SLOPE ARMORING

WSP JOB NO: 30901541B

ID	MATERIAL	FROM STA	TO STA	DAMAGE TYPE	DAMAGE SIZE (IN)			NI	DAMAGE RATING					COMMENTS
						HEIGHT	DEPTH		ND	MN	MD	MJ	SV	
ARMORING	RIP RAP	0+20	0+200	EROSION/MISSING		48	VARIES					X		SOUTH PENINSULA
ARMORING	RIP RAP	0+20	0+200	EROSION/MISSING		36	VARIES							NORTH PENINSULA

On the north and south sides of the peninsula, the May 2024 UW inspection effort observed cavities to be larger than previously inspected in Oct of 2022. Cavities extending 8' to 10' deep were observed at multiple locations. Loss of rip rap and dislodged rip rap was observed at various locations.

APPENDIX C

DAMAGE MAPS

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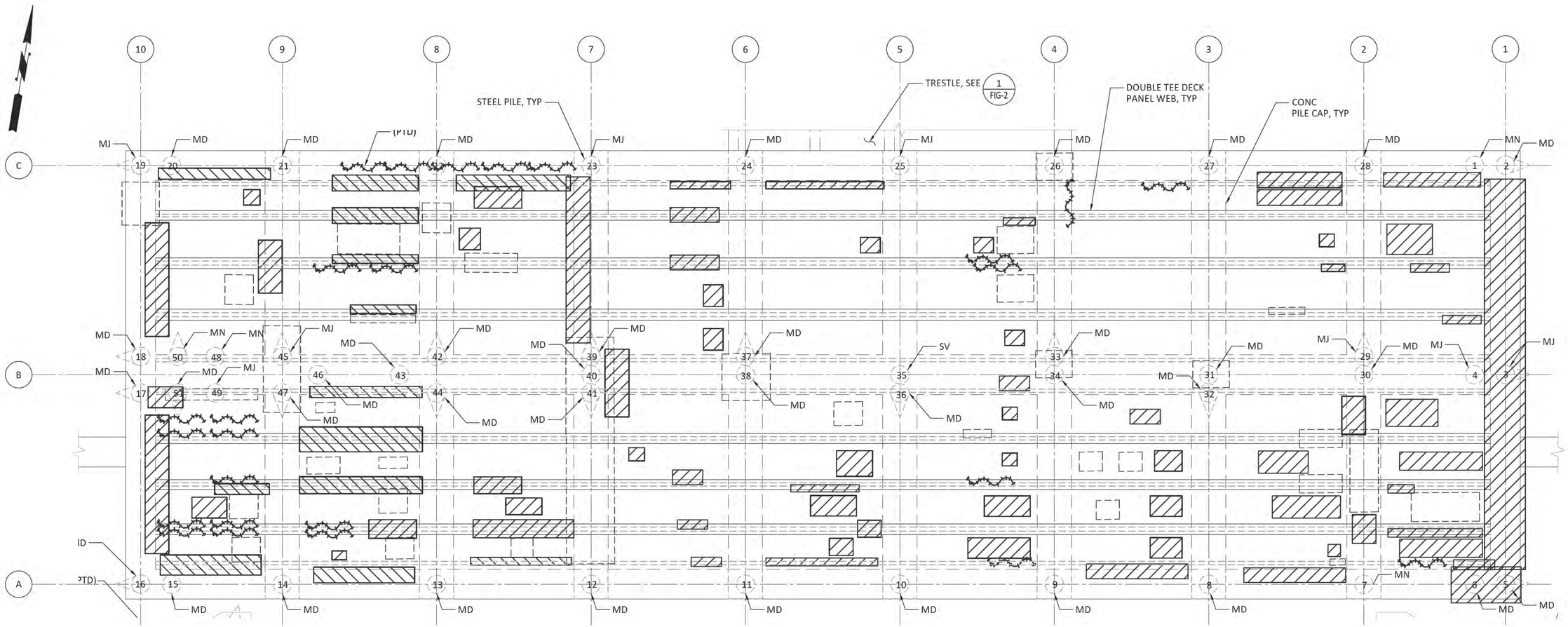

SOFFIT PLAN - MAIN PIER

1 / -

SCALE: 3/16" = 1'-0"

NOTES:

1. AT CONCRETE ELEMENTS, DAMAGES SHOWN ARE AT THE SOFFIT ELEVATION
2. DIMENSIONS SHOWN ARE NOT TO SCALE
3. MOORING HARDWARE AND MISC APPURTENANCES NOT SHOWN

LEGEND

PILE SYMBOLS

- STEEL PLUMB PILE
- STEEL BATTER PILE

DAMAGE RATINGS

MN	MINOR DAMAGE
MD	MODERATE DAMAGE
MJ	MAJOR DAMAGE
SV	SEVERE DAMAGE
	OPEN-CORROSION SPALL
	CLOSED-CORROSION SPALL
	CRACK

3/16" = 1'-0"

8 0 8 16

scale feet

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PORT AUTHORITY OF GUAM
PIER F1
CONDITION ASSESSMENT DAMAGE MAP

MAIN PIER

DRAWING NO. **FIG-1**
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DATE: 9/30/24
SHEET NO. 1 OF 6

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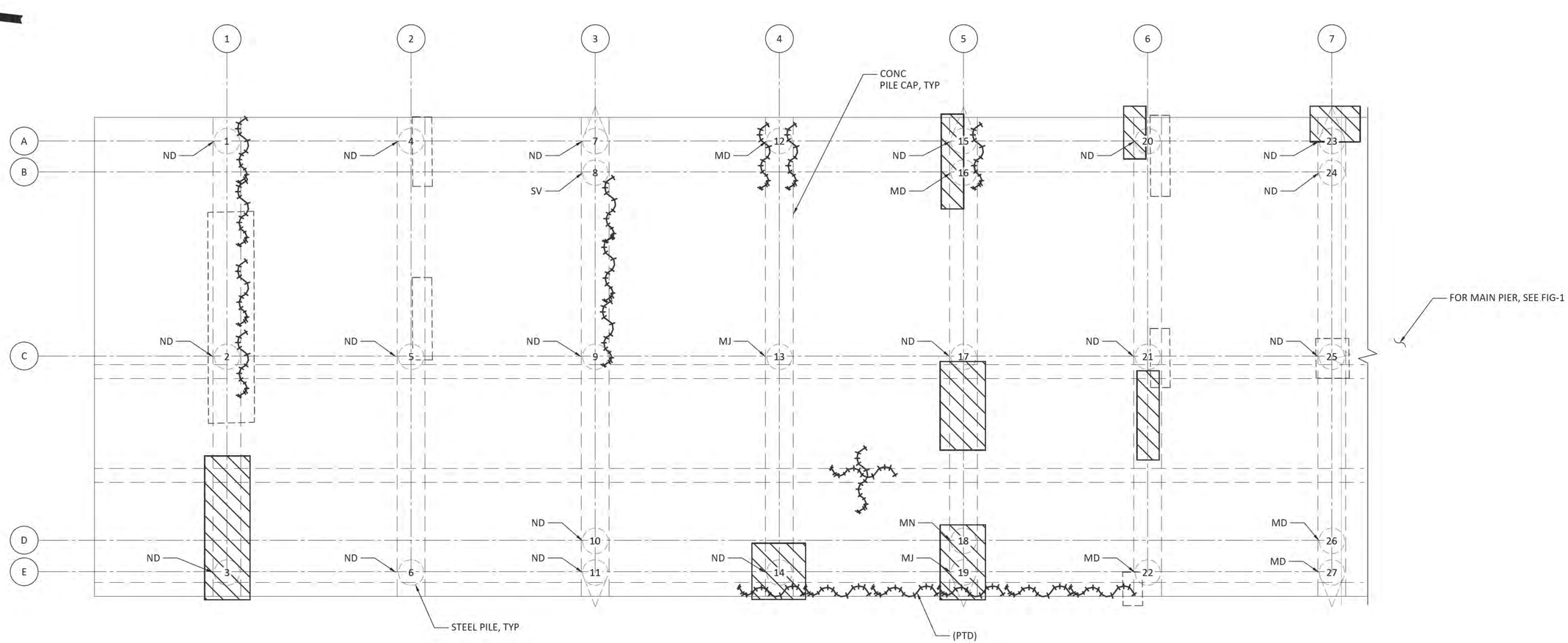

SOFFIT PLAN - TRESTLE

1 / - SCALE: 1/4" = 1'-0"

NOTES:

1. AT CONCRETE ELEMENTS, DAMAGES SHOWN ARE AT THE SOFFIT ELEVATION
2. DIMENSIONS SHOWN ARE NOT TO SCALE
3. MOORING HARDWARE AND MISC APPURTENANCES NOT SHOWN

LEGEND

PILE SYMBOLS

- STEEL PLUMB PILE
- STEEL BATTER PILE

DAMAGE RATINGS

MN	MINOR DAMAGE
MD	MODERATE DAMAGE
MJ	MAJOR DAMAGE
SV	SEVERE DAMAGE
	OPEN-CORROSION SPALL
	CLOSED-CORROSION SPALL
	CRACK

1/4" = 1'-0" scale 4 0 4 8 feet

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PIER F1
CONDITION ASSESSMENT DAMAGE MAP

TRESTLE

DRAWING NO. **FIG-2**
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SHEET NO. 2 OF 6

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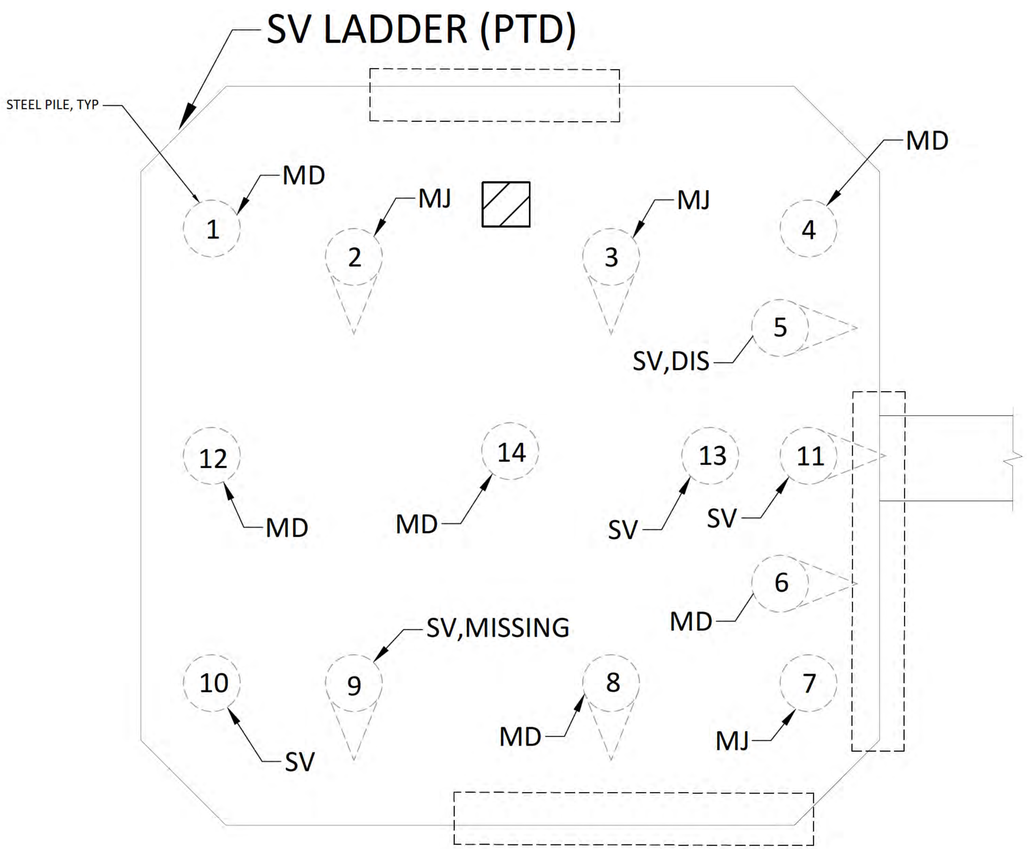
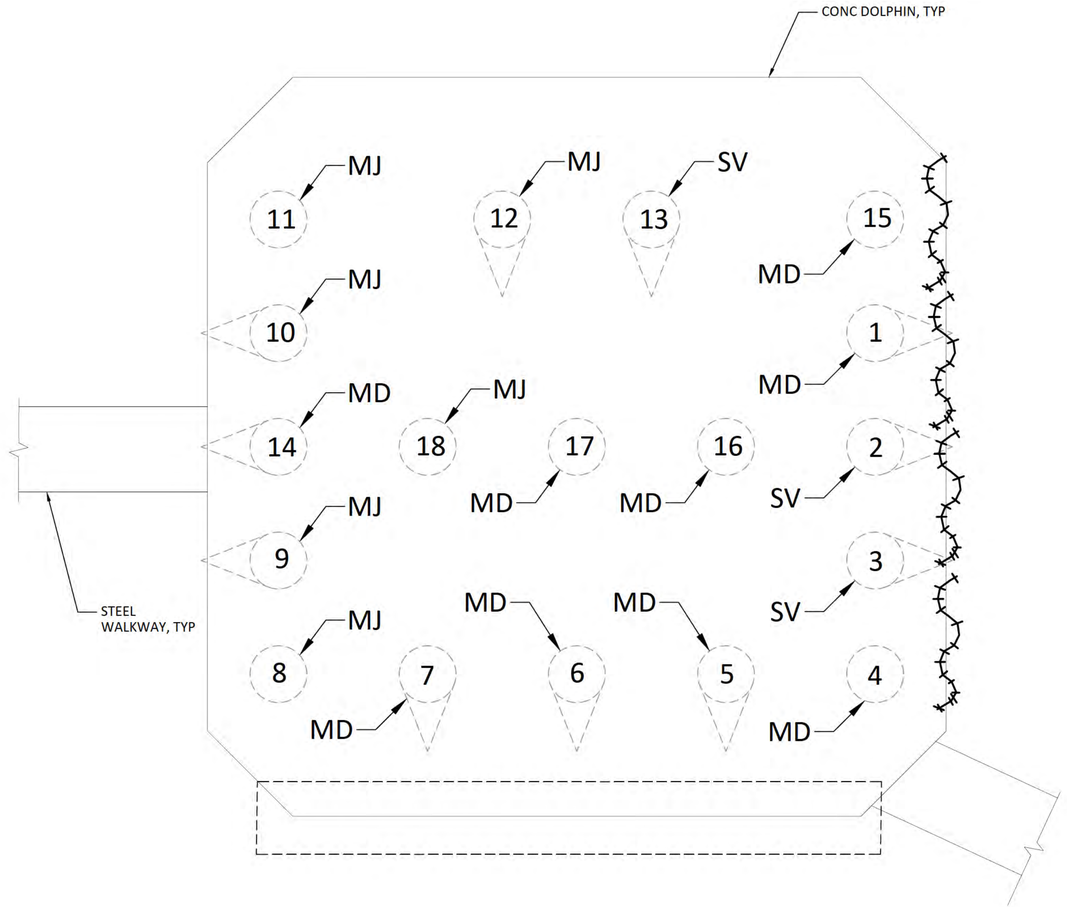


1 PLAN - DOLPHIN A
SCALE: 3/8" = 1'-0"



2 PLAN - DOLPHIN B
SCALE: 3/8" = 1'-0"

NOTES:

1. AT CONCRETE ELEMENTS, DAMAGES SHOWN ARE AT THE SOFFIT ELEVATION
2. DIMENSIONS SHOWN ARE NOT TO SCALE
3. MOORING HARDWARE AND MISC APPURTENANCES NOT SHOWN

LEGEND

PILE SYMBOLS

- STEEL PLUMB PILE
- STEEL BATTER PILE

DAMAGE RATINGS

MN	MINOR DAMAGE
MD	MODERATE DAMAGE
MJ	MAJOR DAMAGE
SV	SEVERE DAMAGE
	OPEN-CORROSION SPALL
	CLOSED-CORROSION SPALL
	CRACK

3/8" = 1'-0" scale 4 0 4 8 feet

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PIER F1
CONDITION ASSESSMENT DAMAGE MAP

DOLPHINS A AND B

DRAWING NO. FIG-3
PROJECT NO. 30901541B.002
DATE: 9/30/24
SHEET NO. 3 OF 6

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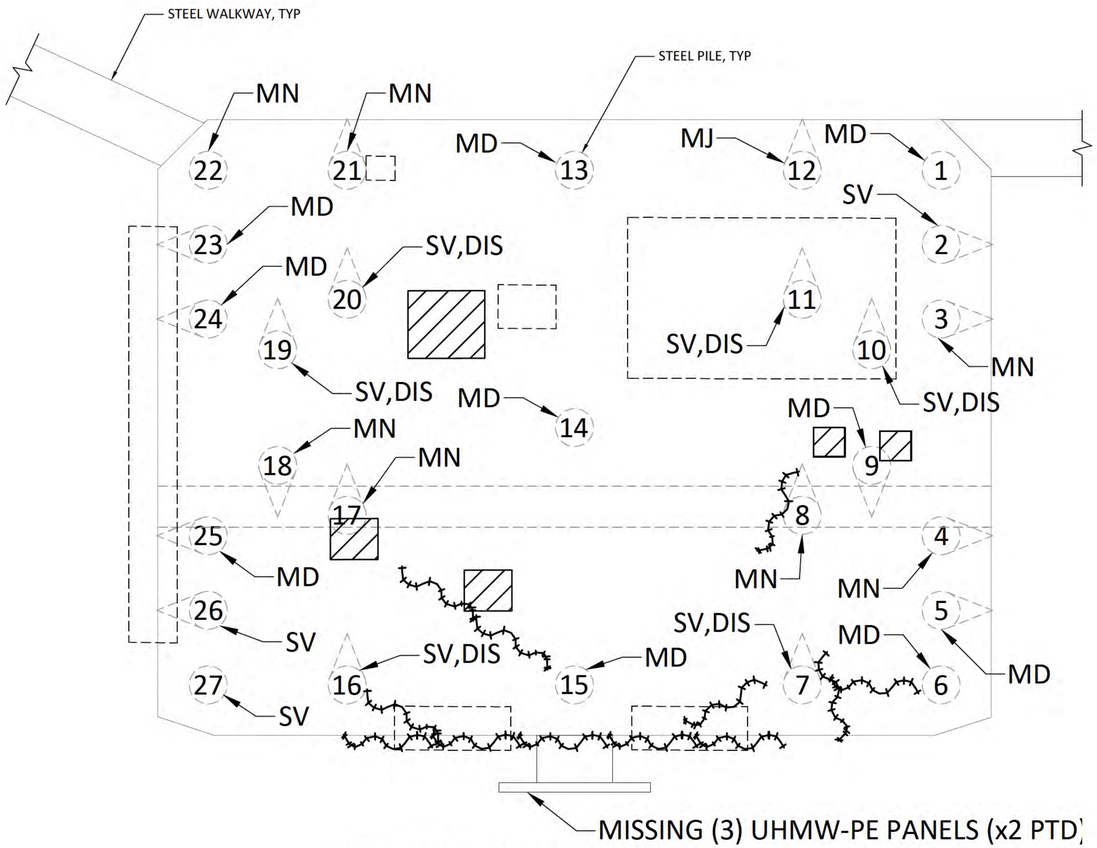
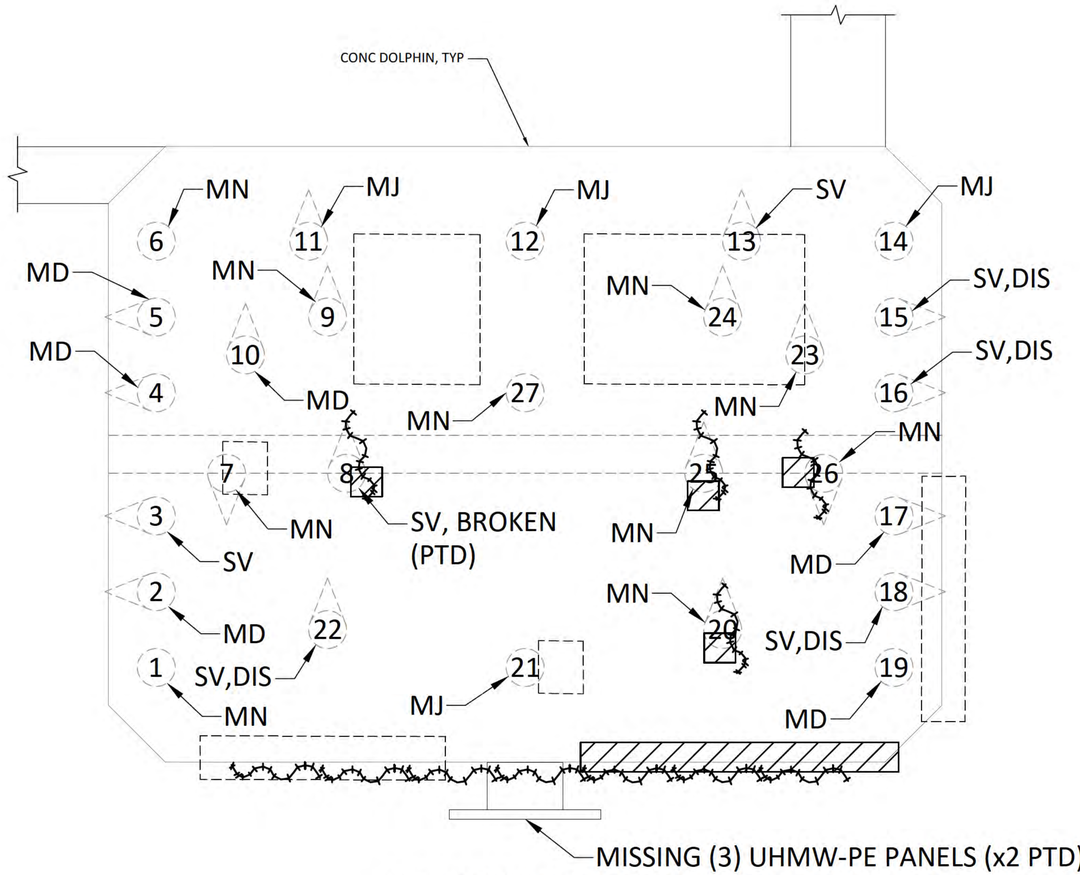


1 - **SOFFIT PLAN - DOLPHIN C**
SCALE: 1/4" = 1'-0"



2 - **SOFFIT PLAN - DOLPHIN D**
SCALE: 1/4" = 1'-0"

NOTES:

1. AT CONCRETE ELEMENTS, DAMAGES SHOWN ARE AT THE SOFFIT ELEVATION
2. DIMENSIONS SHOWN ARE NOT TO SCALE
3. MOORING HARDWARE AND MISC APPURTENANCES NOT SHOWN

LEGEND

PILE SYMBOLS

- STEEL PLUMB PILE
- STEEL BATTER PILE

DAMAGE RATINGS

MN	MINOR DAMAGE
MD	MODERATE DAMAGE
MJ	MAJOR DAMAGE
SV	SEVERE DAMAGE
	OPEN-CORROSION SPALL
	CLOSED-CORROSION SPALL
	CRACK

1/4" = 1'-0" scale 4 0 4 8 feet

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PIER F1
CONDITION ASSESSMENT DAMAGE MAP

DOLPHINS C AND D

DRAWING NO. **FIG-4**
PROJECT NO. 30901541B.002
DATE: 9/30/24
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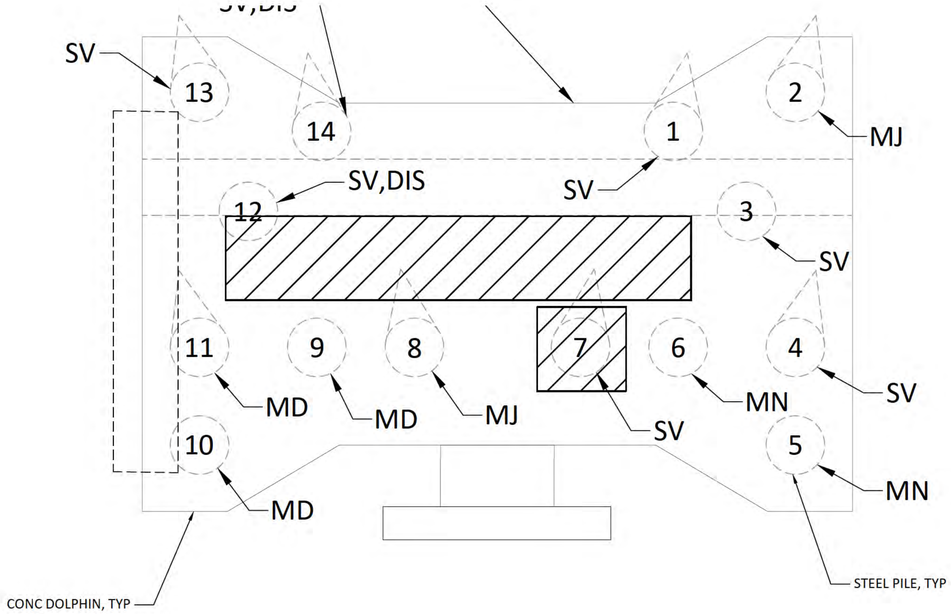
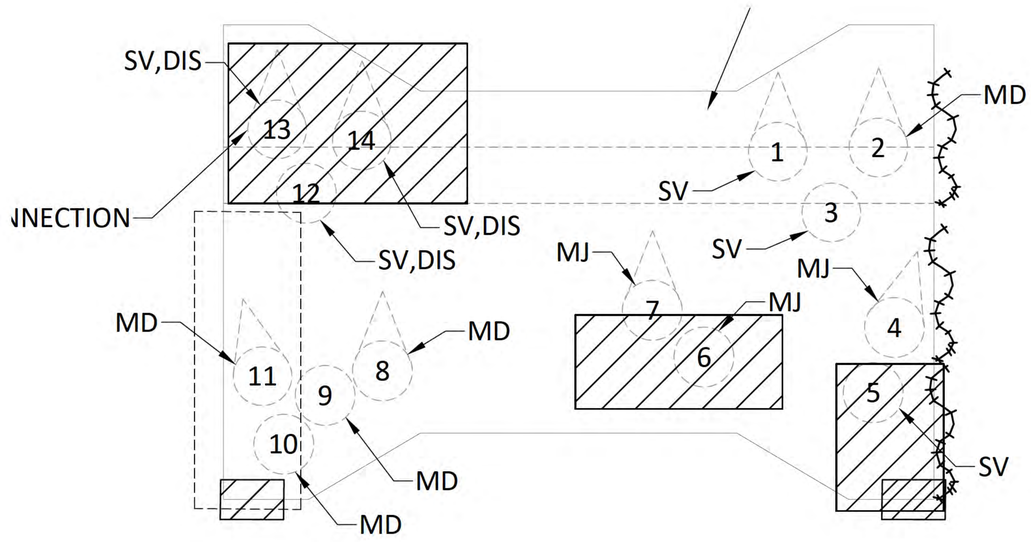


1 / - **SOFFIT PLAN - DOLPHIN G**
SCALE: 3/8" = 1'-0"



2 / - **SOFFIT PLAN - DOLPHIN H**
SCALE: 3/8" = 1'-0"

NOTES:

1. AT CONCRETE ELEMENTS, DAMAGES SHOWN ARE AT THE SOFFIT ELEVATION
2. DIMENSIONS SHOWN ARE NOT TO SCALE
3. MOORING HARDWARE AND MISC APPURTENANCES NOT SHOWN

LEGEND

PILE SYMBOLS

- STEEL PLUMB PILE
- STEEL BATTER PILE

DAMAGE RATINGS

MN	MINOR DAMAGE
MD	MODERATE DAMAGE
MJ	MAJOR DAMAGE
SV	SEVERE DAMAGE
	OPEN-CORROSION SPALL
	CLOSED-CORROSION SPALL
	CRACK

3/8" = 1'-0" scale 4 0 4 8 feet

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PIER F1
CONDITION ASSESSMENT DAMAGE MAP
DOLPHINS G AND H

DRAWING NO.	FIG-5
PROJECT NO.	30901541B.002
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SHEET NO.	5 OF 6

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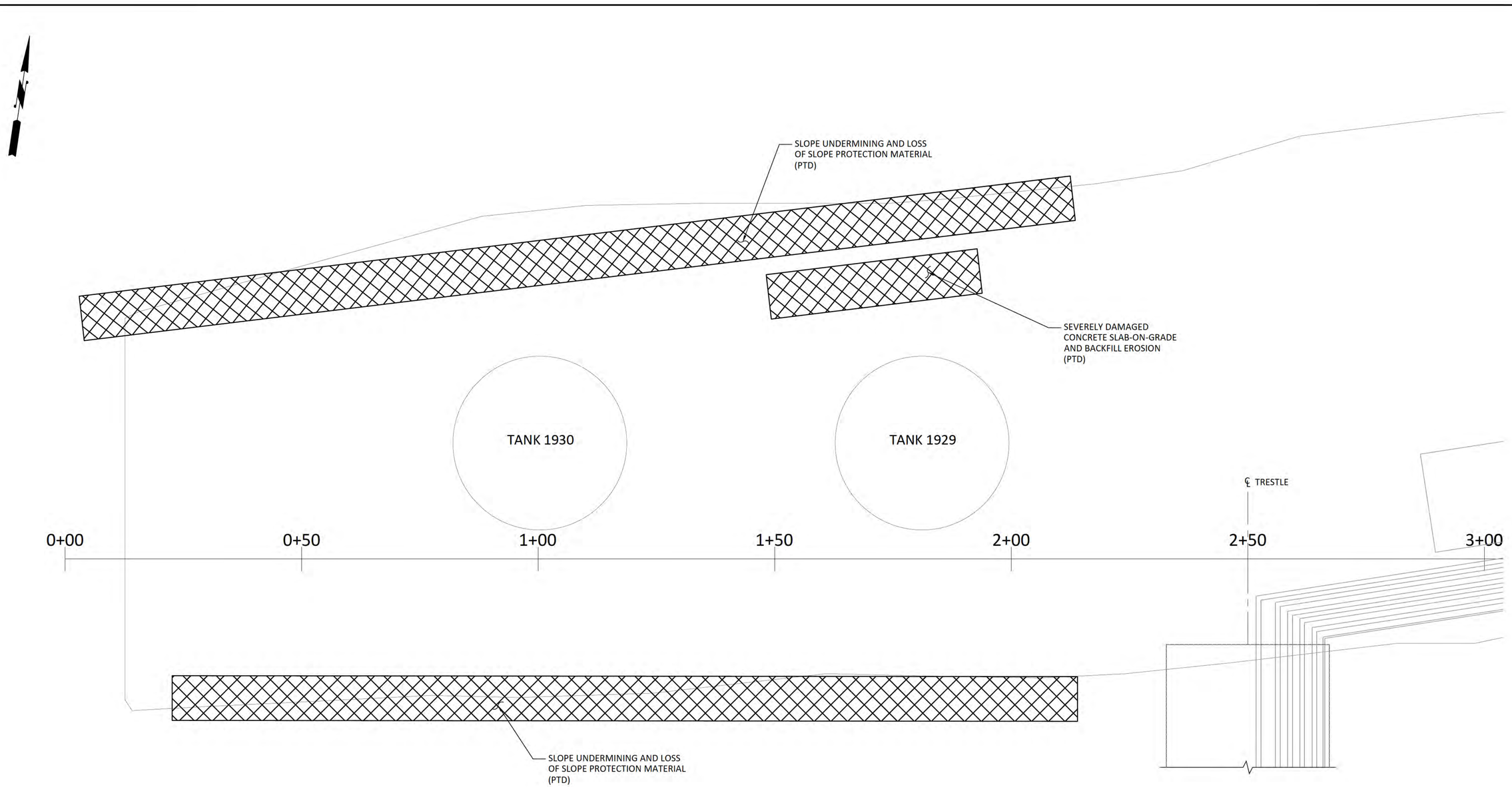

1 / - **PLAN - PENINSULA**
SCALE: 3/32" = 1'-0"

3/32" = 1'-0" scale 16 0 16 32 feet

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PIER F1
CONDITION ASSESSMENT DAMAGE MAP

PENINSULA

DRAWING NO. **FIG-6**
PROJECT NO. 30901541B.002
DATE: 9/30/24
SHEET NO. 6 OF 6

Doc. No. 38GL-26-2386.*

APPENDIX D

PIER F1 BERTHING AND MOORING ANALYSIS

Pier F1 Berthing and Mooring Analysis

Port Authority of Guam
WSP Contract No. 13369I
Subtask 3: Wharf Service Life Extension

Final Submittal

Submitted to

Port Authority of Guam
Piti, Guam

January 2023

Submitted by

WSP USA
590 South Marine Corps Drive
Suite 421
Tamuning, Guam 96913

13369I

PIER F1 BERTHING AND MOORING ANALYSIS
PORT AUTHORITY OF GUAM

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EXECUTIVE SUMMARY

In general, the berthing and mooring dolphins have been in service for approximately 75 years and have performed well. However, damage such as open-corrosion spalling, steel corrosion, and failure of previous repairs are present at multiple locations. These types of damages are normal and to be expected for marine structures of this age that have undergone multiple berthing/mooring cycles in a harsh marine environment. That being said, the berthing and mooring dolphins are at the end of their life span and should be replaced.

Berthing analysis results found that the calculated berthing energies for the design vessels should be reduced to help prevent further damage from occurring to piles at Breasting Dolphins C, D, and G. At Dolphin C, several piles are no longer connected to the concrete pile cap. Because these damaged piles were not included in the analysis, a larger percentage of berthing load is being transferred to adjacent piles, resulting in pile capacities being exceeded for berthing load cases. At Dolphin D, pile capacities are exceeded at multiple locations; a result of reduced pile cross-section thicknesses combined with large unsupported pile lengths. Pile capacity is not exceeded at Dolphin G for berthing loads. Dolphin H was not included in the analysis due to its non-functional fender system and observed level of damage.

Mooring analysis results found that pile capacities are exceeded at Dolphins A and D for large vessels when considering the 30 knot wind speed criteria. At Dolphin A, pile capacities are exceeded at two piles when applying the maximum mooring load of 161 kips. Note that this load represents the highest estimated mooring line load from the Optimoor analysis. Although the dolphin is equipped with double quick release hooks having a total capacity of 400 kips, this load was not considered as smaller loads were shown to exceed pile capacities. At Dolphin D, pile capacity is exceeded at one location. To prevent pile capacities from being exceeded and becoming permanently damaged and/or non-functional, it is recommended that vessels similar to the NS Concept are not moored at Pier F1 until such time that berthing and mooring dolphins can be replaced.

1.0 INTRODUCTION

In accordance with Task Order No. FY020-003WSP dated 4 September 2020, WSP is providing the results of the berthing and mooring analyses for Pier F1 to the Port Authority of Guam (PAG) at the Port of Guam, located in Piti, Guam. The purpose of this effort was to analyze the dolphin structures in their current condition and to determine if the dolphins are loaded beyond their capacity for design berthing and mooring forces. As stated in our proposal, berthing and mooring analyses were performed for three design vessels (small, medium, and large), which regularly berth at Pier F1. This study documents the findings of the analyses and includes the following.

1. Mooring assessment of Pier F1 in its current condition.
2. Berthing assessment of Pier F1 in its current condition.
3. Recommendations for repairs/replacement of structural elements determined to be insufficient for their intended use.
4. Recommendations for reduced berthing velocities and mooring wind speeds for the design vessels.

2.0 FACILITY DESCRIPTION

The Port of Guam (Port) is located on the western side of the island of Guam and encompasses over 1,000 acres of land. Strategically located along major Pacific shipping and air routes, the Port serves as an important transportation hub for the Commonwealth of the Northern Marianas, the Micronesian islands, and markets to the east and west. Maritime facilities at the Port consist of Golf Pier, Hotel Wharf, Pier F1, and Berths F2, F3, F4, F5, and F6. See Figure 1. Although not clearly defined, it is estimated that the above-mentioned marine structures have been in service since the mid-1940s. Throughout the life of the structures, we understand that multiple repair projects consisting of pile strengthening, pile cap repair, and corrosion protection have been performed.

The marine structures at Pier F1 consist of an approach trestle, main pier, four breasting dolphins, four mooring dolphins, and multiple access walkways. The approach trestle and main pier consist of a concrete deck surface spanning between concrete pile caps, which are supported by steel piles. See Figure 2.

The breasting dolphins, consisting of reinforced concrete pile caps supported by steel plumb and batter piles, are positioned on the south side of the main terminal. Dolphins C and D have independent fender systems consisting of Super Cell SUC 1600H buckling-type fenders; one fender at each dolphin. In accordance with the as-built drawings, each SUC 1600H fender has a maximum reaction of 410 kips and a maximum rated energy of 788 kip-feet. Steel fender panels with ultra-high molecular weight polyethylene (UHMW-PE) facing are present at each dolphin and provide a berthing surface for vessels. Single 200-kip quick release mooring hooks are located at Dolphins C and D. Dolphins G and H also have independent fender systems consisting of MV1000x900 leg fenders; two fenders at each dolphin. In accordance with the 2020 Trelleborg Fender Systems Catalog, the reaction and energy criteria for the MV1000 fenders were estimated to be 100 kips and 150 kip-feet, respectively. Similarly, steel fender panels with UHMW-PE facing are present and provide a berthing surface. See Appendix A for fender performance data.

Mooring Dolphins A and B consist of reinforced concrete pile caps and are supported by steel plumb and batter piles. These dolphins are positioned northwest of the main pier and are equipped with double, 200-kip quick release hooks. Mooring Dolphins E and F are located northeast of Breasting Dolphin D and are also equipped with double 200-kip quick release hooks. Note that evaluation of Dolphins E and F are not included in this scope of work.

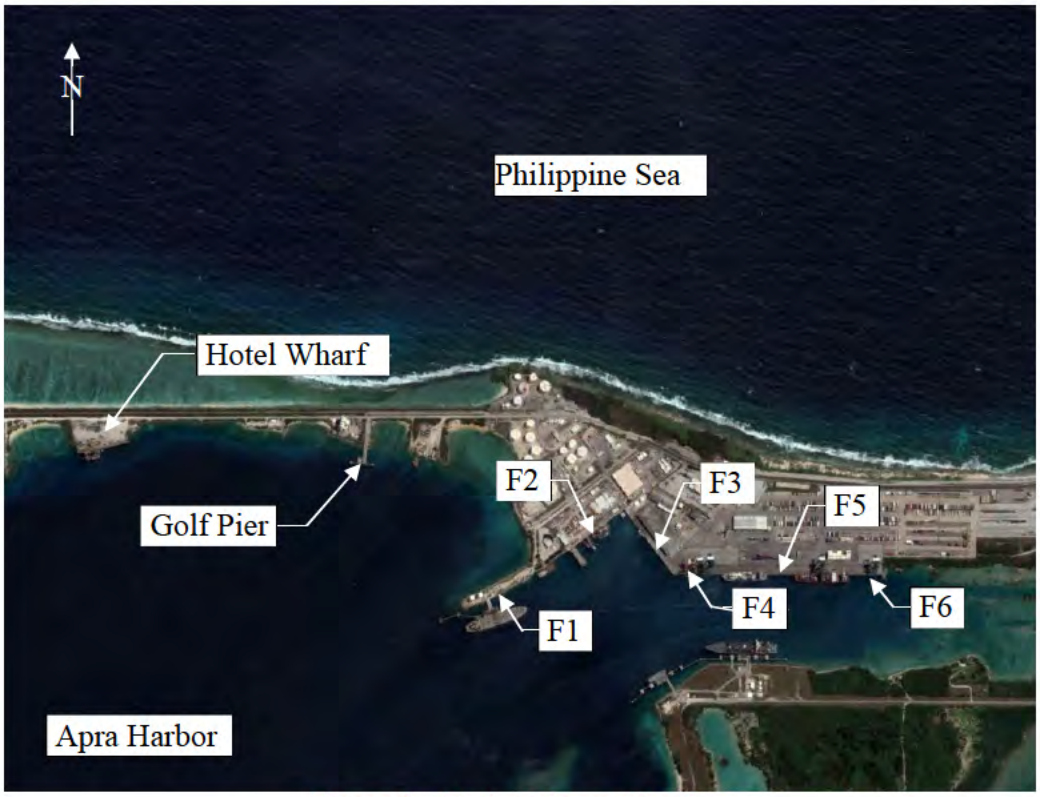


Figure 1 – Port of Guam Site Map

Figure 2 – Pier F1

3.0 DESIGN CRITERIA

3.1 VESSELS

Three design vessels were evaluated for the berthing and mooring analyses. The selected vessels are representative of tankers that currently berth at Pier F1. Vessel characteristics are shown below.

- Eco Galaxy (small)

Type:	Tanker
Length Overall:	384 feet
Breadth:	61 feet
Minimum Draught:	5.3 feet
Maximum Draught:	23 feet
Deadweight Tonnage:	8,034 LT

- Nord Joy (medium)

Type:	Tanker
Length Overall:	599 feet
Breadth:	105 feet
Minimum Draught:	8.3 feet
Maximum Draught:	35.8 feet
Deadweight Tonnage:	49,874 LT

- NS Concept (large)

Type:	Tanker
Length Overall:	800 feet
Breadth:	138 feet
Minimum Draught:	10.7 feet
Maximum Draught:	46.2 feet
Deadweight Tonnage:	109,857 LT

3.2 WIND SPEED

In accordance with the 2019 document titled, “Tristar Terminals Guam, Inc. – Terminal & Port Information Handbook” (handbook), a wind speed of 30 knots (35 mph) was considered in the mooring analysis. This 30-second gust wind speed represents the upper limit at which vessels are directed to vacate the berth.

3.3 WAVE HEIGHT

For the mooring analysis, a wave height of 1.5 feet was selected as an average wave height.

3.4 CURRENT VELOCITY

The handbook states that currents at the harbor entrance are typically 1.5 knots and 3 knots for flood and ebb events, respectively. Because Pier F1 is located approximately 2.5 miles east of the harbor entrance where the channel is at its widest, a velocity of 1.5 knots was used to simulate both flood and ebb events.

4.0 BERTHING ANALYSIS

To estimate forces imposed on the breasting dolphins during normal berthing of vessels, a berthing analysis of the three design vessels was performed. Analyses were performed in accordance with the 2016 California Building Code, Chapter 31F – Marine Oil Terminals (MOTEMS). As outlined in Section 3103F.6.1 of MOTEMS, berthing energies for each vessel were calculated using the criteria defined below. Note that modern berthing design references, such as the Unified Facilities Criteria, the World Association for Waterborne Transport Infrastructure, and MOTEMS, typically specify an accidental berthing factor (Fa) ranging from 1.25 to 2.0 to account for abnormal conditions, such as human error, equipment malfunction, and adverse environmental conditions. For this analysis effort, berthing energies were calculated using Fa = 1.5 as the dolphins have severe damage and may experience sudden failure under abnormal conditions.

- Eco Galaxy
  Estimated Displacement Tonnage: 10,043 LT (1.25 x DWT)
  Velocity Perpendicular to Berth: 0.52 feet per second (fps)
  Cb (berthing coefficient): 0.52
  Accidental Berthing Factor: 1.5
  Calculated Berthing Energy 100 kip-feet

- Nord Joy
  Estimated Displacement Tonnage: 62,343 LT (1.25 x DWT)
  Velocity Perpendicular to Berth: 0.26 fps
  Cb (berthing coefficient): 0.54
  Accidental Berthing Factor: 1.5
  Calculated Berthing Energy 207 kip-feet

- NS Concept
  Estimated Displacement Tonnage: 137,321 LT (1.25 x DWT)
  Velocity Perpendicular to Berth: 0.26 fps
  Cb (berthing coefficient): 0.54
  Accidental Berthing Factor: 1.5
  Calculated Berthing Energy 441 kip-feet

In combination with the berthing energies shown above, fender criteria from the as-built drawings titled, "*Port Authority of Guam Shell Guam Inc. Repairs to Foxtrot F-1 Pier,*" were used to calculate berthing forces. For the Eco Galaxy vessel, which is considerably shorter than the Nord Joy and NS Concept vessels, it was assumed that 100 percent of the berthing energy is resisted by either Dolphin C/D or G during initial contact. Considering the two existing MV1000 leg fenders at Dolphin G, the berthing force was calculated to be 200 kips. Although approximately 67 percent of the fender energy is absorbed (100/150), the maximum reaction is reached when the fenders use 40 percent of their energy-absorbing capacity. See Table 1. With respect to Dolphin C or D, the berthing force was calculated to be 287 kips.

Regarding the Nord Joy and NS Concept, it was assumed that 100 percent of the berthing energy is resisted by a single dolphin; Breasting Dolphin C or D. Similar to the MV

fenders, the maximum fender reaction of 410 kips is reached at Dolphins C or D when the SUC 1600H fenders have absorbed approximately 30 percent of their rated energy capacity; resulting in a total load of 410 kips.

Table 1 – Berthing Energy Results

Vessel	Berthing Energy (kip-ft)	Max Fender Energy (kip-ft)	Percent of Energy Absorbed	Resulting Fender Reaction (kips)
Eco Galaxy (G)	100	150	67	200
Eco Galaxy (C or D)	100	788	12.5	287
Nord Joy	207	788	26	410
NS Concept	441	788	56	410

5.0 MOORING ANALYSIS

To understand the limits of Pier F1 for mooring forces (fenders, hardware, and mooring arrangement), mooring analyses were performed for the design vessels.

Vessel criteria along with wind, wave, and current velocities were entered into the mooring simulation software Optimoor, developed by Tension Technology International, LLC. The 30-knot wind speed considered in the analysis was evaluated from all possible directions (i.e., 360° sweep). Regarding current, a velocity of 1.5 knots was used to simulate both flood and ebb events. Current was applied in an east-west direction, approximately 20 degrees from the longitudinal axis of the vessels. See Figure 3. The analysis also included a significant wave height of 1.5 feet. Data in the form of fender reactions and mooring hardware line loads were output and are provided below in Table 2 and Table 3. Note that the mooring analysis did not include use of Dolphin H due to its severely damaged and non-functional fender system.

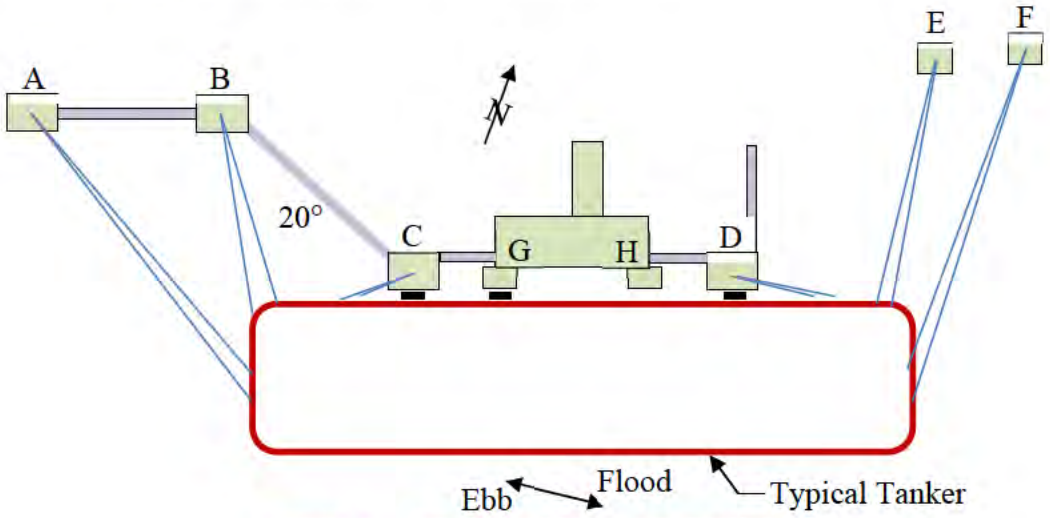


Figure 3 – Typical Mooring Configuration

Table 2 – Maximum Mooring Line Loads

Vessel	Maximum Mooring Line Loads (kips)					
	Dolphin A	Dolphin B	Dolphin C	Dolphin D	Dolphin E	Dolphin F
Eco Galaxy	25	26	20	41	23	22
Nord Joy	34	46	48	52	36	33
NS Concept	161	104	73	105	92	78

Table 3 – Maximum Fender Thrust Results

Vessel	Maximum Fender Thrust Forces (kips)			
	Dolphin C	Dolphin G	Dolphin H	Dolphin D
Eco Galaxy	64	22	-	74
Nord Joy	131	37	-	113
NS Concept	263	64	-	254

6.0 DOLPHIN ANALYSIS RESULTS

To evaluate the forces and stresses resulting from the berthing and mooring forces tabulated above, structural models of Dolphins A, B, C, D, G, and H were developed. Models were based on the as-built drawings titled, "*Port Authority of Guam Shell Guam, Inc. Repairs to Foxtrot F-1 Pier,*" dating from the mid-1990s. These drawings contain information, such as pile location/spacing, pile diameter, pile wall thickness, pile batter/orientation, pile cap thickness, mudline elevation, and identification of piles that have been previously repaired. However, the drawings did not contain detailed dimensions of pile locations or batter pile slopes for Dolphins A and B. Because field measurements were not able to be obtained at the time of this study, models for Dolphins A and B were developed by scaling pile locations from the drawings.

Dolphins were analyzed using the numerical modeling software SAP2000. Capacity of the steel piles was determined using current methods consistent with the American Society of Steel Construction (AISC) Steel Construction Manual, thirteenth edition. Mooring line loads were applied consistent with the Optimoor analysis and included a 10-degree variance each side. Output from models included axial forces, bending moments, and shears in the piles and concrete pile caps. To clearly identify whether demand loads in the structural elements exceeded the code-prescribed limits, demand-capacity ratios (DCRs) were developed. The demand represents the force present within a structural member for a given load condition and can be directly compared to the element's capacity. A DCR less than 1.0 indicates that the level of load within an element does not exceed its capacity. Similarly, a DCR greater than 1.0 indicates that the load within an element exceeds its capacity. A summary of DCRs for each dolphin are described in the following sections. Because the analysis shows that multiple piles across multiple dolphins have DCRs greater than 1.0 (indicating that pile capacities are exceeded), DCRs for concrete pile caps were not calculated.

In accordance with MOTEMS, load factors of 1.2 and 1.6 were used for dead and berthing/mooring loads, respectively. These load factors, when applied in accordance with load and resistance factor design are used to increase design loads to account for the uncertainty involved in estimating magnitudes of loads. Because dead loads can typically be estimated more accurately than live loads, the dead load factor is typically lower.

A corrosion allowance of 1/8 inch was applied to the cross-sections of all steel piles based on the estimated level of corrosion observed in previous inspection reports. In accordance with Table 4-1a of the AISC Design Guide 15, Rehabilitation and Retrofit, a steel yield strength of 33 ksi was used in the analysis.

At various locations, photos from previous inspection reports show that piles have severe damage at the pile-to-cap interface and are no longer connected. Because previous reports do not identify specific piles that are disconnected, damaged pile locations have been estimated from inspection report photos and were modeled appropriately for each dolphin.

6.1 MOORING DOLPHIN A

For the small and medium vessels, all calculated DCRs are below 1.0. For the large vessel, pile capacities were exceeded at two piles with DCRs ranging from 1.05 to 1.24.

For a summary of the number of piles that exceed the DCR for each design vessel, see Table 4. Note that previous inspection reports state that one pile at Dolphin A is not connected to the pile cap. Because photos of Dolphin A were not available for our review, the location of the damaged pile to pile cap connection could not be estimated and was not included in the model. Therefore, the number of piles with DCRs greater than 1.0 may be greater than what is shown below. See Figure 4 for a plan view of Dolphin A.

Table 4 – Dolphin A Quantity of Piles with DCR > 1.0

Vessel	DCR > 1.0 (Mooring Loads)
Eco Galaxy	0
Nord Joy	0
NS Concept	2

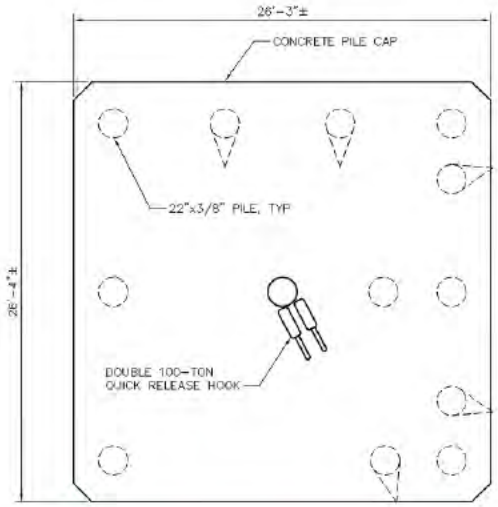


Figure 4 – Mooring Dolphin A

6.2 MOORING DOLPHIN B

For all vessels, DCRs were found to be less than 1.0. See Table 5. Note that previous inspection reports do not mention damage at Dolphin B. Similarly, photos showing the condition of the piles and pile cap were not available for review. See Figure 5 for a plan view of Dolphin B.

Table 5 – Dolphin B Quantity of Piles with DCR > 1.0

Vessel	DCR > 1.0 (Mooring Loads)
Eco Galaxy	0
Nord Joy	0
NS Concept	0

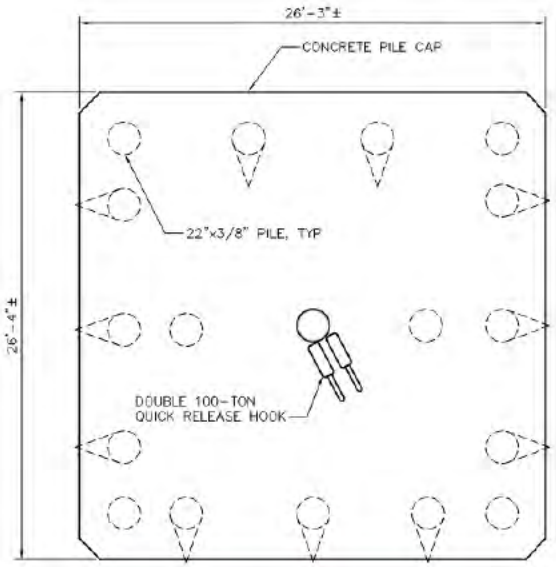


Figure 5 – Mooring Dolphin B

6.3 BREASTING DOLPHIN C

For all vessels, piles are controlled by axial compression. For a summary of the number of piles that exceed the DCR for each vessel, see Table 6. For the small vessel, 70 percent of the fender reaction (0.7 x 410 kips) is distributed to the dolphin during berthing and causes the DCR to exceed 1.0 at one pile. For the medium and large vessels, the full fender reaction is absorbed during berthing and pile capacities are exceeded at three piles with DCRs ranging from 1.09 to 1.39. Based on our review of photographs from previous inspection reports, six previously repaired piles are disconnected from the pile cap. See Figure 6 and Photo 1. With respect to mooring loads, the DCR for all piles is below 1.0 for all vessels.

Table 6 – Dolphin C Quantity of Piles with DCR > 1.0

Vessel	DCR > 1.0 (Mooring Loads)	DCR > 1.0 (Berthing Loads)
Eco Galaxy	0	1
Nord Joy	0	3
NS Concept	0	3

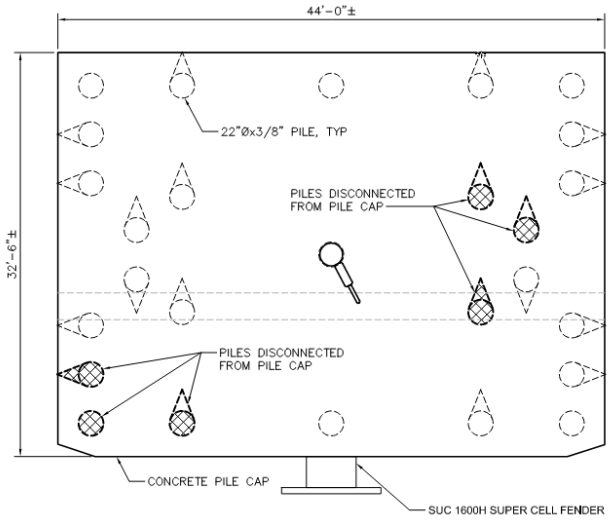


Figure 6 – Breasting Dolphin C

Photo 1 – Dolphin C Damaged Piles
(photo courtesy of Pro Marine Technology)

6.4 BREASTING DOLPHIN G

For all vessels, the analysis found that the DCR for all piles is below 1.0 (see Table 7). Existing inspection reports also show that the soffit of the concrete pile cap has severe open corrosion spalling with corroded steel reinforcement present at multiple locations. See Photo 2 and Figure 7. For this reason, it has been assumed that 50 percent of the bottom steel reinforcement is de-bonded from the concrete and cannot be relied upon to resist tensile forces. The remaining 50 percent of steel reinforcement is estimated to be #8 bars (Grade 40) spaced at 16 inches on center. Based on these assumptions, the bending moment capacity of the pile caps was estimated to be 82 kip-feet/ft. For small, medium, and large vessels, the worst-case bending moment demands were found to be 17-, 28-,

and 34 kip-ft/ft for mooring loads, respectively. The bending moment demand for small vessel berthing is 20 kip-ft/ft. All DCRs for berthing and mooring load cases are less than 1.0.

Table 7 – Dolphin G Quantity of Piles with DCR > 1.0

Vessel	DCR > 1.0 (Mooring Loads)	DCR > 1.0 (Berthing Loads)
Eco Galaxy	0	0
Nord Joy	0	NA
NS Concept	0	NA

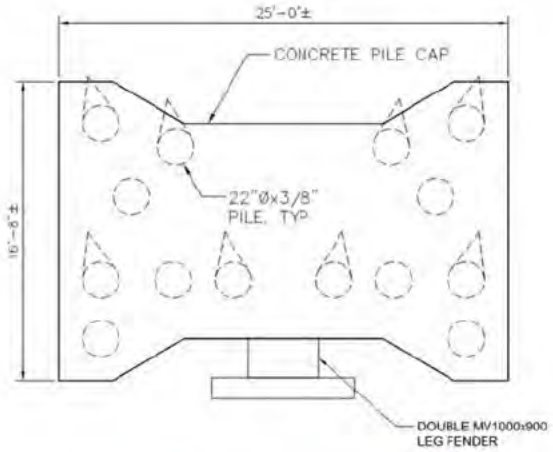


Figure 7 – Breasting Dolphin G

Photo 2 – Breasting Dolphin G Soffit
(photo courtesy of Pro Marine Technology)

6.5 BREASTING DOLPHIN H

Due to the extent of damage present and because the fender system is currently non-functional, Dolphin H was not included in the berthing/mooring analyses. As shown in Figure 8 and Photo 3, the west side of the dolphin has severe damage. The crack pattern and damaged fender system suggest that the dolphin has been loaded beyond its design

capacity and is in a condition where it cannot be relied upon to resist berthing/mooring forces.

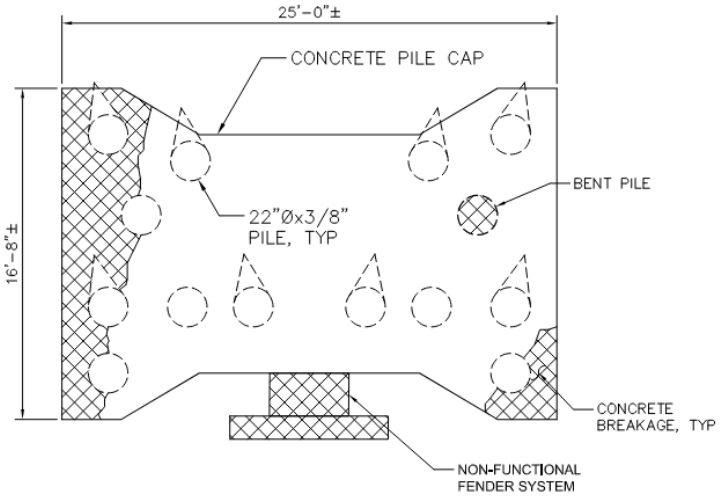


Figure 8 – Breasting Dolphin H

Photo 3 – Breasting Dolphin H
(photo courtesy of Pro Marine Technology)

6.6 BREASTING DOLPHIN D

Regarding berthing loads for medium and large vessels, pile capacities are exceeded at four locations with DCRs ranging from 1.06 to 1.12. See Table 8 for a summary of DCRs for each vessel. Although inspection reports do not indicate significant damage at Dolphin D, the mudline appears to be 20 feet deeper compared to Dolphin C, resulting in a longer unsupported pile length. Also note that previous inspection reports state that one pile is split below the waterline. Because the location of the split pile is unknown, this damage was not included in the model and suggests that additional piles may have DCRs greater than 1.0. See Figure 9 for a plan view of Dolphin D. With respect to mooring loads, the DCR limit is exceeded at one pile for the large vessel (DCR = 1.13).

Table 8 – Dolphin D Quantity of Piles with DCR > 1.0

Vessel	DCR > 1.0 (Mooring Loads)	DCR > 1.0 (Berthing Loads)
Eco Galaxy	0	0
Nord Joy	0	4
NS Concept	1	4

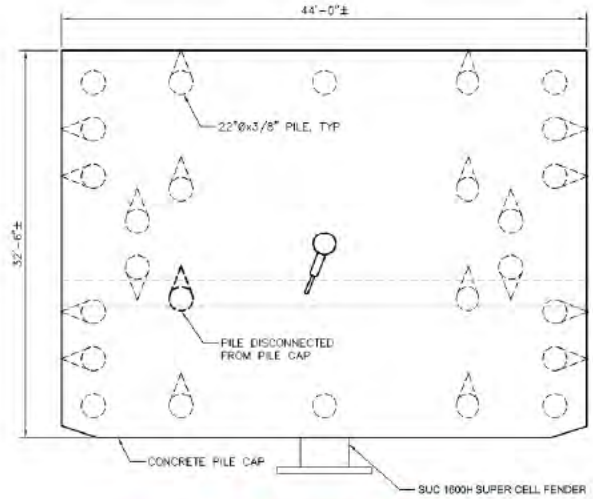


Figure 9 – Breasting Dolphin D

6.7 MOORING DOLPHIN E

Results from the Optimoor analysis show that the maximum line pull at Dolphin E is 92 kips and does not exceed the 400-kip quick release hook capacity.

6.8 MOORING DOLPHIN F

Results from the Optimoor analysis show that the maximum line pull at Dolphin F is 78 kips and does not exceed the 400-kip quick release hook capacity.

7.0 RECOMMENDATIONS

Mooring and berthing dolphins at Pier F1 have been in service for the past 75 years and are at the end of their service life. Severe damage in the form of corrosion, disconnected piles, impact damage, and open corrosion spalling is present at multiple locations.

Geometry of Dolphins G and H is unique and consists of the MV fenders recessed 30 inches into the south side of the dolphins. Based on this geometry and the assumed fender height, it is estimated that the MV fenders can deflect 18 inches before the fender panels come in contact with the dolphins. Note that the MV fenders are designed to deflect approximately 22 inches. Assuming that the berthing face along Dolphins C, G, H, and D is uniform, a deflection of 18 inches at Dolphins C and D results in the maximum fender reaction while only dissipating 60 percent of the berthing energy. This data suggests that the current geometric layout of the dolphins has an increased likelihood for damage occurring to vessels and dolphin structures.

Therefore, it is recommended that Dolphins A, B, C, D, G, and H are replaced to provide the Port with structures that can provide safe and consistent berthing/mooring for vessels. Until such time that the dolphins can be replaced, it is recommended that adjustments are made to the berthing velocity. These recommendations are based on review of previous inspection reports, as-built drawings, photographs, and results from this report and should be considered a temporary means to help prevent additional damage from occurring that may impact the daily use of the terminal.

Regarding the vessel vacate wind speed limit of 30 knots, it was found that large vessels result in pile DCRs greater than 1.0 at Dolphins A and D. Because analysis found that pile DCRs was still exceeded when significantly reducing the wind speed velocity for large vessels, it is recommended that large vessels (similar in size to the NS Concept) are not moored at Pier F1 until such time that these dolphins can be replaced.

7.1 BERTHING RECOMMENDATIONS

Berthing velocity for small vessels should not exceed **0.45** fps perpendicular to berth and the maximum berthing angle should not exceed 10 degrees.

Berthing velocity for medium vessels should not exceed **0.13** fps perpendicular to berth and the maximum berthing angle should not exceed 6 degrees.

As stated above, berthing of large vessels similar in size to the NS Concept is not recommended until such time that Dolphins A and D can be replaced.

7.2 MOORING RECOMMENDATIONS

For small- and medium-sized vessels, reductions in the vessel vacate wind speed are not recommended at this time. However, mooring of large vessels should be temporarily suspended until such time that Dolphins A and D can be replaced.

APPENDIX A

FENDER PERFORMANCE DATA

SCK Cell Fenders

SCK cell fenders have a very long track record and remain popular because of their simplicity, high performance and strength.

They come in a wide range of standard sizes and are interchangeable with many older cell fender types.

FEATURES

- High performance
- Can support large panels
- Strong, well-proven design
- Ideal for low hull pressure systems

APPLICATIONS

- Oil and LNG facilities
- Bulk terminals
- Offshore platforms
- Container berths
- RoRo and cruise terminals
- Multi-user berths

Doc. No. 38GL-26-2386.*

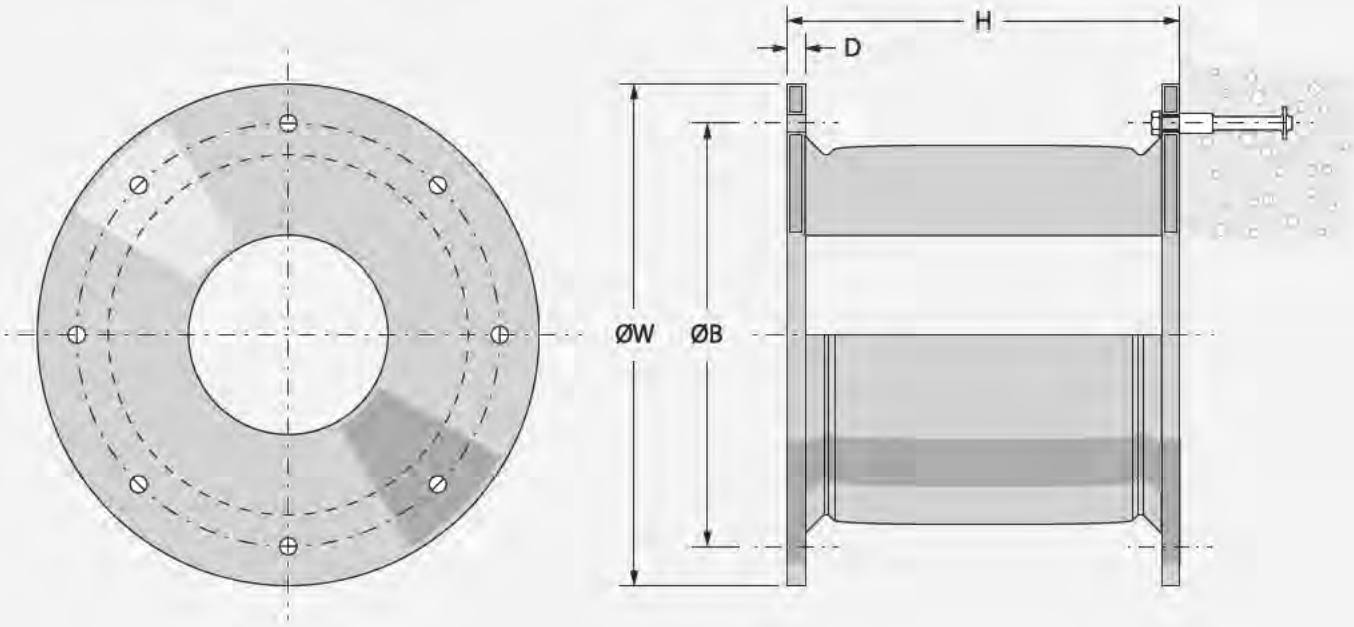
SCK Cell Fenders

DIMENSIONS

	H	ØW	ØB	D	ANCHORS / HEAD BOLTS ^	WEIGHT
SCK 400	400	650	550	24 – 32	4 × M20	75
SCK 500	500	650	550	24 – 32	4 × M24	95
SCK 630	630	840	700	24 – 32	4 × M27	220
SCK 800	800	1050	900	30 – 40	6 × M30	400
SCK 1000	1000	1300	1100	33 – 43	6 × M36	790
SCK 1150	1150	1500	1300	38 – 48	6 × M42	1200
SCK 1250	1250	1650	1450	38 – 48	6 × M42	1500
SCK 1450	1450	1850	1650	43 – 53	6 × M48	2300
SCK 1600	1600	2000	1800	45 – 55	8 × M48	3000
SCK 1700	1700	2100	1900	52 – 62	8 × M56	3700
SCK 2000	2000	2200	2000	50 – 65	8 × M64	5000
SCK 2250	2250	2550	2300	55 – 70	10 × M64	7400
SCK 2500	2500	2950	2700	65 – 80	10 × M64	10700
SCK 3000	3000	3350	3150	70 – 90	12 × M76	18500

^ Fender anchors / head bolts indicated are based on fenders RDP performance using a particular grade of steel. Please contact our local office for precise size, material and type for different grades of fenders pertaining to the project requirements.

[Units: mm, kg]



SCK Cell Fenders

PERFORMANCE DATA*

			E 0.9	E 1.0	E 1.1	E 1.2	E 1.3	E 1.4	E 1.5	E 1.6	E 1.7	E 1.8	E 1.9	E 2.0
400	CV	E	9.0	10.0	10.6	11.2	11.8	12.4	13.0	13.6	14.2	14.8	15.4	16.0
		R	50.0	56.0	59.6	63.2	66.8	70.4	74.0	77.4	80.8	84.2	87.6	91.0
	RPD	E_R	10.5	11.7	12.4	13.1	13.8	14.5	15.2	15.9	16.6	17.3	18.0	18.7
		R_R	58.5	65.5	69.7	73.9	78.2	82.4	86.6	90.6	94.5	98.5	102.5	106.5
500	CV	E	17.0	19.0	20.2	21.4	22.6	23.8	25.0	26.0	27.0	28.0	29.0	30.0
		R	79.0	87.0	92.6	98.2	103.8	109.4	115.0	120.4	125.8	131.2	136.6	142.0
	RPD	E_R	19.6	21.9	23.2	24.6	26.0	27.4	28.8	29.9	31.1	32.2	33.4	34.5
		R_R	90.9	100.1	106.5	112.9	119.4	125.8	132.3	138.5	144.7	150.9	157.1	163.3
630	CV	E	34.0	38.0	40.4	42.8	45.2	47.6	50.0	52.4	54.8	57.2	59.6	62.0
		R	124.0	137.0	145.6	154.2	162.8	171.4	180.0	188.8	197.6	206.4	215.2	224.0
	RPD	E_R	38.8	43.3	46.1	48.8	51.5	54.3	57.0	59.7	62.5	65.2	67.9	70.7
		R_R	141.4	156.2	166.0	175.8	185.6	195.4	205.2	215.2	225.3	235.3	245.3	255.4
800	CV	E	67.0	75.0	80.0	85.0	90.0	95.0	100.0	104.8	109.6	114.4	119.2	124.0
		R	190.0	211.0	225.4	239.8	254.2	268.6	283.0	297.4	311.8	326.2	340.6	355.0
	RPD	E_R	76.0	85.1	90.8	96.5	102.2	107.8	113.5	118.9	124.4	129.8	135.3	140.7
		R_R	215.7	239.5	255.8	272.2	288.5	304.9	321.2	337.5	353.9	370.2	386.6	402.9
1000	CV	E	138.0	153.0	162.6	172.2	181.8	191.4	201.0	210.6	220.2	229.8	239.4	249.0
		R	314.0	349.0	370.8	392.6	414.4	436.2	458.0	480.0	502.0	524.0	546.0	568.0
	RPD	E_R	154.6	171.4	182.1	192.9	203.6	214.4	225.1	235.9	246.6	257.4	268.1	278.9
		R_R	351.7	390.9	415.3	439.7	464.1	488.5	513.0	537.6	562.2	586.9	611.5	636.2
1150	CV	E	210.0	233.0	247.6	262.2	276.8	291.4	306.0	320.6	335.2	349.8	364.4	379.0
		R	416.0	462.0	490.8	519.6	548.4	577.2	606.0	634.8	663.6	692.4	721.2	750.0
	RPD	E_R	232.1	257.5	273.6	289.7	305.9	322.0	338.1	354.3	370.4	386.5	402.7	418.8
		R_R	459.7	510.5	542.3	574.2	606.0	637.8	669.6	701.5	733.3	765.1	796.9	828.8
1250	CV	E	269.0	299.0	317.8	336.6	355.4	374.2	393.0	411.6	430.2	448.8	467.4	486.0
		R	491.0	545.0	579.2	613.4	647.6	681.8	716.0	750.2	784.4	818.6	852.8	887.0
	RPD	E_R	295.9	328.9	349.6	370.3	390.9	411.6	432.3	452.8	473.2	493.7	514.1	534.6
		R_R	540.1	599.5	637.1	674.7	712.4	750.0	787.6	825.2	862.8	900.5	938.1	975.7
1450	CV	E	421.0	468.0	497.2	526.4	555.6	584.8	614.0	643.2	672.4	701.6	730.8	760.0
		R	661.0	734.0	781.0	828.0	875.0	922.0	969.0	1013.8	1058.6	1103.4	1148.2	1193.0
	RPD	E_R	458.9	510.1	541.9	573.8	605.6	637.4	669.3	701.1	732.9	764.7	796.6	828.4
		R_R	720.5	800.1	851.3	902.5	953.8	1005.0	1056.2	1105.0	1153.9	1202.7	1251.5	1300.4
1600	CV	E	566.0	629.0	668.2	707.4	746.6	785.8	825.0	864.2	903.4	942.6	981.8	1021.0
		R	805.0	894.0	950.0	1006.0	1062.0	1118.0	1174.0	1229.8	1285.6	1341.4	1397.2	1453.0
	RPD	E_R	616.9	685.6	728.3	771.1	813.8	856.5	899.3	942.0	984.7	1027.4	1070.2	1112.9
		R_R	877.5	974.5	1035.5	1096.5	1157.6	1218.6	1279.7	1340.5	1401.3	1462.1	1522.9	1583.8

* For explanation of CV and RPD, please refer to note on page 19-20.

[Units: kNm, kN]

SCK Cell Fenders

PERFORMANCE DATA*

			E 2.1	E 2.2	E 2.3	E 2.4	E 2.5	E 2.6	E 2.7	E 2.8	E 2.9	E 3.0	E 3.1
400	CV	E	16.4	16.8	17.2	17.6	18.0	18.6	19.2	19.8	20.4	21.0	23.0
		R	93.6	96.2	98.8	101.4	104.0	106.8	109.6	112.4	115.2	118.0	129.0
	RPD	E_R	19.2	19.7	20.1	20.6	21.1	21.8	22.5	23.2	23.9	24.6	26.9
		R_R	109.5	112.6	115.6	118.6	121.7	125.0	128.2	131.5	134.8	138.1	150.9
500	CV	E	31.0	32.0	33.0	34.0	35.0	35.8	36.6	37.4	38.2	39.0	43.0
		R	146.2	150.4	154.6	158.8	163.0	167.2	171.4	175.6	179.8	184.0	203.0
	RPD	E_R	35.7	36.8	38.0	39.1	40.3	41.2	42.1	43.0	43.9	44.9	49.5
		R_R	168.1	173.0	177.8	182.6	187.5	192.3	197.1	201.9	206.8	211.6	233.5
630	CV	E	63.8	65.6	67.4	69.2	71.0	72.8	74.6	76.4	78.2	80.0	88.0
		R	230.6	237.2	243.8	250.4	257.0	263.6	270.2	276.8	283.4	290.0	319.0
	RPD	E_R	72.7	74.8	76.8	78.9	80.9	83.0	85.0	87.1	89.1	91.2	100.3
		R_R	262.9	270.4	277.9	285.5	293.0	300.5	308.0	315.6	323.1	330.6	363.7
800	CV	E	128.0	132.0	136.0	140.0	144.0	147.8	151.6	155.4	159.2	163.0	179.0
		R	365.8	376.6	387.4	398.2	409.0	420.0	431.0	442.0	453.0	464.0	510.0
	RPD	E_R	145.3	149.8	154.4	158.9	163.4	167.8	172.1	176.4	180.7	185.0	203.2
		R_R	415.2	427.4	439.7	452.0	464.2	476.7	489.2	501.7	514.2	526.6	578.9
1000	CV	E	256.4	263.8	271.2	278.6	286.0	293.6	301.2	308.8	316.4	324.0	356.0
		R	585.0	602.0	619.0	636.0	653.0	669.8	686.6	703.4	720.2	737.0	811.0
	RPD	E_R	287.2	295.5	303.7	312.0	320.3	328.8	337.3	345.9	354.4	362.9	398.7
		R_R	655.2	674.2	693.3	712.3	731.4	750.2	769.0	787.8	806.6	825.4	908.3
1150	CV	E	390.4	401.8	413.2	424.6	436.0	447.2	458.4	469.6	480.8	492.0	541.0
		R	772.6	795.2	817.8	840.4	863.0	885.6	908.2	930.8	953.4	976.0	1073.0
	RPD	E_R	431.4	444.0	456.6	469.2	481.8	494.2	506.5	518.9	531.3	543.7	597.8
		R_R	853.7	878.7	903.7	928.6	953.6	978.6	1003.6	1028.5	1053.5	1078.5	1185.7
1250	CV	E	500.6	515.2	529.8	544.4	559.0	573.8	588.6	603.4	618.2	633.0	696.0
		R	913.6	940.2	966.8	993.4	1020.0	1046.6	1073.2	1099.8	1126.4	1153.0	1269.0
	RPD	E_R	550.7	566.7	582.8	598.8	614.9	631.2	647.5	663.7	680.0	696.3	765.6
		R_R	1005.0	1034.2	1063.5	1092.7	1122.0	1151.3	1180.5	1209.8	1239.0	1268.3	1395.9
1450	CV	E	782.8	805.6	828.4				919.6	942.4	965.2	988.0	1086.0
		R	1228.8	1264.6	1300.4				1443.6	1479.4	1515.2	1551.0	1707.0
	RPD	E_R	853.3	878.1	903.0	927.8	952.7	977.5	1002.4	1027.2	1052.1	1076.9	1183.7
		R_R	1339.4	1378.4	1417.4	1456.5	1495.5	1534.5	1573.5	1612.5	1651.6	1690.6	1860.6
1600	CV	E	1051.6	1082.2	1112.8	1143.4	1174.0	1204.6	1235.2	1265.8	1296.4	1327.0	1460.0
		R	1496.6	1540.2	1583.8	1627.4	1671.0	1714.6	1758.2	1801.8	1845.4	1889.0	2078.0
	RPD	E_R	1146.2	1179.6	1213.0	1246.3	1279.7	1313.0	1346.4	1379.7	1413.1	1446.4	1591.4
		R_R	1631.3	1678.8	1726.3	1773.9	1821.4	1868.9	1916.4	1964.0	2011.5	2059.0	2265.0

788 kip-ft per as-built drawings

410 kips per as-built drawings

* For explanation of CV and RPD, please refer to note on pag[illegible]

[Units: kNm, kN]

Doc. No. 38GL-26-2386.*

SCK Cell Fenders

PERFORMANCE DATA*

			E 0.9	E 1.0	E 1.1	E 1.2	E 1.3	E 1.4	E 1.5	E 1.6	E 1.7	E 1.8	E 1.9	E 2.0
1700	CV	E	678.0	753.0	800.2	847.4	894.6	941.8	989.0	1036.2	1083.4	1130.6	1177.8	1225.0
		R	908.0	1009.0	1072.2	1135.4	1198.6	1261.8	1325.0	1388.2	1451.4	1514.6	1577.8	1641.0
	RPD	E_R	739.0	820.8	872.2	923.7	975.1	1026.6	1078.0	1129.5	1180.9	1232.4	1283.8	1335.3
		R_R	989.7	1099.8	1168.7	1237.6	1306.5	1375.4	1444.3	1513.1	1582.0	1650.9	1719.8	1788.7
2000	CV	E	1104.0	1227.0	1303.6	1380.2	1456.8	1533.4	1610.0	1686.8	1763.6	1840.4	1917.2	1994.0
		R	1258.0	1397.0	1484.2	1571.4	1658.6	1745.8	1833.0	1920.0	2007.0	2094.0	2181.0	2268.0
	RPD	E_R	1186.8	1319.0	1401.4	1483.7	1566.1	1648.4	1730.8	1813.3	1895.9	1978.4	2061.0	2143.6
		R_R	1352.4	1501.8	1595.5	1689.3	1783.0	1876.7	1970.5	2064.0	2157.5	2251.1	2344.6	2438.1
2250	CV	E	1854.0	2060.0	2169.2	2278.4	2387.6	2496.8	2606.0	2715.0	2824.0	2933.0	3042.0	3151.0
		R	1876.0	2085.0	2195.4	2305.8	2416.2	2526.6	2637.0	2747.4	2857.8	2968.2	3078.6	3189.0
	RPD	E_R	1983.8	2204.2	2321.0	2437.9	2554.7	2671.6	2788.4	2905.1	3021.7	3138.3	3254.9	3371.6
		R_R	2007.3	2231.0	2349.1	2467.2	2585.3	2703.5	2821.6	2939.7	3057.8	3176.0	3294.1	3412.2
2500	CV	E	2544.0	2826.0	2975.8	3125.6	3275.4	3425.2	3575.0	3724.6	3874.2	4023.8	4173.4	4323.0
		R	2317.0	2574.0	2710.4	2846.8	2983.2	3119.6	3256.0	3392.2	3528.4	3664.6	3800.8	3937.0
	RPD	E_R	2696.6	2995.6	3154.3	3313.1	3471.9	3630.7	3789.5	3948.1	4106.7	4265.2	4423.8	4582.4
		R_R	2456.0	2728.4	2873.0	3017.6	3162.2	3306.8	3451.4	3595.7	3740.1	3884.5	4028.8	4173.2
3000	CV	E	3795.0	4217.0	4452.4	4687.8	4923.2	5158.6	5394.0	5629.4	5864.8	6100.2	6335.6	6571.0
		R	3310.0	3678.0	3879.0	4080.0	4281.0	4482.0	4683.0	4884.0	5085.0	5286.0	5487.0	5688.0
	RPD	E_R	3984.8	4427.9	4675.0	4922.2	5169.4	5416.5	5663.7	5910.9	6158.0	6405.2	6652.4	6899.6
		R_R	3475.5	3861.9	4073.0	4284.0	4495.1	4706.1	4917.2	5128.2	5339.3	5550.3	5761.4	5972.4

[Units: kNm, kN]

*Note:

1. CV: performance data at slow speed constant velocity (2-8 cm/min) compression at 23 ±5°C temperature and 0° compression angle.
2. RPD: Rated performance data, in accordance with PIANC with initial high speed berthing velocity 0.15 m/s.
   RPD = CV (performance) x VF (velocity factor for Natural and Synthetic rubber blend) x TF (temperature factor) x AF (angle factor).
   RPD is reported at 23 ±5°C temperature and 0° compression angle, therefore TF = 1, AF = 1.

Doc. No. 38GL-26-2386.*

SCK Cell Fenders

PERFORMANCE DATA*

			E 2.1	E 2.2	E 2.3	E 2.4	E 2.5	E 2.6	E 2.7	E 2.8	E 2.9	E 3.0	E 3.1
1700	CV	E	1261.6	1298.2	1334.8	1371.4	1408.0	1444.8	1481.6	1518.4	1555.2	1592.0	1751.0
		R	1690.0	1739.0	1788.0	1837.0	1886.0	1935.2	1984.4	2033.6	2082.8	2132.0	2345.0
	RPD	E_R	1375.1	1415.0	1454.9	1494.8	1534.7	1574.8	1614.9	1655.1	1695.2	1735.3	1908.6
		R_R	1842.1	1895.5	1948.9	2002.3	2055.7	2109.4	2163.0	2216.6	2270.3	2323.9	2556.1
2000	CV	E	2053.8	2113.6	2173.4	2233.2	2293.0	2352.8	2412.6	2472.4	2532.2	2592.0	2851.0
		R	2335.4	2402.8	2470.2	2537.6	2605.0	2672.4	2739.8	2807.2	2874.6	2942.0	3236.0
	RPD	E_R	2207.8	2272.1	2336.4	2400.7	2465.0	2529.3	2593.5	2657.8	2722.1	2786.4	3064.8
		R_R	2510.6	2583.0	2655.5	2727.9	2800.4	2872.8	2945.3	3017.7	3090.2	3162.7	3478.7
2250	CV	E	3245.6	3340.2	3434.8	3529.4	3624.0	3718.4	3812.8	3907.2	4001.6	4096.0	4506.0
		R	3284.8	3380.6	3476.4	3572.2	3668.0	3763.6	3859.2	3954.8	4050.4	4146.0	4561.0
	RPD	E_R	3472.8	3574.0	3675.2	3776.5	3877.7	3978.7	4079.7	4180.7	4281.7	4382.7	4821.4
		R_R	3514.7	3617.2	3719.7	3822.3	3924.8	4027.1	4129.3	4231.6	4333.9	4436.2	4880.3
2500	CV	E	4452.6	4582.2	4711.8	4841.4	4971.0	5100.6	5230.2	5359.8	5489.4	5619.0	6181.0
		R	4055.2	4173.4	4291.6	4409.8	4528.0	4646.2	4764.4	4882.6	5000.8	5119.0	5631.0
	RPD	E_R	4719.8	4857.1	4994.5	5131.9	5269.3	5406.6	5544.0	5681.4	5818.8	5956.1	6551.9
		R_R	4298.5	4423.8	4549.1	4674.4	4799.7	4925.0	5050.3	5175.6	5300.8	5426.1	5968.9
3000	CV	E	6761.8	6952.6	7143.4	7334.2	7525.0	7715.8	7906.6	8097.4	8288.2	8479.0	9327.0
		R	5855.6	6023.2	6190.8	6358.4	6526.0	6693.4	6860.8	7028.2	7195.6	7363.0	8099.0
	RPD	E_R	7099.9	7300.2	7500.6	7700.9	7901.3	8101.6	8301.9	8502.3	8702.6	8903.0	9793.4
		R_R	6148.4	6324.4	6500.3	6676.3	6852.3	7028.1	7203.8	7379.6	7555.4	7731.2	8504.0

[Units: kNm, kN]

3. For other initial berthing velocities, temperature and berthing angle, VF/ TF/ AF should be calculated separately and apply on CV performance to come to the final performance.
4. If fenders are tested in decreasing velocity (DV) mode at initial velocity 0.15 m/s, 0° compression angle and 23 ±5°C testing temperature, RPD = DV (performance).
5. Fender performance is subject to ±10% manufacturing tolerance (+10% for reaction force and -10% for energy).
6. CV performance is based on a rubber compound blend of natural and synthetic rubber.

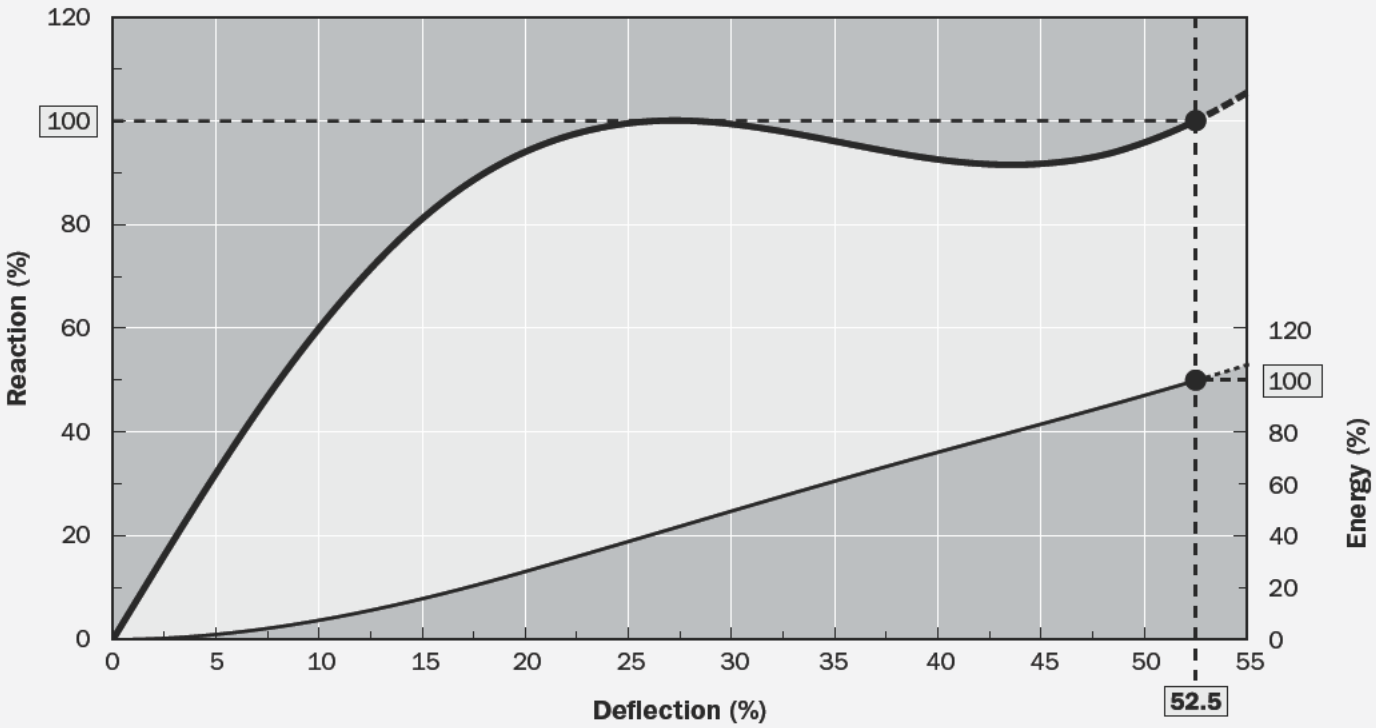
Doc. No. 38GL-26-2386.*

SCK Cell Fenders

INTERMEDIATE DEFLECTIONS

D_i (%)	0	5	10	15	20	25	30	35	40	45	50	**52.5**	55
E_i (%)	0	2	7	16	26	38	50	61	72	83	94	**100**	106
R_i (%)	0	32	60	81	94	99	99	96	92	92	96	**100**	106

Nominal rated deflection may vary at RPD. Refer to the Performance Tolerances table in the Fender Application Design Manual.



Generic curve shown. Actual curve geometry may vary depending on grade, temperature, velocity and angle.

ANGLE FACTOR (AF) TABLE

ANGLE (°)	ENERGY FACTOR	REACTION FACTOR
0	1.000	1.000
3	0.977	1.000
5	0.951	1.000
8	0.909	1.000
10	0.883	1.000
15	0.810	1.000
20	0.652	1.000

Leg Fenders

Leg fenders provide an extremely compact solution, ideal for when fenders need to be mounted in a limited area. These versatile fenders have a modular design and are available as MV elements, MV V-elements, MI elements, Unit elements and UE V-fenders solutions.

FENDERS	FEATURES	APPLICATIONS
MV Elements	Modular design system Many standard sizes High performance geometry Recessed fixings Long life, low maintenance	All vessel types which use the following systems: Fender piles V-fenders Multiple fenders Pivot pillars Parallel Motion (Torsion Arm)
MV V-Fenders	Simple, modular design Low-friction shield Non-marking face Reduced hull pressure Easy maintenance	General cargo quays Berthing dolphins Pontoon fendering Passenger ferry berths Offshore platforms Long fender walls
MI-2000 Elements	Modular design system Choice of lengths and rubber grades High performance and efficiency Long life, low maintenance	Ideal for larger vessels including: Tankers and LNG ships Bulk carriers Post-Panamax containers Mega cruise ships
Unit Elements	Versatile modular system Highly efficient shape Symmetrical or asymmetrical fixings Strong in lengthwise shear Easy to install Low maintenance	Container terminals Tanker Berths RoRo and cruise ships Dolphins and monopiles Bulk and general cargo berths Fender walls Small craft berths
UE V-Fenders	Simple, modular design Low-friction shield Non-marking face Reduced hull pressure Easy maintenance	Multi-user berths Small RoRo terminals Workboat berths Pontoon fenders

Doc. No. 38GL-26-2386.*

MV Elements

DIMENSIONS

	L	B	C	F	G	J	T	ANCHORS / HEAD BOLTS ^	HOLES	WEIGHT
*MV300	600	150	300	94	93	47	17-26	M20	2 + 2	27
	900								3 + 3	41
	1200								4 + 4	54
	1500								5 + 5	68
MV400	750	125	500	125	124	63	17-26	M24	2 + 2	50
	1000	250							2 + 2	66
	1500								3 + 3	99
	2000								4 + 4	132
	2500								5 + 5	165
	3000								6 + 6	198
MV500	750	125	500	158	142	87	17-26	M30	2 + 2	84
	1000	250							2 + 2	111
	1500								3 + 3	167
	2000								4 + 4	222
	2500								5 + 5	278
	3000								6 + 6	334
MV550	750	125	500	172	170	87	18-27	M30	2 + 2	100
	1000	250							2 + 2	132
	1500								3 + 3	200
MV600	750	125	500	188	199	87	18-28	M30	2 + 2	115
	1000	250							2 + 2	153
	1500								3 + 3	230
MV750	750	125	500	235	230	118	22-32	M36	2 + 2	180
	1000	250							2 + 2	239
	1500								3 + 3	359
MV800	800	150	500	250	240	129	22-32	M36	2 + 2	214
	1000	250							2 + 2	268
	1500								3 + 3	402
	2000								4 + 4	536
MV1000	800	150	500	322	310	162	28-40	M42	2 + 2	346
	850	175							2 + 2	368
	900	200							2 + 2	389
	950	225							2 + 2	411
	1000	250							2 + 2	432
	1050	275							2 + 2	454
	1100	300							2 + 2	476
	1150	325							2 + 2	497
	1200	350							2 + 2	519
	1500	250							3 + 3	648
	2000								4 + 4	864

*MV300 elements up to 3000mm length available on request. [Units: mm, kg]

^ Fender anchors / head bolts indicated are based on fenders RDP performance using a particular grade of steel. Please contact our local office for precise size, material and type for different grades of fenders pertaining to the project requirements.

MV Elements

RATED PERFORMANCE DATA (RPD)

	L	COMPOUND A		COMPOUND B	
		E	R	E	R
300	600	13	91.4	8.8	64
	900	19	137	13	96
	1200	25	183	18	128
	1500	32	229	22	160
400	750	27	146	19	102
	1000	37	203	26	142
	1500	56	305	39	213
	2000	75	406	52	284
	2500	94	508	65	356
	3000	112	609	79	427
500	750	41	179	29	125
	1000	58	254	41	178
	1500	88	381	61	267
	2000	117	508	82	356
550	750	50	197	35	138
	1000	71	279	50	196
	1500	106	419	74	293
600	750	59	215	42	151
	1000	84	305	59	213
	1500	126	457	88	320
750	750	90	262	63	183
	1000	131	381	92	267
	1500	197	571	138	400
800		111	302		212
		150	406		284
		224	609		427
	2000	299	813	209	569
1000	800	175	380	122	266
	850	189	412	133	288
	900	204	444	143	311
	950	219	476	153	333
	1000	234	508	164	356
	1050	248	540	174	378
	1100	263	572	184	400
	1150	278	604	195	423
	1200	293	636	205	445
	1500	350	762	245	533
	2000	467	1016	327	711
1250	800	269	468	188	327
	850	293	510	205	357
	900	317	551	222	386
	950	341	593	239	415
	1000	365	635	256	444
	1050	389	677	272	474
	1100	413	718	289	503
	1150	437	760	306	532
	1200	461	802	323	561
	1250	485	844	340	591
	1500	548	952	383	667
	2000	730	1270	511	889
1450	900	426	638	298	447
	1000	491	736	344	516
	1100	557	835	390	584
	1200	622	933	436	653
	1500	737	1105	516	773
	2000	982	1473	688	1031
1600	1000	598	813	419	569
	1100	690	937	483	656
	1200	781	1061	547	743
	1500	897	1219	628	853
	2000	1196	1625	837	1138

150 kip-ft

100 kips

[Units: kNm, kN]

MV-elements are the foundation of many fender systems. These modular units are compression molded from a high performance polymer which resists attack from ultraviolet light, ozone and immersion in seawater for long service life and low maintenance.

Available in a full range of sizes, the geometry of the MV-element has been optimized for maximum energy absorption per unit volume of rubber combined with a low reaction force. Fully encapsulated steel mounting plates are vulcanized inside the MV-element to allow easy fixing. Bolts are located centrally on the base flanges to reduce stresses, but being recessed into pockets the fixings are well protected from damage.

RPD is reported at:

- 0.15 m/s (initial berthing speed)
- 23°C ± 5°C temperature
- 0° compression angle

All MV/MI/MV-V fender performances are based on decreasing velocity (DV) method compression testing of full size elements.

All performance values are for a single element. Per leg per meter.

* Reference testing conditions to Fender Application Design Manual. Tolerance ± 10%.

* Values are for a single element and per 1000mm length.

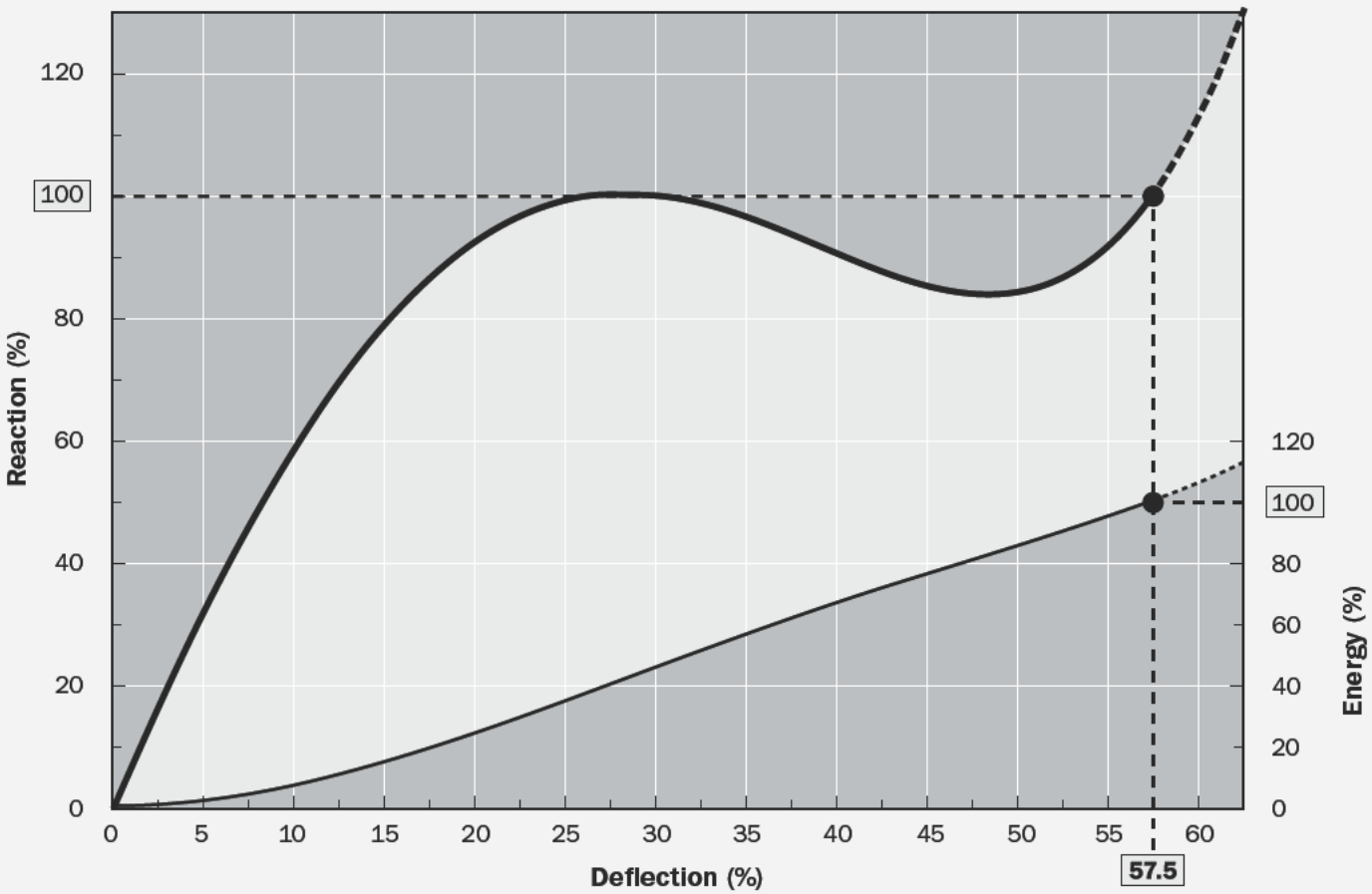
Doc. No. 38GL-26-2386.*

MV Elements

INTERMEDIATE DEFLECTIONS

D_i (%)	0	5	10	15	20	28	35	40	45	50	**57.5**	62.5
E_i (%)	0	2	7	14	24	41	56	66	76	85	**100**	113
R_i (%)	0	31	58	78	92	100	96	90	85	84	**100**	130

Nominal rated deflection may vary at RPD. Refer to the Performance Tolerances table in the Fender Application Design Manual.



Generic curve shown. Actual curve geometry may vary depending on grade, temperature, velocity and angle.

APPENDIX E

REPLACEMENT CONCEPT

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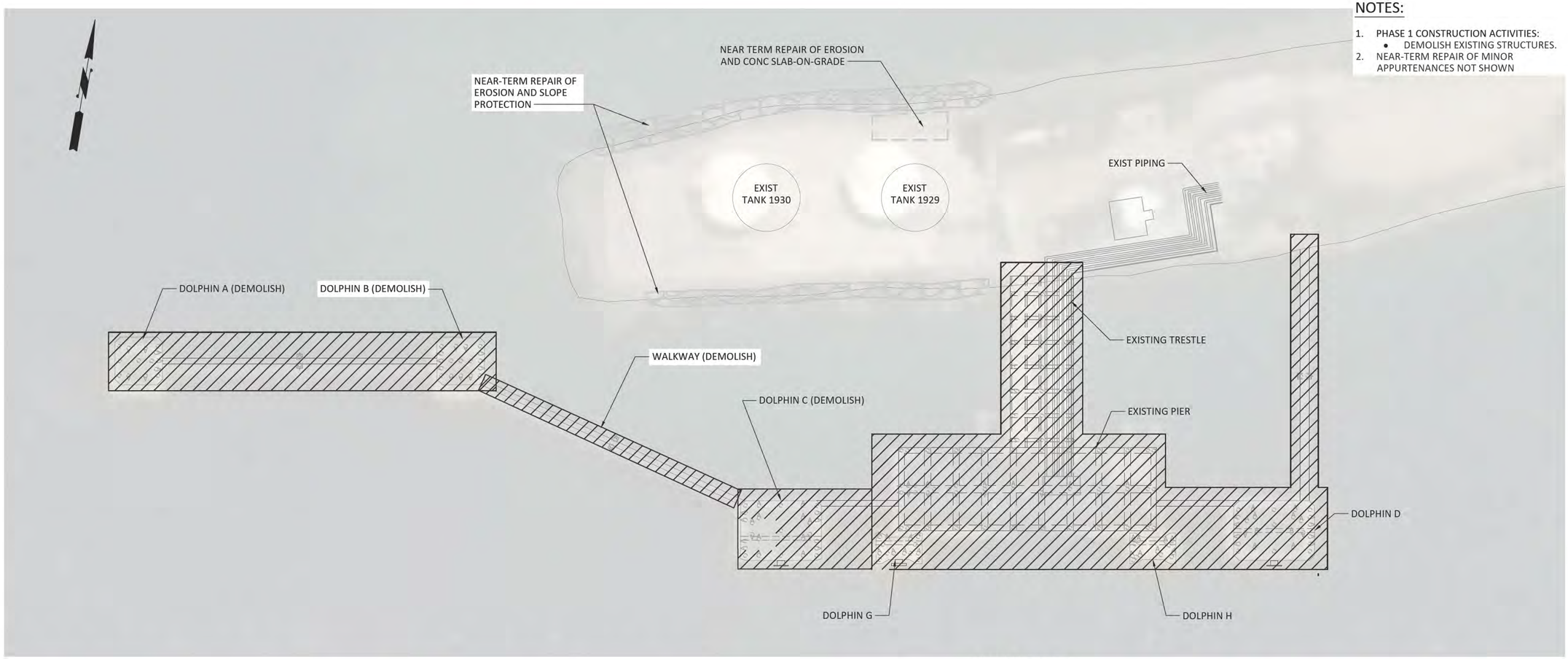

PITI CHANNEL

NOTES:

1. PHASE 1 CONSTRUCTION ACTIVITIES:
   - DEMOLISH EXISTING STRUCTURES.
2. NEAR-TERM REPAIR OF MINOR APPURTENANCES NOT SHOWN

LEGEND:

DEMOLITION

1 / - **PLAN - PHASE 1 DEMOLITION**
SCALE: 1" = 30'-0"

CONCEPTUAL - NOT FOR CONSTRUCTION

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590 S. Marine Corps Dr.
Suite 421
Tamuning, GU 96913
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FAX: (671) 646-6873

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DESIGN BY LC
CHECK BY MAD
PROJ MGR MAD

PORT AUTHORITY OF GUAM
PIER F1
REPLACEMENT CONCEPT

PHASE 1

DRAWING NO. **FIG-1**
PROJECT NO. 30901541B.002
DATE: 9/30/24
SHEET NO. 1 OF 6

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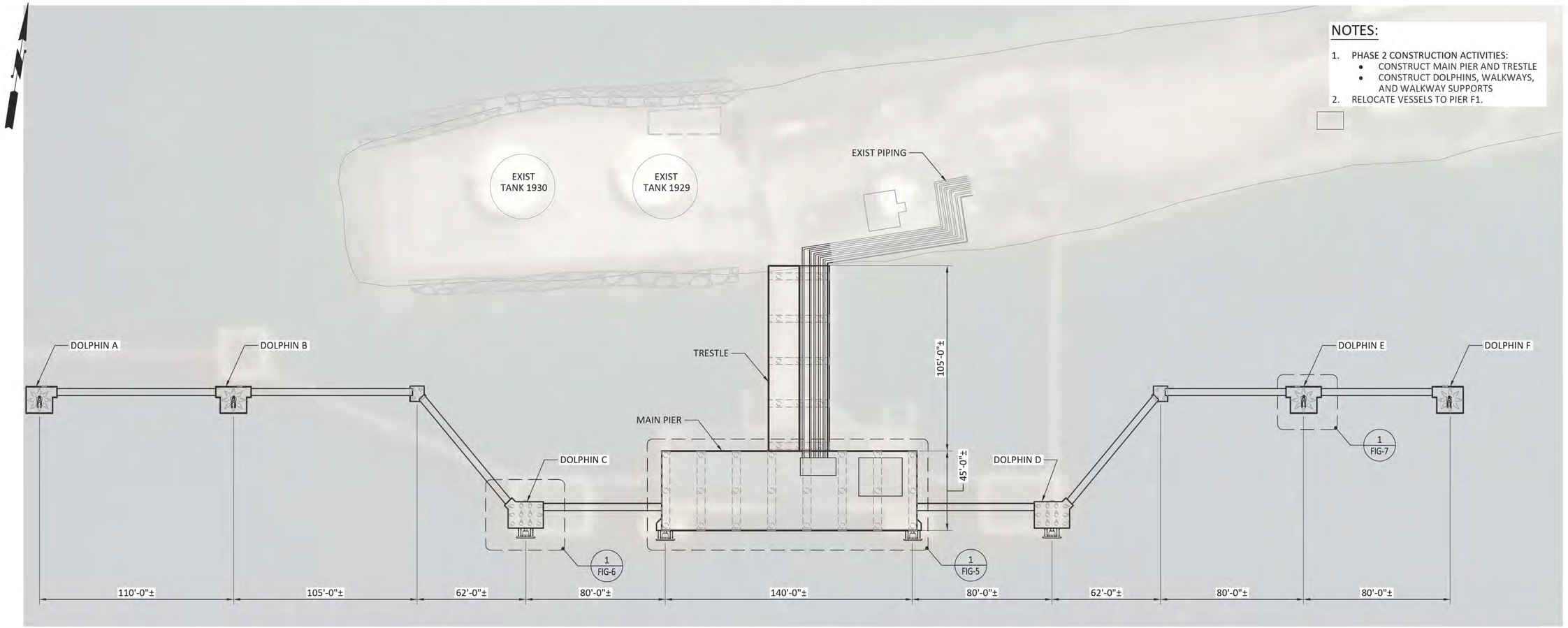

PITI CHANNEL

1 PLAN - PHASE 3 CONSTRUCTION

SCALE: 1" = 30'-0"

1" = 30' scale 30 0 30 60 feet

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PHASE 2

DRAWING NO. **FIG-2**
PROJECT NO. 30901541B.002
DATE: 9/30/24
SHEET NO. 2 OF 6

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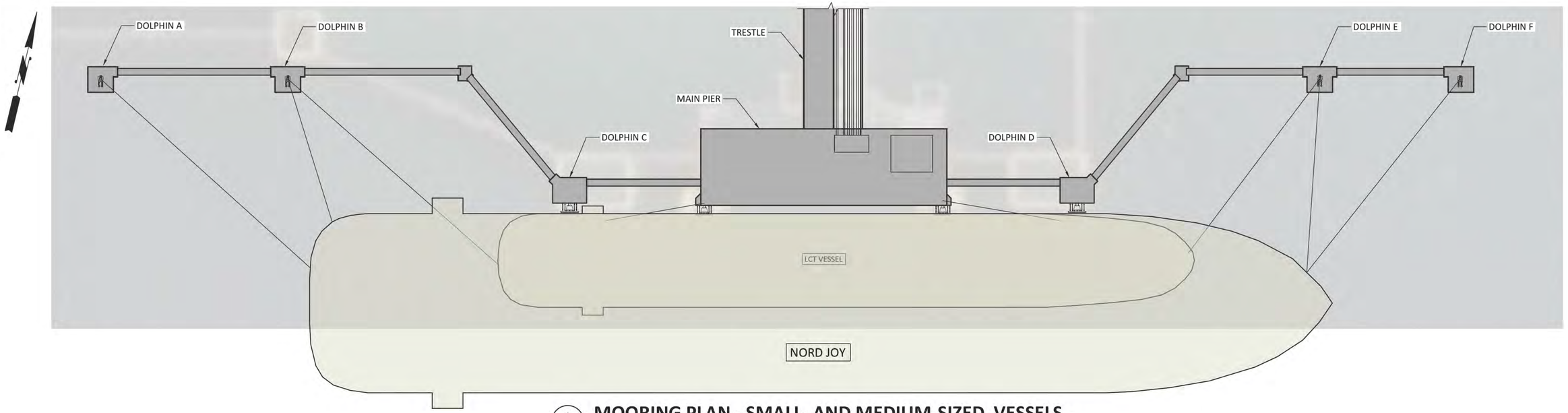
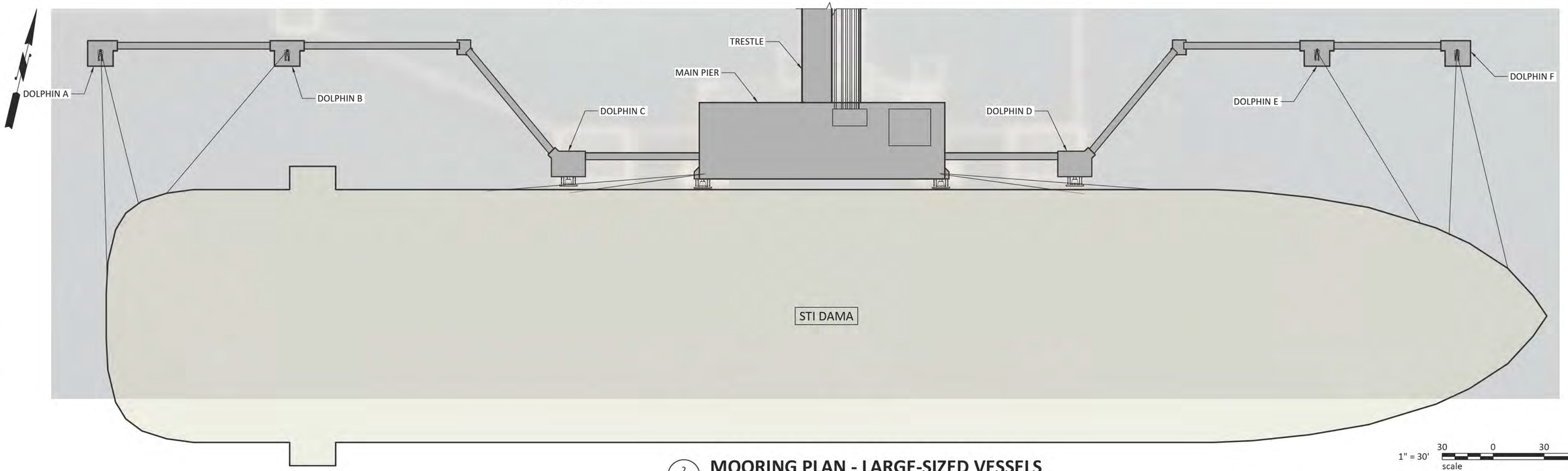


1 / - **MOORING PLAN - SMALL- AND MEDIUM-SIZED VESSELS**
SCALE: 1" = 30'



2 / - **MOORING PLAN - LARGE-SIZED VESSELS**
SCALE: 1" = 30'

1" = 30' scale 30 0 30 60 feet

CONCEPTUAL - NOT FOR CONSTRUCTION

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MOORING PLAN

DRAWING NO. **FIG-3**
PROJECT NO. 30901541B.002
DATE: 9/30/24
SHEET NO. 3 OF 6

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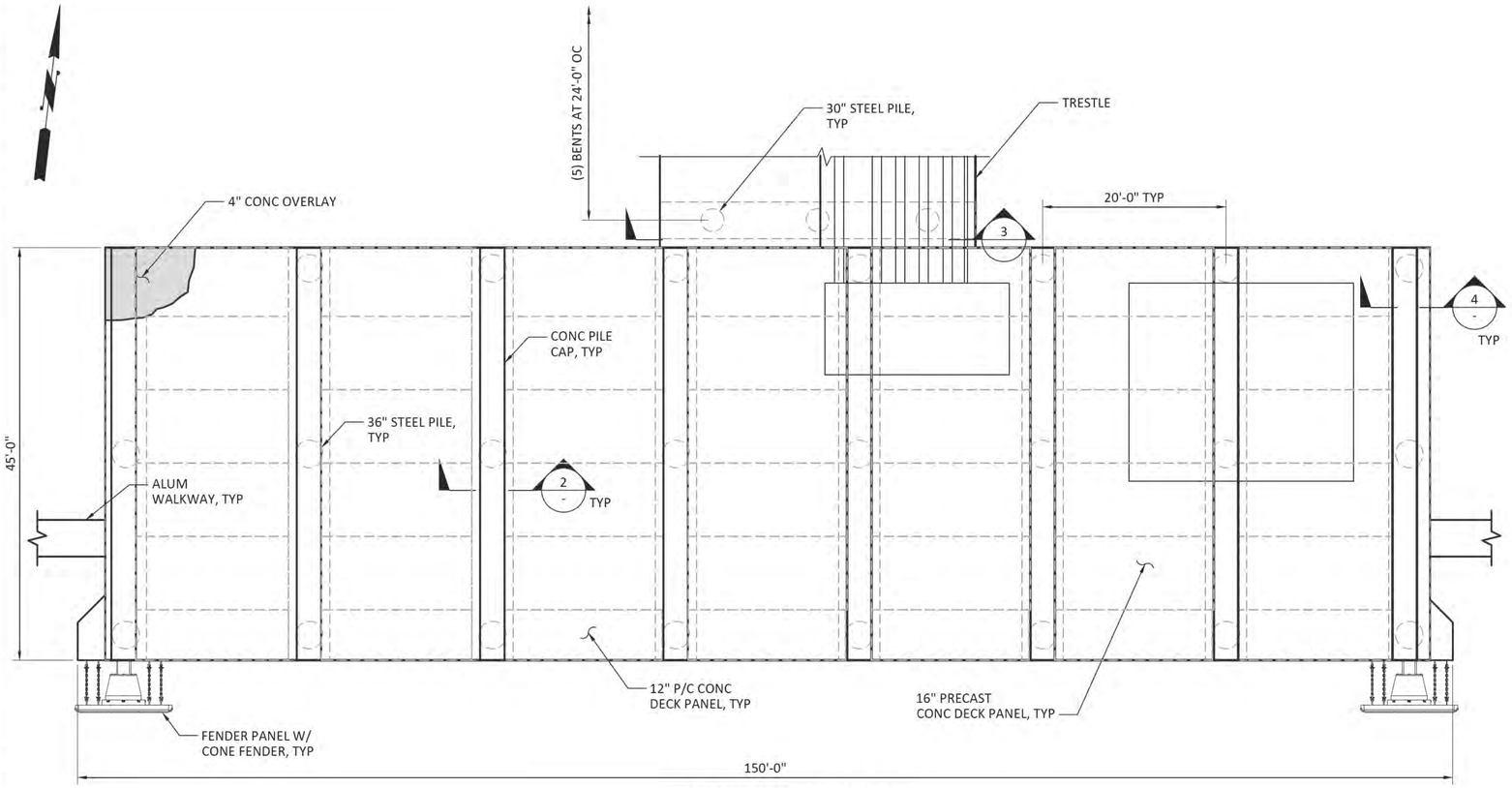
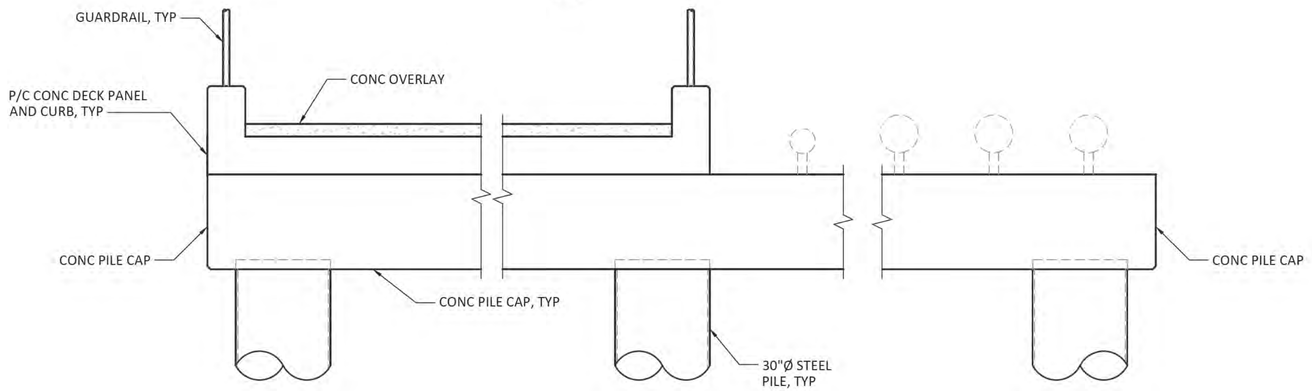
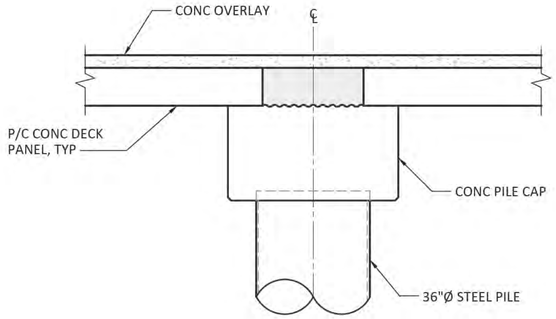


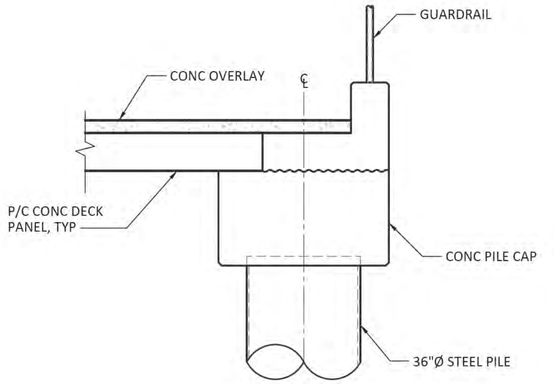
1 FIG-3 **PLAN - PIER F1**
SCALE: 1/8" = 1'-0"



3 - **SECTION - TRESTLE**
SCALE: 1/2" = 1'-0"



2 - **SECTION - TYPICAL PILE CAP**
SCALE: 1/2" = 1'-0"



4 - **SECTION - TYPICAL PILE CAP**
SCALE: 1/2" = 1'-0"

1/2" = 1'-0" scale 2 0 2 4 feet

1/8" = 1'-0" scale 8 0 8 16 feet

CONCEPTUAL - NOT FOR CONSTRUCTION

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Suite 421
Tamuning, GU 96913
TEL: (671) 646-6872
FAX: (671) 646-6873

PORT OF GUAM

DRAWN BY JDM
DESIGN BY LC
CHECK BY MAD
PROJ MGR MAD

PORT AUTHORITY OF GUAM
PIER F1
REPLACEMENT CONCEPT

DETAILS

DRAWING NO. FIG-4
PROJECT NO. 30901541B.002
DATE: 9/30/24
SHEET NO. 4 OF 6

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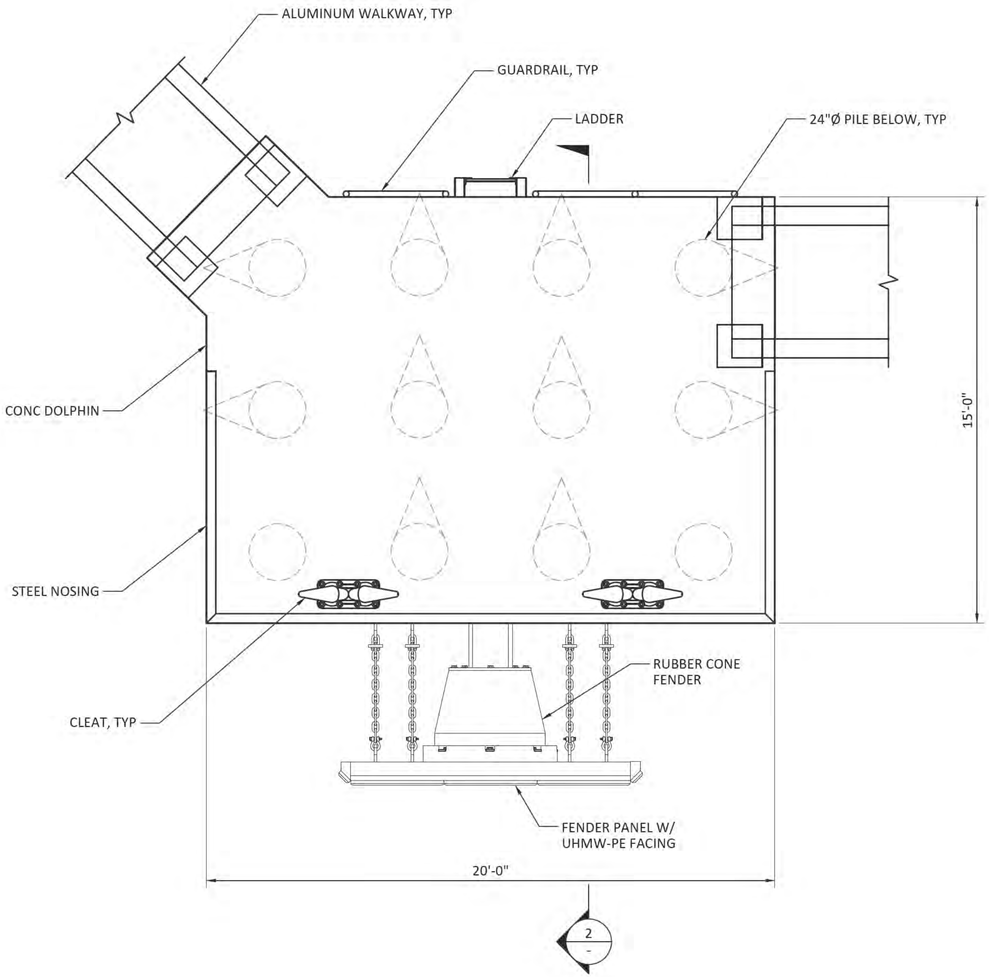
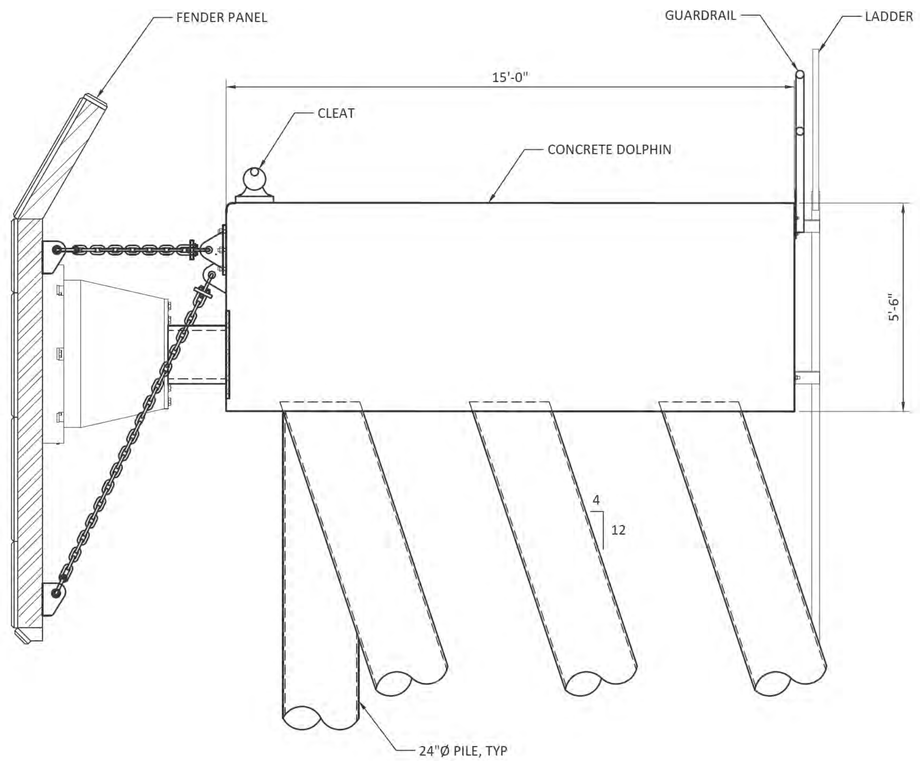


1 FIG-3 **PLAN - TYPICAL BREASTING DOLPHIN**
SCALE: 3/8 = 1'-0"



2 - **SECTION - TYPICAL BREASTING DOLPHIN**
SCALE: 1/2 = 1'-0"

1/2" = 1'-0" 2 0 2 4 scale feet

3/8" = 1'-0" 4 0 4 8 scale feet

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PIER F1
REPLACEMENT CONCEPT
TYPICAL BREASTING DOLPHIN
PLAN AND SECTION

DRAWING NO. **FIG-5**
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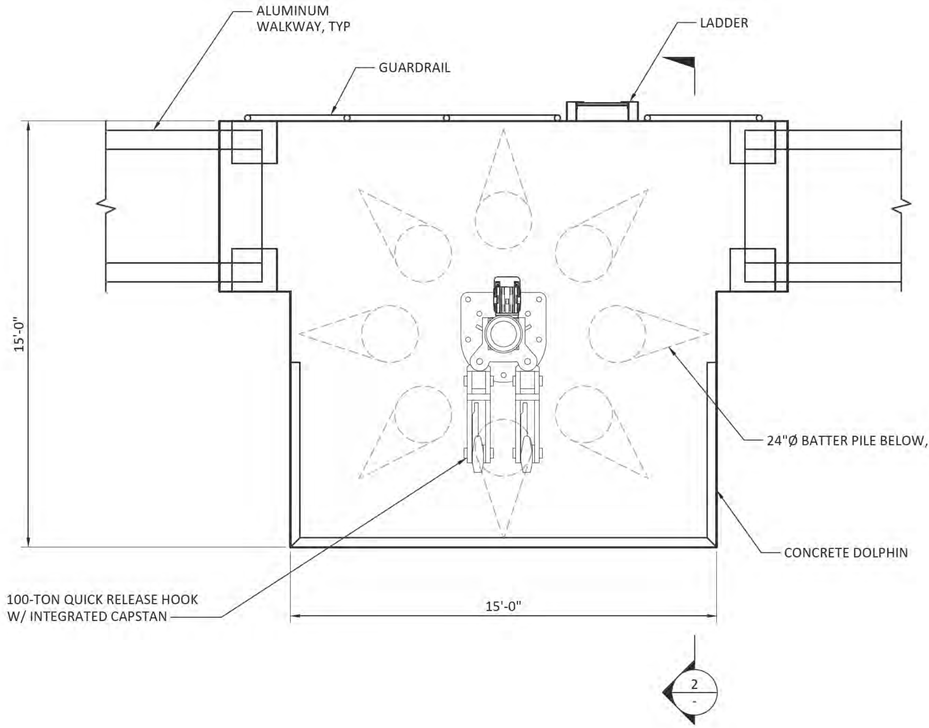
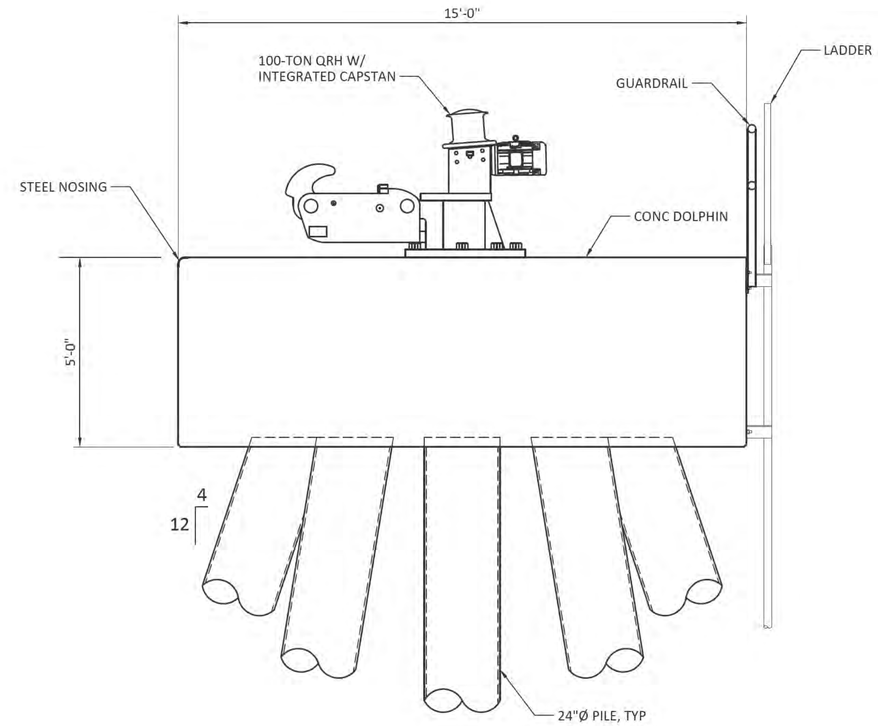


1 FIG-3 **PLAN - TYPICAL MOORING DOLPHIN**
SCALE: 3/8 = 1'-0"



2 - **SECTION - TYPICAL MOORING DOLPHIN**
SCALE: 1/2" = 1'-0"

1/2" = 1'-0" scale 2 0 2 4 feet

3/8" = 1'-0" scale 4 0 4 8 feet

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590 S. Marine Corps Dr.
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Tamuning, GU 96913
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FAX: (671) 646-6873

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PIER F1
REPLACEMENT CONCEPT
TYPICAL MOORING DOLPHIN
PLAN AND SECTION

DRAWING NO. **FIG-6**
PROJECT NO. 30901541B.002
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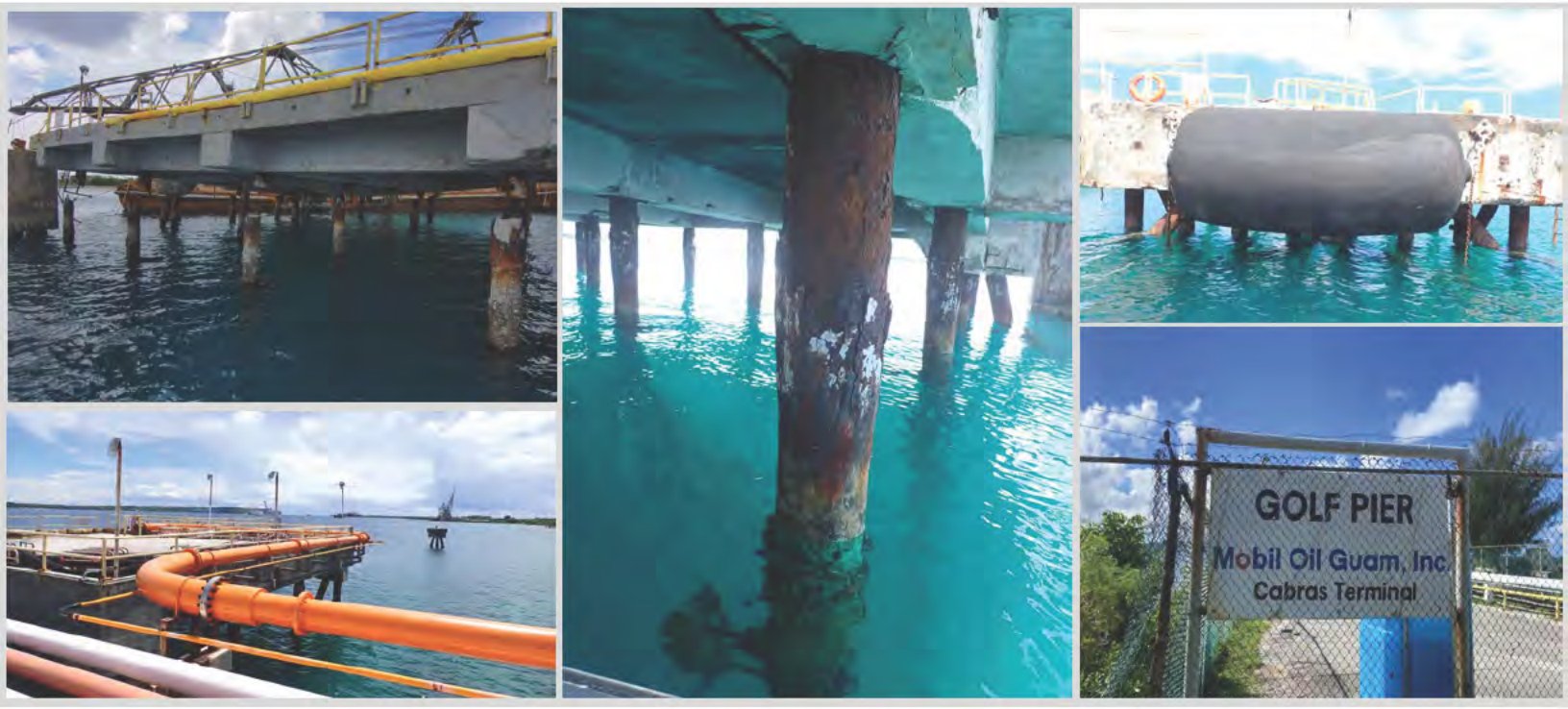
Appendix E – Golf Pier Inspection and Feasibility Study Report

WSP USA
590 Marine Corps Drive
Suite 421
Tamuning, Guam 96913

Final Submittal
(REV 6)



Port Authority of Guam

Golf Pier Condition Assessment and Feasibility Study Report

Submitted to
Port Authority of Guam
Piti, Guam

This study was prepared under contract with the Port Authority of Guam (PAG), with financial support from the Office of Local Defense Community Cooperation (OLDCC). The content reflects the views of the PAG and does not necessarily reflect the views of OLDCC.

30901541B.002

September 2024

Golf Pier Condition Assessment and Feasibility Study Report – Final (Rev 6)

Port Authority of Guam
GOLF PIER

Submitted to

Port Authority of Guam
Piti, Guam

30 September 2024

Submitted by

WSP USA
590 South Marine Corps Drive
Suite 421
Tamuning, Guam 96913

30901541B

FINAL (REV 6)
CONDITION ASSESSMENT AND FEASIBILITY STUDY REPORT
PORT AUTHORITY OF GUAM – GOLF PIER

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EXECUTIVE SUMMARY

This report presents the overall condition assessment rating of Golf Pier, a summary of observations and findings from the inspection efforts performed in 2022, 2023, and 2024 and presents a concept and associated cost estimate for full replacement of Golf Pier. The initial inspection effort was performed in October 2022 and included above-deck, below-deck/above-water, and underwater inspection of structural components. To evaluate damage resulting from Typhoon Mawar, a follow-on cursory assessment and underwater inspection were performed in September of 2023 and May of 2024, respectively.

Overall, Golf Pier is in **critical** condition. Advanced corrosion and breakage have resulted in the localized failure of multiple primary structural components. Primary framing members, such as plumb piles, batter piles, and pile caps have widespread severe damage consisting of open- and closed-corrosion spalls, cracks, corrosion, breakage, and bent piles. Following Typhoon Mawar, approximately 60 percent of the structural piles have sheared and are no longer supporting the structure at the Main Pier. At several other locations, structural piles have corroded to a point where visible penetrations are present. At these locations, the concrete pile plugs are visible. At five locations where batter piles frame into the structure, breakage consisting of cracks, open-corrosion spalls, and rust staining are present.

The structural integrity of Golf Pier is compromised; evidenced by the partial collapse of the Main Pier. In its current condition, Golf Pier is at an increased risk for global failure that may result in damage to personnel, vessels, the pier, and/or the environment. Therefore, it is recommended that use of Golf Pier is suspended until such time that the structure can be replaced or brought to a code-defined level of safety and service.

Because Golf Pier is one of only two fuel piers that provides critical services to the island of Guam, it is recommended that priority is given to the immediate replacement of the pier. Therefore, a replacement concept for full replacement was developed and is described below.

Replacement Concept: $83,427,926 (2027)

The replacement concept consists of full replacement of the Main Pier, Trestle, dolphins, and piping network. In relation to the centerline of the existing pier, the new structure can be located approximately 300-feet west of the existing pier and is equipped with mooring dolphins, breasting dolphins, and an access trestle. Construction of the pier, trestle, and dolphins can be performed with a phased construction approach which allows for cement vessels to continue operations at the existing pier until the new pier is operational. However, it will be necessary to demolish the critically damaged Main Pier and perform repairs and temporary modifications to the existing breasting dolphins and Trestle before cement vessels can berth. In addition, this replacement concept also includes repair of the damaged shoreline (south of the cement silos) which experienced soil erosion and loss of slope protection material following Typhoon Mawar. Note that costs to demolish and remove the grounded crane barge next to the Trestle are not included.

Phase 1A

The Main Pier, fuel lines, and abandoned mooring dolphins can be demolished. Similarly, demolition of the cement line (over-water) and partial demolition of the upland cement line can also be performed. Note that the Trestle will remain in place and be used during future construction phases. During Phase 1A, cement vessels will need to operate from an alternative location.

Phase 1B

To prepare the site for receiving cement vessels, this phase involves repair and strengthening of breasting dolphins, the Trestle, and shoreline restoration west of the Trestle. At the Trestle and dolphins, severely deteriorated piles can be repaired using structural pile jackets that extend below the waterline. The intent of these jackets is to help prevent further deterioration of the steel cross sections and protect the piles from chlorides within the splash zone. Concrete framing elements at the Trestle having severe open-corrosion spalling and cracks can be repaired by removing damaged sections of concrete and restoring the cross sections with a cementitious material. At Bents 1 and 2 where pile caps have failed, a temporary walkway can be installed to span the damaged structure. Once this work is complete, a cement line can be installed on the Trestle and tied into the existing upland pipe.

Along the shoreline west of the Trestle, eroded and undermined portions of the bulkhead wall and foundation can be strengthened by installing a reinforced concrete slab between the buttresses. The concrete should extend a minimum of 12- to 18- inches below the ground surface to help prevent future loss of material. Once the concrete slab is in place, slope protection (rip rap) can be placed in front of the bulkhead to protect the concrete wall from debris and wave impacts.

To support rubber-flanged hoses that extend from cement vessels to the Trestle, a series of steel floats (Flexi-Floats) can be installed at the south end of the Trestle. The Flexi-Floats will

serve as a temporary work platform and provide access from the Trestle to cement vessels. The Flexi-Floats will be connected to the trestle and dolphins by a series of walkways.

Phase 2

The Main Pier, Trestle, west breasting dolphin, western mooring dolphins, and fuel/cement lines can be constructed west of the existing pier. At the beginning of this phase, cement vessels can relocate to the existing site and utilize the temporary structures and repaired Trestle to offload cement.

Phase 3A

With completion of Phase 2, cement vessels and LCT's can relocate to the partially completed Golf Pier. The breasting dolphins, Trestle, and temporary cement line at the "old" structure can be demolished. Similarly, the Flexi-Floats can also be removed.

Phase 3B

During this final construction phase, the east breasting dolphin and both eastern mooring dolphins can be constructed. After completion, Golf Pier will have the capacity to service cement vessels, local coastal tankers, and tankers up to 109,857 DWT.

1.0 INTRODUCTION

As part of Service Agreement FY021-003 dated 4 November 2020, the Port Authority of Guam authorized Task Order No. 12 (FY23-001), In-Water Inspection and Feasibility Study. As part of this task order, WSP USA performed above-water and underwater inspections and a facility condition assessment of Golf Pier. Observations and findings from the field inspection effort are summarized in this facility condition assessment report (FCAR). Condition assessment ratings were assigned to primary structural components: Main Pier, Trestle, and dolphins. Using this information, a comprehensive facility condition assessment rating was then assigned to the entirety of Golf Pier.

The purpose of this effort was to evaluate the current condition of Golf Pier and develop recommendations and a conceptual replacement concept based on the observed deficiencies. The replacement concept incorporated dead loads, live loads, seismic loads, and berthing/mooring forces for current vessels that use the facility. A conceptual basis of design was developed to summarize the load assumptions and codes and is presented within this report.

1.1 FACILITY DESCRIPTION

The Port of Guam (Port) is located on the western side of the island of Guam and encompasses over 1,000 acres of land. Strategically located along major Pacific shipping and air routes, the Port serves as an important transportation hub for the Commonwealth of the Northern Marianas, the Micronesian islands, and markets to the east and west. Maritime facilities at the Port consist of the following facilities. Note that this FCAR is limited to evaluation of Golf Pier. See Figure 1.

- Pier F1 (Apra Harbor)
- Berths F2 through F6 (Apra Harbor)
- Hotel Wharf (Apra Harbor)
- **Golf Pier (Apra Harbor)**
- Family Beach (Apra Harbor)
- Outhouse Beach (Apra Harbor)
- Dog-Leg Pier (Apra Harbor)
- Harbor of Refuge
- Agat Marina
- Perez Marina (Boat Basin)

Figure 1: Apra Harbor

1.2 GOLF PIER

Golf Pier is located on the southern side of the Glass Breakwater within Outer Apra Harbor. Currently, Golf Pier is used by Mobil Oil Guam Inc. and Cementon Micronesia for loading and unloading of petroleum-based products and cement, respectively. Golf Pier has been in service since the late 1940's; originally part of what was called Pier B. It is estimated that Golf Pier was renovated in the 1960's when it began to be used to store bulk cement.

The terminal comprises a Main Pier, approach trestle, and mooring and breasting dolphins. The L-shaped Main Pier is approximately 93 feet long by 60 feet wide and is constructed with a cast-in-place concrete deck spanning between concrete pile caps supported by steel pipe piles. A trestle measuring approximately 143 feet long by 31 feet wide provides direct access to the pier. The trestle is constructed with a cast-in-place concrete deck spanning between longitudinal concrete pile caps that are supported by transverse concrete subcaps, supported by steel pipe piles.

Breasting Dolphins B and C are located on the southwest and southeast corners of the Main Pier and consist of concrete pile caps supported by steel batter piles. Breasting Dolphins A and D are located west and east of the Main Pier and are of similar construction to Dolphins B and C. Access to Dolphins A and D is provided by pile-supported walkways that extend west and east from Dolphins B and C. Abandoned mooring dolphins composed of concrete pile caps and battered steel piles are located

northwest and northeast of the Main Pier. Upland mooring structures composed of mooring bollards and concrete foundations are located on the southwest corner of Cementon and SeaPlane Ramp. Although not associated with Golf Pier, these structures are currently used as mooring points for vessels that berth at Golf Pier. See Figure 2.

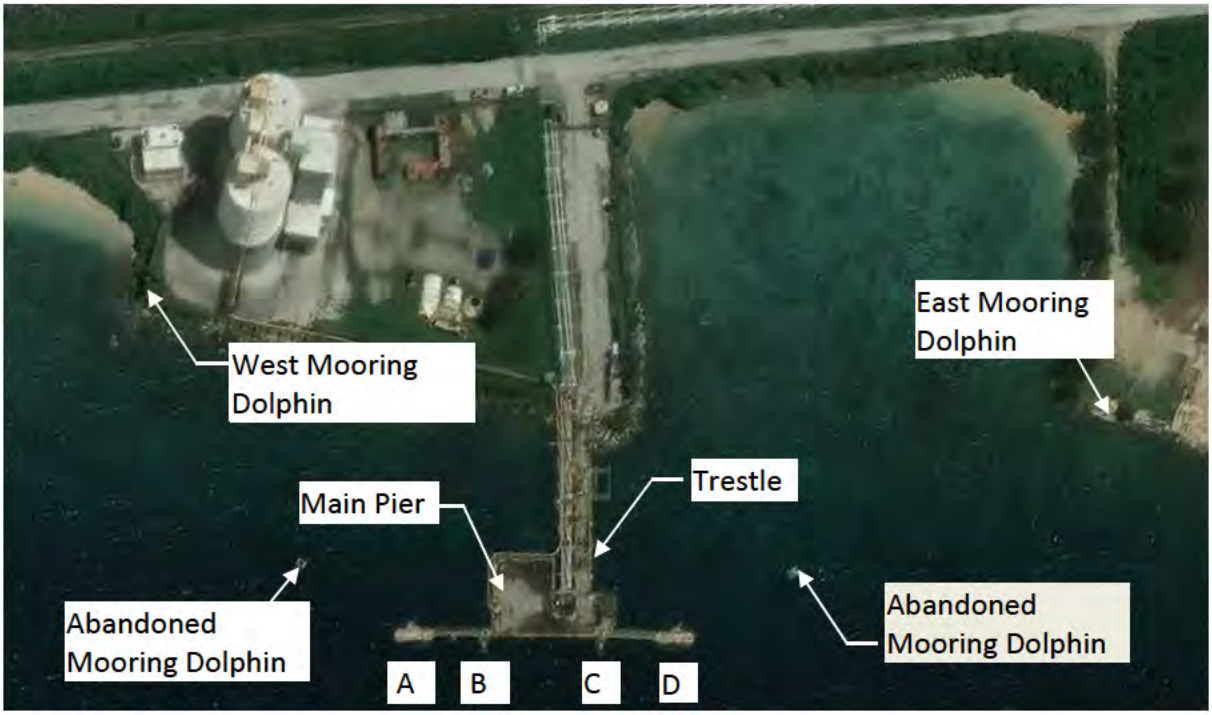

Figure 2: Golf Pier

2.0 FACILITY CONDITION ASSESSMENT

2.1 CONDITION ASSESSMENT APPROACH

WSP performed a routine inspection of above-deck, below-deck/above-water, and underwater elements at Golf Pier. Inspections were performed in accordance with ASCE Manuals and Reports on Engineering Practice No. 130, *Waterfront Facilities Inspection and Assessment* (ASCE MOP 130).

2.2 FACILITY CONDITION ASSESSMENT METHODOLOGY

Condition assessment of elements included both visual observation and limited hands-on assessment. In accordance with ASCE MOP 130, elements were assigned an element-level damage rating, with damages defined as minor, moderate, major, or severe. These damage ratings are defined in Chapter 2 of ASCE MOP 130 and have been standardized to provide a qualitative and consistent description of an elements level of damage. Abbreviated element level damage rating tables from ASCE MOP 130 are provided in Appendix A for reference.

Following completion of the field work, element level damage ratings in combination with visual observations were used to assign condition assessment ratings for each primary structural component. In accordance with Table 2-14 of ASCE MOP 130, a summary of the facility condition assessment ratings is provided below.

Table 1: Facility Condition Assessment Ratings

Rating	Description
Good	No visible damage or only minor damage noted. Structural elements may show very minor deterioration, but no overstressing observed. No repairs are required.
Satisfactory	Limited minor to moderate defects or deterioration observed but no overstressing observed. No repairs are required.
Fair	All primary structural elements are sound but minor to moderate defects or deterioration observed. Localized areas of moderate to advanced deterioration may be present but do not significantly reduce the load-bearing capacity of the structure. Repairs are recommended, but the priority of the recommended repairs is low.
Poor	Advanced deterioration or overstressing observed on widespread portions of the structure but does not significantly reduce the load-bearing capacity of the structure. Repairs may need to be carried out with moderate urgency.
Serious	Advanced deterioration, overstressing, or breakage may have significantly affected the load-bearing capacity of the primary structural components. Local failures are possible and loading restrictions may be necessary. Repairs may need to be carried out on a high-priority basis with urgency.
Critical	Very advanced deterioration, overstressing, or breakage has resulted in localized failure(s) of primary structural components. Failures that are more widespread are possible or likely to occur, and load restrictions should be implemented as necessary. Repairs may need to be carried out on a very high-priority basis with strong urgency.

2.2.1 Above-deck Inspection

The initial above-deck inspection was performed on 1 November 2022 and evaluated the general condition of the deck surface, mooring hardware, fender system, and miscellaneous appurtenances. The inspection was performed by walking along the deck surface and visually observing the condition of the elements.

A follow-on cursory assessment was performed on 19 September 2023 and included a general evaluation of the structure in its post-typhoon condition.

2.2.2 Below-deck Inspection

The initial below-deck inspection was performed on 1 November 2022 and evaluated the general condition of deck soffit, pile caps, subcaps, concrete abutment, dolphin soffits, and exposed portions of the steel piles. Concrete elements were visually assessed for damage, such as cracks, mechanical damage, and corrosion spalls. Steel elements were visually assessed for corrosion damage, such as pitting, flaking, and loss of cross-sectional thickness. The below-deck assessment was performed using a small aluminum skiff at low tidal elevations, which allowed the inspection crew direct visual and hands-on access to structural elements.

A follow-on cursory assessment was performed on 15 September 2023. For this effort, the general condition of the structure was assessed using a small skiff by navigating around the perimeter of the pier. Due to its post-typhoon condition and partially collapsed state, inspectors were not able to perform an up-close/detailed inspection.

2.2.3 Underwater Inspection

The initial underwater inspection was performed on 25 October 2022 and assessed 100 percent of the structural plumb and batter piles. For this effort, WSP's in-house engineer dive team performed dive operations using self-contained underwater breathing apparatus (SCUBA) procedures. The engineer dive team consisted of a four-person crew: dive supervisor, safety diver/tender, and two divers.

All piles included in this work received a Level I/visual inspection in accordance with ASCE MOP 130. This level of inspection is essentially a "swim-by" over the entire length of the pile above the mudline and typically does not involve removal of marine growth or cleaning the pile. The diver relies primarily on visual and/or tactile observations (depending on water clarity) to make condition assessments. A Level II inspection was performed on approximately 10 percent of the inspection piles. In addition to a visual inspection, this level involves removing the marine growth in a 12-inch-high band around the pile at three elevations (mudline, mean lower low water, and midway between). In addition to an overall visual inspection of the pile, removal of marine growth allows the diver a more in-depth visual examination at three locations. A Level III inspection was performed on approximately 5 percent of the inspected piles. This highly detailed level of inspection consisted of ultrasonic thickness measurements at Level II locations.

A follow-on underwater inspection was performed on 21 May 2024 and included inspection of the plumb and batter piles at Breasting Dolphin A. Inspection of this dolphin was identified as a priority given its location relative to the grounded crane barge. Due to its post-typhoon condition and partially collapsed state, inspectors were not able to perform an up-close/detailed inspection of piles at the Main Pier and Trestle.

3.0 INITIAL CONDITION ASSESSMENT FINDINGS

Findings from the condition assessment effort and ratings for above-deck and below-deck/above-water elements are described in the following sections. Ratings have been assigned based on field observations and element level damage ratings for individual elements. Observations and findings from the inspection effort have been tabulated and are provided in Appendix B. Similarly, a damage map showing the type and location of damage is provided in Appendix C for the Main Pier, Trestle, and dolphins.

3.1 MAIN PIER

3.1.1 Steel Piles

The steel piles are in **critical** condition. Severe damage consisting of splitting, pitting, and scaling of the steel wall thickness was observed at all piles within the top 3 feet of the upper tidal zone. See Photo 1. At 12 locations, perforations through the wall thickness are present and vary in size from 6-inch-diameter holes to complete loss of cross section. At these locations, the concrete plugs are visible. At Pile 4A, the visible concrete plug is sheared through its cross section and dislodged approximately 1/8 inch from the remaining plug. See Photo 2. Below water, observed damages consisted of minor to moderate corrosion. In general, sacrificial anodes were found to have 75 percent remaining cross section.

Photo 1: Typical Severe Pile

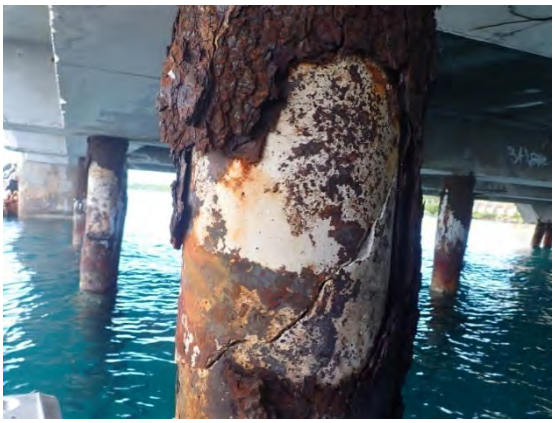

Photo 2: Pile 4A

3.1.2 Concrete Pile Caps

The concrete pile caps are in **poor/serious** condition. Cracks, closed-corrosion spalls, and open-corrosion spalls with exposed reinforcement are present at multiple locations. Breakage, spalling, and structural cracks measuring 1/16 to 1/4 inch wide were observed at multiple subcap locations where batter piles connect to the structure. See Photo 3 and Photo 4.

Photo 3: Typical Damage at Concrete Pile Caps

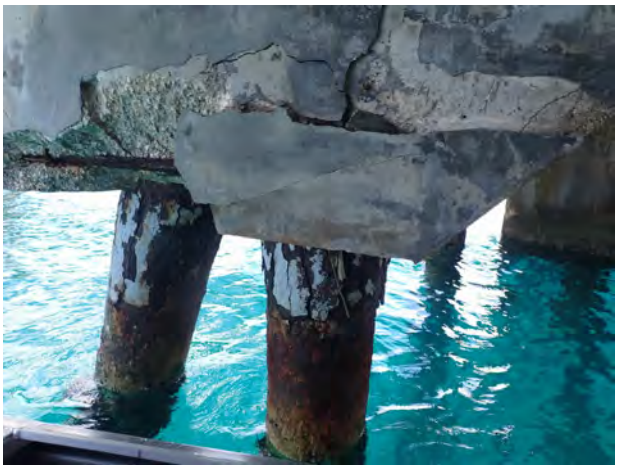

Photo 4: Typical Damage at Batter Pile to SubCap Connections

3.1.3 Concrete Deck

The concrete deck is in **fair** condition. Open-corrosion spalling with exposed reinforcement was observed at eight locations on the deck soffit. Above deck, minor cracks and gouges were observed at various locations.

3.1.4 Guardrail

The guardrail is in **poor** condition. The guardrail posts and base plates exhibit moderate to severe corrosion at multiple locations. See Photo 5.

Photo 5: Typical Corrosion at Guardrail

3.1.5 Bullrail

The concrete bullrail is in **satisfactory** condition. At select locations corresponding with the guardrail posts/base plates, mechanical spalls with exposed/corroded reinforcement are present.

3.2 TRESTLE

3.2.1 Piles

The steel piles are in **serious** condition. Severe damage consisting of splitting, pitting, and scaling of the steel wall thickness was observed at all piles within the upper tidal zone. See Photo 6. At two locations, perforations through the wall thickness are present. At these locations, the concrete plugs are visible. Below water, observed damages consist of moderate corrosion. In general, sacrificial anodes were found to have 70 percent remaining cross section.

Photo 6: Typical Severe Pile

3.2.2 Transverse Pile Caps

The transverse pile caps are in **serious** condition. Structural cracks ranging from 1/16 to 1/2 inch are present at multiple locations along the top and bottom of the pile caps. Open- and close-corrosion spalls with exposed reinforcement are present at multiple locations. See Photo 7.

Photo 7: Severe Crack at Pile Cap No. 3

3.2.3 Longitudinal Pile Caps

The longitudinal pile caps are in **serious** condition. Structural cracks ranging from 1/16 to 3/4 inch are present at multiple locations along the top and bottom of the pile caps. Open- and close-corrosion spalls with exposed reinforcement are present at multiple locations. See Photo 8 and Photo 9.

Photo 8: Severe Crack at East Longitudinal Pile Cap

Photo 9: Open-Corrosion Spalling at East Longitudinal Pile Cap

3.2.4 Concrete Deck

The concrete deck is in **fair** condition. Open- and close-corrosion spalls are present on the soffit of the concrete deck between the bulkhead and Bent 2. See Photo 10.

Photo 10: Concrete Deck Soffit Damage (Bulkhead to Bent 1)

3.2.5 Abutment

The abutment is in **serious** condition. A 3/4-inch-wide horizontal crack is present at the concrete abutment beam and spans the full width of the trestle.

3.2.6 Slope Protection

The slope protection is in **satisfactory** condition. Deficiencies were not observed. See Photo 11.

Photo 11: Typical Slope Protection

3.3 BREASTING DOLPHIN A

3.3.1 Steel Piles

The steel piles are in **critical** condition. Severe damage consisting of splitting, pitting, and scaling of the steel wall thickness was observed at all piles within the upper tidal zone. At nine locations, perforations through the wall thickness are present and vary in

size. At these locations, the concrete plugs are visible. Below water, moderate corrosion damage is present at all piles. See Photo 12.

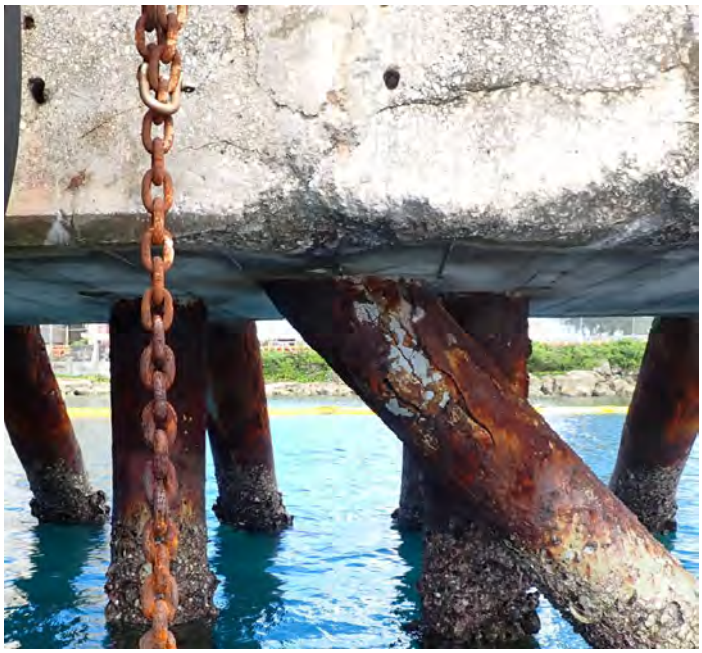

Photo 12: Severe Pile Corrosion (Pile 12)

3.3.2 Concrete Pile Cap

The concrete pile cap is in **poor** condition. Mechanical spalls and corrosion cracks up to 1/8 inch wide were observed at multiple locations. See Photo 13. Closed-corrosion spalling is present on the top surface/west end of the dolphin. An open-corrosion spall is present where Pile No. 9 intersects the pile cap soffit.

Photo 13: Corrosion Crack

3.3.3 Mooring System

Two mooring bollards are present on Dolphin A. The mooring bollards are in **satisfactory** condition. Minor surface corrosion and coating loss were observed at each bollard.

Photo 14: Minor Corrosion at Mooring Bollard

3.3.4 Fender System

The fender system, consisting of a suspended foam-filled fender, is in **poor** condition. Permanent deformation of the fender was observed. Minor gouges and tears are present at multiple locations. See Photo 15.

Photo 15: Foam-filled Fender

3.3.5 Walkway

The walkway is in **critical** condition. Severe corrosion of the tubular steel stringers is present at all bearing locations. Similarly, the bolts and steel plates that connect the walkways to the pier and dolphins are severely corroded. Connection of the guardrail posts to the steel stringers are severely corroded at several locations. See Photo 16.

Photo 16: Severe Corrosion at Walkway Framing

3.3.6 Ladder

The ladder is in **critical** condition. The ladder is permanently deformed and non-functional. See Photo 17.

Photo 17: Non-functional Ladder

3.4 BREASTING DOLPHIN B

3.4.1 Steel Piles

The steel piles are in **fair** condition. Moderate corrosion damage was observed at all piles. See Photo 18.

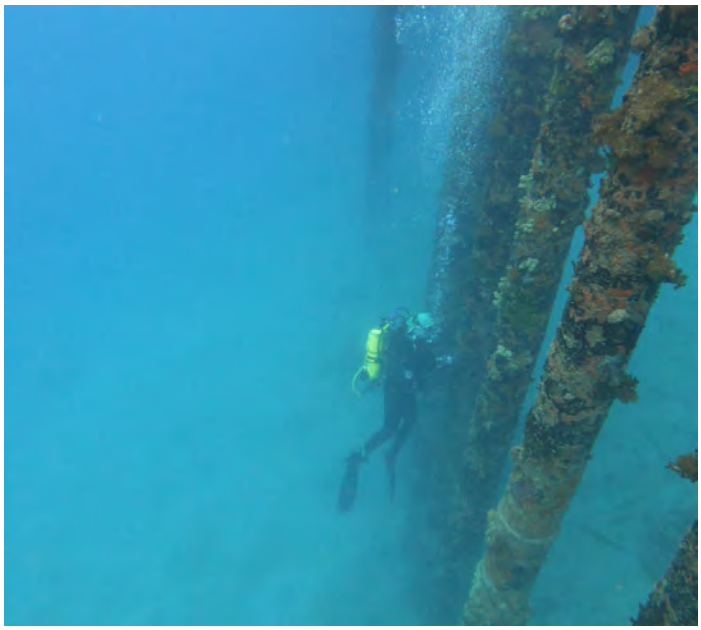

Photo 18: Typical Steel Piles

3.4.2 Concrete Pile Cap

The concrete pile cap is in **fair** condition. Mechanical spalls are present at the walkway landing. A moderate vertical crack was observed on the south face. See Photo 19.

Photo 19: Vertical Crack at Concrete Dolphin

3.4.3 Fender System

The fender system is in **satisfactory** condition. Minor wear and delamination are present at the rubber fender. Minor corrosion is present at the steel fender panel, chains, and attachment plates. The ultra-high molecular weight polyethylene (UHMW-PE) quarter panels are missing at the top of the fender panel. See Photo 20.

Photo 20: Typical Fender System

3.4.4 Mooring System

The mooring system was found to be in **poor** condition. Major corrosion, loose scale, pitting, and loss of the coating system are present at the bollard. See Photo 21.

Photo 21: Mooring Dolphin

3.5 BREASTING DOLPHIN C

3.5.1 Steel Piles

The steel piles are in **fair** condition. Moderate corrosion damage was observed at all piles.

3.5.2 Concrete Pile Cap

The concrete pile cap is in **fair** condition. Mechanical spalls are present at the walkway landing and corners of the pile cap. See Photo 22.

Photo 22: Mechanical Spalls at Breasting Dolphin

3.5.3 Fender System

The fender system is in **poor** condition. Minor wear and delamination are present at the rubber fender. Spalled concrete (potentially concrete breakout) is present at the top anchor bolt locations. At the anchor bolt locations, the nuts are loose and a gap of approximately 1/2 inch is present between the concrete and pipe extension. Moderate corrosion is present at the steel fender panel, chains, and attachment plates. The UHMW-PE quarter panels are missing at the top of the fender panel.

Photo 23: Spalled Concrete at Fender System Anchor Bolts

3.5.4 Mooring System

The mooring system was found to be in **poor** condition. Major corrosion, loose scale, pitting, and loss of the coating system are present at the bollard. See Photo 24.

Photo 24: Mooring Bollard

3.6 BREASTING DOLPHIN D

3.6.1 Steel Piles

The steel piles are in **critical** condition. Severe damage consisting of splitting, pitting, and scaling of the steel wall thickness was observed at all piles within the upper tidal zone. See Photo 25. At six locations, perforations through the wall thickness are present and vary in size. At these locations, the concrete plugs are visible. Below water, moderate corrosion damage is present at all piles. Similar to previous inspections, permanent deformation of Pile No. 12 was observed below the waterline. See Photo 26.

Photo 25: Typical Pile with Severe Corrosion Damage

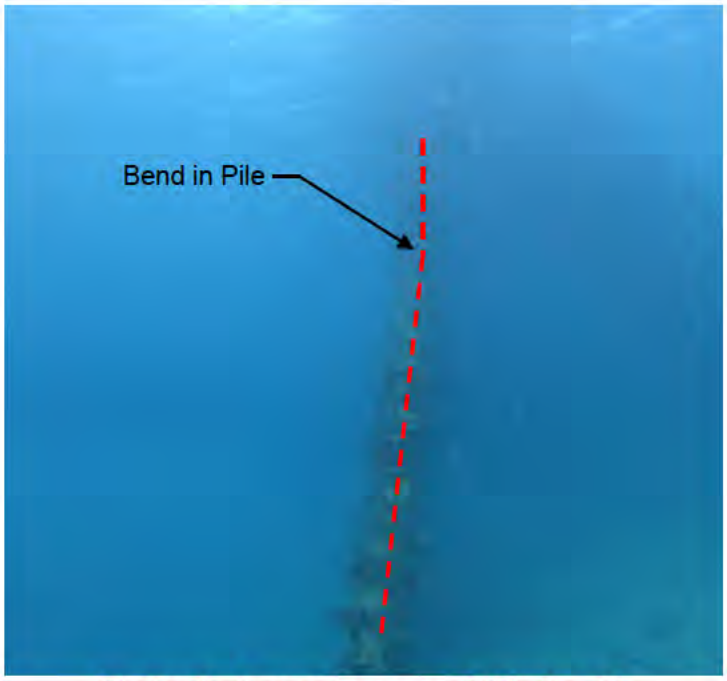

Photo 26: Severe Damage at Pile No. 12

3.6.2 Concrete Pile Cap

The concrete pile cap is in **poor** condition. Mechanical spalls, corrosion cracks, and open- and closed-corrosion spalls are present at multiple locations. An open-corrosion spall measuring approximately 4 feet by 4 feet by 6 inches deep is present between Pile Nos. 9 and 10. See Photo 27. The guardrail is missing and severely corroded at multiple locations.

Photo 27: Open-corrosion Spall at Concrete Dolphin

3.6.3 Mooring System

Two mooring bollards are present on Dolphin D. The mooring bollards are in **satisfactory** condition. Minor surface corrosion and coating loss were observed at each bollard. See Photo 28.

Photo 28: Mooring Bollard

3.6.4 Fender System

The fender system, consisting of a suspended foam-filled fender, is in **poor** condition. Moderate to major damage consisting of gouges and loss of the outer layer are present where the fender makes contact with the concrete dolphin. See Photo 29.

Photo 29: Fender System at Dolphin D

3.6.5 Walkway

The walkway is in **critical** condition. Severe corrosion of the tubular steel stringers is present at all bearing locations. Similarly, the bolts and steel plates that connect the walkways to the pier and dolphins are severely corroded. Connection of the guardrail posts to the steel stringers are severely corroded at several locations. See Photo 30.

Photo 30: Walkway at Dolphin D

3.6.6 Ladder

The ladder is in **satisfactory** condition. Damage was not observed. See Photo 31.

Photo 31: Ladder at Dolphin D

4.0 POST TYPHOON MAWAR CONDITION ASSESSMENT FINDINGS

On 24 May 2023, the island of Guam experienced severe winds, wind-driven rain, and storm surges resulting from Typhoon Mawar. As a result, several of the PAG's maritime and upland assets experienced severe damage. During the typhoon event, a crane barge made contact with the northwest corner of Golf Pier and the Trestle at Bents 1 and 2. To identify the level and extent of damage resulting from the typhoon and allision, WSP performed a post-typhoon cursory above-water assessment and underwater inspection at limited locations. An above-water assessment was also performed by PAG. Results from the assessment and inspection efforts found severe damage and failure of primary structural elements at several locations.

From the follow-on inspection and assessment efforts, staff identified approximately 21 piles that are deformed (no longer plumb), failed/sheared approximately 2 feet below the soffit elevation, and that have lost connection to the deck; representing 60 percent of structural piles at the main pier. At the trestle, damages consisting of permanently deformed cement/fuel lines and severely damaged pipe flanges were observed at multiple locations. Similar to the Main Pier, severe damage was also observed at pile caps and piles at Bents 1 and 2. At dolphin A, batter pile #9 was observed to be permanently bent and buckled at a localized area. Aside from the missing walkway leading from the Main Pier to Dolphin A, it is unknown whether the typhoon resulted in additional damages to dolphins B, C, and D. See Photo 32, Photo 33, Photo 34 and Photo 37.

At the shoreline adjacent to the cement silos and Trestle, severe soil erosion and loss of slope protection occurred over a length of approximately 300 feet. See Photo 35.

Photo 32: Post Typhoon Mawar Damage (Looking East)

Photo 33: Critically Damaged Main Pier

Photo 34: Damage to Cement/Fuel Pipelines

Photo 35: Soil Erosion and Loss of Slope Protection

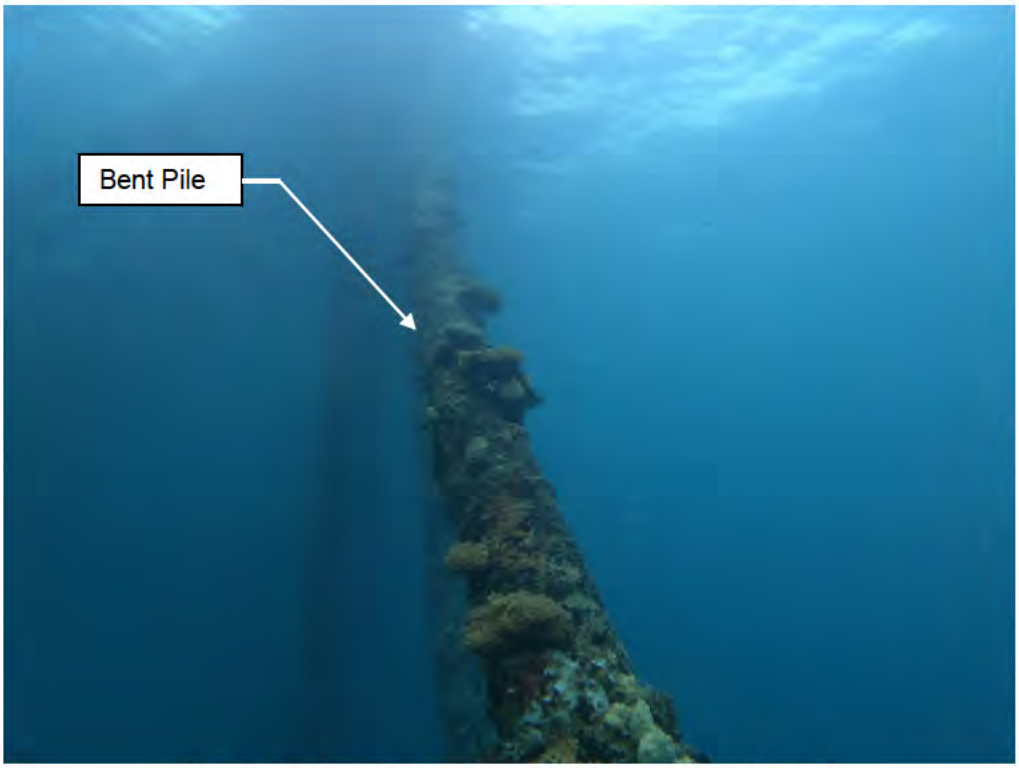

Photo 36: Breasting Dolphin A (Bent Pile #9 Bent)

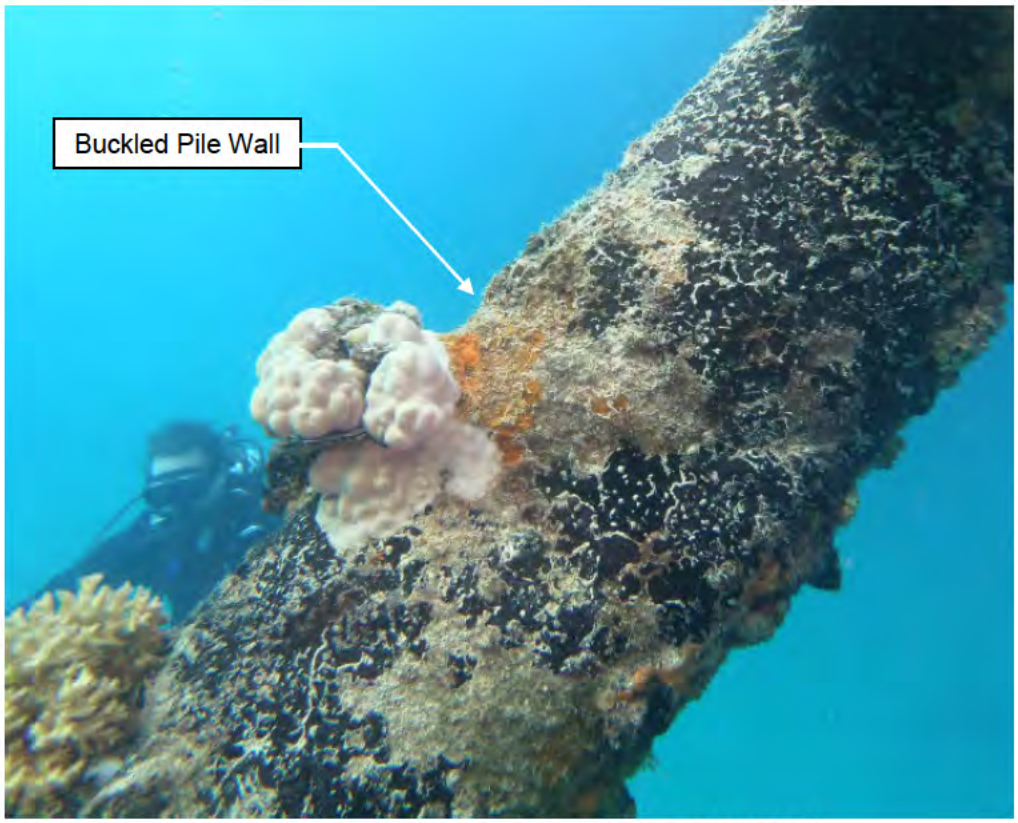

Photo 37: Breasting Dolphin A (Pile #9 Buckled)

5.0 OVERALL FACILITY CONDITION ASSESSMENT RATING

The current overall facility condition assessment ratings for marine components at Golf Pier are summarized in Table 2. Assessment ratings were assigned based on visual observations and element level damage ratings from the 2022, 2023, and 2024 inspection efforts. The overall rating was determined by considering the following.

- Total number of observed damages
- Severity of observed damages
- Distribution of observed damages
- Sensitivity of affected elements
- Location of damages
- Serviceability

Table 2: Golf Pier Condition Assessment Ratings

Component Identification	Condition Assessment Rating
Main Pier	Critical
Trestle	Serious
[1]Breasting Dolphin A	Critical
[1]Breasting Dolphin B	Fair
[1]Breasting Dolphin C	Fair
[1]Breasting Dolphin D	Serious
Golf Pier Overall Condition Assessment Rating	
Critical	

Note 1: Condition assessment ratings for Dolphins B, C, and D are based on observations from the October 2022 inspection and assessment effort.

6.0 BERTHING AND MOORING ANALYSIS

The existing breasting dolphins in their pre-Typhoon Mawar condition were evaluated for their ability to support berthing and mooring forces from current vessels that use the facility. To estimate the structural capacity of the dolphins, damages observed during the October 2022 inspection effort and summarized in Section 3.0 were incorporated into the analysis effort. The berthing and mooring analyses were performed to determine if the load demands imposed on the dolphins exceeded the axial capacity of the steel piles.

The Main Pier and approach trestle were not included in the berthing and mooring analysis as these structures are physically separated from the breasting dolphins. Similarly, the abandoned 3-pile mooring dolphins east and west of the terminal were not included in the analysis.

6.1 DESIGN CRITERIA

Two design vessels were evaluated for the berthing and mooring analyses. The selected vessels are representative of tankers that berth at Golf Pier. Vessel characteristics are shown below.

- Asia Cement No. 6

Type:	Cement Carrier
Length Overall:	412 feet
Breadth:	55 feet
Minimum Draught:	
Maximum Draught:	25 feet
Deadweight Tonnage:	12,283 LT

- STI Dama

Type:	Tanker
Length Overall:	600 feet
Breadth:	105 feet
Minimum Draught:	
Maximum Draught:	28 feet
Deadweight Tonnage:	49,990 LT

6.1.1 Wind Speed

A wind speed of 30 knots (35 mph) was considered in the mooring analysis. This 30-second gust wind speed represents the upper limit at which vessels are directed to vacate the berth.

6.1.2 Wave Height

For the mooring analysis, a wave height of 1.5 feet was selected as an average wave height.

6.1.3 Current Velocity

The 2019 document titled, "Tristar Terminals Guam, Inc. – Terminal & Port Information Handbook", states that the current at the harbor entrance is typically 1.5 knots and 3 knots for flood and ebb events, respectively. Because Golf Pier is located approximately 2.5 miles east of the harbor entrance where the channel is at its widest, a velocity of 1.5 knots was used to simulate both flood and ebb events.

6.2 BERTHING ANALYSIS

To estimate forces imposed on the breasting dolphins during normal berthing of vessels, a berthing analysis of the design vessels was performed. Analyses were performed in accordance with the 2016 California Building Code, Chapter 31F – Marine Oil Terminals (MOTEMS). As outlined in Section 3103F.6.1 of MOTEMS, berthing energies for each vessel were calculated using the criteria defined in Section 6.1. Note that modern berthing design references, such as the Unified Facilities Criteria, the World Association for Waterborne Transport Infrastructure, and MOTEMS, typically specify an accidental berthing factor (Fa) ranging from 1.25 to 2.0 to account for abnormal conditions, such as human error, equipment malfunction, and adverse environmental conditions. For this analysis effort, berthing energies were calculated using Fa = 1.5 as the dolphins have severe damage and may experience sudden failure under abnormal conditions. The calculated berthing energies for the design vessels are provided below and are based on assumed vessel displacements of 1.25 times the deadweight tonnage.

Asia Cement No. 6
Calculated Berthing Energy: 55 kip-ft
Resulting Fender Reaction: 19 kips (SCN350xF1.0)

STI Dama
Calculated Berthing Energy: 189 kip-ft
Resulting Fender Reaction: 130 kips (SCN800xF1.8)

6.3 MOORING ANALYSIS

To understand the limits of Golf Pier for mooring forces (fenders, hardware, and mooring arrangement), mooring analyses were performed for the design vessels. See Figure 3.

Vessel criteria along with wind, wave, and current velocities were entered into the mooring simulation software Optimoor, developed by Tension Technology International, LLC. The 30-knot wind speed considered in the analysis was evaluated from all possible directions (i.e., 360° sweep). Regarding current, a velocity of 1.5 knots was used to simulate both flood and ebb events. Current was applied in an east-west direction, approximately 20 degrees from the longitudinal axis of the vessels. The analysis also included a significant wave height of 1.5 feet. Data in the form of fender reactions and mooring hardware line loads were output and are provided below in Table 3 and Table 4.

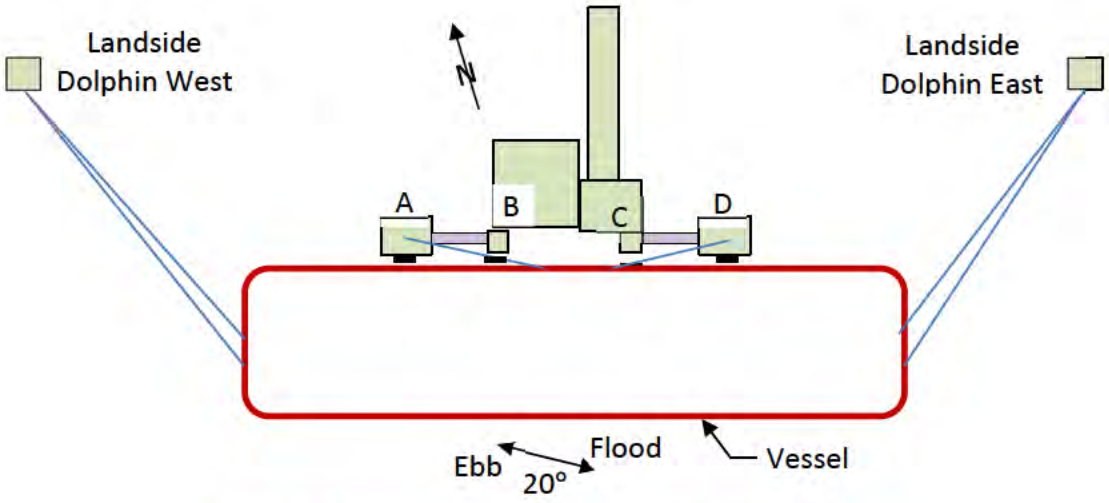

Figure 3: Graphic Representation of Mooring Analysis

Table 3: Mooring Line Demands

Vessel	Maximum Mooring Line Pull (kips)					
	West Dolphin	Dolphin A	Dolphin B	Dolphin C	Dolphin D	East Dolphin
Cement No. 6	62	40	-	-	71	51
STI Dama	123	38	-	-	68	141

Table 4: Fender Demands

Vessel	Maximum Fender Thrust Forces (kips)			
	Dolphin A	Dolphin B	Dolphin C	Dolphin D
Cement No. 6	28	34	22	7
STI Dama	23	54	50	19

6.4 DOLPHIN ANALYSIS RESULTS

To evaluate the forces and stresses resulting from the berthing and mooring forces tabulated above, structural models of Dolphins A, B, C, and D were developed. Because record drawings, repair drawings, and/or the original design drawings were not available to verify the pile locations and pile cap geometry, models were based on field data collected during the October 2022 inspection effort.

Dolphins were analyzed using the numerical modeling software SAP2000. Capacity of the steel piles was determined using current methods consistent with the American Society of Steel Construction (AISC) Steel Construction Manual, thirteenth edition. Mooring line loads were applied consistent with the Optimoor analysis and included a

10-degree variance each side. Output from models included axial forces, bending moments, and shears in the piles and concrete pile caps. To clearly identify whether demand loads in the structural elements exceeded the code-prescribed limits, demand-capacity ratios (DCRs) were developed. The demand represents the force present within a structural member for a given load condition and can be directly compared to the element's capacity. A DCR less than 1.0 indicates that the level of load within an element does not exceed its capacity. Similarly, a DCR greater than 1.0 indicates that the load within an element exceeds its capacity. A summary of DCRs for each dolphin are described in the following sections. Because the analysis shows that multiple piles across multiple dolphins have DCRs greater than 1.0 (indicating that pile capacities are exceeded), DCRs for concrete pile caps were not calculated.

In accordance with MOTEMS, load factors of 1.2 and 1.6 were used for dead and berthing/mooring loads, respectively. These load factors, when applied in accordance with load and resistance factor design are used to increase design loads to account for the uncertainty involved in estimating magnitudes of loads. Because dead loads can typically be estimated more accurately than live loads, the dead load factor is typically lower.

For piles at each of the dolphins, a corrosion allowance consistent with the level of corrosion observed both underwater and above water were incorporated into the structural models. The cross sections for piles having moderate damage were reduced by an average of 15 percent. The cross sections of piles having major and severe damage were reduced by 30 percent and 50 percent, respectively. Given that the structures have been in service since the 1960's, a steel yield strength of 36 ksi was used in the analysis per Table 4-1a of AISC Design Guide 15.

For each vessel, a summary of the resulting pile design capacity ratios is provided for in the following sections. Design capacity ratios greater than 1.0 indicate that the code-prescribed pile capacity is exceeded for the given load demand.

6.4.1 DOLPHIN A RESULTS

Mooring Condition

- Asia Cement No. 6: 20 percent of piles have DCR's greater than 1.0
- STI Dama: 20 percent of piles have DCR's greater than 1.0

Berthing Condition

- Asia Cement No. 6: All piles have DCR's less than 1.0
- STI Dama: 10 percent of piles have DCR's greater than 1.0

6.4.2 DOLPHIN B RESULTS

Berthing Condition

- Asia Cement No. 6: 33 percent of piles were found to have DCR's greater than 1.0
- STI Dama: Not evaluated for berthing loads from this vessel

6.4.3 DOLPHIN C RESULTS

Berthing Condition

- Asia Cement No. 6: 33 percent of piles were found to have DCR's greater than 1.0
- STI Dama: Not evaluated for berthing loads from this vessel

6.4.4 DOLPHIN D RESULTS

Mooring Condition

- Asia Cement No. 6: 20 percent of piles have DCR's greater than 1.0
- STI Dama: 20 percent of piles have DCR's greater than 1.0

Berthing Condition

- Asia Cement No. 6: Zero percent of piles were found to have DCR's greater than 1.0
- STI Dama: 10 percent of piles were found to have DCR's greater than 1.0

6.5 DOLPHIN ANALYSIS SUMMARY

Results from the berthing and mooring analysis found that the demand to capacity ratios are exceeded at multiple pile locations for berthing and mooring load scenarios. As stated in Section 6.4, DCR's greater than 1.0 indicate that the load within a pile exceeds the code-defined capacity. When considering the factor of safety that's built in to the capacity, it is possible for piles to support loads that exceed their capacity. However, this level of load within a pile is not recommended as the amount of surplus capacity is less than what the code defines.

7.0 DISCUSSION

7.1 PRE-TYPHOON MAWAR

Widespread advanced deterioration, corrosion, and breakage have resulted in localized failures of primary structural framing elements. Prior to Typhoon Mawar, the vertical and lateral force resisting systems of the structures were considered to be compromised. At the Main Pier, approximately 35 percent of the structural piles were observed to have major to severe corrosion damage within the top three to four feet. At several of these locations, the concrete pile plugs were exposed. See Photo 38 which illustrates a shear crack through the cross section of Pile 4A. At this location, rust staining emanating from the concrete section was not observed. The lack of rust staining indicates that steel reinforcement is either not present or that it does not extend below the observed shear crack. In marine construction, steel reinforcement is commonly placed within pile plugs to connect steel piles to the structure which provides shear strength and resistance to lateral forces (wind, wave, vessel, seismic, etc).

Photo 38: Pile 4A Damage Comparison

Evaluation of the exposed concrete pile plugs and review of conceptual repair drawings developed by others shows the plumb and batter piles to be filled with concrete and reinforced within the top two feet and six feet, respectively. Below these elevations, the unreinforced concrete fill does not provide sufficient lateral strength to the piles.

Regarding the steel walkways that provide access to Breasting Dolphins A and D, severe corrosion was identified at locations where the walkways connect to the Main Pier. At Breasting Dolphin A, 85 percent or the piles have severe damage. At Breasting Dolphin D and the Trestle, 100 percent of the piles have major or severe corrosion damage. Similarly, extensive major and severe damage is present at steel and concrete framing elements within the trestle.

7.2 POST-TYPHOON MAWAR

The evaluation following Typhoon Mawar found that roughly 60 percent of the structural piles within the Main Pier are severely damaged and have failed and are no longer supporting loads. See Photo 39. These failures have resulted in partial collapse of the Main Pier. At the Trestle, the nearshore pile cap at Bents 1 and 2 have also failed. At Breasting Dolphin A, batter pile #9 is bent, buckled, and no longer has a positive connection to the concrete pile cap. Similar, access to the dolphin is no longer available due to the missing walkway. In its current/structurally compromised condition, Golf Pier is not in a useable condition.

Photo 39: Post Typhoon Mawar Damage

7.3 SUMMARY

As described in Section 3.0, and summarized above, Golf Pier is in critical condition and continues to be at an increased risk of incurring additional localized failures or catastrophic failure which may result in damage/harm to personnel, vessels, the pier, or the environment. Replacement of Golf Pier should be carried out on a high-priority basis with strong urgency. Until such time that the pier, trestle, and dolphins can be replaced or brought to a code-defined level of serviceability, it is recommended that all pedestrian traffic and use of Golf Pier is suspended.

8.0 GOLF PIER REPLACEMENT CONCEPT

Given that Golf Pier is partially collapsed and not in a functional condition, a replacement concept was developed and is presented below.

8.1 REPLACEMENT CONCEPT

The replacement concept consists of full replacement of the Main Pier, Trestle, and dolphins approximately 300-feet west of the existing pier. Framing of the pier and trestle consist of precast concrete deck panels spanning between reinforced concrete pile caps that are supported by steel plumb and battered piles. Fenders panels (integrated into the Main Pier) are located on the west and east ends of the structure and replace existing dolphins B and C. Breasting and mooring dolphins consist of concrete pile caps supported by plumb and batter piles. Access to the dolphins is provided by a series of aluminum walkways. See Figure 4 and Appendix D.

Due to soil erosion and loss of slope protection material, the concept includes installation of a concrete slab and slope protection material (rip rap) along the shoreline directly west of the Trestle and extending 300 feet to the west.

Regarding liquid bulk-carrying lines, the concept includes installation of fuel lines, fire water lines, and LPG lines. Fuel lines and the fire water line extend from the manifold located on the Main Pier to nearshore tie-in points. The concept assumes that the existing on-shore piping can be reused. Similarly, the concept also includes installation of LPG lines that extend from the Main pier manifold to an on-shore tie-in point. The LPG lines will be capped until such time that they can be tied into existing LPG lines near Area C. A listing of the piping and equipment included in the concept and cost estimate are provided below.

- 2”Ø Miscellaneous Lines (x3)
- 4” LPG Vapor Line (x1)
- 6” LPG Liquid Line (x1)
- 8” Fire Water Line (x1)
- 10” fuel line (x3)
- 12” Cement Line (x1)
- Rubber Flanged Hoses at 180 feet
- LPG Vapor Recovery System
- Gasoline Vapor Recovery System (Vapor balancing piping)

Figure 4: Golf Pier Replacement Concept

Relative to the Main Pier, the breasting dolphins are located in a similar location to the existing dolphins and consist of concrete pile caps supported by steel batter piles. Access to the dolphins is provided by aluminum walkways from the Main Pier.

Unlike the existing facility, the concept structure includes four mooring dolphins; two located west of the Main Pier and two located east. This layout is similar to Pier F1 and consistent with traditional fuel-pier layouts. Access to the mooring dolphins is provided by walkways from the breasting dolphins which reduces line lengths and eliminates the need to use a boat to run mooring lines to the landside dolphins. Mooring dolphins are comprised of concrete pile caps and supported by steel batter piles.

At all pile locations, the replacement concept includes the use of sacrificial anodes and durability jackets to protect the steel piles. Sacrificial anodes are effective at providing corrosion protection at the submerged locations of piles. Within the upper tidal zone (splash zone), durability jackets form a barrier between the salt spray and steel cross section and prevent corrosion from occurring. Use of these corrosion mitigation measures will help ensure that the new structures are able to withstand the harsh tropical marine environment for the design service life.

At the time of this report, cement unloading operations have been suspended at Golf Pier due to its compromised condition. Similarly, LCT's have been relocated to Pier F1.

Reconstruction of Golf Pier can be performed with a phased construction approach which allows for cement vessels to relocate to the existing pier until the new pier is operational. However, it will be necessary to demolish the critically damaged Main Pier

and perform repairs and temporary modifications to the existing breasting dolphins and Trestle before cement vessels can berth. The crane barge that collided with Golf pier during typhoon Mawar is recommended to be demoed in place, as the removal of the barge will likely cause the collapse of the Main Pier and Trestle. In addition, this replacement concept also includes repair of the damaged shoreline (south of the cement silos) which experienced soil erosion and loss of slope protection material following Typhoon Mawar. A conceptual phasing plan is described below.

Phase 1A

The Main Pier, fuel lines, and abandoned mooring dolphins can be demolished. Similarly, demolition of the cement line (over-water) and partial demolition of the upland cement line can also be performed. Note that the Trestle will remain in place and be used during future construction phases. During this phase, it will be necessary for cement vessels to operate at alternative location.

Phase 1B

To prepare the site for receiving cement vessels, this phase involves repair and strengthening of breasting dolphins, the Trestle, and shoreline restoration west of the Trestle. At the Trestle and dolphins, severely deteriorated piles can be repaired using structural pile jackets that extend below the waterline. The intent of these jackets is to help prevent further deterioration of the steel cross sections and protect the piles from chlorides within the splash zone. Concrete framing elements at the Trestle having severe open-corrosion spalling and cracks can be repaired by removing damaged sections of concrete and restoring the cross sections with a cementitious material. At Bents 1 and 2 where pile caps have failed, a temporary walkway can be installed to span the damaged structure. A cement line can be installed on the Trestle and tied into the existing upland pipe.

Along the shoreline west of the Trestle, eroded and undermined portions of the bulkhead wall and foundation can be strengthened by installing a reinforced concrete slab between the buttresses. The concrete should extend a minimum of 12- to 18-inches below the ground surface to help prevent future loss of material. Once the concrete slab is in place, slope protection (rip rap) can be placed in front of the bulkhead to protect the concrete wall from debris and wave impacts.

To support rubber-flanged hoses that extend from cement vessels to the Trestle, steel floats (Flexi-Floast) can be installed at the south end of the Trestle. The Flexi-Floats will serve as a temporary work platform and provide access from the Trestle to cement vessels. The Flexi-Floats will be connected to the trestle and dolphins by a series of walkways.

Phase 2

The Main Pier, Trestle, west breasting dolphin, western mooring dolphins, and fuel/cement lines can be constructed west of the existing pier. During this phase,

cement vessels can relocate to the existing site and utilize the temporary structures and repaired Trestle to offload cement.

Phase 3A

With completion of Phase 2, cement vessels and LCT's can relocate to the partially completed Golf Pier. The breasting dolphins, Trestle, and temporary cement line at the "old" structure can be demolished. Similarly, the Flexi-Floats can also be removed.

Phase 3B

During this final construction phase, the east breasting dolphin and both eastern mooring dolphins can be constructed. After completion, Golf Pier will have the capacity to service cement vessels, local coastal tankers, and tankers up to 109,857 DWT.

9.0 BASIS OF DESIGN

9.1 CODES AND CRITERIA

The concepts described in Section 8.0 were developed in accordance with the following codes and regulations. New versions of these codes may be in effect during future design phases, which may affect the findings of this report. A review of applicable codes and regulations is recommended during the detailed design phase.

Note that the seismic design procedures outlined in ASCE 7-61 were not utilized for this concept study but should be considered for the detailed design phase. For the concept study, seismic demands were estimated using force-based design procedures per ASCE 7-16 and seismic design parameters from the ATC Hazards by Location website. Ultimate load demands were determined using load combinations from ASCE 7-16 (dead and live load) and ASCE 7-61 (seismic). Similarly, load combinations for berthing and mooring forces per UFC 4-152-01 were also utilized.

- UFC 4-152-01 Design: Piers and Wharves, 24 January 2017
- UFC 4-159-03 Moorings, 12 March 2020
- 2016 California Building Code, Chapter 31F – Marine Oil Terminals (MOTEMS)
- ASCE 7-16: Minimum Design Loads for Buildings and Other Structures
- ASCE 7-61: Seismic Design of Piers and Wharves
- AISC Steel Construction Manual, 14th Edition
- ACI 318-19: Building Code Requirements for Structural Concrete

9.2 SUSTAINABILITY AND RESILIENCY

9.2.1 Sustainability

1. Employ integrated design principles, which includes considering the environment when siting the structure; use a collaborative, integrated process to plan, design, and construct; and employ commissioning to optimize and verify performance of the structure.
2. Pursue outreach to stakeholders that may be affected by the proposed location.
3. Protect and conserve water by reducing stormwater runoff and discharges or polluted water to protect natural hydrology and watershed health.
4. Reduce the environmental impact by specifying materials that have a lesser or reduced effect on human health and the environment.
5. Assess and consider climate change risks by assessing potential impacts and vulnerabilities due to weather events and chronic climate change.
6. Evaluate strategies for implementing Port-related zero emission initiatives.

9.2.2 Resiliency

Resiliency from earthquakes and subsequent tsunamis is an important component of sustainable development. New facilities should be constructed to modern building

codes that address mitigating risks from these natural disasters. Please note that evaluation of tsunami surge loads was not included in this concept design effort.

A possible scenario is that a future earthquake could catastrophically damage the existing infrastructure but leave the new pier repairable. Although the new pier could be repaired relatively quickly, the more severe damage to existing infrastructure (upland piping and cement silos) would essentially render the new pier unusable until access and utilities could be restored.

Use of a high-performance coating system, pile jackets, and sacrificial anode cathodic protection should be incorporated into the detailed design effort. These systems are important measures that protect steel elements located below MLLW, within the splash zone, and within the upper tidal zone. If left unprotected, primarily within the splash zone and upper tidal zone, the aggressive nature of the tropical marine environment will increase the growth rate of corrosion and thereby and may reduce the service life of the element and/or structure.

9.3 STRUCTURAL DESIGN LOADS

The following design loads were used to evaluate the size and strength of structural elements for the concept pier.

- Dead Load: Actual weight of construction materials
- Live Loads: 250 psf
- Seismic Design Parameters:
  - Site Class: D
  - Seismic Design Category III
  - Importance Factor: 1.25
  - SDS: 2.756
  - SD1: 0.674
  - PGA: 0.882
  - R = 3
- Design Vessel Criteria
  - Small: LCT/Cement Vessel
    - DWT = 12,283 LT
    - Berthing Velocity = 1.55 knots
  - Medium: Fuel Tanker
    - DWT = 49,990 LT
    - Berthing Velocity = 1.13 knots
  - Large: Fuel Tanker
    - DWT = 109,857 LT
    - Berthing Velocity = 1.13 knots

- Vessel Vacate Wind Speed (30-second gust)
  - Small and Medium Vessels: 50 knots
  - Large Vessels: 30 knots
- Significant Wave Height: 1.5 feet
- Current: 1.5 knots
- Mooring Dolphin Capacity: 100 tons

10.0 REPLACEMENT COST ESTIMATE

A cost estimate for replacement of Golf Pier based on the Task 8 concept was developed and is summarized in the following tables. Costs are intended to provide a rough order of magnitude and include construction, planning, administration, business privilege tax, and contingency as shown below.

Table 5: Golf Pier Repair and Replacement Concept ROM Cost Estimate

ITEM	DESCRIPTION	COST
1	Administrative and Legal Expenses (5% of 8 & 9)	$2,263,680
2	Land, Structures, Right-of-Ways, Appraisals, etc	$0
3	Relocation Expenses and Payments	$0
4	Architectural and Engineering Fees (8% of 8 & 9)	$3,621,888
5	Other Architectural and Engineering Fees (10% of 8 & 9)	$4,527,360
6	Project Inspection Fees (12% of 8 & 9)	$5,432,832
7	Site Work	$0
8	Demolition and Removal	$4,007,800
9	Construction	$41,265,800
10	Equipment	$0
11	Miscellaneous	$3,055,968
12	Subtotal (sum lines 1 – 11)	**$64,175,328**
13	Contingencies	$19,252,598
14	SUBTOTAL	**$83,427,926**
15	Project (Program) Income	$0
16	Total Project Cost (sum 14 and 15)	**$83,427,926**

Notes:

1. Estimate is based on immediate repairs performed in FY2025 and midpoint of reconstruction performed in FY2027
2. Project is Buy America
3. Marine contractor mobilizes from Hawai'i
4. Steel piles, steel reinforcement, and misc steel sourced from west coast
5. Concrete sourced locally

APPENDIX A

ASCE MOP 130
ELEMENT LEVEL DAMAGE RATING SYSTEM

Table 2-11. Damage Ratings for Pneumatic, Foam-Filled, and Hydropneumatic Fenders*

Damage Rating		Existing Damage[a]	Exclusions [Defects Requiring Elevation to the Next Higher Damage Rating(s)]
NI	Not Inspected	Not inspected, inaccessible, or passed by[b]	
ND	No Defects	• Good original surfaces • Components sound • All hardware intact and operable	No Defects Rating not appropriate if • Components are weathered, worn, or torn
MN	Minor	• Wear on the fender unit with no visible belting • Hardware intact with visible surface corrosion, but less than 10% section loss • Swivel operable but binding	
MD	Moderate	• Wear on the fender, belting visible to a maximum depth of 1 inch • Hardware intact with 10 to 25% section loss • Swivel heavily corroded and or bound	Moderate damage not appropriate if • Fender unit permanently set or deformed
MJ	Major	• Wear on the fender, belting visible to a maximum depth of 2 inches • Permanent deformation of unit • Hardware loose or heavily corroded with between 25 and 50% section loss • Swivel heavily corroded and or bound, or with 25 to 50% section loss • Air pressure inflation and valves do not appear operable	Major damage not appropriate if • Components missing or broken
SV	Severe	• Considerable wear on the fender, belting visible to a depth greater than 2 inches • Punctures, tears, or holes in fender; foam exposed • Hardware heavily corroded with greater than 50% section loss or missing or broken • Swivel heavily corroded and or bound, or with greater than 50% section loss or broken • Air pressure inflation and valves are broken or damaged[c]	

*Taken from ASCE Waterfront Facilities Inspection and Assessment Manual No. 130, 2015.
a = Any defect listed is sufficient to identify relevant damage grade.
b = If not inspected due to inaccessibility or passed by, note as such.
c = For pneumatic and hydropneumatic fenders, an assessment of the air pressure and inflation/pressurization system should be confirmed.

Table 2-12. Damage Ratings for Rubber Fender Elements*

Damage Rating		Existing Damage[a]	Exclusions [Defects Requiring Elevation to the Next Higher Damage Rating(s)]
NI	Not Inspected	Not inspected, inaccessible, or passed by[b]	
ND	No Defects	• Good original surface, sound • Connections intact and tight	No Defects Rating not appropriate if • Noticeable abrasion or wear of rubber surfaces
MN	Minor	• Small gouges or surface defects present less than 10% of nominal depth • Connection intact, tight with light corrosion (less than 10% section loss at any location)	Minor damage not appropriate if • Surface cracking or degradation of rubber components
MD	Moderate	• Gouges, wear, or tears less than 25% of nominal depth • Rubber damaged at the connectors or connection plates • Connections loose, a bolt missing, or corrosion with 10 to 25% section loss at any location	Moderate damage not appropriate if • Permanent deformation or misalignment of rubber elements
MJ	Major	• Cracks, gouges, or tears between 25 and 50% of nominal depth • Rubber torn at the connectors or connection plates • Connections loose, two bolts missing, or corrosion with 25 to 50% section loss at any location	Major damage not appropriate if • Rubber element is split or torn through
SV	Severe	• Cracks, gouges, or tears greater than 50% of nominal depth • Rubber torn through at the connectors or connection plates • Connections with loose or missing bolts, or corrosion with greater than 50% section loss at any location	

*Taken from ASCE Waterfront Facilities Inspection and Assessment Manual No. 130, 2015.
a = Any defect listed is sufficient to identify relevant damage grade.
b = If not inspected due to inaccessibility or passed by, note as such.

Table 2-13. Damage Ratings for Fender Panels*

Damage Rating		Existing Damage[a]	Exclusions [Defects Requiring Elevation to the Next Higher Damage Rating(s)]
NI	Not Inspected	Not inspected, inaccessible, or passed by[b]	
ND	No Defects	• Good original surfaces • All connections intact • Backing panel sound	No Defects Rating not appropriate if • Coatings damaged • Visible surface corrosion
MN	Minor	• Small cracks or gouges (less than 10% of nominal) • 90% of panel connections intact • Backing frame with surface corrosion with no significant loss of section • Support chains intact with light surface corrosion	Minor Rating not appropriate if • Panels displaced or misaligned • Any loose or missing hardware
MD	Moderate	• Cracks or gouges (less than 25% of nominal) • 75% of panel connections intact • Panels displaced from the backing panel • Backing frame corroded • Support chains intact, with less than 25% section loss	Moderate Rating not appropriate if • Panels displaced or misaligned • Any loose or missing hardware
MJ	Major	• Cracks or gouges (less than 50% of nominal) • 50% of the panel connections intact or multiple panels displaced from the backing panel • Backing frame corroded with loose scale, but panel substantially in place • Support chains heavily corroded with more than 25% section loss	Major Rating not appropriate if • Panel/frame system sagging, misaligned, or with limited bearing
SV	Severe	• Cracks or gouges (greater than 50% of nominal) • Less than 50% of the panel connections intact or multiple panels displaced from the backing panel • Backing frame heavily corroded with loose scale • Sagging/displacement of panel/frame system • Support chains heavily corroded with loose scale and/or missing or broken	

*Taken from ASCE Waterfront Facilities Inspection and Assessment Manual No. 130, 2015.
a = Any defect listed is sufficient to identify relevant damage grade.
b = If not inspected due to inaccessibility or passed by, note as such.

Table 2-14. Condition Assessment Ratings

Rating		Description
6	Good	No visible damage or only minor damage noted. Structural elements may show very minor deterioration, but no overstressing observed. No repairs are required.
5	Satisfactory	Limited minor to moderate defects or deterioration observed but no overstressing observed. No repairs are required.
4	Fair	All primary structural elements are sound but minor to moderate defects or deterioration observed. Localized areas of moderate to advanced deterioration may be present but do not significantly reduce the load-bearing capacity of the structure. Repairs are recommended, but the priority of the recommended repairs is low.
3	Poor	Advanced deterioration or overstressing observed on widespread portions of the structure but does not significantly reduce the load-bearing capacity of the structure. Repairs may need to be carried out with moderate urgency.
2	Serious	Advanced deterioration, overstressing, or breakage may have significantly affected the load-bearing capacity of the primary structural components. Local failures are possible and loading restrictions may be necessary. Repairs may need to be carried out on a high-priority basis with urgency.
1	Critical	Very advanced deterioration, overstressing, or breakage has resulted in localized failure(s) of primary structural components. More widespread failures are possible or likely to occur, and load restrictions should be implemented as necessary. Repairs may need to be carried out on a very high-priority basis with strong urgency.

*Taken from ASCE Waterfront Facilities Inspection and Assessment Manual No. 130, 2015.

Table 2-5. Damage Ratings for Steel Elements*

Damage Rating		Existing Damage[a]	Exclusions [Defects Requiring Elevation to the Next Higher Damage Rating(s)]
NI	Not Inspected	Not inspected, inaccessible, or passed by[b]	
ND	No Defects	• Protective coating or wrap intact • Light surface rust • No apparent loss of material	
MN	Minor	• Protective coating or wrap damaged and loss of thickness up to 15% of nominal at any location • Less than 50% of perimeter or circumference affected by corrosion at any elevation or cross section • Loss of thickness up to 15% of nominal at any location	Minor damage not appropriate if • Changes in straight line configuration or local buckling • Corrosion loss exceeding fabrication tolerances (at any location).
MD	Moderate	• Protective coating or wrap damaged and loss of thickness 15 to 30% of nominal at any location • More than 50% of perimeter or circumference affected by corrosion at any elevation or cross section • Loss of thickness 15 to 30% of nominal at any location	Moderate damage not appropriate if • Changes in straight line configuration or local buckling • Loss of thickness exceeding 30% of nominal at any location
MJ	Major	• Protective coating or wrap damaged and loss of nominal thickness 30 to 50% at any location • Partial loss of flange edges or visible reduction of wall thickness on pipe piles • Loss of nominal thickness 30 to 50% at any location	Major damage not appropriate if • Changes in straight line configuration or local buckling • Perforations or loss of wall thickness exceeding 50% of nominal
SV	Severe	• Protective coating or wrap damaged and loss of wall thickness exceeding 50% of nominal at any location • Structural bends or buckling, breakage, and displacement at supports, loose, or lost connections • Loss of wall thickness exceeding 50% of nominal at any location	

*Taken from ASCE Waterfront Facilities Inspection and Assessment Manual No. 130, 2015.
a = Any defect listed is sufficient to identify relevant damage grade.
b = If not inspected due to inaccessibility or passed by, note as such.

Table 2-6. Damage Ratings for Reinforced Concrete Elements*

Damage Rating		Existing Damage[a]	Exclusions [Defects Requiring Elevation to the Next Higher Damage Rating(s)]
NI	Not Inspected	Not inspected, inaccessible, or passed by[b]	
ND	No Defects	Good original hard surface, hard material, sound	
MN	Minor	• Mechanical or impact spalls up to 1 in. deep • Occasional corrosion stains or small pop-out corrosion spalls • General cracks up to 1/16 in. wide	Minor damage not appropriate if • Structural damage • Corrosion cracks • Chemical deterioration[c]
MD	Moderate	• Structural cracks up to 1/16 in. wide • Corrosion cracks up to 1/4 in. wide • Chemical deterioration: random cracks up to 1/16 in. wide; "Soft" concrete and/or rounding of corners up to 1 in. deep • Mechanical abrasion or impact spalls greater than 1 in. deep	Moderate damage not appropriate if • Structural breakage and/or spalls • Exposed reinforcement • Loss of cross section due to chemical deterioration beyond rounding of corner edges
MJ	Major	• Structural cracks 1/16 in. to 1/4 in. wide and partial breakage (through section cracking with structural spalls) • Corrosion cracks wider than 1/4 in. and open or closed corrosion spalls (excluding pop-outs) • Multiple cracks and disintegration of surface layer due to chemical deterioration • Mechanical abrasion or impact spalls exposing the reinforcing	Major damage not appropriate if • Loss of cross section exceeding 30% due to any cause
SV	Severe	• Structural cracks wider than 1/4in. wide or complete breakage • Complete loss of concrete cover due to corrosion of reinforcing steel with more than 30% of diameter loss for any main reinforcing bar • Loss of bearing and displacement at connections • Loss of concrete cover (exposed steel) due to chemical deterioration • Loss of more than 30% of cross section due to any cause	

*Taken from ASCE Waterfront Facilities Inspection and Assessment Manual No. 130, 2015.
a = Any defect listed is sufficient to identify relevant damage grade.
b = If not inspected due to inaccessibility or passed by, note as such.
c = Chemical deterioration: sulfate attack, alkali-silica reaction, alkali-aggregate reaction, alkali-carbonate reaction ettringite distress, or other chemical/concrete deterioration.

Table 2-8. Damage Ratings for Mooring Hardware*

Damage Rating		Existing Damage[a]	Exclusions [Defects Requiring Elevation to the Next Higher Damage Rating(s)]
NI	Not Inspected	Not inspected, inaccessible, or passed by[b]	
ND	No Defects	• Material sound, surfaces smooth without indications of corrosion, surface coating in good condition, connections sound • Bolt countersinks grouted or sealed	No Defects Rating not appropriate if • Surface coatings worn or damaged • Visible corrosion on fasteners
MN	Minor	• Fitting has surface corrosion over 10 to 25% of its area. • Minor wear marks or pitting on surface of fittings are less than 1/8-in. deep • Fasteners have minor corrosion with no significant loss of section.	Minor damage not appropriate if • Deep pits, gouges, or wear on fitting surfaces • Any noticeable loss of section on fasteners threads, if visible
MD	Moderate	• Fitting has moderate surface corrosion with loose scale over less than 50% of its area • Significant surface wear marks or pitting on fitting are up to 1/4-in. deep • Fasteners have corrosion with less than 25% loss of section	Moderate damage not appropriate if • Loose scale on fasteners • Inability to remove fasteners due to heavy corrosion, if accessible
MJ	Major	• Fitting has surface corrosion with loose scale over 50% or more of its surface area and/or less than 25% section loss • Significant surface wear marks or pitting on fitting 1/4-in. deep or greater • Fasteners have corrosion with loose scale or loss of section greater than 25%	Major damage not appropriate if • Displaced, damaged, or broken fitting components • Loose or missing fasteners
SV	Severe	• Fitting has heavy surface corrosion and loose scale with greater than 25% loss of section at critical areas of the fitting • Structural displacement, deformation, or rotation of the fitting are present; fitting components are broken, cracked, or delaminated • Loose, broken, or missing fasteners	

*Taken from ASCE Waterfront Facilities Inspection and Assessment Manual No. 130, 2015.
a = Any defect listed is sufficient to identify relevant damage grade.
b = If not inspected due to inaccessibility or passed by, note as such.

Table 2-9. Damage Ratings for Mooring Foundations*

Damage Rating		Existing Damage[a]	Exclusions [Defects Requiring Elevation to the Next Higher Damage Rating(s)]
NI	Not Inspected	Not inspected, inaccessible, or passed by[b]	
ND	No Defects	• Good original hard surface, hard material, sound	No Defects Rating not appropriate if • Weathering on timber, steel, or composite fenders • Hairline cracks in concrete elements
MN	Minor	• Timber Foundations: Weathered timber; evidence of fungal decay; minor checks, splits, and gouges up to 1/4-in. wide • Steel Foundations: Weathering of steel coating, light surface corrosion • Concrete Foundations: No significant section loss to load-bearing areas, hairline cracking of the concrete due to corrosion of the mooring hardware • Composites: Weathered surfaces	Minor damage not appropriate if • Load-bearing areas around mooring hardware not sound • Displacement, loss of bearing, or connections • Fungal decay, insect infestation within or adjacent to the bearing area on timber elements • Corrosion loss exceeding fabrication tolerances (at any location) • Structural damage or corrosion cracking or concrete elements
MD	Moderate	• Timber cracked and checked up to 1/2-in. wide; weathered surfaces; fungal decay under or adjacent to the mooring hardware, with loss of section (max 1 in.) • Corrosion of steel with less than 10 to 25% section loss at any location • Noticeable cracking of concrete, larger than hairline but with no loss of interlock	Moderate damage not appropriate if • Displacements, loss of bearing, or connections • Changes in straight-line configuration or local buckling • Loss of thickness exceeding 30% of nominal at any location for steel elements • Structural breakage, spalls, or corrosion cracks in concrete elements • Chemical deterioration[c] or “softening” of concrete elements
MJ	Major	• Timber cracked and checked greater than 1/2-in. wide; weathered; fungal decay present (max 3 in. depth); up to 25% loss of bearing • Steel corrosion with 25 to 50% section loss at any location • Noticeable cracking of concrete, resulting in loss of interlock • Composite elements cracked or split	Major damage not appropriate if • Breakage or displacement of any element • Exposed steel strands in prestressed concrete elements • Perforations or loss of section exceeding 50% on steel elements

Table 2-9. Damage Ratings for Mooring Foundations (Continued)*

Damage Rating		Existing Damage[a]	Exclusions [Defects Requiring Elevation to the Next Higher Damage Rating(s)]
SV	Severe	• Displacement/yielding of any support members • Loss of full bearing of fitting under hardware • Fungal decay of timber members (greater than 3 in. depth) • Significant corrosion of steel members with greater than 50% section loss at any location • Cracking or spalling of concrete based under hardware • Composite broken or damaged	

*Taken from ASCE Waterfront Facilities Inspection and Assessment Manual No. 130, 2015.
a = Any defect listed is sufficient to identify relevant damage grade.
b = If not inspected due to inaccessibility or passed by, note as such.
c = Chemical deterioration: Sulfate attack, alkali-silica reaction, alkali-aggregtate reaction, alkali-carbonate reaction ettringite distress, or other chemical/concrete deterioration.

APPENDIX B

TABULATED FIELD DATA

INSPECTION RECORD - PILES

LOCATION: COMMERCIAL PORT, PITI GUAM

STRUCTURE ID: GOLF PIER - TRESTLE

DEPTH REFERENCE: X DATUM ☐ GUAGE ☐ TIDE

WSP JOB NO: 30901541B

MATERIAL: STEEL

PILE TYPE	BENT #	PILE ROW	ML ELEV ±	DAMAGE ELEV	DAMAGE TYPE	DAMAGE SIZE (in)	NI	DAMAGE RATING ND	MN	MD	MJ	SV	COMMENTS
PLUMB	**1**	**A**	**-3**	**5**	**FAILED**							**X**	**FAILED & DISCONNECTED**
PLUMB	1	B	-3	5	COR, PIT, SCL						X		**OCS DAMAGE AT CONNECTION TO CAP**
PLUMB	1	C	-3	5	COR, PIT, SCL							X	
PLUMB	**2**	**B**	**-5**	**5**	**FAILED**							**X**	**LVL2, FAILED & DISCONNECTED**
PLUMB	2	C	-5	5	COR, PIT, SCL							X	
PLUMB	2	D	-7	5	COR, PIT, SCL						X		
PLUMB	3	B	-9	5	COR,PIT,SCL							X	LVL2, CONC PLUG VISIBLE
PLUMB	3	C	-7	5	COR, PIT, SCL							X	
PLUMB	3	D	-5	5	COR, PIT, SCL							X	
PLUMB	4	B	-12	5	COR, PIT, SCL						X		
PLUMB	4	C	-9	FULL HT	COR, PIT, SCL					X			LVL2,LVL3: ML=0.47, MID=0.47, WL=0.46
BATTER	4	C.1	-9	FULL HT	COR, PIT, SCL					X			
PLUMB	5	B	-15	5	COR, PIT, SCL						X		
PLUMB	5	C	-14	5	COR, PIT, SCL							X	
PLUMB	6	B	-18	5	COR, PIT, SCL						X		
PLUMB	6	C	-19	FULL HT	COR, PIT, SCL					X			
BATTER	6	C.1	-19	FULL HT	COR, PIT, SCL					X			50% ANODE REMAINING
PLUMB	7	B	-22	5	COR, PIT, SCL						X		
PLUMB	7	C	-23	5	COR, PIT, SCL							X	

NOTE 1: MODERATE CORROSION DAMAGE UNDERWATER AT ALL PILES

NOTE 2: 70% REMAINING ANODE CROSS SECTION TYPICAL UNLESS NOTED OTHERWISE

NOTE 3: BOLD ENTRIES REPRESENT UPDATED ASSESSMENT BY PAG & WSP FOLLOWING TYPHOON MAWAR.

INSPECTION RECORD - PILES

LOCATION: COMMERCIAL PORT, PITI GUAM

STRUCTURE ID: GOLF PIER - MAIN PIER

DEPTH REFERENCE: X DATUM ☐ GUAGE ☐ TIDE

WSP JOB NO: 30901541B

MATERIAL: STEEL

PILE TYPE	BENT #	PILE ROW	ML ELEV ±	DAMAGE ELEV	DAMAGE TYPE	DAMAGE SIZE (in)	NI	DAMAGE RATING ND	MN	MD	MJ	SV	COMMENTS
PLUMB	1	A.5	-30	8	COR, PIT, SCL							X	CONC PLUG EXPOSED
PLUMB	1	B	-29	8	COR, PIT, SCL							X	LVL2
BATTER	1	B.1	-28	8	COR, PIT, SCL							X	
PLUMB	**1**	**C**	**-22**	**8**	**COR, PIT, SCL**							**X**	
BATTER	**1**	**C.1**	**-23**	**8**	**COR, PIT, SCL**							**X**	
PLUMB	2	A.5	-30	8	COR, PIT, SCL							X	
PLUMB	2	B	-29	8	COR, PIT, SCL							X	
PLUMB	**2**	**C**	**-24**	**8**	**FAILED**							**X**	**PILE SHEARED**
PLUMB	3	A	-31	8	COR, PIT, SCL							X	CONC PLUG EXPOSED
PLUMB	3	B	-29	8	COR, PIT, SCL							X	
PLUMB	3	C	-24	8	COR, PIT, SCL							X	
PLUMB	**4**	**A**	**-24**	**8**	**FAILED**							**X**	**PILE SHEARED & SEPARATED FROM STRUCTURE**
PLUMB	4	B	-30	8	COR, PIT, SCL							X	
PLUMB	4	C	-24	8	COR, PIT, SCL							X	LVL2, CONC PLUG EXPOSED
PLUMB	4	D	-19	8	COR, PIT, SCL							X	
PLUMB	**4**	**E**	**-17**	**8**	**COR, PIT, SCL**							**X**	**PERMANENTLY DEFORMED/BENT**
BATTER	**4**	**E.1**	**-17**	**8**	**COR, PIT, SCL**							**X**	**PERMANENTLY DEFORMED/BENT**
BATTER	**4.1**	**E**	**-17**	**8**	**COR, PIT, SCL**							**X**	**PERMANENTLY DEFORMED/BENT**

INSPECTION RECORD - PILES

LOCATION: COMMERCIAL PORT, PITI GUAM

STRUCTURE ID: GOLF PIER - MAIN PIER

DEPTH REFERENCE: X DATUM ☐ GUAGE ☐ TIDE

WSP JOB NO: 30901541B

MATERIAL: STEEL

PILE TYPE	BENT #	PILE ROW	ML ELEV ±	DAMAGE ELEV	DAMAGE TYPE	DAMAGE SIZE (in)	NI	DAMAGE RATING ND	MN	MD	MJ	SV	COMMENTS
PLUMB	5	A	-30	8	FAILED							X	PILE SHEARED
PLUMB	5	B	-30	8	FAILED							X	PILE SHEARED
PLUMB	5	C	-24	8	FAILED							X	PILE SHEARED
PLUMB	5	D	-19	8	FAILED							X	PILE SHEARED
PLUMB	5	E	-17	8	FAILED							X	PILE SHEARED
PLUMB	6	A	-30	8	FAILED							X	PILE SHEARED
PLUMB	6	B	-29	8	COR, PIT, SCL							X	PERMANENTLY DEFORMED/BENT
PLUMB	6	C	-22	8	FAILED							X	LVL2, LVL3: ML=0.47, MID=0.475, WL=0.465 / SHEARED
PLUMB	6	D	-22	8	FAILED							X	PILE SHEARED
PLUMB	6	E	-17	8	FAILED							X	PILE SHEARED
PLUMB	7	A	-34	8	FAILED							X	PILE SHEARED
PLUMB	7	B	-28	8	COR, PIT, SCL							X	PERMANENTLY DEFORMED/BENT
BATTER	7.1	B	-29	8	COR, PIT, SCL							X	PERMANENTLY DEFORMED/BENT
PLUMB	7	C	-24	8	FAILED							X	PILE SHEARED
PLUMB	7	D	-24	8	FAILED							X	PILE SHEARED
BATTER	7	D.9	-21	8	FAILED							X	PILE SHEARED
PLUMB	7	E	-19	8	FAILED							X	LVL2, PILE SHEARED

NOTE 1: MODERATE CORROSION DAMAGE UNDERWATER AT ALL PILES

NOTE 2: 75% REMAINING ANODE CROSS SECTION TYPICAL UNLESS NOTED OTHERWISE

NOTE 3: BOLD ENTRIES REPRESENT UPDATED ASSESSMENT BY PAG & WSP FOLLOWING TYPHOON MAWAR.

INSPECTION RECORD - PILES

LOCATION: COMMERCIAL PORT, PITI GUAM

STRUCTURE ID: GOLF PIER - DOLPHINS B AND C

DEPTH REFERENCE: X DATUM ☐ GUAGE ☐ TIDE

WSP JOB NO: 30901541B

MATERIAL: STEEL

PILE TYPE	BENT #	PILE ROW	ML ELEV ±	DAMAGE ELEV	DAMAGE TYPE	DAMAGE SIZE (in)	NI	DAMAGE RATING ND	MN	MD	MJ	SV	COMMENTS
BREASTING DOLPHIN B (WEST DOLPHIN)													
PLUMB	1	WEST	-37	FULL HT	COR, PIT, SCL					X			
PLUMB	2	EAST	-37	FULL HT	COR, PIT, SCL					X			
BATTER	3	BAT WEST	-37	FULL HT	COR, PIT, SCL					X			
BATTER	4	BAT EAST	-35	FULL HT	COR, PIT, SCL					X			
BATTER	5	WEST	-32	FULL HT	COR, PIT, SCL					X			
BATTER	6	EAST	-32	FULL HT	COR, PIT, SCL					X			
BREASTING DOLPHIN C (EAST DOLPHIN)													
PLUMB	1	WEST	-34	FULL HT	COR, PIT, SCL					X			
PLUMB	2	EAST	-34	FULL HT	COR, PIT, SCL					X			
BATTER	3	BAT EAST	-33	FULL HT	COR, PIT, SCL					X			
BATTER	4	BAT WEST	-33	FULL HT	COR, PIT, SCL					X			
BATTER	5	WEST	-27	FULL HT	COR, PIT, SCL					X			
BATTER	6	EAST	-27	FULL HT	COR, PIT, SCL					X			LVL2, LVL3: 0.475, MID=0.475, WL=0.49

NOTE 1: MODERATE CORROSION DAMAGE UNDERWATER AT ALL PILES

NOTE 2: 75% REMAINING ANODE CROSS SECTION TYPICAL UNLESS NOTED OTHERWISE

INSPECTION RECORD - PILES

LOCATION: COMMERCIAL PORT, PITI GUAM

STRUCTURE ID: GOLF PIER - DOLPHINS A AND D

DEPTH REFERENCE: X DATUM ☐ GUAGE ☐ TIDE

WSP JOB NO: 30901541B

MATERIAL: STEEL

PILE TYPE	BENT #	PILE ROW	ML ELEV ±	DAMAGE ELEV	DAMAGE TYPE	DAMAGE SIZE (in)	NI	DAMAGE RATING ND	MN	MD	MJ	SV	COMMENTS
BREASTING DOLPHIN A (WEST DOLPHIN)													
PLUMB		1	-41	6	COR, PIT, SCL							X	CONC PLUG EXPOSED
PLUMB		2	-41	6	COR, PIT, SCL							X	CONC PLUG EXPOSED
PLUMB		3	-41	6	COR, PIT, SCL							X	
PLUMB		4	-41	6	COR, PIT, SCL							X	CONC PLUG EXPOSED
PLUMB		5	-38	6	COR, PIT, SCL							X	LVL2
PLUMB		6	-38	6	COR, PIT, SCL							X	
PLUMB		7	-38	6	COR, PIT, SCL							X	CONC PLUG EXPOSED
PLUMB		8	-39	6	COR, PIT, SCL							X	CONC PLUG EXPOSED
BATTER		**9**	**-50**	**6**	**FAILED**							**X**	**BENT/BUCKLED BELOW WATER, DISCONNECTED AT SOFFIT**
BATTER		10	-35	6	COR, PIT, SCL							X	
BATTER		11	-47	6	COR, PIT, SCL							X	LVL2, LVL3: ML=0.36, MID=0.36, WL=0.32
BATTER		12	-35	6	COR, PIT, SCL							X	CONC PLUG EXPOSED AND BROKEN
BATTER		13	-29	6	COR, PIT, SCL							X	LVL2, CONC PLUG EXPOSED
BATTER		14	-28	6	COR, PIT, SCL							X	CONC PLUG EXPOSED
BATTER		15	-28	6	COR, PIT, SCL							X	CONC PLUG EXPOSED
BATTER		16	-28	6	COR, PIT, SCL							X	
BATTER		17	-28	6	COR, PIT, SCL							X	
BATTER		18	-28	FULL HT	COR, PIT					X			
BATTER		19	-28	FULL HT	COR, PIT					X			
BATTER		20	-27	FULL HT	COR, PIT					X			

INSPECTION RECORD - PILES

LOCATION: COMMERCIAL PORT, PITI GUAM

STRUCTURE ID: GOLF PIER - DOLPHINS A AND D

DEPTH REFERENCE: X DATUM ☐ GUAGE ☐ TIDE

WSP JOB NO: 30901541B

MATERIAL: STEEL

PILE TYPE	BENT #	PILE ROW	ML ELEV ±	DAMAGE ELEV	DAMAGE TYPE	DAMAGE SIZE (in)	NI	DAMAGE RATING ND	MN	MD	MJ	SV	COMMENTS
BREASTING DOLPHIN D (EAST DOLPHIN)													
PLUMB		1	-35	6	COR, PIT, SCL						X		
PLUMB		2	-36	6	COR, PIT, SCL						X		
PLUMB		3	-36	6	COR, PIT, SCL						X		
PLUMB		4	-36	6	COR, PIT, SCL						X		
PLUMB		5	-35	6	COR, PIT, SCL						X		
PLUMB		6	-35	6	COR, PIT, SCL						X		LVL2, LVL3: ML=0.31, MID=0.34, WL=0.35
PLUMB		7	-35	6	COR, PIT, SCL						X		
PLUMB		8	-35	6	COR, PIT, SCL						X		
BATTER		9	-35	6	COR, PIT, SCL							X	CONC PLUG EXPOSED
BATTER		10	-36	6	COR, PIT, SCL							X	
BATTER		11	-35	6	COR, PIT, SCL							X	CONC PLUG EXPOSED
BATTER		12	-36	6	COR, PIT, SCL							X	CONC PLUG EXPOSED, PERMANENT PILE DEFORM AT -15
BATTER		13	-24	6	COR, PIT, SCL						X		
BATTER		14	-24	6	COR, PIT, SCL						X		
BATTER		15	-24	6	COR, PIT, SCL						X		
BATTER		16	-24	6	COR, PIT, SCL						X		LVL2
BATTER		17	-25	6	COR, PIT, SCL							X	
BATTER		18	-25	6	COR, PIT, SCL							X	CONC PLUG EXPOSED
BATTER		19	-25	6	COR, PIT, SCL							X	CONC PLUG EXPOSED
BATTER		20	-25	6	COR, PIT, SCL							X	CONC PLUG EXPOSED

NOTE 1: MODERATE CORROSION DAMAGE UNDERWATER AT ALL PILES

NOTE 2: 50% REMAINING ANODE CROSS SECTION TYPICAL UNLESS NOTED OTHERWISE

INSPECTION RECORD - CONCRETE FRAMING ELEMENTS

LOCATION: COMMERCIAL PORT, PITI GUAM | WSP JOB NO: 30901541B

STRUCTURE ID: GOLF PIER

STRUCTURE	DESCRIPTION	MATERIAL	BENT #	PILE ROW	DAMAGE LOCATION	DAMAGE TYPE	DAMAGE SIZE (IN)				DAMAGE RATING					COMMENTS
							LENGTH	WIDTH	DEPTH	NI	ND	MN	MD	MJ	SV	
MAIN PIER	PILE CAP	CONC	2	C	ALL	DISCONN									X	CAP DISCONNECTED FROM PILE
MAIN PIER	PILE CAP	CONC	4	A	ALL	DISCONN									X	CAP DISCONNECTED FROM PILE
MAIN PIER	PILE CAP	CONC	4	E	ALL	BENT									X	CAP ROTATED AND OUT OF ALIGNEMENT
MAIN PIER	PILE CAP	CONC	5	A	ALL	DISCONN									X	CAP DISCONNECTED FROM PILE
MAIN PIER	PILE CAP	CONC	5	B	ALL	DISCONN									X	CAP DISCONNECTED FROM PILE
MAIN PIER	PILE CAP	CONC	5	C	ALL	DISCONN									X	CAP DISCONNECTED FROM PILE
MAIN PIER	PILE CAP	CONC	5	D	ALL	DISCONN									X	CAP DISCONNECTED FROM PILE
MAIN PIER	PILE CAP	CONC	5	E	ALL	DISCONN									X	CAP DISCONNECTED FROM PILE
MAIN PIER	PILE CAP	CONC	6	A	ALL	DISCONN									X	CAP DISCONNECTED FROM PILE
MAIN PIER	PILE CAP	CONC	6	C	ALL	DISCONN									X	CAP DISCONNECTED FROM PILE
MAIN PIER	PILE CAP	CONC	6	D	ALL	DISCONN									X	CAP DISCONNECTED FROM PILE
MAIN PIER	PILE CAP	CONC	6	E	ALL	DISCONN									X	CAP DISCONNECTED FROM PILE
MAIN PIER	PILE CAP	CONC	7	A	ALL	DISCONN									X	CAP DISCONNECTED FROM PILE
MAIN PIER	PILE CAP	CONC	7	B	ALL	BENT									X	CAP ROTATED AND OUT OF ALIGNEMENT
MAIN PIER	PILE CAP	CONC	7	C	ALL	DISCONN									X	CAP DISCONNECTED FROM PILE
MAIN PIER	PILE CAP	CONC	7	D	ALL	DISCONN									X	CAP DISCONNECTED FROM PILE
MAIN PIER	PILE CAP	CONC	7	E	ALL	DISCONN									X	CAP DISCONNECTED FROM PILE
MAIN PIER	PILE CAP	CONC	1	A-B	E,W,SOF	OCS	84	10	4						X	DAMAGE ALONG PILE CAP BETWEEN GRID A AND B
MAIN PIER	SUB CAP	CONC	1	B	N,S,SOF	OCS	96	27	6						X	FAILED CONNECTION
MAIN PIER	SUB CAP	CONC	1	C	N,S,W,SOF	OCS	96	27	6						X	FAILED CONNECTION
MAIN PIER	SUB CAP	CONC	7	E	E,S,W,SOF	OCS	54	30	5						X	
MAIN PIER	PILE CAP	CONC	7	D	E, SOF	OCS	48	16	5						X	
MAIN PIER	PILE CAP	CONC	7	C	E,W,SOF	OCS,CCS	60	24	4						X	
MAIN PIER	PILE CAP	CONC	7	B	N,S,E,W, SOF	OCS,CCS	72	30	5						X	1/4" CR
MAIN PIER	PILE CAP	CONC	7	A	E	OCS	18	10	2					X		
MAIN PIER	PILE CAP	CONC	7	A	SOF	CCS	12	12						X		
MAIN PIER	PILE CAP	CONC	7	A	S,W	OCS	12	6	1				X			

INSPECTION RECORD - CONCRETE FRAMING ELEMENTS

LOCATION: COMMERCIAL PORT, PITI GUAM | **WSP JOB NO:** 30901541B

STRUCTURE ID: GOLF PIER

STRUCTURE	DESCRIPTION	MATERIAL	BENT #	PILE ROW	DAMAGE LOCATION	DAMAGE TYPE	DAMAGE SIZE (IN)				DAMAGE RATING					COMMENTS
							LENGTH	WIDTH	DEPTH	NI	ND	MN	MD	MJ	SV	
MAIN PIER	PILE CAP	CONC	6	E	E	OCS	10	10	2					X		
MAIN PIER	PILE CAP	CONC	6	D	W	OCS	30	12	4						X	
MAIN PIER	PILE CAP	CONC	6	D	E	CR	60	0.25							X	
MAIN PIER	PILE CAP	CONC	6	B.5-C	W,SOF	OCS,CCS	72	10	2						X	
MAIN PIER	PILE CAP	CONC	6	B	SOF	CCS	18	18						X		
MAIN PIER	PILE CAP	CONC	6	B	E,SOF	OCS	36	8	3						X	
MAIN PIER	PILE CAP	CONC	6	C	E	OCS	18	10	2					X		
MAIN PIER	PILE CAP	CONC	6	C.5-D.5	E,SOF	OCS	108	6						X		
MAIN PIER	PILE CAP	CONC	6-6.5	E	S	OCS	60	12	2						X	
MAIN PIER	PILE CAP	CONC	6	A	E	MESP	6	12	2				X			SPALL AT BERTH FACE
MAIN PIER	PILE CAP	CONC	5	A.3	W,SOF	OCS	24	10	2					X		
MAIN PIER	PILE CAP	CONC	5	A.5-B	W.SOF	CCS	48	12						X		
MAIN PIER	PILE CAP	CONC	5	B	E,W,SOF	OCS	18	10	2					X		FAILED CONNECTION
MAIN PIER	PILE CAP	CONC	5	C	W	CCS	12	4					X			FAILED REPAIR

INSPECTION RECORD - CONCRETE FRAMING ELEMENTS

LOCATION: COMMERCIAL PORT, PITI GUAM | **WSP JOB NO:** 30901541B

STRUCTURE ID: GOLF PIER

STRUCTURE	DESCRIPTION	MATERIAL	BENT #	PILE ROW	DAMAGE LOCATION	DAMAGE TYPE	DAMAGE SIZE (IN)				DAMAGE RATING					COMMENTS
							LENGTH	WIDTH	DEPTH	NI	ND	MN	MD	MJ	SV	
MAIN PIER	PILE CAP	CONC	5	D	E,W,SOF	OCS	60	18	6						X	FAILED CONNECTION
MAIN PIER	PILE CAP	CONC	5	E	W	CCS	18	18						X		
MAIN PIER	PILE CAP	CONC	5	E	S	OCS	30	12	2						X	LS TRANS CAP
MAIN PIER	PILE CAP	CONC	5	C	E,SOF	OCS	8	24	2						X	
MAIN PIER	PILE CAP	CONC	5	B-C	E,SOF	CCS	84	10						X		
MAIN PIER	PILE CAP	CONC	5	A-A.6	E,SOF	OCS	36	8	3						X	
MAIN PIER	PILE CAP	CONC	4	E	N,S,E,W, SOF	OCS	96	12	4						X	1/4" CRs, FAILED CONNECTION
MAIN PIER	PILE CAP	CONC	4	D-E	OCS/CCS	W.SOF	120	12	4						X	
MAIN PIER	PILE CAP	CONC	4	C	W	CCS	30	10						X		0.1875" CR
MAIN PIER	PILE CAP	CONC	4	A.5-C	W,SOF	OCS	144	24	4						X	
MAIN PIER	PILE CAP	CONC	4	A	W	CCS	12	12					X			
MAIN PIER	PILE CAP	CONC	4	A	E,SOF	OCS	24	12	4						X	
MAIN PIER	PILE CAP	CONC	4	C	S,SOF	OCS	12	6					X			TRANS CAP
MAIN PIER	PILE CAP	CONC	4	A	S,E	OCS	12	12	2				X			SPALL AT BERTH FACE
MAIN PIER	PILE CAP	CONC	2-3	C	S,SOF	CCS	108	10						X		TRANS CAP
MAIN PIER	PILE CAP	CONC	2	A.5-C	E,W,SOF	OCS	225	24	4						X	
MAIN PIER	PILE CAP	CONC	1.8-2	B	N	CR		24	0.125				X			TRANS CAP
MAIN PIER	**PILE CAP**	**CONC**	**1**	**B**	**N,E,W,S, SOF**	**OCS**									**X**	**ADD'L DMG FROM TYPHOON**
MAIN PIER	**PILE CAP**	**CONC**	**1**	**C**	**N,E,W,S, SOF**	**OCS**	**60**	**24**	**6**						**X**	**ADD'L DMG FROM TYPHOON**
MAIN PIER	PILE CAP	CONC	1-2	C	S,SOF	OCS	60	8	3						X	
MAIN PIER	PILE CAP	CONC	1	A	E	CR	24	0.0625					X			
MAIN PIER	PILE CAP	CONC	2	A	E,W,SOF	OCS	36	24	3						X	SPALL AT BERTH FACE
MAIN PIER	PILE CAP	CONC	3	A	E,W,SOF	OCS	60	12	2						X	FAILED CONNECTION
MAIN PIER	PILE CAP	CONC	3	B	W,SOF	OCS/CCS	48	12	3						X	
MAIN PIER	PILE CAP	CONC	3	A	E,W,S	MESP						X			X	SPALL AT BERTH FACE

INSPECTION RECORD - CONCRETE FRAMING ELEMENTS

LOCATION: COMMERCIAL PORT, PITI GUAM | **WSP JOB NO:** 30901541B

STRUCTURE ID: GOLF PIER

STRUCTURE	DESCRIPTION	MATERIAL	BENT #	PILE ROW	DAMAGE LOCATION	DAMAGE TYPE	DAMAGE SIZE (IN)				DAMAGE RATING					COMMENTS
							LENGTH	WIDTH	DEPTH	NI	ND	MN	MD	MJ	SV	
DOLPHIN A	PILE CAP	CONC		13-18	N	CR-H	192	0.125					X			8" UP FROM SOFFIT
DOLPHIN A	PILE CAP	CONC		14	N	CR-V	48	0.0625					X			
DOLPHIN A	PILE CAP	CONC		8-20	SOF	CR	36	0.0625					X			
DOLPHIN A	PILE CAP	CONC		9-10	SOF	CR	72	0.0625					X			
DOLPHIN A	PILE CAP	CONC		11-12	SOF	CR	72	0.0625					X			
DOLPHIN A	PILE CAP	CONC		9	SOF	OCS	24	24	2					X		
DOLPHIN A	PILE CAP	CONC			W	CR-H	108	0.0625					X			
DOLPHIN A	PILE CAP	CONC			W	CR-V	24	0.0625					X			
DOLPHIN A	**N RAMP LND**	**CONC**				**BRK**									**X**	**BROKEN AND DETACHED**
DOLPHIN A	**E CONC LND**	**CONC**				**OCS**	**18**	**12**	**4**						**X**	
DOLPHIN D	PILE CAP	CONC		9.5	S,SOF	OCS	48	48	4						X	BEHIND FOAM-FENDER
DOLPHIN D	PILE CAP	CONC		1-13	SOF	CR	54	0.0625					X			
DOLPHIN D	PILE CAP	CONC		13	N	CR-H	60	0.0625					X			4" DOWN FROM DECK SURFACE
DOLPHIN D	PILE CAP	CONC			W,SOF	CCS	108	12					X			
DOLPHIN D	PILE CAP	CONC			E,SOF	CCS	108	3					X			
DOLPHIN D	PILE CAP	CONC		13-20	N	CR-H	336	0.125					X			
DOLPHIN D	PILE CAP	CONC		17	N	CR-V	24	HL				X				
DOLPHIN D	PILE CAP	CONC		18	N	CR-V	24	HL				X				
DOLPHIN D	PILE CAP	CONC		19	N	CR-V	24	HL				X				
DOLPHIN D	PILE CAP	CONC		14	N	CR-V	48	0.0625					X			X2 CRACKS
DOLPHIN C	PILE CAP	CONC			W	CCS	24	18					X			
DOLPHIN C	PILE CAP	CONC			S	MESP	18	6	2				X			
TRESTLE	**PILE CAP**	**CONC**	**1**	**A-B**	**ALL**	**MISS**									**X**	**MISSING**
TRESTLE	PILE CAP	CONC	1	B	S	CR-H	72	0.125					X			
TRESTLE	PILE CAP	CONC	1	B	S,TOP	CCS	192	6						X		1/4" CR
TRESTLE	PILE CAP	CONC	1	A.2-B	S	CR-H	96	HL				X				
TRESTLE	**PILE CAP**	**CONC**	**2**	**A-C**	**ALL**	**MISS**									**X**	**MISSING**

INSPECTION RECORD - CONCRETE FRAMING ELEMENTS

LOCATION: COMMERCIAL PORT, PITI GUAM | **WSP JOB NO:** 30901541B

STRUCTURE ID: GOLF PIER

STRUCTURE	DESCRIPTION	MATERIAL	BENT #	PILE ROW	DAMAGE LOCATION	DAMAGE TYPE	DAMAGE SIZE (IN)				DAMAGE RATING					COMMENTS
							LENGTH	WIDTH	DEPTH	NI	ND	MN	MD	MJ	SV	
TRESTLE	PILE CAP	CONC	3	B.5	N,TOP	CCS	60	6							X	1/2" CR
TRESTLE	PILE CAP	CONC	3	B.5-C	N,SOF	OCS	60	12	3						X	
TRESTLE	PILE CAP	CONC	4	B	N,SOF	CCS	6	8				X				
TRESTLE	SUB CAP	CONC	4	C	S	CR-H	36	HL						X		3" FROM BTM
TRESTLE	PILE CAP	CONC	4	B.2	S	CR-H	24	0.0625					X			3" FROM BTM
TRESTLE	PILE CAP	CONC	5	C	S	CR-H	12	0.0625					X			3" FROM TOP
TRESTLE	PILE CAP	CONC	6	B.2-C	N	CR-H	72	0.125						X		4" FROM TOP
TRESTLE	SUB CAP	CONC	6	C	N,S,W	CCS	24	18						X		
TRESTLE	PILE CAP	CONC	6	B.2	S	CR-H	24	0.0625								4" FROM TOP
TRESTLE	PILE CAP	CONC	7	B	N	MESP	6	6	1				X			
TRESTLE	W STRINGER	CONC	BULK-1	B.2	E	CCS	225	18							X	
TRESTLE	W STRINGER	CONC	BULK-1	B.2	E	CR-H	225	0.75							X	3" UP FROM BTM
TRESTLE	W STRINGER	CONC	1	B.2	E	CR	24	0.0625					X			X2 DIAGONAL CRACKS OVER SUPPORT
TRESTLE	W STRINGER	CONC	1-2	B.2	E	CR-H	216	0.0625					X			3" UP FROM BTM
TRESTLE	W STRINGER	CONC	2-3	B.2	E,SOF	CCS	216	12							X	1/2" CR
TRESTLE	W STRINGER	CONC	3-4	B.2	E,SOF	OCS	216	12	5						X	CRACKING W/IN OCS
TRESTLE	W STRINGER	CONC	4	B.2	E,SOF	OCS	30	6	4						X	
TRESTLE	W STRINGER	CONC	4-5	B.2	E	CR-H	216	0.0625					X			
TRESTLE	W STRINGER	CONC	5	B.2	E,SOF	CCS	12	4					X			
TRESTLE	W STRINGER	CONC	5-6	B.2	E,SOF	OCS	216	24	5						X	CRACKING W/IN OCS
TRESTLE	W STRINGER	CONC	6	B.2	E	CCS	12	18					X			
TRESTLE	W STRINGER	CONC	6	B.2	E	CR-H	36	0.0625					X			
TRESTLE	E STRINGER	CONC	BULK-1	C	W	CR-H	216	0.75							X	3-6" UP FROM BTM
TRESTLE	E STRINGER	CONC	1	C	W	CCS	12	12					X			
TRESTLE	E STRINGER	CONC	1-2	C	W	OCS, CR-H	216	0.125						X		CR VARIES HL TO 0.125"
TRESTLE	E STRINGER	CONC	3	C	W	CCS	6	6				X				
TRESTLE	E STRINGER	CONC	3.5	C	W	CR-H	36	0.0625					X			

INSPECTION RECORD - CONCRETE FRAMING ELEMENTS

LOCATION: COMMERCIAL PORT, PITI GUAM | **WSP JOB NO:** 30901541B

STRUCTURE ID: GOLF PIER

STRUCTURE	DESCRIPTION	MATERIAL	BENT #	PILE ROW	DAMAGE LOCATION	DAMAGE TYPE	DAMAGE SIZE (IN)				DAMAGE RATING					COMMENTS
							LENGTH	WIDTH	DEPTH	NI	ND	MN	MD	MJ	SV	
TRESTLE	E STRINGER	CONC	4	C	W	OCS	6	18							X	
TRESTLE	E STRINGER	CONC	4.2	C	W	CCS	6	6				X				
TRESTLE	DECK	CONC	B.2	C	SOF	OCS	48	48	2					X		
TRESTLE	DECK	CONC	B.8	C	SOF	OCS	48	48	2					X		
TRESTLE	DECK	CONC	1	B.2	SOF	OCS	12	12					X			
TRESTLE	DECK	CONC	1	C	SOF	OCS	36	12						X		
BULKHEAD	BULKHEAD	CONC	BLK	C	S	OCS	36	12	4						X	

NOTE 1: BOLD ENTRIES REPRESENT UPDATED ASSESSMENT BY PAG & WSP FOLLOWING TYPHOON MAWAR.

INSPECTION RECORD - APPURTENANCES

LOCATION: COMMERCIAL PORT, PITI GUAM | **WSP JOB NO:** 30901541B

STRUCTURE ID: GOLF PIER

STRUCTURE	DESCRIPTION	MATERIAL	BENT #	PILE ROW	DAMAGE LOCATION	DAMAGE TYPE	DAMAGE SIZE (IN)			NI	DAMAGE RATING					COMMENTS
							LENGTH	WIDTH	DEPTH		ND	MN	MD	MJ	SV	
DOLPHIN C	PANEL	STEEL				COR							X			
DOLPHIN C	FACING	UHMW-PE				WEAR							X			MISSING 2 TOP CORNER PCS
DOLPHIN C	CHAINS	STEEL				COR						X				
DOLPHIN C	PLATES	STEEL				COR						X				
DOLPHIN C	PIPE	STEEL				COR						X				
DOLPHIN C	FENDER	RUBBER				DELAM						X				
DOLPHIN C	BOLLARD	CAST IRON				COR								X		
DOLPHIN B	PANEL	STEEL				COR							X			
DOLPHIN B	FACING	UHMW-PE				WEAR							X			
DOLPHIN B	CHAINS	STEEL				COR						X				
DOLPHIN B	PLATES	STEEL				COR						X				
DOLPHIN B	FENDER	RUBBER				DELAM						X				
DOLPHIN B	PIPE	STEEL				COR						X				
DOLPHIN B	BOLLARD	CAST IRON				COR								X		
TRESTLE	PIPE PLATES	STEEL				COR							X			PLATES SUPPORTING CEMENT PIPE
MAIN PIER	**GUARDRAIL**	**STEEL**	**7**	**B-D**		**COR**									**X**	**MULTIPLE LOCATIONS**
MAIN PIER	**GUARDRAIL**	**STEEL**	**4-7**	**E**		**COR**									**X**	**MULTIPLE LOCATIONS**
MAIN PIER	**GUARDRAIL**	**STEEL**	**4**	**C-E**		**COR**									**X**	**MULTIPLE LOCATIONS**
MAIN PIER	**GUARDRAIL**	**STEEL**	**1-2**	**C**		**COR**									**X**	**MULTIPLE LOCATIONS**
MAIN PIER	GUARDRAIL	STEEL	1-7	A		COR							X			POSTS AND BASEPLATE
DOLPHIN A	**GUARDRAIL**	**STEEL**				**MISSING**									**X**	**MISSING**
DOLPHIN A	W BOLLARD	CAST IRON				COR						X				
DOLPHIN A	E BOLLARD	CAST IRON				COR						X				

INSPECTION RECORD - APPURTENANCES

LOCATION: COMMERCIAL PORT, PITI GUAM | **WSP JOB NO:** 30901541B

STRUCTURE ID: GOLF PIER

STRUCTURE	DESCRIPTION	MATERIAL	BENT #	PILE ROW	DAMAGE LOCATION	DAMAGE TYPE	DAMAGE SIZE (IN)			NI	DAMAGE RATING					COMMENTS
							LENGTH	WIDTH	DEPTH		ND	MN	MD	MJ	SV	
DOLPHIN A	**LADDER**	**SS**				**MISSING**									**X**	**MISSING**
DOLPHIN A	FENDER	RUBBER				WEAR							X			GOUGES AND WEAR
DOLPHIN A	**WALKWAY**	**STEEL**				**MISSING**									**X**	**WALKWAY MISSING**
DOLPHIN D	GUARDRAIL	STEEL				COR/BRK									X	
DOLPHIN D	W BOLLARD	CAST IRON				COR						X				
DOLPHIN D	E BOLLARD	CAST IRON				COR						X				
DOLPHIN D	FENDER	RUBBER				WEAR							X			GOUGES AND WEAR
DOLPHIN D	LADDER	SS				BRK									X	MISSING LOWER RUNGS
DOLPHIN D	WALKWAY	STEEL				COR									X	MD THROUGHOUT, BUT SV AT P/C CONNECTIONS
MAIN PIER	GUARDRAIL	STEEL	1-3	A		COR									X	POSTS AND BASEPLATE
MAIN PIER	PIPE SPRT	STEEL				COR							X	X		WF SUPPORTING VALVES/PIPING
MAIN PIER	**BULLRAIL**	**CONC**				**OCS/BRK**									**X**	**MULTIPLE LOCATIONS**

NOTE 1: BOLD ENTRIES REPRESENT UPDATED ASSESSMENT BY PAG & WSP FOLLOWING TYPHOON MAWAR.

INSPECTION RECORD - SLOPE ARMORING AND BULKHEAD

LOCATION: COMMERCIAL PORT, PITI GUAM

STRUCTURE ID: GOLF PIER

WSP JOB NO: 30901541B

ID	MATERIAL	BENT # / STATION	PILE ROW	DAMAGE TYPE	DAMAGE SIZE (IN)			NI	DAMAGE RATING					COMMENTS
					LENGTH	WDTH	DEPTH		ND	MN	MD	MJ	SV	
RIP RAP	**RIP RAP**			**EROSION**	**3600**								**X**	**SOIL EROSION AND LOSS OF SLOPE ARMORING WEST OF TRESTLE**

NOTE 1: BOLD ENTRIES REPRESENT UPDATED ASSESSMENT BY PAG & WSP FOLLOWING TYPHOON MAWAR.

APPENDIX C

DAMAGE MAPS

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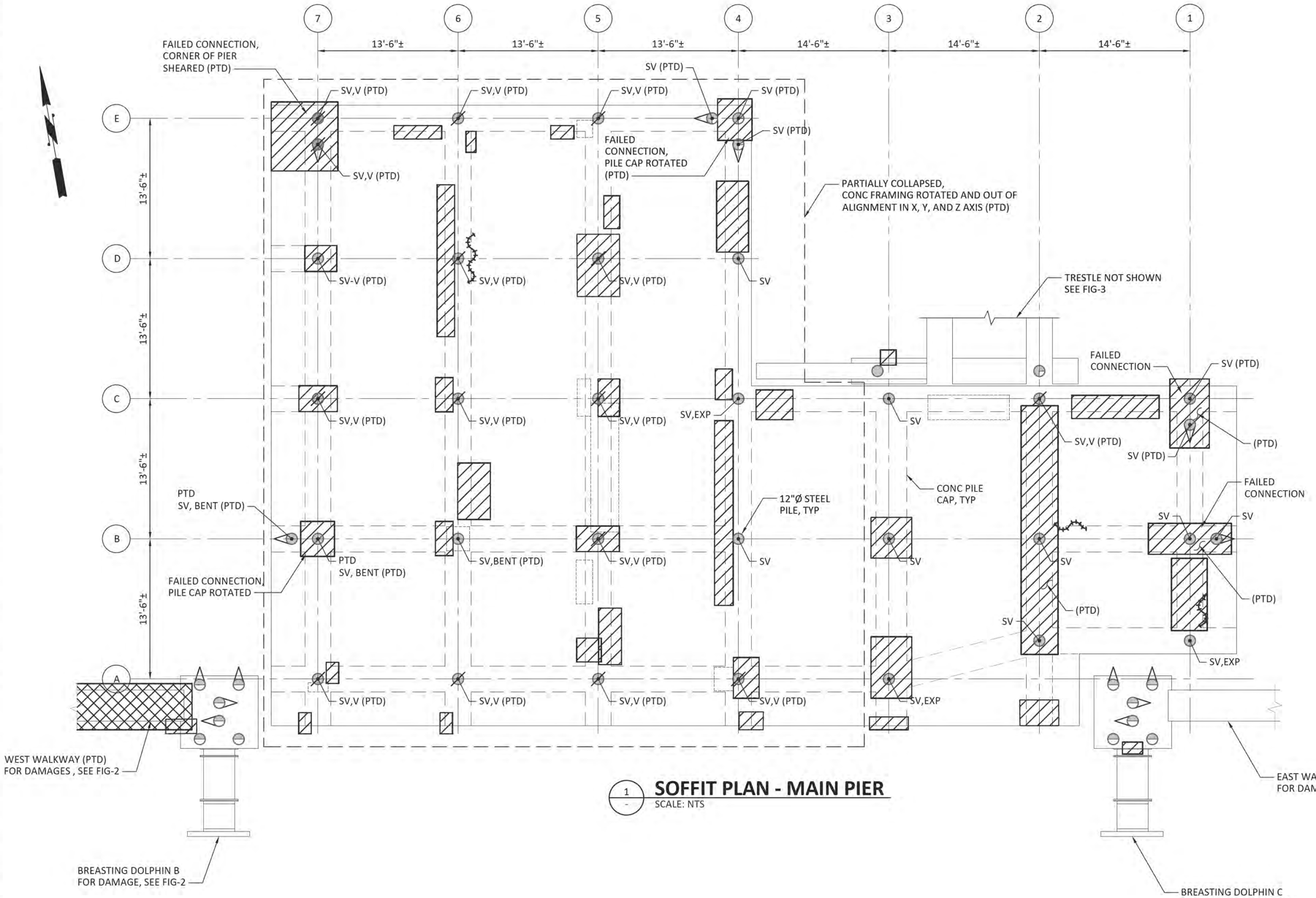

1 - **SOFFIT PLAN - MAIN PIER**
SCALE: NTS

NOTES:

1. AT CONCRETE ELEMENTS, DAMAGES SHOWN ARE AT THE SOFFIT ELEVATION
2. DIMENSIONS SHOWN ARE NOT TO SCALE
3. MOORING HARDWARE AND MISC APPURTENANCES NOT SHOWN
4. DAMAGES SHOWN ARE BASED ON THE OCTOBER 2022 ASCE ROUTINE ABOVE-WATER AND UNDERWATER INSPECTION AND A CURSORY, ABOVE-DECK ASSESSMENT PERFORMED IN SEPT 2023.

LEGEND

PILE SYMBOLS

- 12"Ø STEEL PLUMB PILE
- 12"Ø STEEL BATTER PILE

DAMAGE RATINGS

MN	MINOR DAMAGE
MD	MODERATE DAMAGE
MJ	MAJOR DAMAGE
SV	SEVERE DAMAGE
SV,EXP	SEVERE DAMAGE W/ EXPOSED CONC PLUG
SV, V	SEVERE DAMAGE, BROKEN/SHEARED PILE
	OPEN-CORROSION SPALL
	CLOSED-CORROSION SPALL
	GENERAL DAMAGE
	CRACK
PTD	POST TYPHOON MAWAR DAMAGE

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DESIGN BY LC
CHECK BY MAD
PROJ MGR MAD

PORT AUTHORITY OF GUAM
GOLF PIER
CONDITION ASSESSMENT DAMAGE MAP

MAIN PIER

DRAWING NO. **FIG-1**
PROJECT NO. 30901541B.002
DATE: 9/30/24
SHEET NO. 1 OF 3

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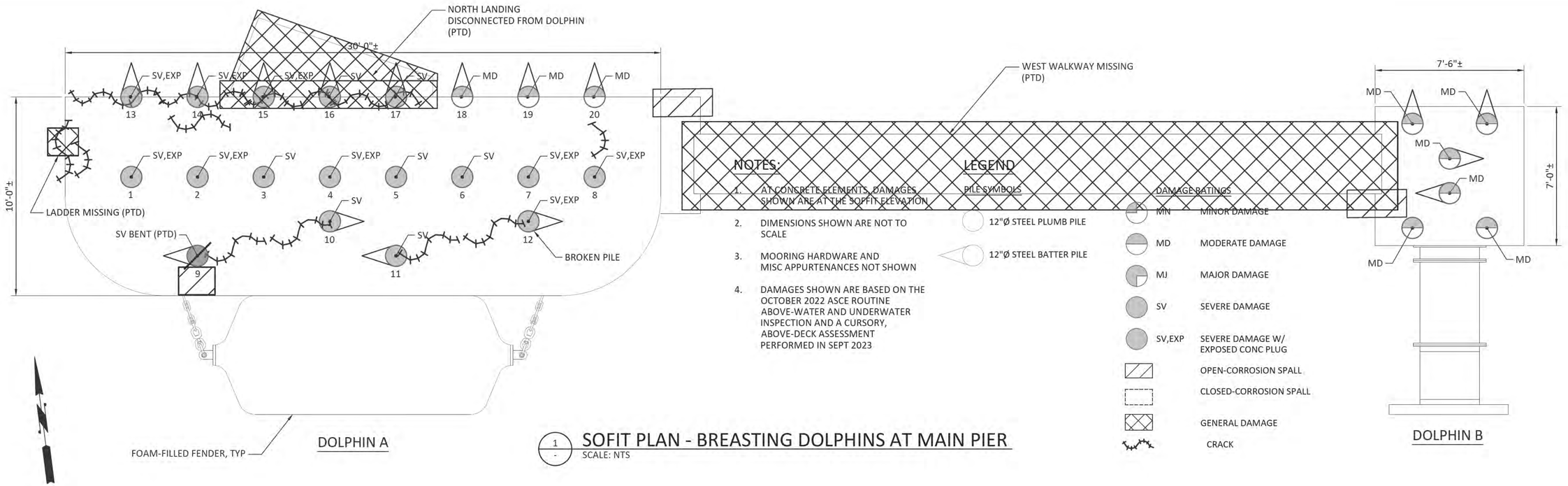
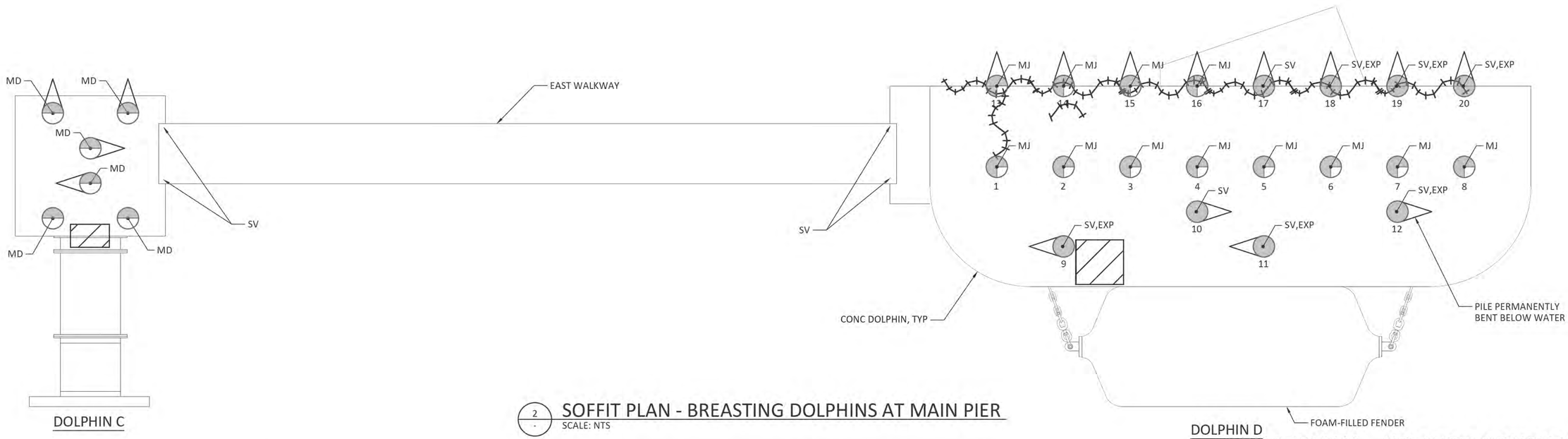


1 - SOFIT PLAN - BREASTING DOLPHINS AT MAIN PIER
SCALE: NTS



2 - SOFFIT PLAN - BREASTING DOLPHINS AT MAIN PIER
SCALE: NTS

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GOLF PIER
CONDITION ASSESSMENT DAMAGE MAP
BREASTING DOLPHINS

DRAWING NO. **FIG-2**
PROJECT NO. 30901541B.002
DATE: 9/30/24
SHEET NO. 2 OF 3

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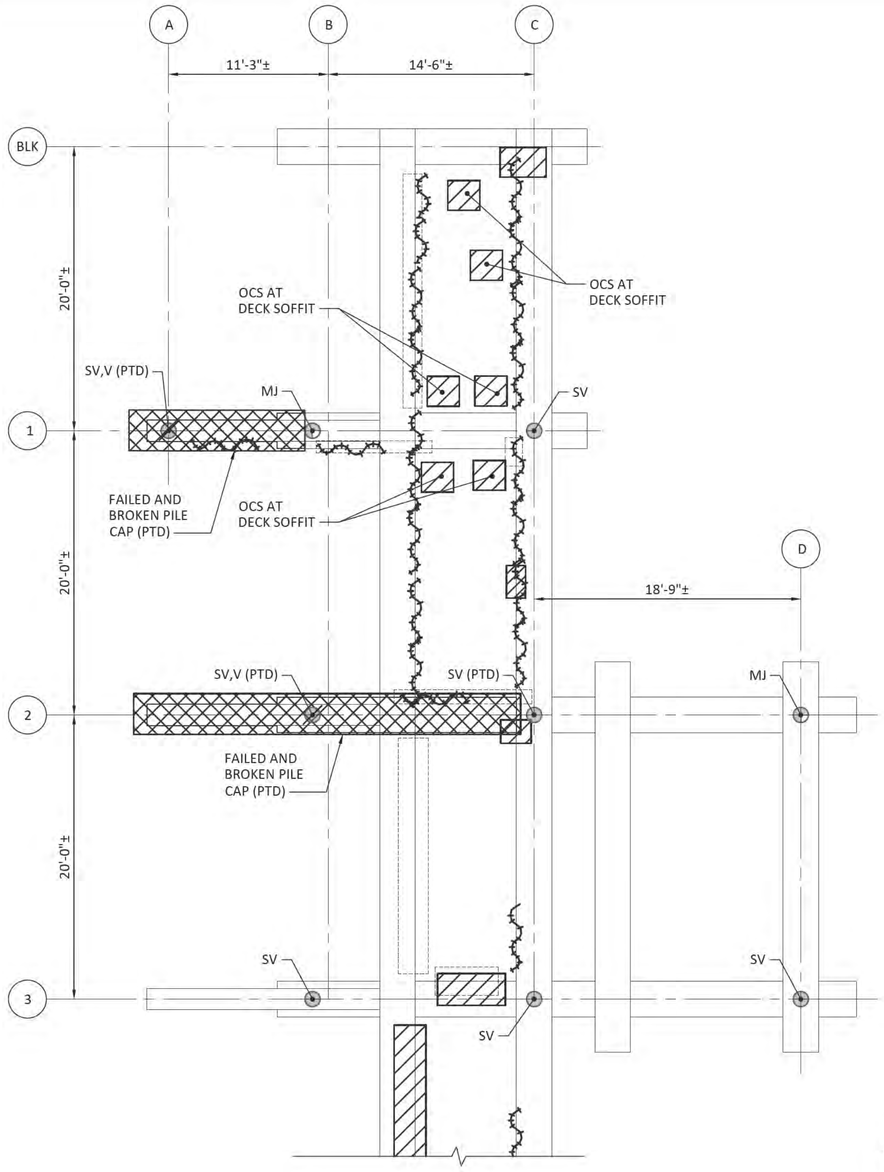

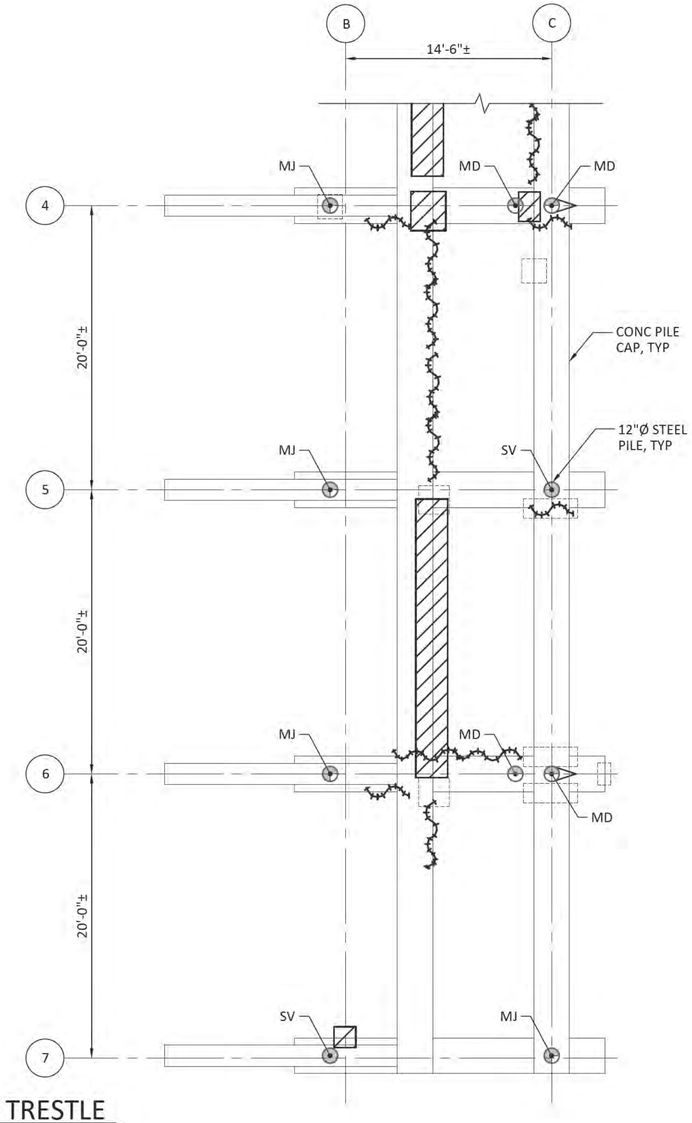

1 - SOFFIT PLAN - TRESTLE
SCALE: NTS

NOTES:

1. AT CONCRETE ELEMENTS, DAMAGES SHOWN ARE AT THE SOFFIT ELEVATION UNLESS NOTED OTHERWISE
2. DIMENSIONS SHOWN ARE NOT TO SCALE
3. MOORING HARDWARE AND MISC APPURTENANCES NOT SHOWN
4. DAMAGES SHOWN ARE BASED ON THE OCTOBER 2022 ASCE ROUTINE ABOVE-WATER AND UNDERWATER INSPECTION AND A CURSORY, ABOVE-DECK ASSESSMENT PERFORMED IN SEPT 2023.

LEGEND

PILE SYMBOLS

- 12"Ø STEEL PLUMB PILE
- 12"Ø STEEL BATTER PILE

DAMAGE RATINGS

MN	MINOR DAMAGE
MD	MODERATE DAMAGE
MJ	MAJOR DAMAGE
SV	SEVERE DAMAGE
SV,EXP	SEVERE DAMAGE W/ EXPOSED CONC PLUG
SV, V	SEVERE DAMAGE, BROKEN/SHEARED PILE
	OPEN-CORROSION SPALL
	CLOSED-CORROSION SPALL
	GENERAL DAMAGE
	CRACK

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PORT AUTHORITY OF GUAM
GOLF PIER
CONDITION ASSESSMENT DAMAGE MAP

TRESTLE

DRAWING NO. **FIG-3**
PROJECT NO. 30901541B.002
DATE: 9/30/24
SHEET NO. 3 OF 3

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APPENDIX D

REPLACEMENT CONCEPT

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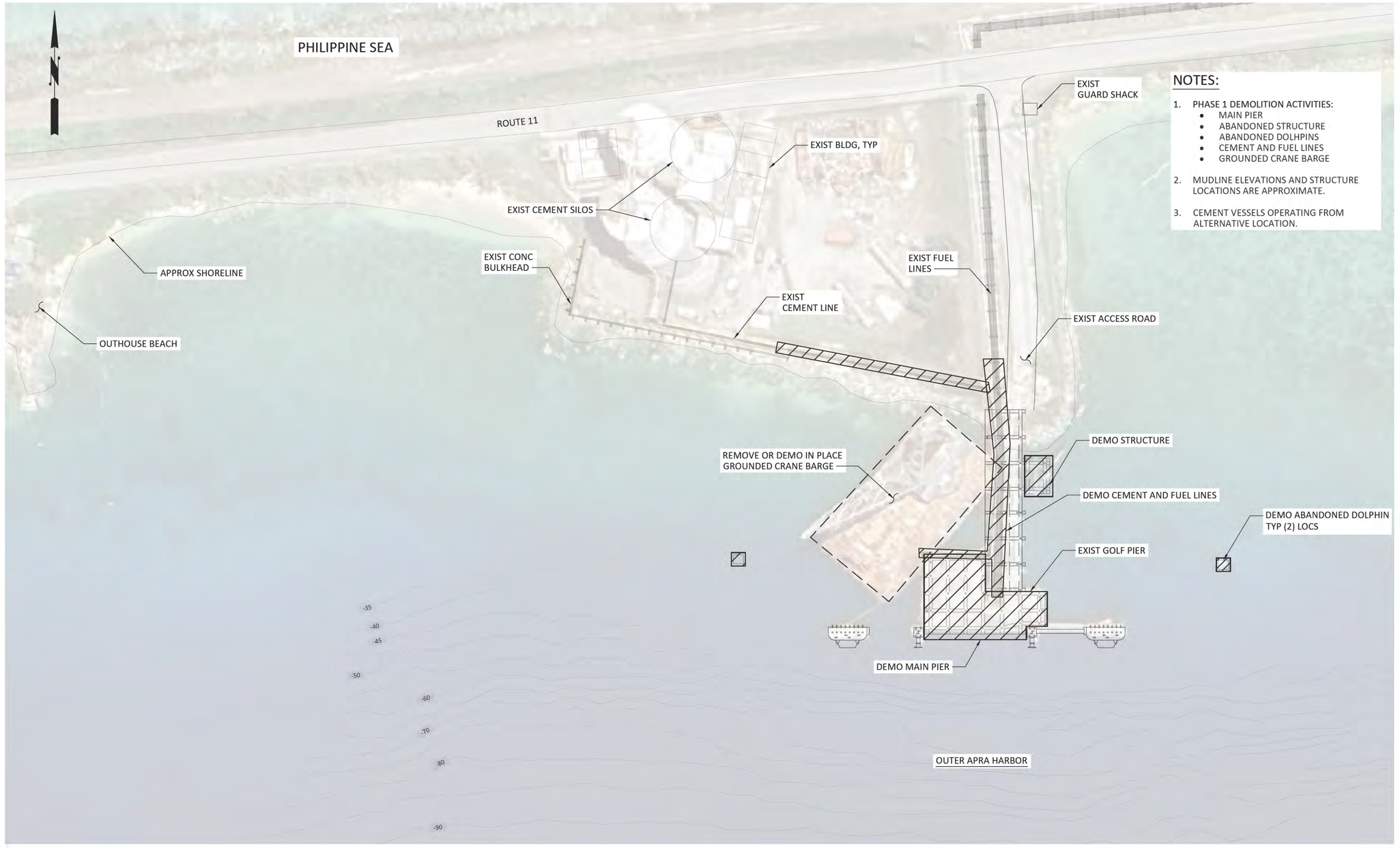

NOTES:

1. PHASE 1 DEMOLITION ACTIVITIES:
   - MAIN PIER
   - ABANDONED STRUCTURE
   - ABANDONED DOLHPINS
   - CEMENT AND FUEL LINES
   - GROUNDED CRANE BARGE
2. MUDLINE ELEVATIONS AND STRUCTURE LOCATIONS ARE APPROXIMATE.
3. CEMENT VESSELS OPERATING FROM ALTERNATIVE LOCATION.

1 / - **PLAN - PHASE 1A CONSTRUCTION**
SCALE: 1"=40'

1" = 40' scale 40 0 40 80 feet

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GOLF PIER REPLACEMENT CONCEPT
PHASE 1A CONSTRUCTION

DRAWING NO. **FIG-1**
PROJECT NO. 30901541B.002
DATE: 9/30/24
SHEET NO. 1 OF 10

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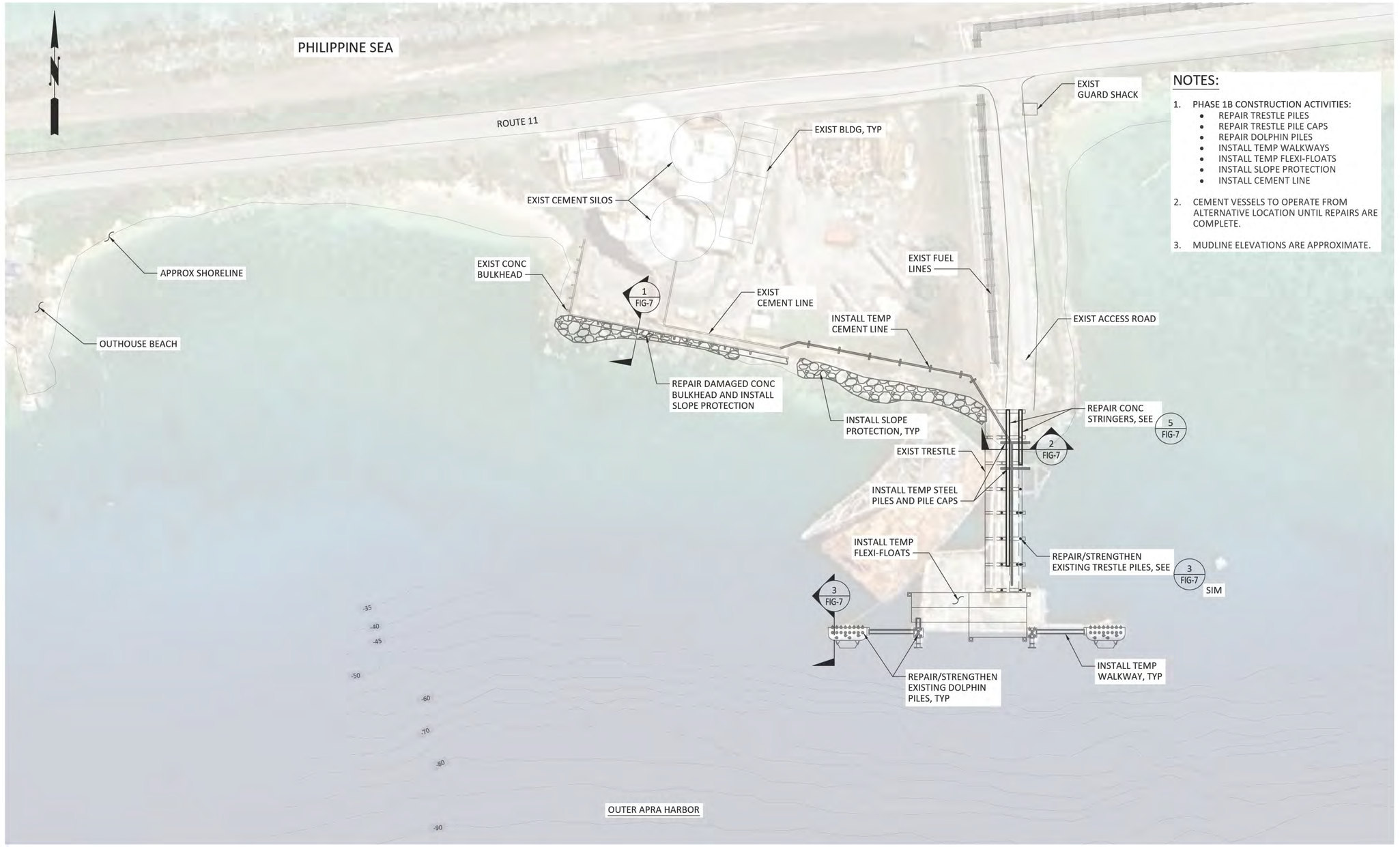

NOTES:

1. PHASE 1B CONSTRUCTION ACTIVITIES:
   - REPAIR TRESTLE PILES
   - REPAIR TRESTLE PILE CAPS
   - REPAIR DOLPHIN PILES
   - INSTALL TEMP WALKWAYS
   - INSTALL TEMP FLEXI-FLOATS
   - INSTALL SLOPE PROTECTION
   - INSTALL CEMENT LINE
2. CEMENT VESSELS TO OPERATE FROM ALTERNATIVE LOCATION UNTIL REPAIRS ARE COMPLETE.
3. MUDLINE ELEVATIONS ARE APPROXIMATE.

1/- PLAN - PHASE 1B CONSTRUCTION

SCALE: 1"=40'

1" = 40' scale 40 0 40 80 feet

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GOLF PIER REPLACEMENT CONCEPT

PHASE 1B CONSTRUCTION

DRAWING NO. **FIG-2**
PROJECT NO. 30901541B.002
DATE: 9/30/24
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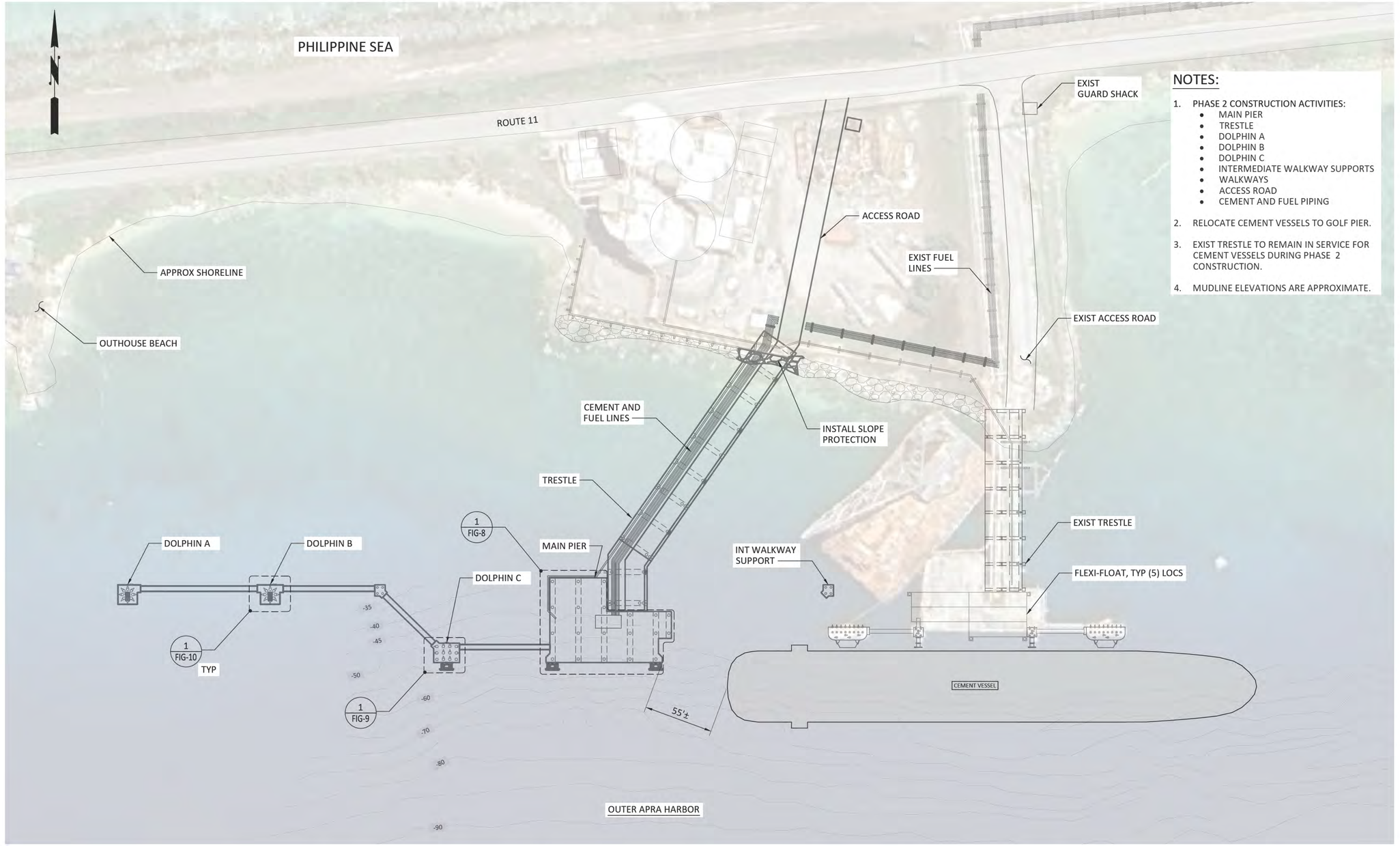

NOTES:

1. PHASE 2 CONSTRUCTION ACTIVITIES:
   - MAIN PIER
   - TRESTLE
   - DOLPHIN A
   - DOLPHIN B
   - DOLPHIN C
   - INTERMEDIATE WALKWAY SUPPORTS
   - WALKWAYS
   - ACCESS ROAD
   - CEMENT AND FUEL PIPING
2. RELOCATE CEMENT VESSELS TO GOLF PIER.
3. EXIST TRESTLE TO REMAIN IN SERVICE FOR CEMENT VESSELS DURING PHASE 2 CONSTRUCTION.
4. MUDLINE ELEVATIONS ARE APPROXIMATE.

1 / - PLAN - PHASE 2 CONSTRUCTION

SCALE: 1"=40'

1" = 40' scale: 40 0 40 80 feet

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PHASE 2 CONSTRUCTION

DRAWING NO. FIG-3
PROJECT NO. 30901541B.002
DATE: 9/30/24
SHEET NO. 3 OF 10

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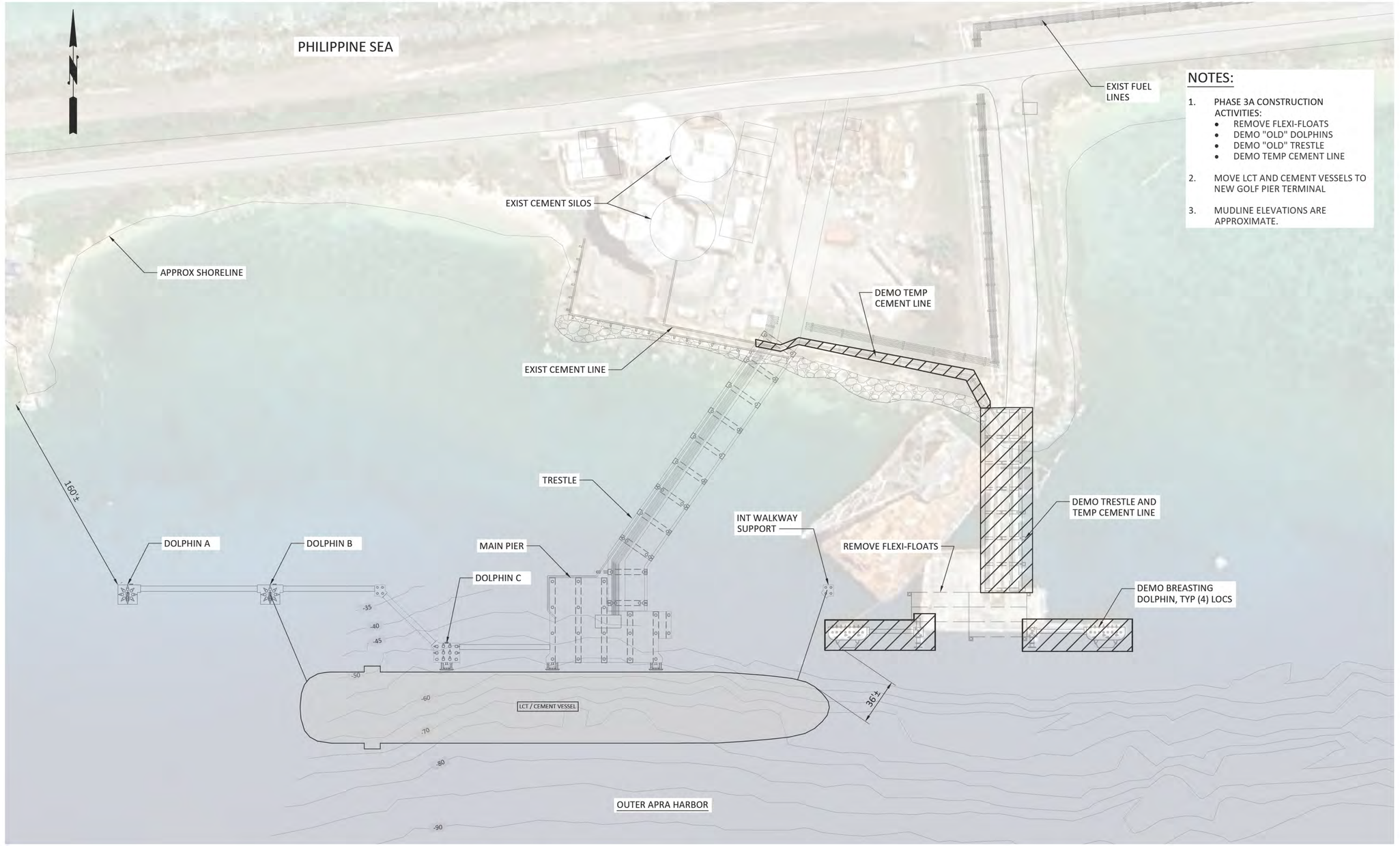

NOTES:

1. PHASE 3A CONSTRUCTION ACTIVITIES:
   - REMOVE FLEXI-FLOATS
   - DEMO "OLD" DOLPHINS
   - DEMO "OLD" TRESTLE
   - DEMO TEMP CEMENT LINE
2. MOVE LCT AND CEMENT VESSELS TO NEW GOLF PIER TERMINAL
3. MUDLINE ELEVATIONS ARE APPROXIMATE.

1 / - **PLAN - PHASE 3A CONSTRUCTION**
SCALE: 1" = 40'

1" = 40' (40 0 40 80 scale feet)

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GOLF PIER REPLACEMENT CONCEPT
PHASE 3A CONSTRUCTION

DRAWING NO. **FIG-4**
PROJECT NO. 30901541B.002
DATE: 9/30/24
SHEET NO. 4 OF 10

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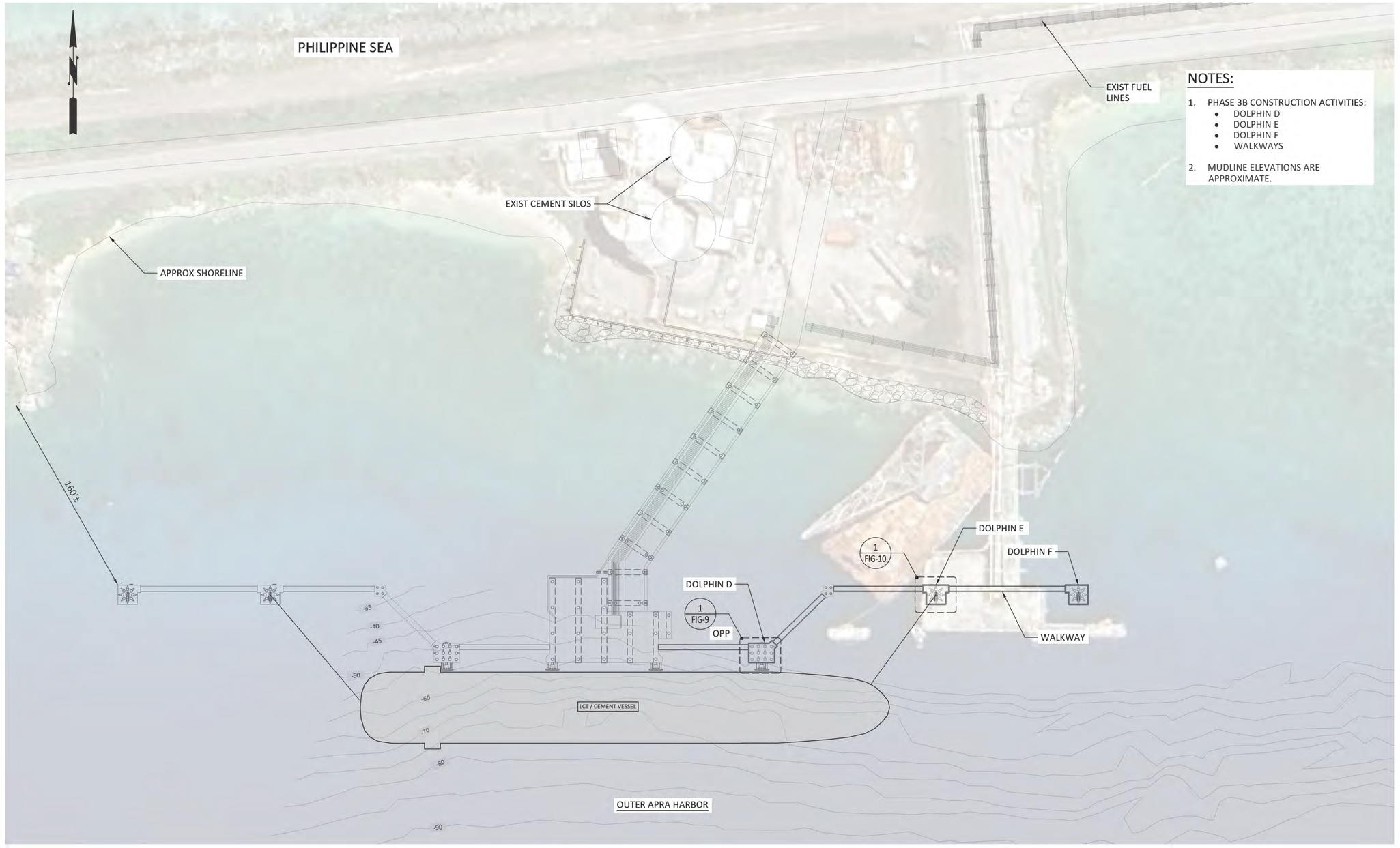

NOTES:

1. PHASE 3B CONSTRUCTION ACTIVITIES:
   - DOLPHIN D
   - DOLPHIN E
   - DOLPHIN F
   - WALKWAYS
2. MUDLINE ELEVATIONS ARE APPROXIMATE.

1 - PLAN - PHASE 3B CONSTRUCTION

SCALE: 1" = 40'

1" = 40' scale — 40 0 40 80 feet

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GOLF PIER REPLACEMENT CONCEPT

PHASE 3B CONSTRUCTION

DRAWING NO. **FIG-5**
PROJECT NO. 30901541B.002
DATE: 9/30/24
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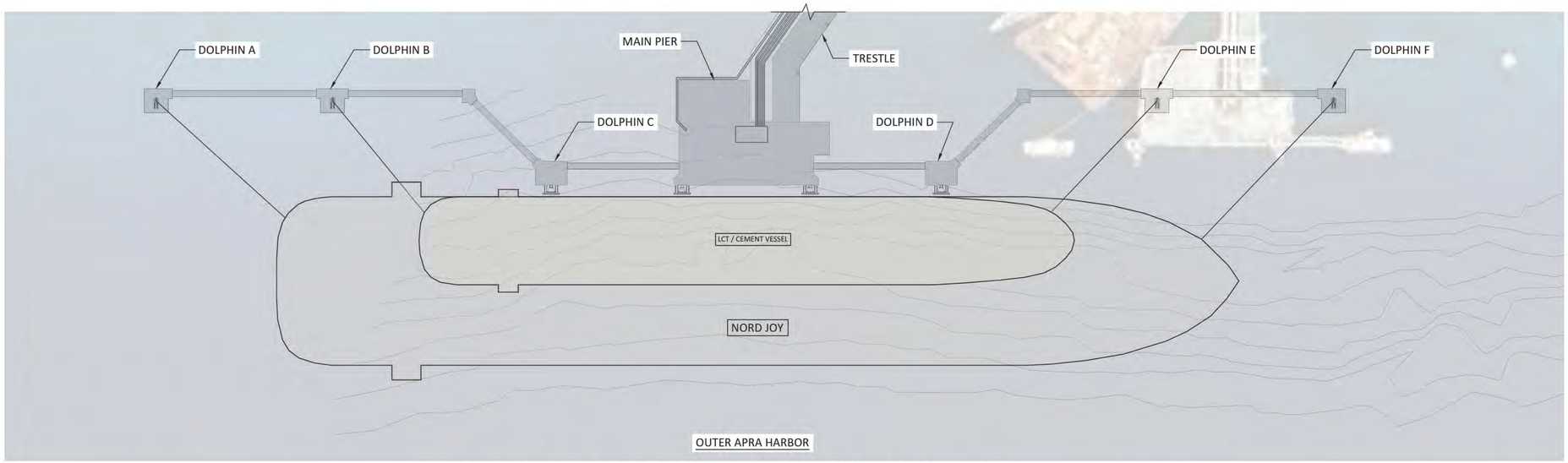
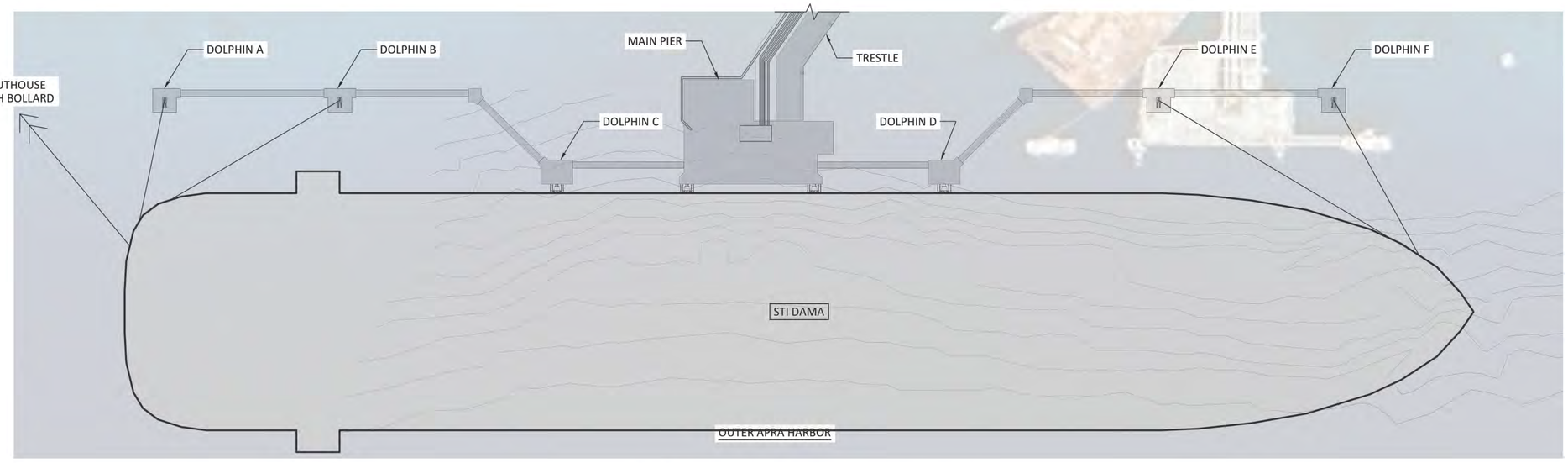


1 / - **MOORING PLAN - SMALL- AND MEDIUM-SIZED VESSELS**
SCALE: 1" = 40'



2 / - **MOORING PLAN - LARGE-SIZED VESSEL**
SCALE: 1" = 40'

1" = 40' scale 40 0 40 80 feet

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GOLF PIER REPLACEMENT CONCEPT
CONCEPTUAL MOORING PLAN

DRAWING NO. **FIG-6**
PROJECT NO. 30901541B.002
DATE: 9/30/24
SHEET NO. 6 OF 10

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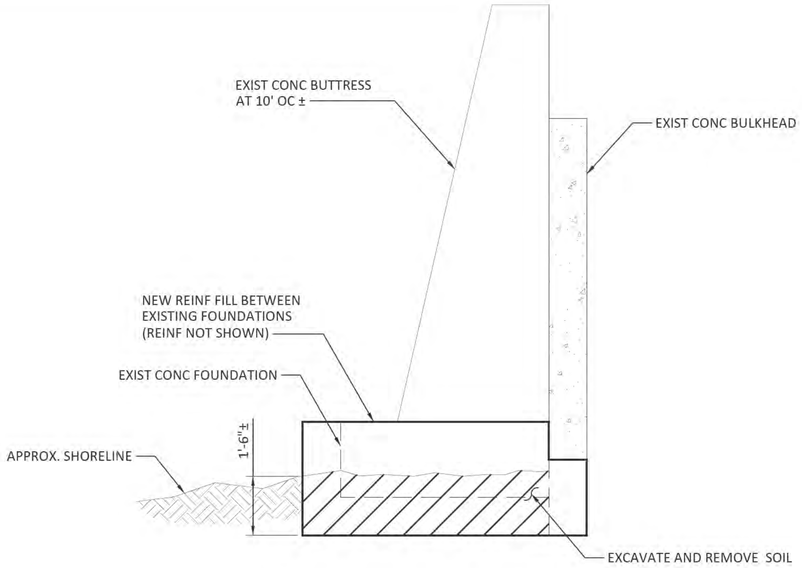
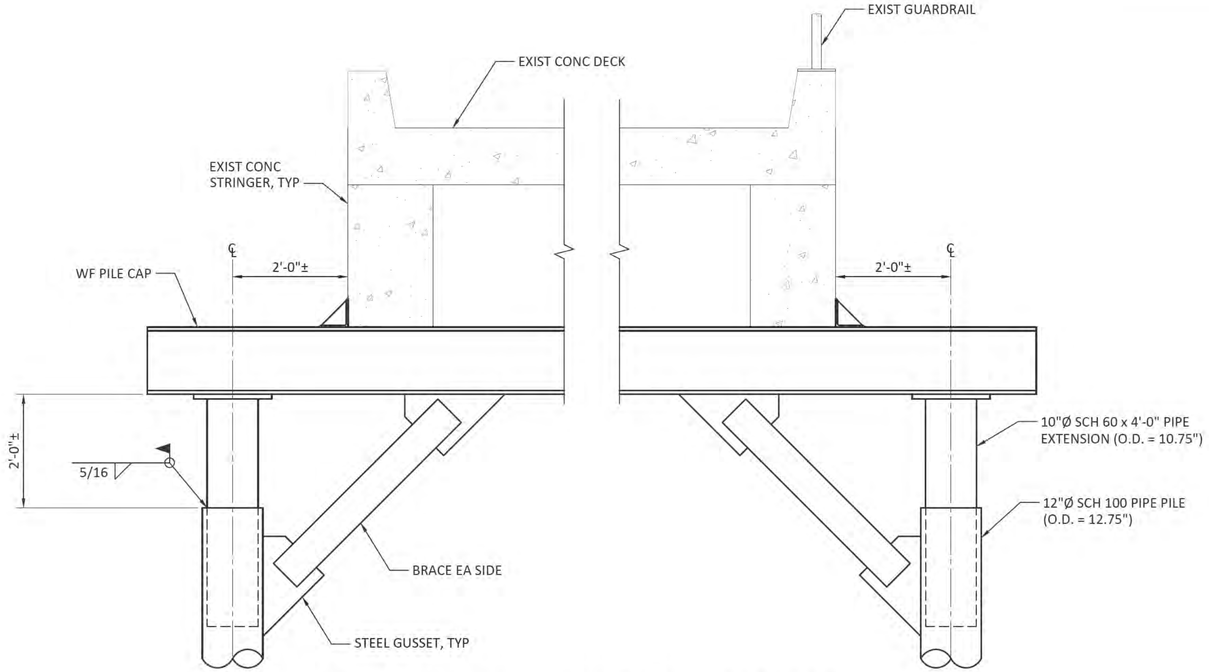
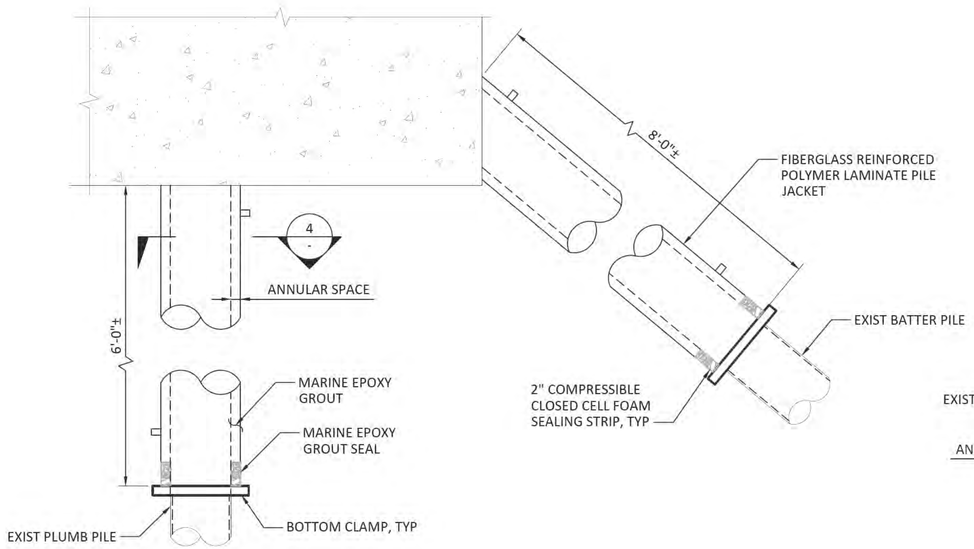


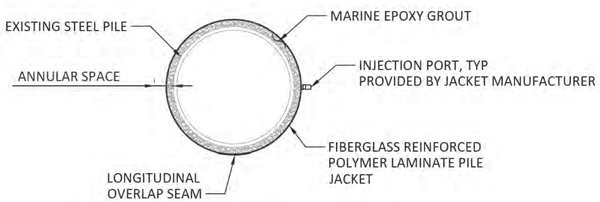
1 FIG-2 **SECTION - BULKHEAD REPAIR**
SCALE: NTS



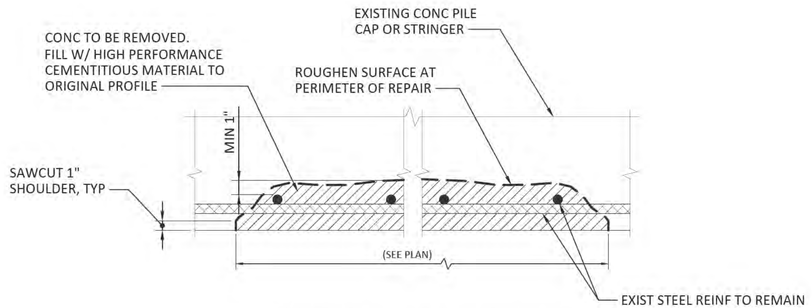
2 FIG-2 **ELEVATION - TRESTLE PILE CAP REPAIR**
SCALE: NTS



3 FIG-2 **SECTION - STRUCTURAL PILE JACKET**
SCALE: NTS



4 - **SECTION - PILE JACKET**
SCALE: NTS



5 - **SECTION - SPALL REPAIR**
SCALE: NTS

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590 S. Marine Corps Dr.
Suite 421
Tamuning, GU 96913
TEL: (671) 646-6872
FAX: (671) 646-6873

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DRAWING NO. **FIG-7**
PROJECT NO. 30901541B.002
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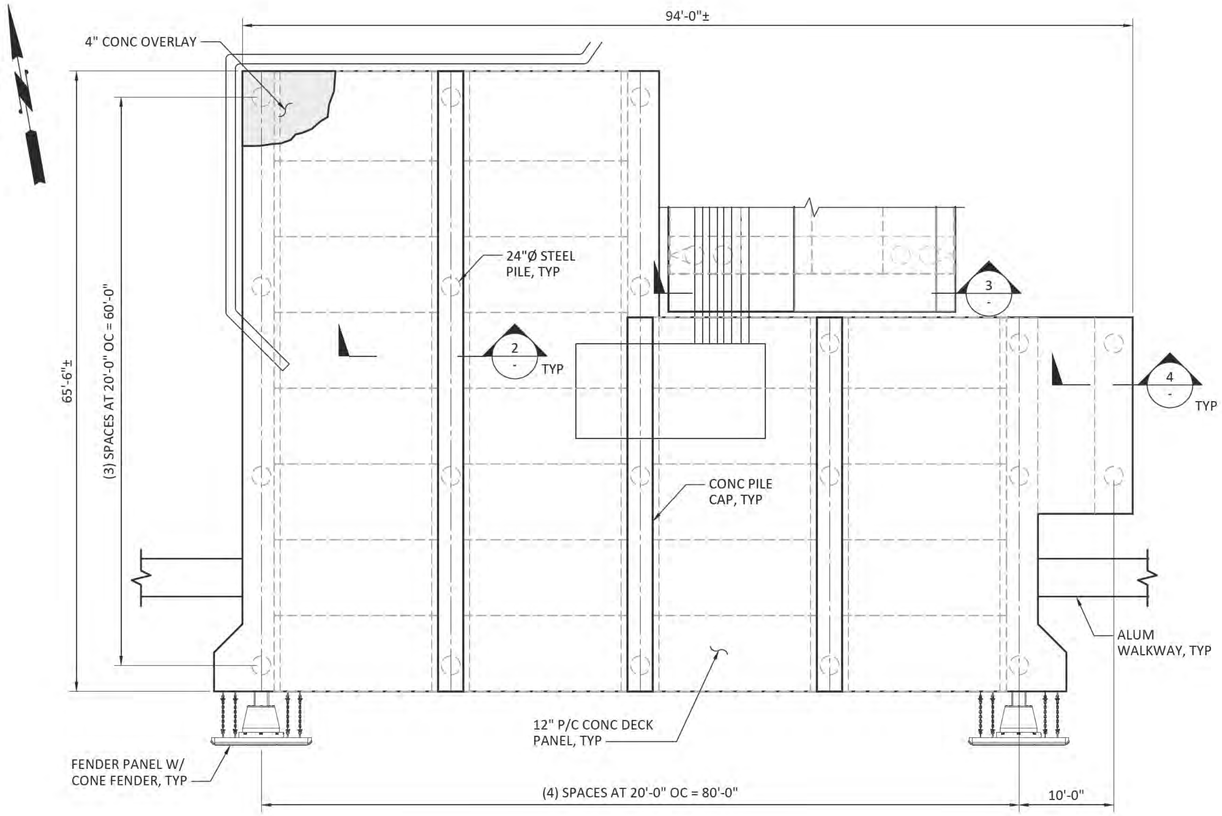
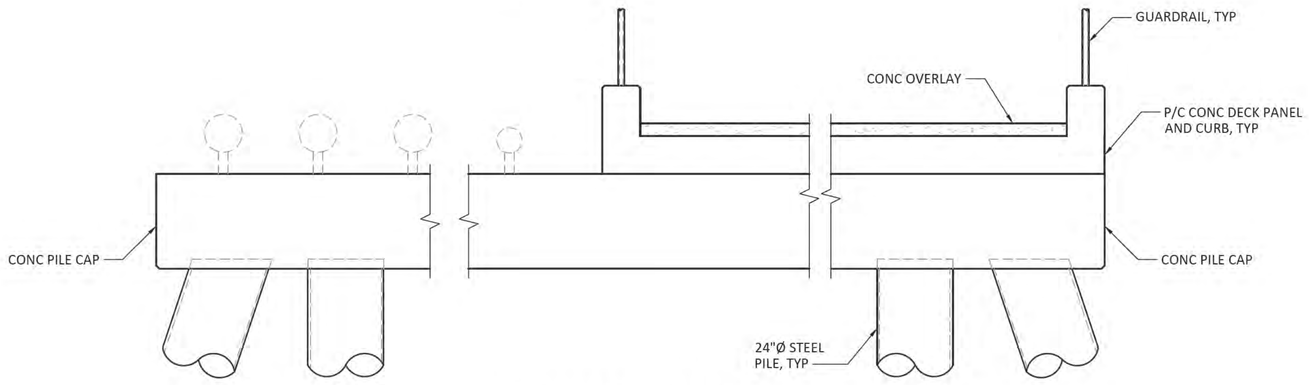
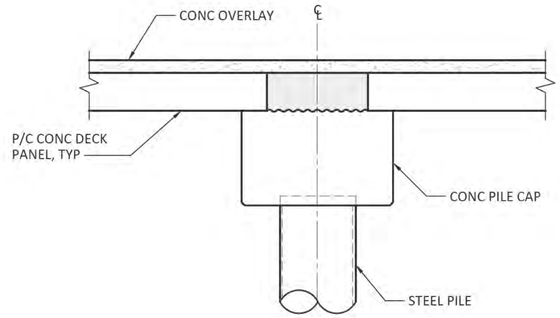


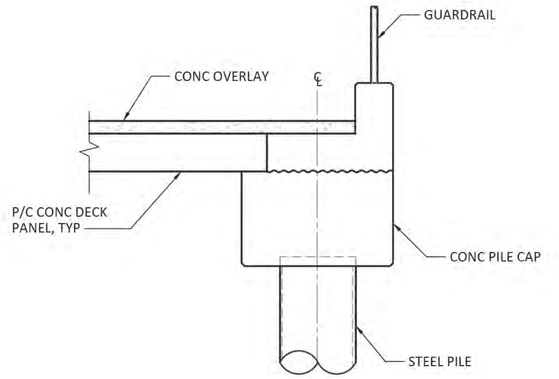
1 - **PLAN - GOLF PIER**
SCALE: 1/8 = 1'-0"



3 - **SECTION - TRESTLE**
SCALE: 1/2" = 1'-0"



2 - **SECTION - TYPICAL PILE CAP**
SCALE: 1/2" = 1'-0"



4 - **SECTION - TYPICAL PILE CAP**
SCALE: 1/2" = 1'-0"

1/2" = 1'-0" scale 2 0 2 4 feet

1/8" = 1'-0" scale 8 0 8 16 feet

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590 S. Marine Corps Dr.
Suite 421
Tamuning, GU 96913
TEL: (671) 646-6872
FAX: (671) 646-6873

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DRAWING NO. **FIG-8**
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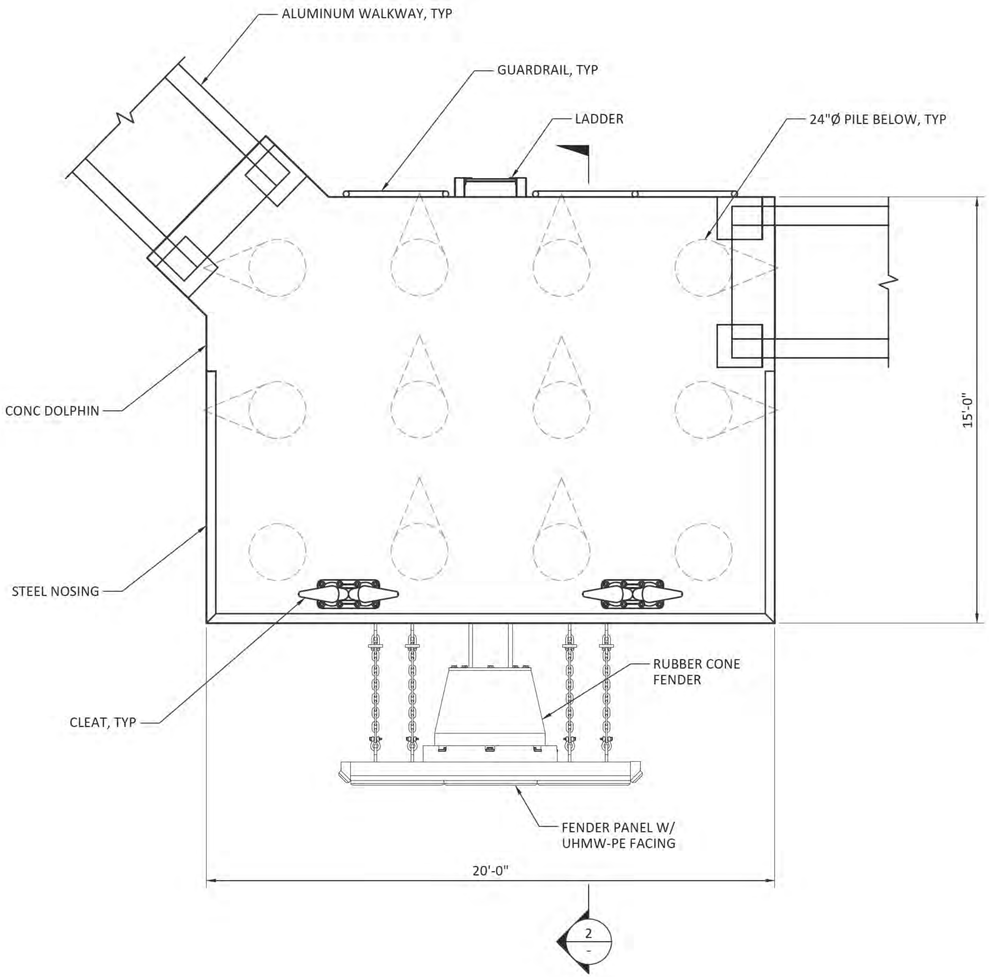
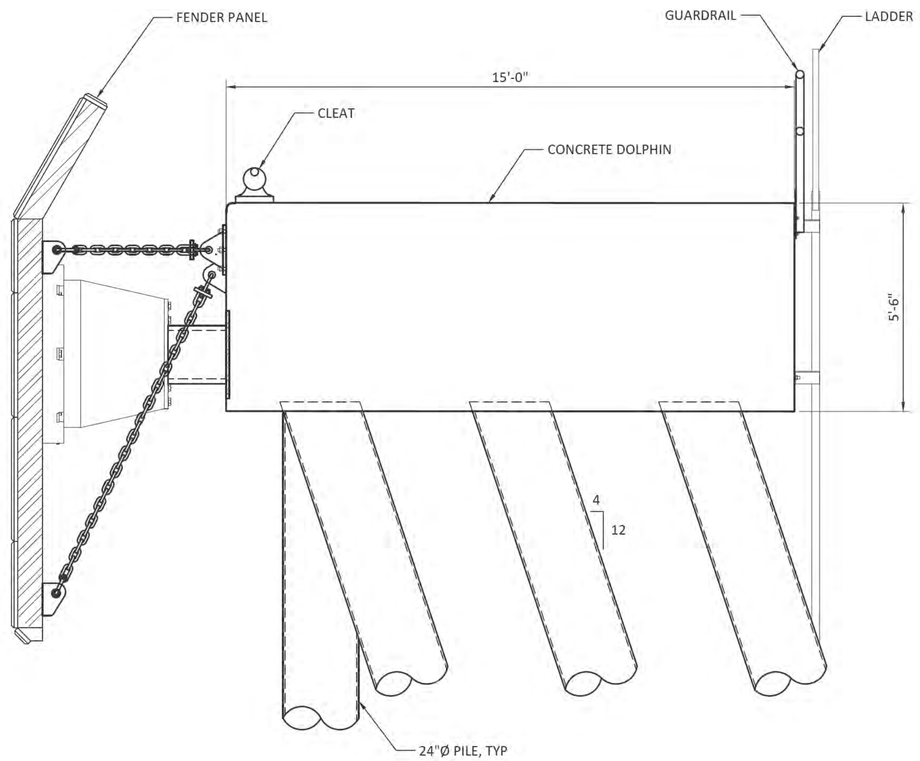


1 - **PLAN - TYPICAL BREASTING DOLPHIN**
SCALE: 3/8 = 1'-0"



2 - **SECTION - TYPICAL BREASTING DOLPHIN**
SCALE: 1/2 = 1'-0"

1/2" = 1'-0" 2 0 2 4 scale feet

3/8" = 1'-0" 4 0 4 8 scale feet

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590 S. Marine Corps Dr.
Suite 421
Tamuning, GU 96913
TEL: (671) 646-6872
FAX: (671) 646-6873

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DRAWING NO. **FIG-9**
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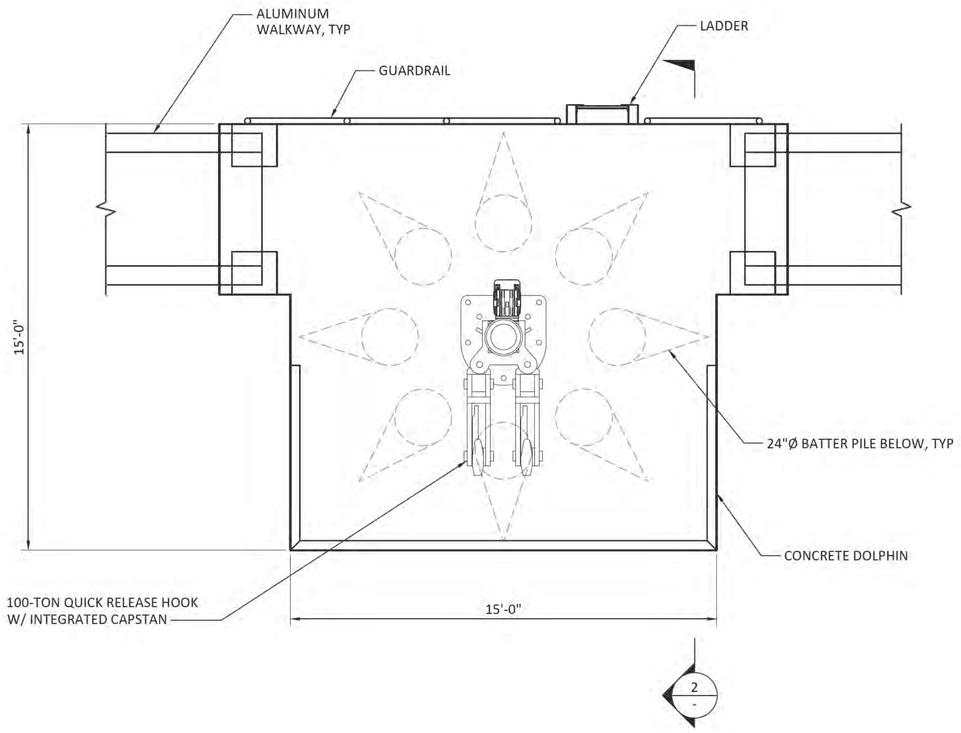
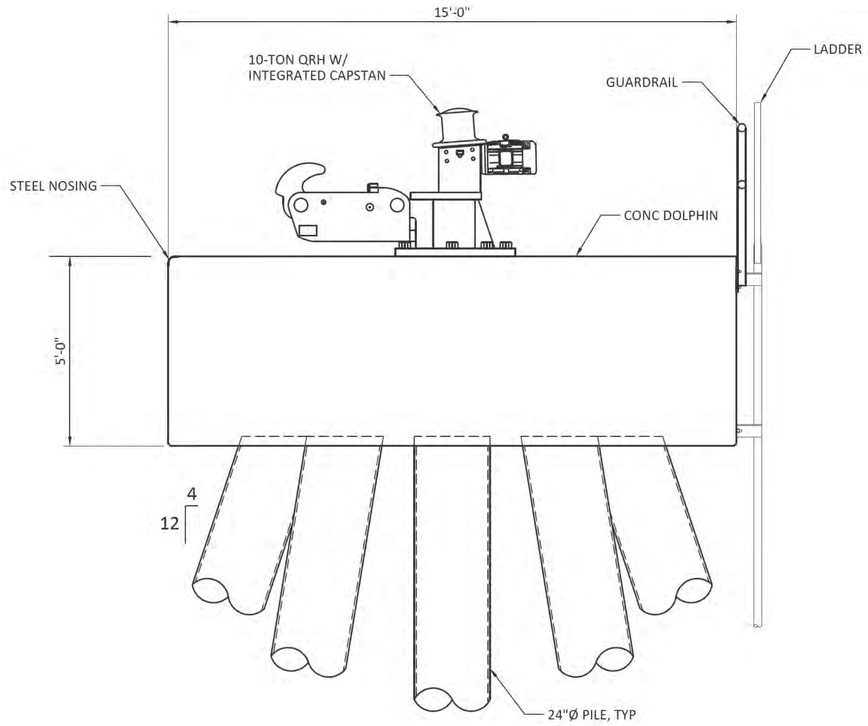


1 - **PLAN - TYPICAL MOORING DOLPHIN**
SCALE: 3/8 = 1'-0"



2 - **SECTION - TYPICAL MOORING DOLPHIN**
SCALE: 1/2" = 1'-0"

1/2" = 1'-0" 2 0 2 4 scale feet

3/8" = 1'-0" 4 0 4 8 scale feet

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590 S. Marine Corps Dr.
Suite 421
Tamuning, GU 96913
TEL: (671) 646-6872
FAX: (671) 646-6873

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DRAWING NO. **FIG-10**
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Appendix F – Area A Condition Assessment Report

WSP USA
590 Marine Corps Drive
Suite 421
Tamuning, Guam 96913

Final Submittal

Port Authority of Guam

Area A Condition Assessment Report

Submitted to
Port Authority of Guam
Piti, Guam

This study was prepared under contract with the Port Authority of Guam (PAG), with financial support from the Office of Local Defense Community Cooperation (OLDCC). The content reflects the views of the PAG and does not necessarily reflect the views of OLDCC.

30901541B.002

September 2024

Area A Condition Assessment Report - Final

Port Authority of Guam
AREA A

Submitted to

Port Authority of Guam
Piti, Guam

30 September 2024

Submitted by

WSP USA
590 South Marine Corps Drive, Suite 421
Tamuning, Guam 96913

30901541B

FINAL
CONDITION ASSESSMENT REPORT
PORT AUTHORITY OF GUAM – AREA A

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EXECUTIVE SUMMARY

This report presents the current overall condition assessment rating of Area A and a summary of observations and findings from the inspection effort. The inspection effort was performed in November 2022 and included exterior inspection of liquid bulk storage tanks, piping networks, and associated infrastructure at Area A.

Overall, Area A is in **critical** condition and has sat vacant and without maintenance and/or repairs for the past 20 years. Four of the seven tanks are in critical condition, evidenced by severe corrosion and holes in the tank structures. Similarly, corrosion ranging from minor to severe is present at multiple locations within the piping network. At multiple locations, pipes, valves, and pumps are disconnected. Given the partially collapsed condition of Tank No. 3, it is recommended that priority is given to demolition and removal of the tank from the site.

Depending on the PAG's near-term and long-term goals, it is recommended that Area A is rehabilitated. A rehabilitation concept and associated cost estimate are provided in a separate report titled, "Military Readiness Report".

1.0 INTRODUCTION

As part of Service Agreement FY021-003 dated 4 November 2020, the Port Authority of Guam authorized Task Order No. 12 (FY23-001), In-Water Inspection and Feasibility Study. As part of this task order, WSP USA Inc. (WSP) performed an inspection and facility condition assessment of Area A. The purpose of this effort was to evaluate the current condition of the steel tanks and associated infrastructure.

Observations and findings from the field inspection effort are summarized in this facility condition assessment report. Based on the severity and extent of observed damages, condition assessment ratings were assigned to primary structural components: Fuel Tanks, Pipes, Pipe Supports, and Retaining Walls. A comprehensive facility condition assessment rating was then assigned to the entirety of Area A, using this information.

1.1 FACILITY DESCRIPTION

The Port of Guam (Port) is located on the western side of the island of Guam and encompasses over 1,000 acres of land. Strategically located along major Pacific shipping and air routes, the Port serves as an important transportation hub for the Commonwealth of the Northern Marianas, the Micronesian islands, and markets to the east and west. In general, multiple upland and maritime structures are owned and managed by the Port and located within Outer Apra Harbor and the villages of Agat and Hagatna. The information provided within this report is limited to evaluation of Area A. See Figure 1.

Figure 1 – Apra Harbor

1.2 AREA A

The Area A facility is located within the Port's Marine Industrial Complex and is situated on the north shoreline of the Glass Breakwater facing the Philippine Sea. Historically, Area A has been used by Port tenants to store liquid bulk products including gasoline, diesel, and Jet A1 fuel. In the early 2000's, deteriorating conditions of the tanks and supporting infrastructure resulted in Area A being closed and the lease terminated. Following this closure, Area A has remained vacant and has not been used to store liquid bulk products.

Area A is comprised of five storage tanks (Tanks 1, 2, 3, 4, and 6) that are joined by an interconnected series of above-ground and underground pipes; having a total capacity of approximately 214,973 barrels. See Table 1 for the capacity and size of each tank. Tanks are steel framed and supported by concrete foundations. Containment berms consisting of concrete and CMU walls and sloped concrete slabs are present at each tank. A firewater tank (Tank No. 8) and miscellaneous fuel tank with unknown capacity (Tank No. 7) are located in the southwest corner of the site. A fuel depot/truck loading area is also located on the southeastern side of the property. The north, west, and east sides of the property are defined by a concrete retaining wall. See Figure 2.

Table 1: Tank Information

Tank No.	Diameter (ft)	Product	Max Working Capacity (BBL)
1	100±	Gasoline/Diesel	65,808
2	70±	Gasoline	32,490
3	60±	Gasoline	20,670
4	90±	Diesel	53,205
5	NA	NA	NA
6	80±	Gasoline	42,800
7	40±	Unknown	
8	25±	Firewater	

Figure 2: Area A Site Plan

2.0 FACILITY CONDITION ASSESSMENT

2.1 CONDITION ASSESSMENT APPROACH

WSP performed a general exterior inspection of the steel-framed storage tanks, pipes, and associated appurtenances at Area A. The intent of the inspection effort was to evaluate the general exterior condition of the tanks and associated piping. Therefore, personnel having American Petroleum Institute, Steel Tank Institute, and other tank inspection certifications were not included in this scope of work. Similarly, the inspection effort did not include hydrostatic testing, evaluation of grounding systems or mechanical equipment, or an internal inspection of the tank shells, bases, or roofs.

The following standards were used as guides for performing the inspection work and classification the level of damage observed.

- American Standards Testing and Materials (ASTM) Standard E2018-15
- American Society of Civil Engineers Manuals and Reports on Engineering Practice No. 130, *Waterfront Facilities Inspection and Assessment* (ASCE MOP 130)

The ASTM E2018-15 standard serves as a guide for performing property condition assessments and outlines procedures for performing walk-through surveys. This standard loosely defines the physical conditions of a property, system, and component but does not define specific levels of damage for individual elements. Within the document, conditions are defined as good, fair, and poor. However, the standard permits the use of alternative terms provided they are sufficiently defined within the body of the property condition report. Therefore, procedures and definitions described in ASCE MOP 130 were utilized in this report to provide a qualitative description of an elements level of damage that is consistent with other inspections performed under this contract.

2.2 FACILITY CONDITION ASSESSMENT METHODOLOGY

Condition assessment of elements included both visual observation and limited hands-on assessment. In accordance with ASCE MOP 130, elements were assigned an element-level damage rating, with damages defined as minor, moderate, major, or severe. These damage ratings are defined in Chapter 2 of ASCE MOP 130 and have been standardized to provide a qualitative and consistent description of an elements level of damage. Abbreviated element level damage rating tables from ASCE MOP 130 are provided in Appendix A for reference.

Following completion of the field work, element-level damage ratings in combination with visual observations were used to assign facility condition assessment ratings to each primary structural component. In accordance with Table 2-14 of ASCE MOP 130, a summary of the facility condition assessment ratings is provided below.

Table 2: Facility Condition Assessment Ratings

Rating	Description
Good	No visible damage or only minor damage noted. Structural elements may show very minor deterioration, but no overstressing observed. No repairs are required.
Satisfactory	Limited minor to moderate defects or deterioration observed but no overstressing observed. No repairs are required.
Fair	All primary structural elements are sound but minor to moderate defects or deterioration observed. Localized areas of moderate to advanced deterioration may be present but do not significantly reduce the load-bearing capacity of the structure. Repairs are recommended, but the priority of the recommended repairs is low.
Poor	Advanced deterioration or overstressing observed on widespread portions of the structure but does not significantly reduce the load-bearing capacity of the structure. Repairs may need to be carried out with moderate urgency.
Serious	Advanced deterioration, overstressing, or breakage may have significantly affected the load-bearing capacity of the primary structural components. Local failures are possible, and loading restrictions may be necessary. Repairs may need to be carried out on a high-priority basis with urgency.
Critical	Very advanced deterioration, overstressing, or breakage has resulted in localized failure(s) of primary structural components. Failures that are more widespread are possible or likely to occur, and load restrictions should be implemented as necessary. Repairs may need to be carried out on a very high-priority basis with strong urgency.

The initial inspection effort was performed on 3 November 2022 and evaluated the general condition of the steel tanks, fuel pipes, pipe supports, retaining wall, containment walls, fuel depot, and other miscellaneous appurtenances. The inspection was performed by walking through the tank farm and visually observing the condition of the elements. Concrete elements were visually assessed for damage such as cracks, mechanical damage, and corrosion spalls. Steel elements were visually assessed for corrosion damage such as pitting, flaking, and loss of cross-sectional thickness. At select locations, an ultrasonic thickness gauge was used to measure the cross-sectional thickness of the steel tank walls. Similarly, coating thicknesses were also measured at each tank.

3.0 INITIAL CONDITION ASSESSMENT FINDINGS

Findings from the condition assessment effort and element ratings are described in the following sections. Ratings have been assigned based on field observations and element-level damage ratings for individual elements. Observations and findings for tanks have been tabulated and are provided in Appendix B. Similarly, damage maps showing the type and location of damage are provided in Appendix C.

3.1 TANKS

Due to the severity and corroded condition of the roof access stairs, inspection of the exterior tank roofs was not performed. Similarly, strong fuel odors were present at some tank locations which limited the inspection team's access to photograph the inside of tanks.

3.1.1 Tank No. 1

Tank No. 1 is in **critical** condition. See Photo 1 and Photo 2. Severe corrosion and holes are present at multiple locations within the tank shell. Severe corrosion is present at the steel tension rings and valves. The steel stairs are severely corroded and non-functional. Although defects were not observed within the concrete slab around the tank perimeter, the circular steel ring at the tank base is severely corroded. The coating around the tank exterior is peeling at several locations where corrosion is present.

- Average Measured Tank Thickness: 0.69 inches
- Average Measured Coating Thickness: 27 mils

3.1.2 Tank No. 2

Tank No. 2 is in **critical** condition. See Photo 3 and Photo 4. Severe corrosion and holes are present at multiple locations within the tank shell. Major corrosion is present at the steel tension ring and valves. The steel stairs are severely corroded and non-functional. Although defects were not observed within the concrete slab around the tank perimeter, the hold-down bolts and steel brackets are severely corroded. The coating is peeling and damaged at multiple locations and corrosion staining is present on all sides of the tanks.

- Average Measured Tank Thickness: 0.45 inches
- Average Measured Coating Thickness: 11 mils

3.1.3 Tank No. 3

Tank No. 3 is in **critical** condition. See Photo 5 and Photo 6. Severe corrosion and holes are present at multiple locations within the tank shell. Major to severe corrosion is present at the valves and bottom perimeter steel beam. Permanent deformations (dents) are present on the northeast and northwest faces. The steel stairs are severely corroded and non-functional. The coating around the tank exterior is peeling at several locations where corrosion is present.

- Average Measured Tank Thickness: 0.35 inches
- Average Measured Coating Thickness: 28 mils

3.1.4 Tank No. 4

Tank No. 4 is in **poor** condition. See Photo 7 and Photo 8. Moderate corrosion is present along the welded seams at multiple locations, primarily on the north and northwest sides of the tank. Moderate to major corrosion is present at the valves and along the top perimeter of the tank shell. Although the stairs are intact, major to severe corrosion is present at multiple stair treads. The coating around the tank exterior is peeling at several locations where corrosion is present.

- Average Measured Tank Thickness: 0.51 inches
- Average Measured Coating Thickness: 8 mils

3.1.5 Tank No. 5

Tank No. 5 is not present and was not inspected.

3.1.6 Tank No. 6

Tank No. 6 is in **critical** condition. See Photo 9 and Photo 10. Severe corrosion and holes are present at multiple locations within the tank shell. Moderate corrosion is present at the steel tension rings and valves. The steel stairs are severely corroded and non-functional. Although defects were not observed within the concrete slab around the tank perimeter, the perimeter steel beam exhibits moderate to major corrosion.

- Average Measured Tank Thickness: 0.41 inches
- Average Measured Coating Thickness: 22 mils

3.1.7 Tank No. 7

Tank No. 7 is in **fair to poor** condition. See Photo 11 and Photo 12. Minor corrosion pitting and staining are present at multiple locations within the shell. The steel stairs are severely corroded and non-functional. The coating around the tank exterior is peeling at several locations where corrosion is present. Defects were not observed within the concrete curb around the tank perimeter.

- Average Measured Tank Thickness: 0.22 inches
- Average Measured Coating Thickness: 26 mils

3.1.8 Tank No. 8

Tank No. 8 is in **fair to poor** condition. See Photo 13 and Photo 14. Minor corrosion pitting and staining are present at multiple locations within the shell. The steel stairs are severely corroded and non-functional. Valves have major corrosion. The coating around the tank exterior is peeling at several locations where corrosion is present. Defects were not observed within the concrete curb around the tank perimeter.

- Average Measured Tank Thickness: 0.25 inches
- Average Measured Coating Thickness: 25 mils

Photo 1: Tank 1 Typical Exterior Condition

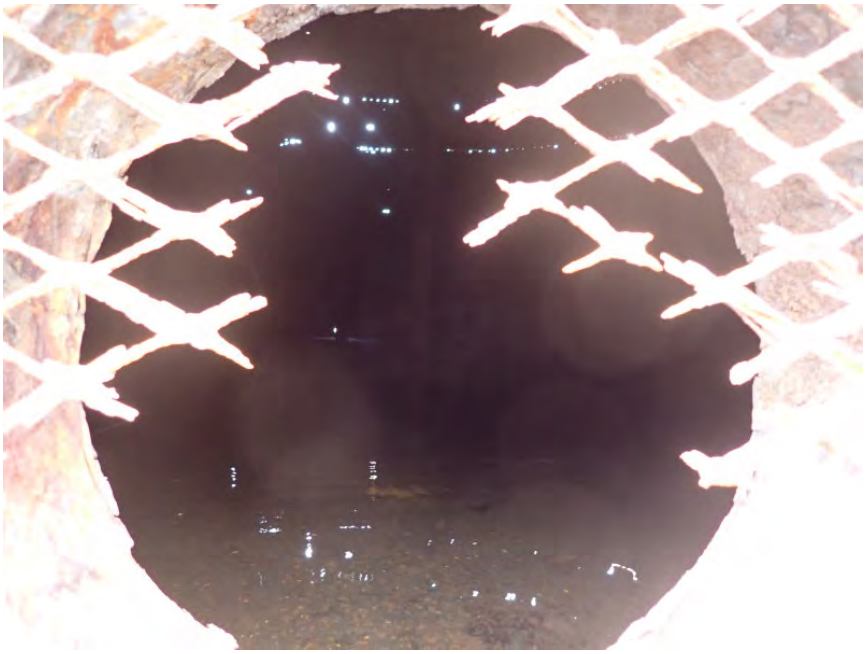

Photo 2: Tank 1 Holes through Tank Wall

Photo 3: Tank 2 Typical Exterior Condition

Photo 4: Tank 2 Typical Foundation Condition

Photo 5: Tank 3 Typical Exterior Condition

Photo 6: Tank 3 Deformation on Northwest Face

Photo 7: Tank 4 Typical Exterior Condition

Photo 8: Tank 4 Corrosion at Weld Seams

Photo 9: Tank 6 Typical Exterior Condition

Photo 10: Tank 6 Holes on Tank Wall

Photo 11: Tank 7 Typical Exterior Condition

Photo 12: Tank 7 Typical Perimeter Curb

Photo 13: Tank 8 Typical Exterior Condition

Photo 14: Tank 8 Perimeter Curb, Pipe, and Valves

3.2 PIPING NETWORK

3.2.1 Pipes

In general, pipes are in **poor** condition. Minor to moderate corrosion and coating damage are present at a majority of pipes. At select locations, major to severe corrosion is present. Steel thickness measurements were not recorded at fuel pipe locations. See Photo 15.

3.2.2 Valves and pumps

In general, valves, flanges, and pumps are in **poor** condition. Corrosion ranging from minor to severe were observed throughout the site. It is unclear if valves and pumps are operational. See Photo 15 and Photo 16.

3.2.3 Pipe Supports

In general, pipe supports are in **poor** condition. Corrosion ranging from minor to severe and open-corrosion spalling of the supporting concrete foundations is present at multiple locations. See Photo 19.

3.2.4 Containment Walls

In general, containment walls are in **poor** condition. Minor to moderate cracks and spalling are present at multiple locations. See Photo 17. Open-corrosion spalling and corrosion staining are prevalent along the north wall adjacent to Tanks 1, 2, and 3. See Photo 18.

Photo 15: Typical Condition of Piping, Valves, and Pumps

Photo 16: Piping with Major/Severe Corrosion

Photo 17: Containment Wall at Tank 1

Photo 18: Typical Containment Wall at Tanks 1, 2, and 3

Photo 19: Typical Pipe Support

3.3 MISCELLANEOUS STRUCTURES

3.3.1 Catwalks

Catwalks are in **fair** condition. Minor cracks and corrosion staining are present at multiple locations. At isolated locations, corrosion cracks and open-corrosion spalls are present. See Photo 20 and Photo 21.

3.3.2 Fuel Depot

The Fuel Depot is in **poor** condition. Severe cracks and open- and close-corrosion spalling are present at the concrete columns. Minor cracks are present on the roof beams and roof soffit. See Photo 22 and Photo 23.

3.3.3 Fencing

The perimeter fencing is in **poor** condition. At several locations along the site perimeter, fencing is missing and fence posts are permanently bent. See Photo 24.

3.3.4 Abandoned Building Foundation

The building foundation in the northeast corner of the site is abandoned and in disrepair. See Photo 25.

3.3.5 Tank Foundations

The tank foundations in the northeast corner of the site are in **fair** condition. Minor cracking and spalling are present at isolated locations. See Photo 26.

Photo 20: Typical Catwalk

Photo 21: Corrosion Cracks at Catwalk

Photo 22: Fuel Depot

Photo 23: Severely Damaged Column at Fuel Depot

Photo 24: Damaged Perimeter Fence

Photo 25: Abandoned Building Foundation

Photo 26: Abandoned Fuel Tank Foundations

4.0 POST TYPHOON MAWAR CONDITION ASSESSMENT FINDINGS

On 24 May 2023, the island of Guam experienced severe winds, wind-driven rain, and storm surges resulting from Typhoon Mawar. As a result, several of the PAG's maritime and upland assets experienced severe damage. With respect to Area A, WSP performed a cursory assessment of the site from nearby Route 11. During this assessment, Tank No. 3 was observed to be partially collapsed. See Photo 27 for a comparison of Tank No. 3 before and after Typhoon Mawar. Given the pre-typhoon condition of elements, no further evaluation of elements was performed.

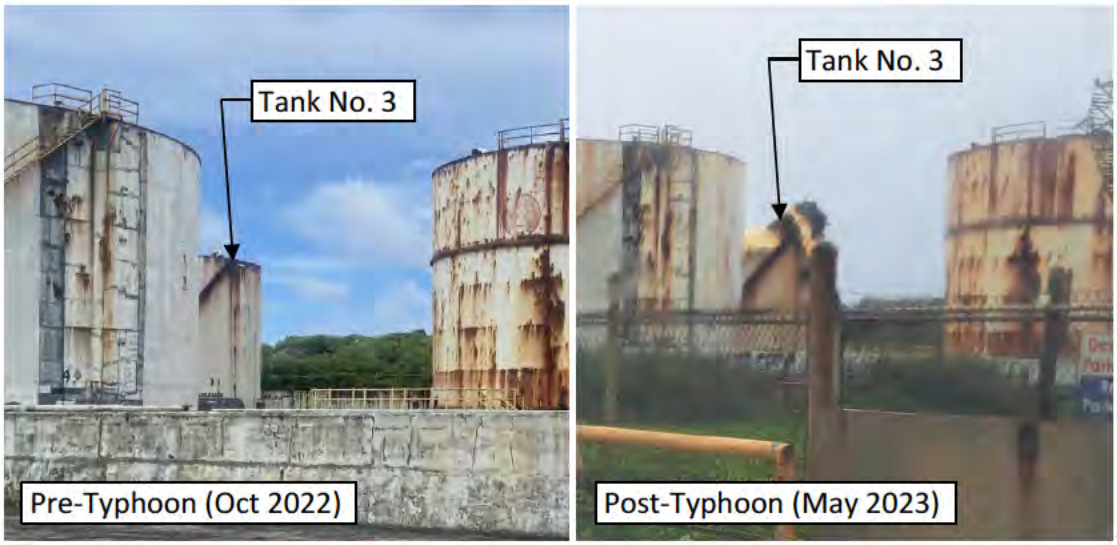

Photo 27: Area A (Before and After Typhoon Mawar)

5.0 OVERALL FACILITY CONDITION ASSESSMENT RATING

Condition assessment ratings for components at Area A are summarized in Table 3. Assessment ratings were assigned based on visual observations and element level damage ratings. The overall rating was determined by considering the following.

- Total number of observed damages
- Severity of observed damages
- Distribution of observed damages
- Sensitivity of affected elements
- Location of damages
- Serviceability

Table 3: Area A Condition Assessment Ratings

Component Identification	Condition Assessment Rating
Tank 1	Critical
Tank 2	Critical
Tank 3	Critical
Tank 4	Poor
Tank 5	NA
Tank 6	Critical
Tank 7	Fair/Poor
Tank 8	Fair/Poor
Piping Network	Poor
Miscellaneous Structures	Poor
Area A Overall Condition Assessment Rating	
Overall Facility Condition Assessment Rating	**Critical**

6.0 DISCUSSION AND RECOMMENDATIONS

As described in Sections **Error! Reference source not found.** and 4.0 of this report, tanks and associated infrastructure at Area A are severely damaged and have sat dormant and without maintenance for the past 20 years. Depending on the near-term and long-term goals of the PAG, it is recommended that Area A be rehabilitated to make it suitable for the transfer and storage of liquid bulk products. Rehabilitation will include demolition and replacement of the fuel tanks, the fire suppression system, piping network, and mechanical systems to current codes and environmental standards. Depending on the volume and design of the replacement tanks, it may also be necessary to provide new foundations. Given the partially collapsed condition of Tank No. 3, it is recommended that priority is given to demolition and removal of the tank from the site.

A concept for rehabilitation of Area A and the associated costs have been developed and are described in a separate report titled, “Military Readiness Report”. This report provides a conceptual level layout for removing existing infrastructure and installing a series of new fuel storage tanks and piping systems that will increased the fuel storage capacity by approximately 60 percent.

APPENDIX A

ASCE MOP 130
ELEMENT LEVEL DAMAGE RATING SYSTEM

Table 2-14. Condition Assessment Ratings

Rating		Description
6	Good	No visible damage or only minor damage noted. Structural elements may show very minor deterioration, but no overstressing observed. No repairs are required.
5	Satisfactory	Limited minor to moderate defects or deterioration observed but no overstressing observed. No repairs are required.
4	Fair	All primary structural elements are sound but minor to moderate defects or deterioration observed. Localized areas of moderate to advanced deterioration may be present but do not significantly reduce the load-bearing capacity of the structure. Repairs are recommended, but the priority of the recommended repairs is low.
3	Poor	Advanced deterioration or overstressing observed on widespread portions of the structure but does not significantly reduce the load-bearing capacity of the structure. Repairs may need to be carried out with moderate urgency.
2	Serious	Advanced deterioration, overstressing, or breakage may have significantly affected the load-bearing capacity of the primary structural components. Local failures are possible and loading restrictions may be necessary. Repairs may need to be carried out on a high-priority basis with urgency.
1	Critical	Very advanced deterioration, overstressing, or breakage has resulted in localized failure(s) of primary structural components. More widespread failures are possible or likely to occur, and load restrictions should be implemented as necessary. Repairs may need to be carried out on a very high-priority basis with strong urgency.

*Taken from ASCE Waterfront Facilities Inspection and Assessment Manual No. 130, 2015.

Table 2-5. Damage Ratings for Steel Elements*

Damage Rating		Existing Damage[a]	Exclusions [Defects Requiring Elevation to the Next Higher Damage Rating(s)]
NI	Not Inspected	Not inspected, inaccessible, or passed by[b]	
ND	No Defects	• Protective coating or wrap intact • Light surface rust • No apparent loss of material	
MN	Minor	• Protective coating or wrap damaged and loss of thickness up to 15% of nominal at any location • Less than 50% of perimeter or circumference affected by corrosion at any elevation or cross section • Loss of thickness up to 15% of nominal at any location	Minor damage not appropriate if • Changes in straight line configuration or local buckling • Corrosion loss exceeding fabrication tolerances (at any location).
MD	Moderate	• Protective coating or wrap damaged and loss of thickness 15 to 30% of nominal at any location • More than 50% of perimeter or circumference affected by corrosion at any elevation or cross section • Loss of thickness 15 to 30% of nominal at any location	Moderate damage not appropriate if • Changes in straight line configuration or local buckling • Loss of thickness exceeding 30% of nominal at any location
MJ	Major	• Protective coating or wrap damaged and loss of nominal thickness 30 to 50% at any location • Partial loss of flange edges or visible reduction of wall thickness on pipe piles • Loss of nominal thickness 30 to 50% at any location	Major damage not appropriate if • Changes in straight line configuration or local buckling • Perforations or loss of wall thickness exceeding 50% of nominal
SV	Severe	• Protective coating or wrap damaged and loss of wall thickness exceeding 50% of nominal at any location • Structural bends or buckling, breakage, and displacement at supports, loose, or lost connections • Loss of wall thickness exceeding 50% of nominal at any location	

*Taken from ASCE Waterfront Facilities Inspection and Assessment Manual No. 130, 2015.
a = Any defect listed is sufficient to identify relevant damage grade.
b = If not inspected due to inaccessibility or passed by, note as such.

Table 2-6. Damage Ratings for Reinforced Concrete Elements*

Damage Rating		Existing Damage[a]	Exclusions [Defects Requiring Elevation to the Next Higher Damage Rating(s)]
NI	Not Inspected	Not inspected, inaccessible, or passed by[b]	
ND	No Defects	Good original hard surface, hard material, sound	
MN	Minor	• Mechanical or impact spalls up to 1 in. deep • Occasional corrosion stains or small pop-out corrosion spalls • General cracks up to 1/16 in. wide	Minor damage not appropriate if • Structural damage • Corrosion cracks • Chemical deterioration[c]
MD	Moderate	• Structural cracks up to 1/16 in. wide • Corrosion cracks up to 1/4 in. wide • Chemical deterioration: random cracks up to 1/16 in. wide; "Soft" concrete and/or rounding of corners up to 1 in. deep • Mechanical abrasion or impact spalls greater than 1 in. deep	Moderate damage not appropriate if • Structural breakage and/or spalls • Exposed reinforcement • Loss of cross section due to chemical deterioration beyond rounding of corner edges
MJ	Major	• Structural cracks 1/16 in. to 1/4 in. wide and partial breakage (through section cracking with structural spalls) • Corrosion cracks wider than 1/4 in. and open or closed corrosion spalls (excluding pop-outs) • Multiple cracks and disintegration of surface layer due to chemical deterioration • Mechanical abrasion or impact spalls exposing the reinforcing	Major damage not appropriate if • Loss of cross section exceeding 30% due to any cause
SV	Severe	• Structural cracks wider than 1/4in. wide or complete breakage • Complete loss of concrete cover due to corrosion of reinforcing steel with more than 30% of diameter loss for any main reinforcing bar • Loss of bearing and displacement at connections • Loss of concrete cover (exposed steel) due to chemical deterioration • Loss of more than 30% of cross section due to any cause	

*Taken from ASCE Waterfront Facilities Inspection and Assessment Manual No. 130, 2015.
a = Any defect listed is sufficient to identify relevant damage grade.
b = If not inspected due to inaccessibility or passed by, note as such.
c = Chemical deterioration: sulfate attack, alkali-silica reaction, alkali-aggregate reaction, alkali-carbonate reaction ettringite distress, or other chemical/concrete deterioration.

APPENDIX B

TABULATED FIELD DATA

INSPECTION RECORD - STEEL TANKS

LOCATION: MARINE INDUSTRIAL COMPLEX, PITI GUAM **INSPECTORS:** MAD, CRE **DATE:** 11/3/2002

STRUCTURE ID: AREA A: TANKS 1, 2, 3, 4, 6, 7, AND 8

WSP JOB NO: 30901541B

TANK ID	ELEMENT ID	MAT'L	DAMAGE TYPE	DAMAGE LOCATION				NI	DAMAGE RATING					COMMENTS
				NORTH	SOUTH	EAST	WEST		ND	MN	MD	MJ	SV	
1	SHELL	STEEL	COR/PIT	X	X	X	X				X			MULTIPLE LOCATIONS
1	SHELL	STEEL	COR/HOLES				X						X	MULTIPLE LOCATIONS
1	TOP SHELL	STEEL	COR	X	X	X	X						X	
1	BTM SHELL	STEEL	COR	X	X	X	X						X	
1	INT RINGS	STEEL	COR	X	X	X	X						X	
1	FLNG/VALV	STEEL	COR		X	X	X						X	
1	GUARDRAIL	STEEL	COR/MISSING	X	X	X	X						X	
1	STAIRS	STEEL	COR		X		X						X	
2	SHELL	STEEL	COR			X					X			MULTIPLE LOCATIONS
2	SHELL	STEEL	COR/HOLES	X	X		X						X	MULTIPLE LOCATIONS
2	TOP SHELL	STEEL	COR	X	X	X	X						X	
2	HOLDOWNS	STEEL	COR	X	X	X	X						X	
2	INT RING	STEEL	COR	X	X	X	X						X	
2	FLNG/VALV	STEEL	COR		X	X	X						X	
2	GUARDRAIL	STEEL	MISSING	X	X	X	X						X	FULL PERIMETER
2	STAIRS	STEEL	COR		X	X							X	
2	CURB	CONC	NA						X					
2	**SHELL**	**STEEL**	**COLLAPSE**										**X**	**PARTIALLY COLLAPSED**
3	SHELL	STEEL	COR/PIT	X		X					X			MULTIPLE LOCATIONS. PARTIALLY COLLAPSED
3	SHELL	STEEL	COR/PIT		X		X						X	MULTIPLE LOCATIONS. PARTIALLY COLLAPSED
3	TOP SHELL	STEEL	COR/HOLES	X	X	X	X						X	MULTIPLE LOCATIONS
3	BTM SHELL	STEEL	COR	X	X	X	X						X	FULL PERIMETER
3	FLNG/VALV	STEEL	COR		X	X	X					X		
3	GUARDRAIL	STEEL	MISSING	X	X	X	X						X	FULL PERIMETER
3	STAIRS	STEEL	COR		X	X							X	

INSPECTION RECORD - STEEL TANKS

LOCATION: MARINE INDUSTRIAL COMPLEX, PITI GUAM **INSPECTORS:** MAD, CRE **DATE:** 11/3/2002

STRUCTURE ID: AREA A: TANKS 1, 2, 3, 4, 6, 7, AND 8

WSP JOB NO: 30901541B

TANK ID	ELEMENT ID	MAT'L	DAMAGE TYPE	DAMAGE LOCATION				NI	DAMAGE RATING					COMMENTS
				NORTH	SOUTH	EAST	WEST		ND	MN	MD	MJ	SV	
4	SHELL	STEEL	COR	X	X	X	X				X			MULTIPLE LOCATIONS
4	TOP SHELL	STEEL	COR	X	X	X	X					X		FULL PERIMETER
4	BTM SHELL	STEEL	COR	X	X	X	X					X		FULL PERIMETER
4	FLNG/VALV	STEEL	COR	X	X	X						X		
4	GUARDRAIL	STEEL	MISSING	X	X	X	X						X	FULL PERIMETER
4	STAIRS	STEEL	COR		X	X							X	
4	CURB	CONC	NA						X					
6	SHELL	STEEL	COR		X	X	X				X			MULTIPLE LOCATIONS
6	SHELL	STEEL	COR/HOLES	X									X	MULTIPLE LOCATIONS
6	TOP SHELL	STEEL	COR	X	X	X	X					X		FULL PERIMETER
6	BTM SHELL	STEEL	COR	X	X	X	X						X	FULL PERIMETER
6	INT RINGS	STEEL	COR	X	X	X	X						X	FULL PERIMETER
6	FLNG/VALV	STEEL	COR							X	X	X		CORROSION RANGING FROM MN TO MJ
6	GUARDRAIL	STEEL	COR/MISSING	X	X	X	X						X	PORTIONS OF GUARDRAIL MISSING
6	STAIRS	STEEL	COR/MISSING	X			X						X	
7	SHELL	STEEL	COR/PIT	X	X		X			X	X			MN TO MD CORROSION, MULTIPLE LOCATIONS
7	TOP SHELL	STEEL	COR	X	X	X	X					X		FULL PERIMETER
7	BTM SHELL	STEEL	COR	X	X	X	X				X			FULL PERIMETER
7	FLNG/VALV	STEEL	COR			X	X				X	X		MD TO MJ CORROSION
7	GUARDRAIL	STEEL	COR/MISSING	X	X	X	X						X	
7	STAIRS	STEEL	COR/MISSING	X									X	
7	CURB	CONC	NA	X	X	X	X		X					

INSPECTION RECORD - STEEL TANKS

LOCATION: MARINE INDUSTRIAL COMPLEX, PITI GUAM **INSPECTORS:** MAD, CRE **DATE:** 11/3/2002

STRUCTURE ID: AREA A: TANKS 1, 2, 3, 4, 6, 7, AND 8

WSP JOB NO: 30901541B

TANK ID	ELEMENT ID	MAT'L	DAMAGE TYPE	DAMAGE LOCATION				NI	DAMAGE RATING					COMMENTS
				NORTH	SOUTH	EAST	WEST		ND	MN	MD	MJ	SV	
8	SHELL	STEEL	COR/PIT	X	X	X				X				
8	SHELL	STEEL	COR/PIT				X				X			
8	TOP TANK	STEEL	COR	X	X	X	X					X		FULL PERIMETER
8	BTM TANK	STEEL	COR	X	X	X	X					X		FULL PERIMETER
8	FLNG/VALV	STEEL	COR	X	X	X						X		
8	GUARDRAIL	STEEL	MISSING	X	X	X	X						X	FULL PERIMETER
8	STAIRS	STEEL	COR	X									X	
8	CURB	CONC	NA	X	X	X	X		X					

APPENDIX C

DAMAGE MAP

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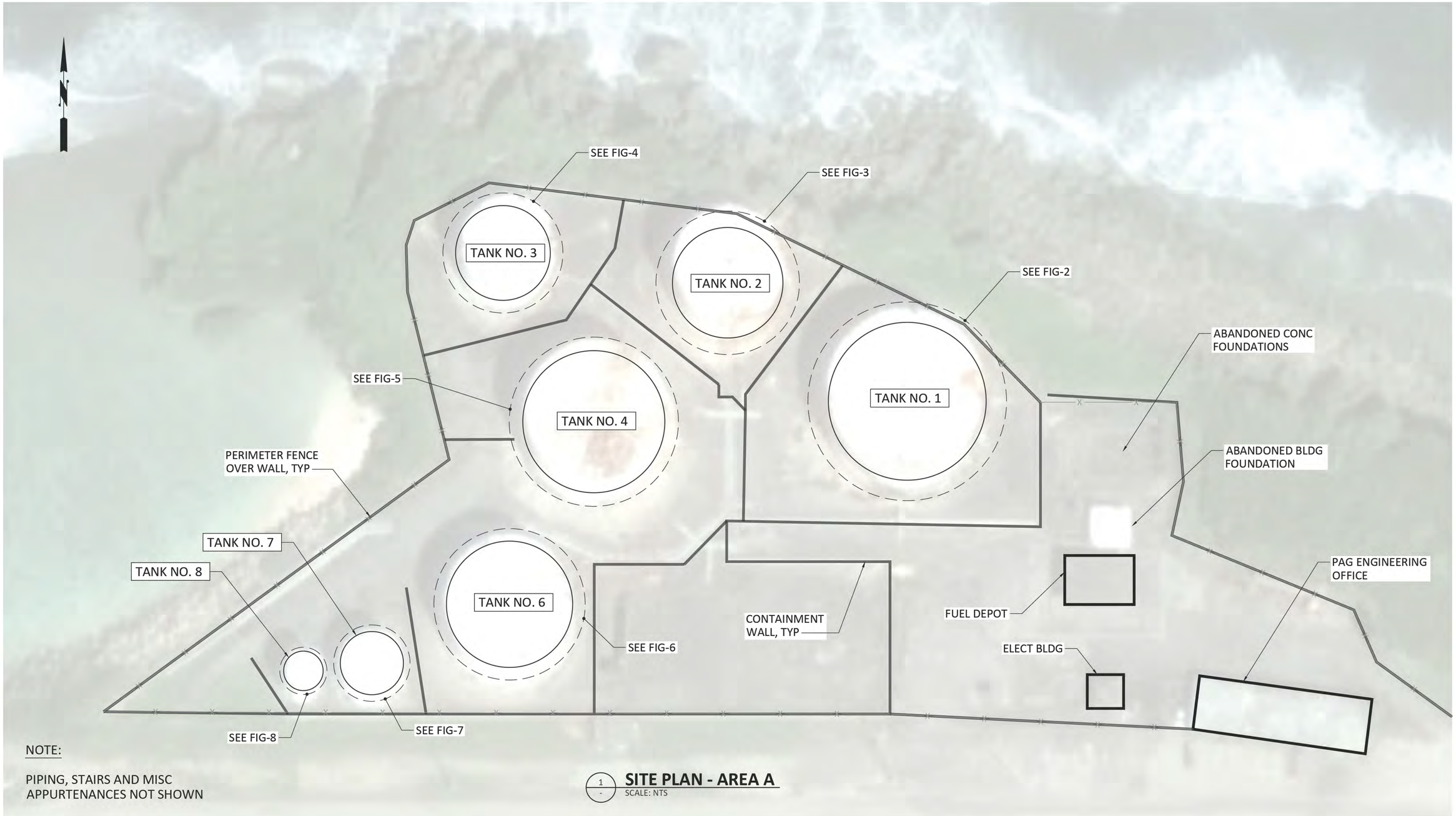

NOTE:

PIPING, STAIRS AND MISC APPURTENANCES NOT SHOWN

1 / - **SITE PLAN - AREA A**
SCALE: NTS

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OVERALL PLAN

DRAWING NO. **FIG-1**
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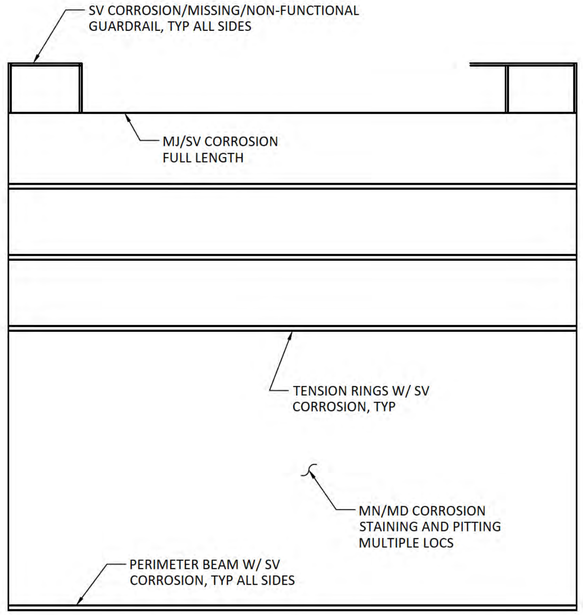
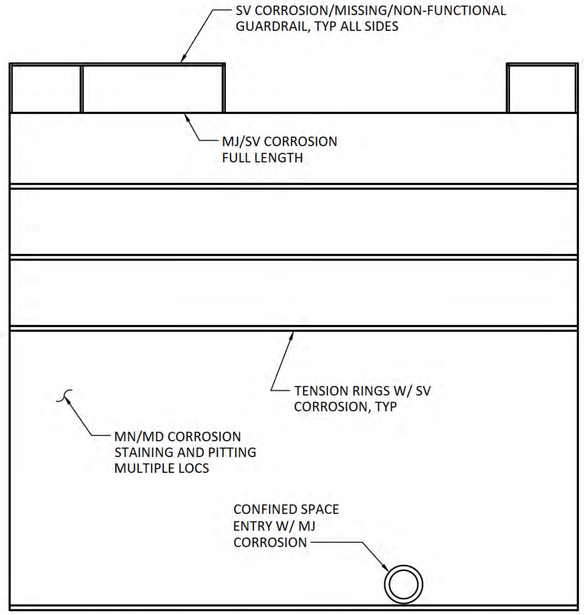


1 - **ELEVATION - TANK 1 NORTH FACE**
SCALE: NTS



2 - **ELEVATION - TANK 1 EAST FACE**
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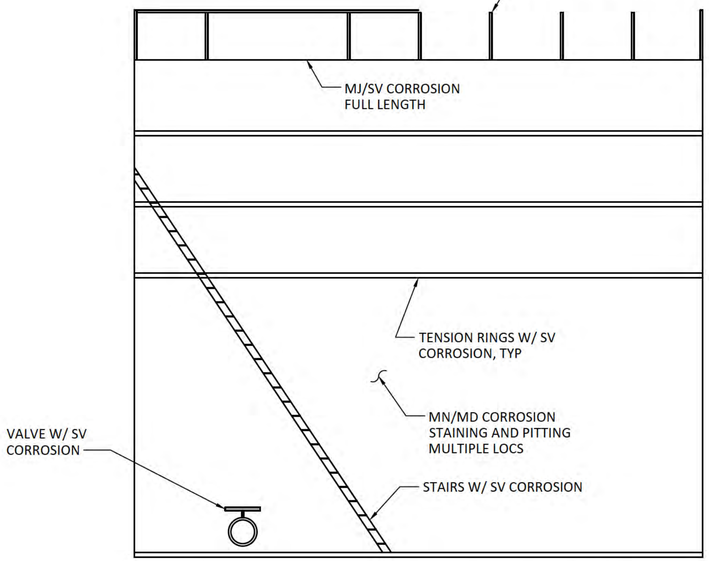
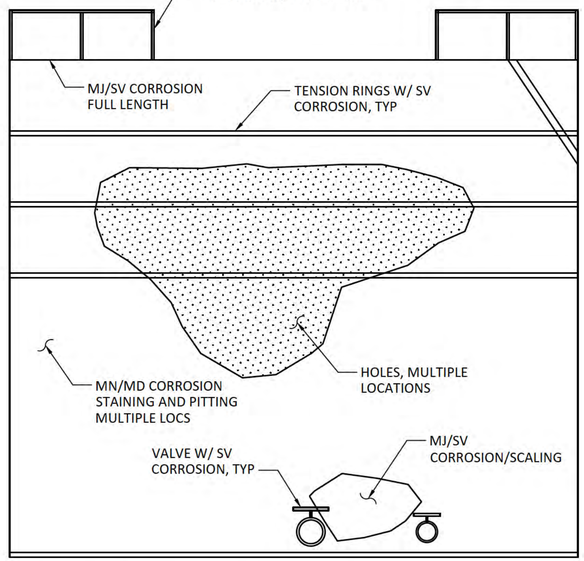


3 - **ELEVATION - TANK 1 SOUTH FACE**
SCALE: NTS



4 - **ELEVATION - TANK 1 WEST FACE**
SCALE: NTS

DAMAGE RATINGS

MN	MINOR DAMAGE
MD	MODERATE DAMAGE
MJ	MAJOR DAMAGE
SV	SEVERE DAMAGE

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TANK ELEVATIONS - SHEET 1

DRAWING NO. **FIG-2**
PROJECT NO. 30901541B.002
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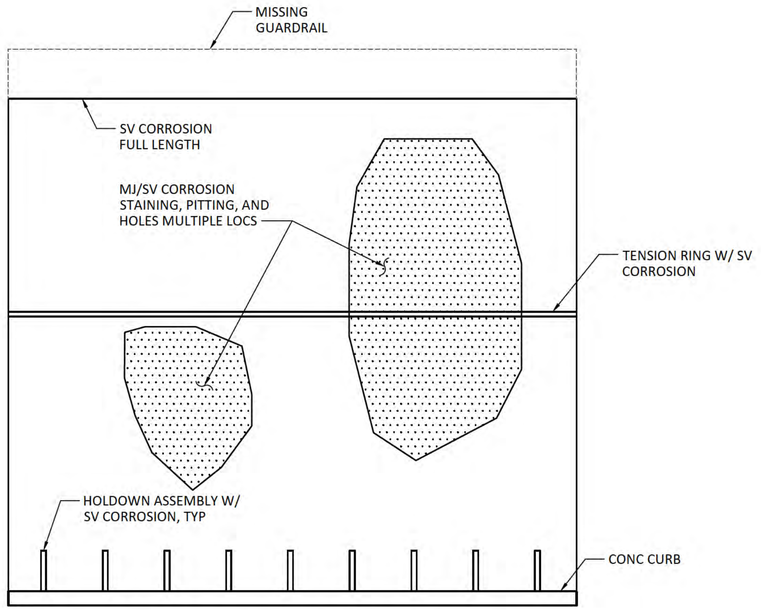
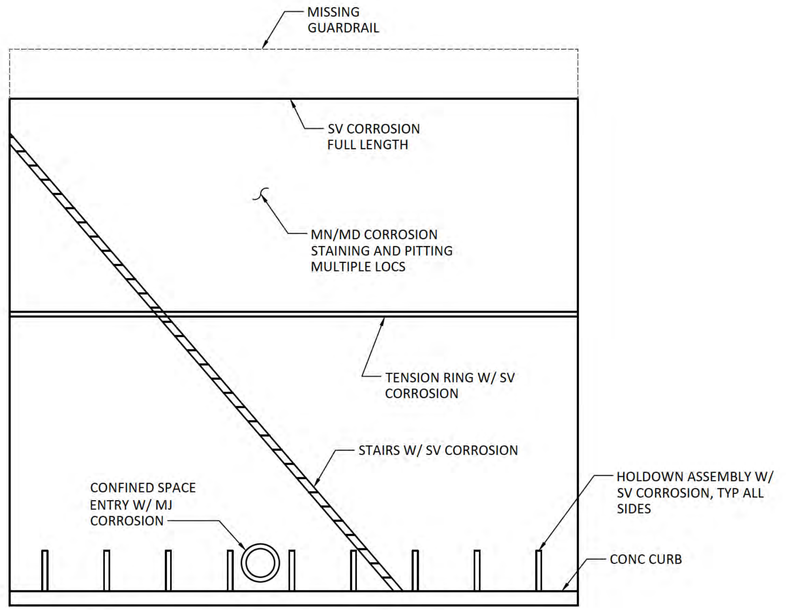


1 - **ELEVATION - TANK 2 NORTH FACE**
SCALE: NTS



2 - **ELEVATION - TANK 2 EAST FACE**
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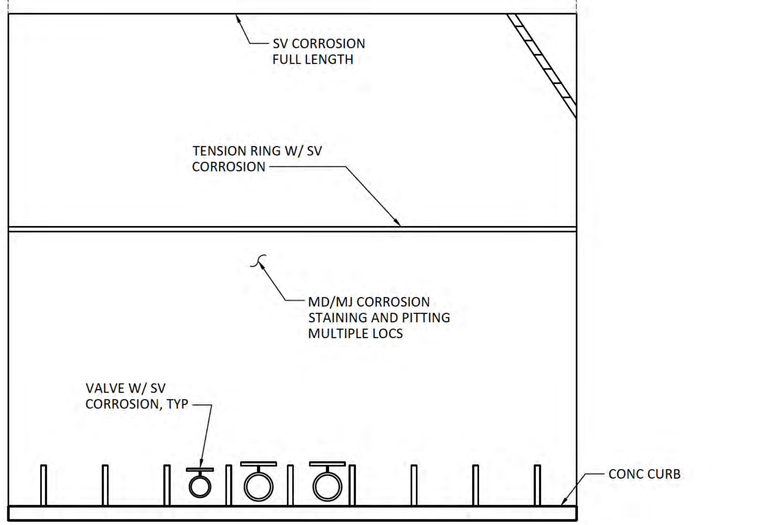
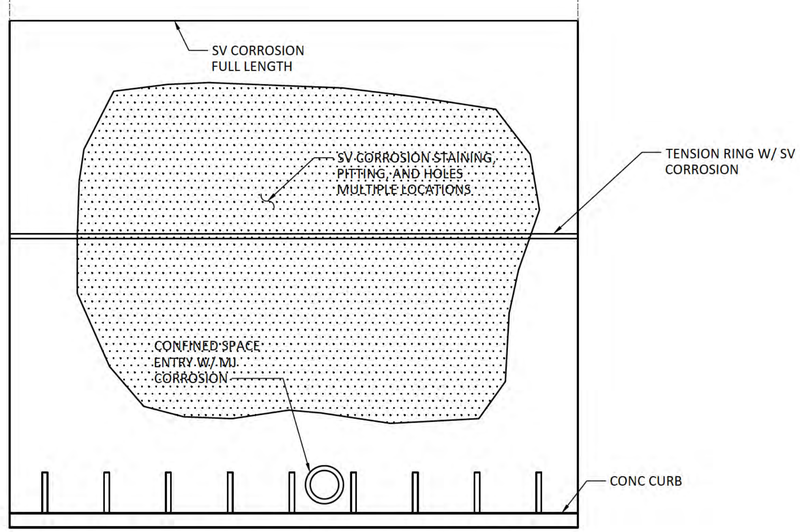


3 - **ELEVATION - TANK 2 SOUTH FACE**
SCALE: NTS



4 - **ELEVATION - TANK 2 WEST FACE**
SCALE: NTS

DAMAGE RATINGS

MN	MINOR DAMAGE
MD	MODERATE DAMAGE
MJ	MAJOR DAMAGE
SV	SEVERE DAMAGE

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TANK ELEVATIONS - SHEET 2

DRAWING NO. **FIG-3**
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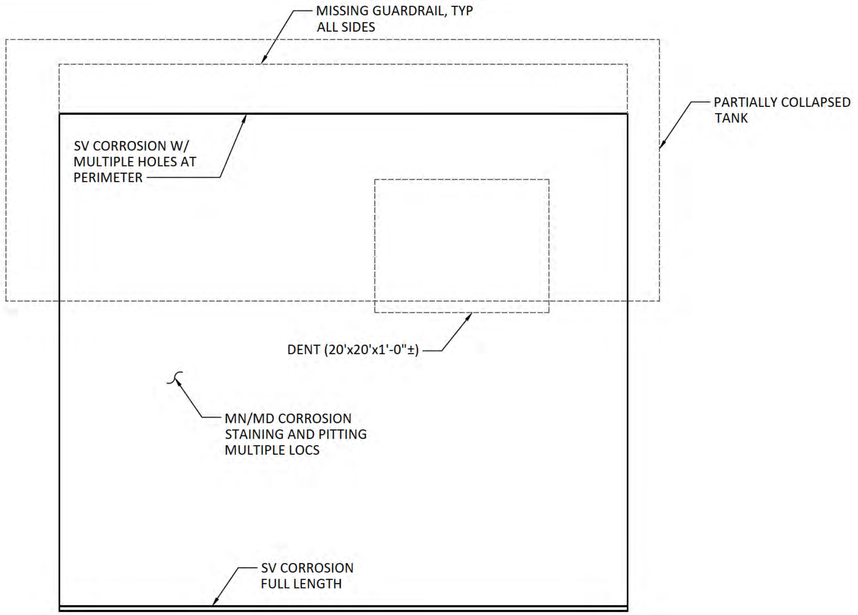
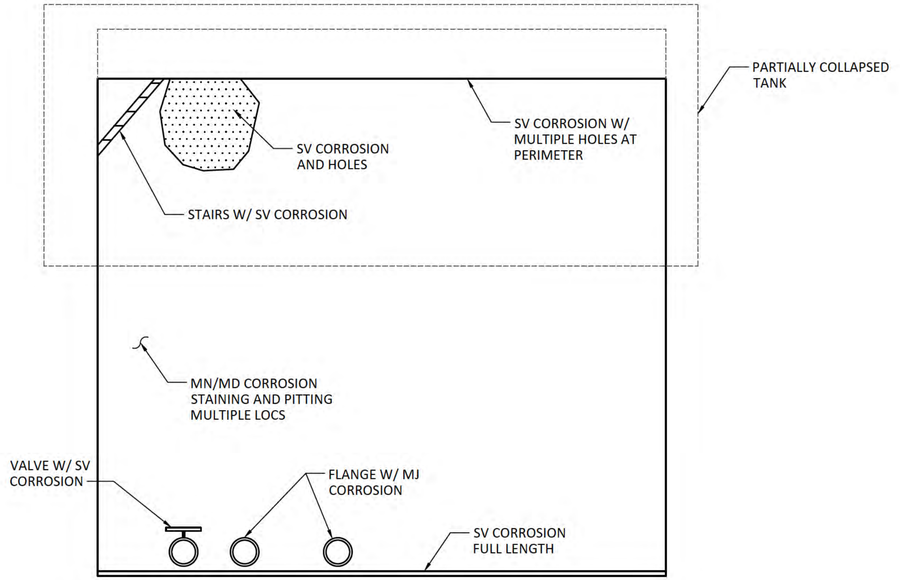
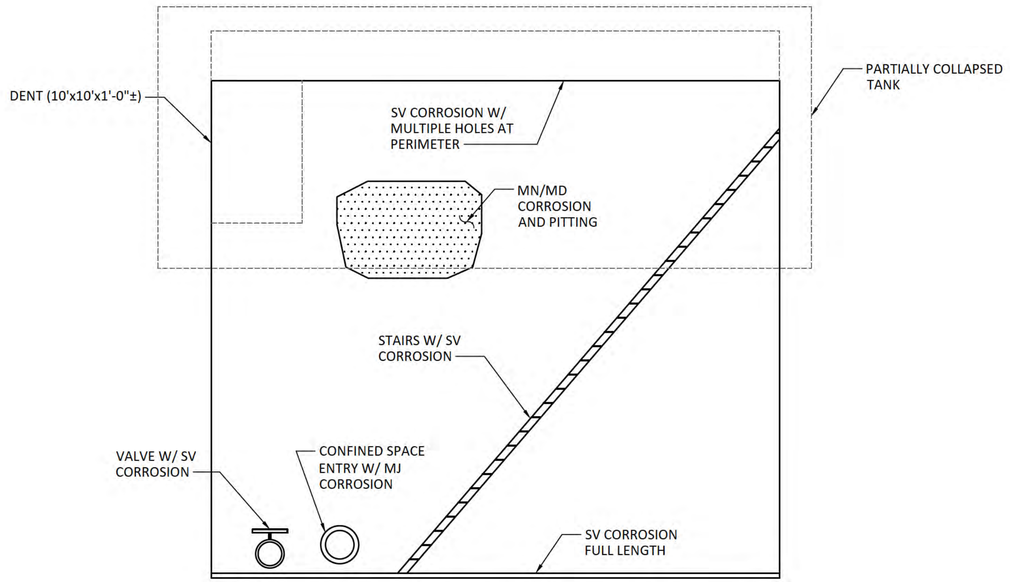


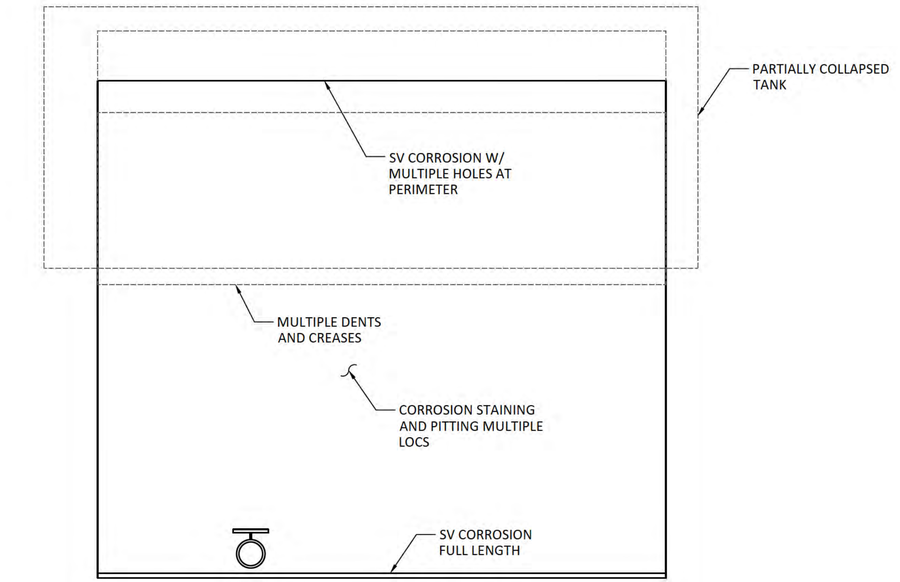
1 - **ELEVATION - TANK 3 NORTH FACE**
SCALE: NTS



2 - **ELEVATION - TANK 3 EAST FACE**
SCALE: NTS



3 - **ELEVATION - TANK 3 SOUTH FACE**
SCALE: NTS



4 - **ELEVATION - TANK 3 WEST FACE**
SCALE: NTS

DAMAGE RATINGS

MN	MINOR DAMAGE
MD	MODERATE DAMAGE
MJ	MAJOR DAMAGE
SV	SEVERE DAMAGE

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TANK ELEVATIONS - SHEET 3

DRAWING NO. **FIG-4**
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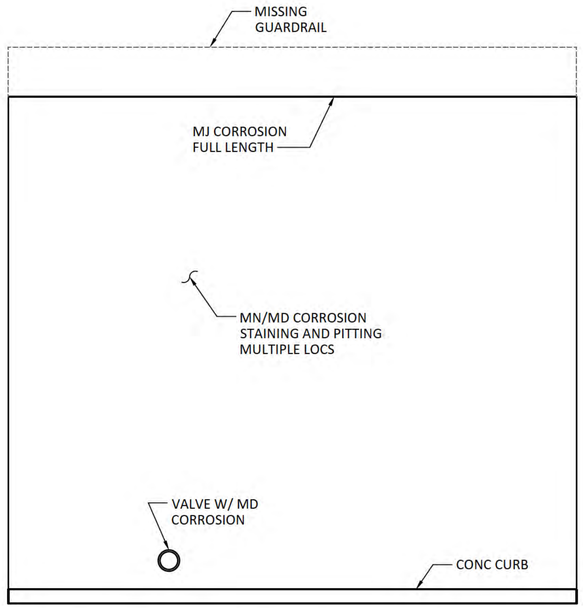

1 - **ELEVATION - TANK 4 NORTH FACE**
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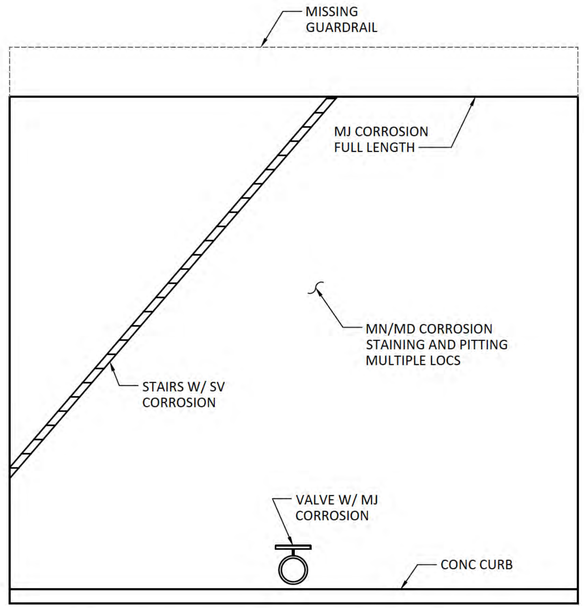

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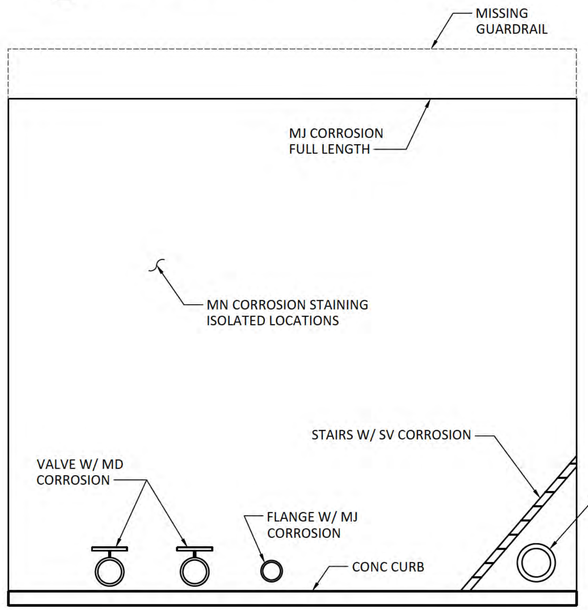

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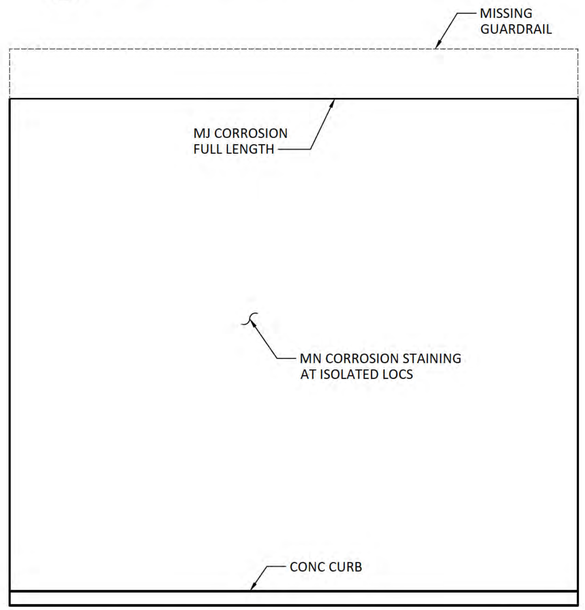

4 - **ELEVATION - TANK 4 WEST FACE**
SCALE: NTS

DAMAGE RATINGS

MN	MINOR DAMAGE
MD	MODERATE DAMAGE
MJ	MAJOR DAMAGE
SV	SEVERE DAMAGE

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FAX: (671) 646-6873

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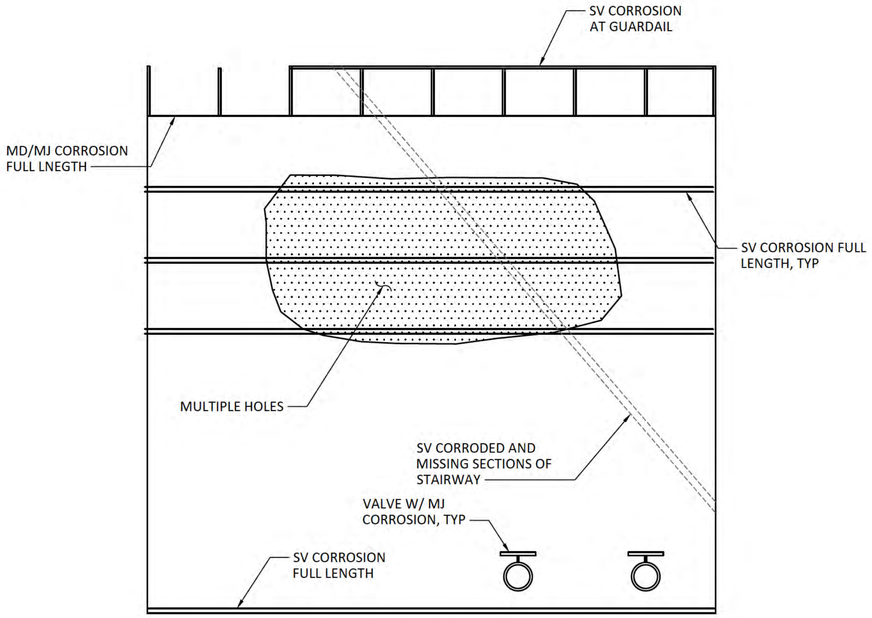

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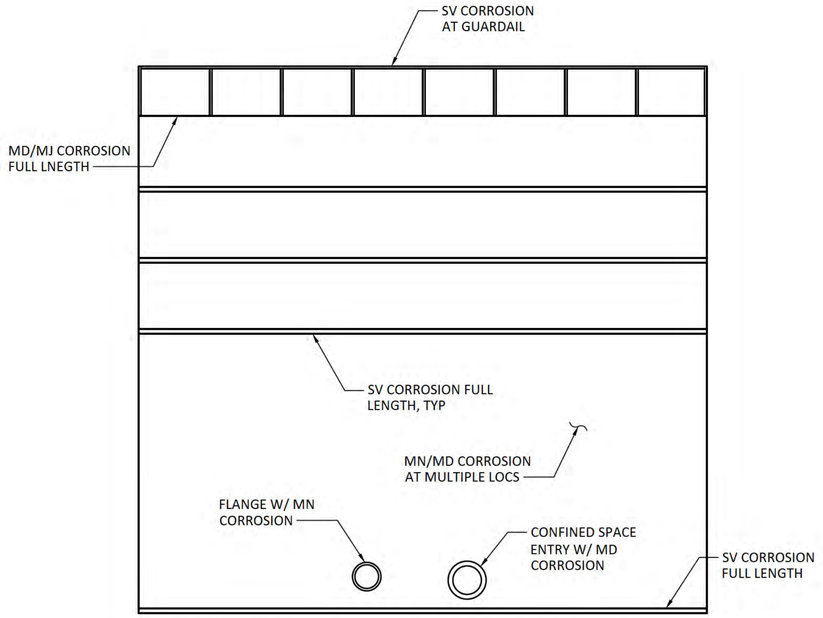

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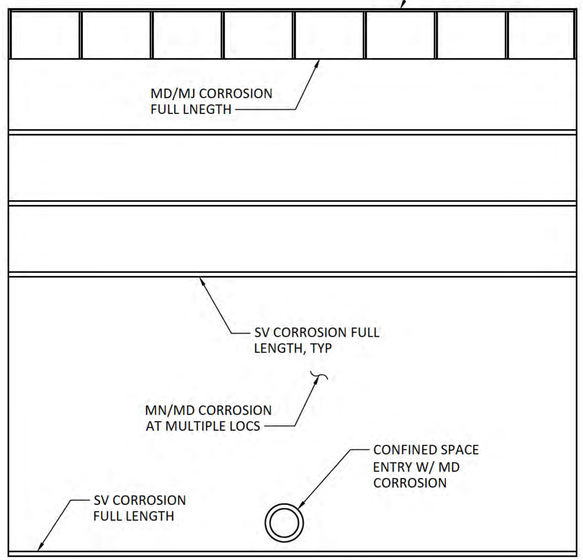

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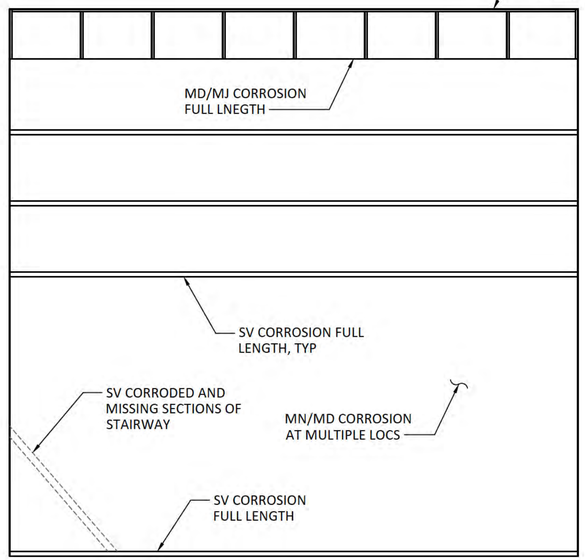

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SCALE: NTS

DAMAGE RATINGS

MN	MINOR DAMAGE
MD	MODERATE DAMAGE
MJ	MAJOR DAMAGE
SV	SEVERE DAMAGE

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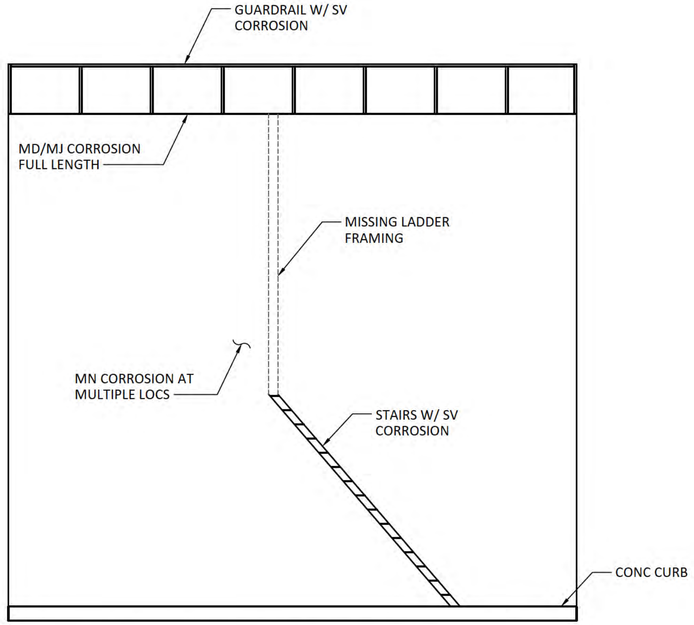

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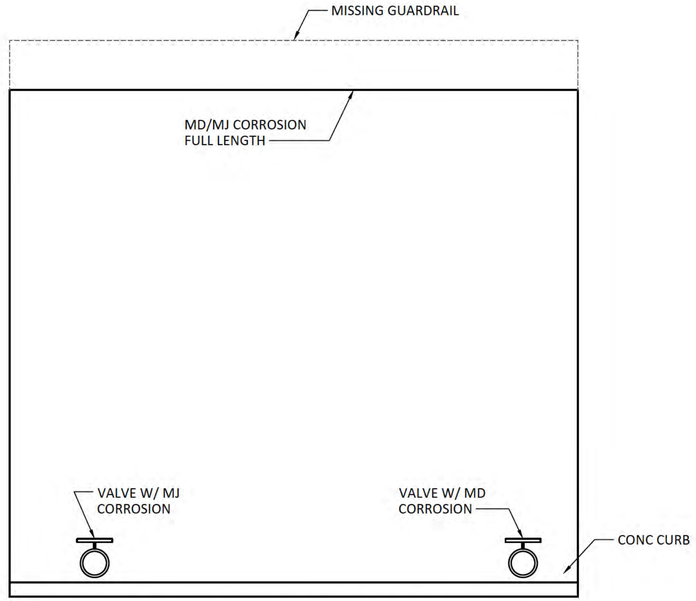

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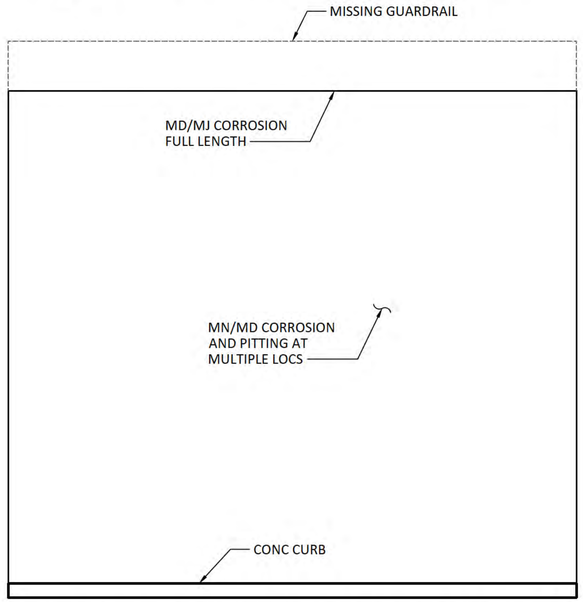

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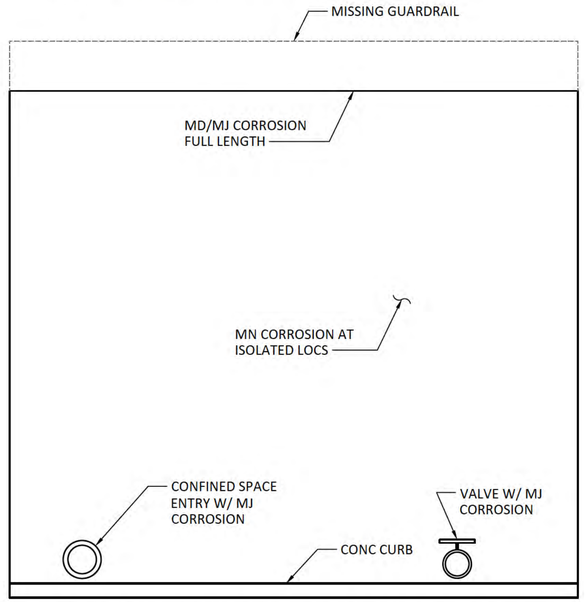

4 - **ELEVATION - TANK 7 WEST FACE**
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DAMAGE RATINGS

MN	MINOR DAMAGE
MD	MODERATE DAMAGE
MJ	MAJOR DAMAGE
SV	SEVERE DAMAGE

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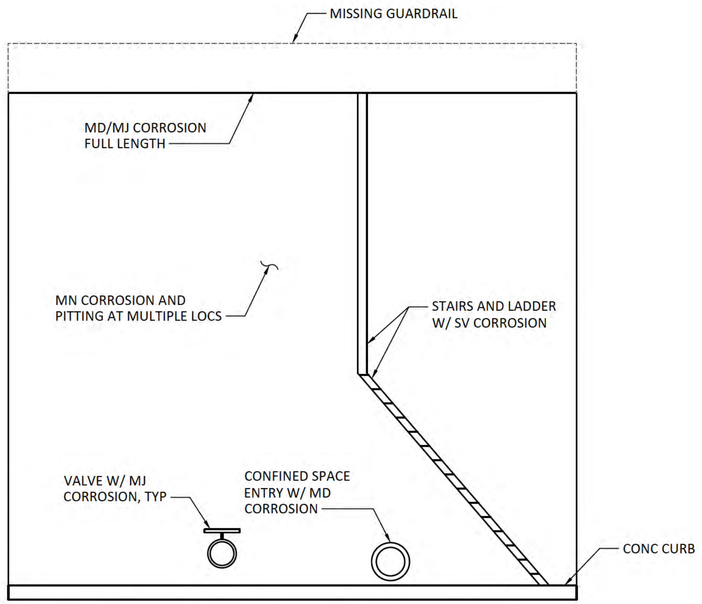

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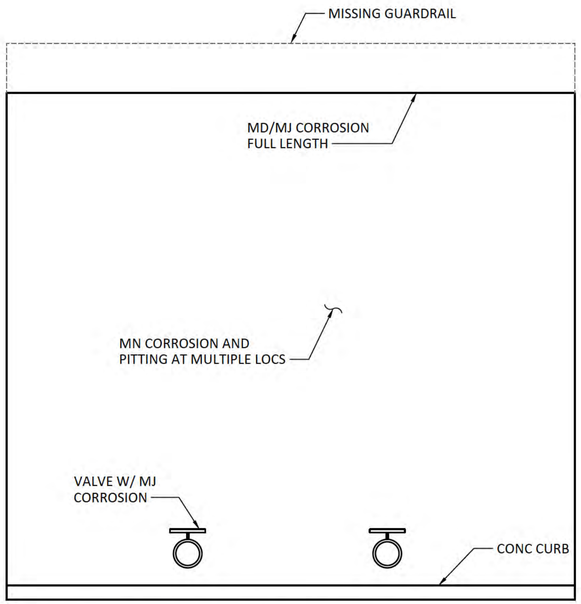

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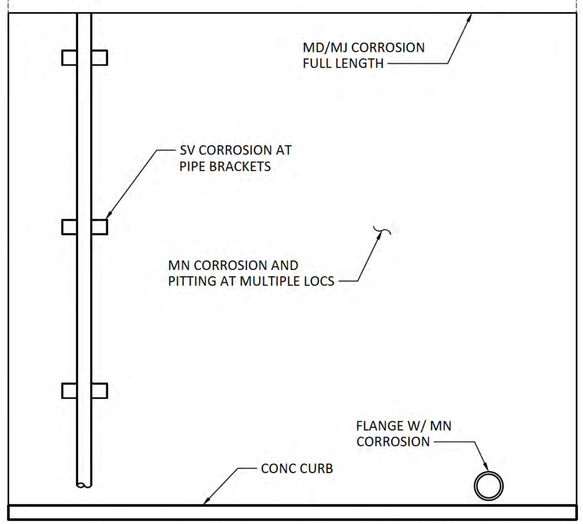

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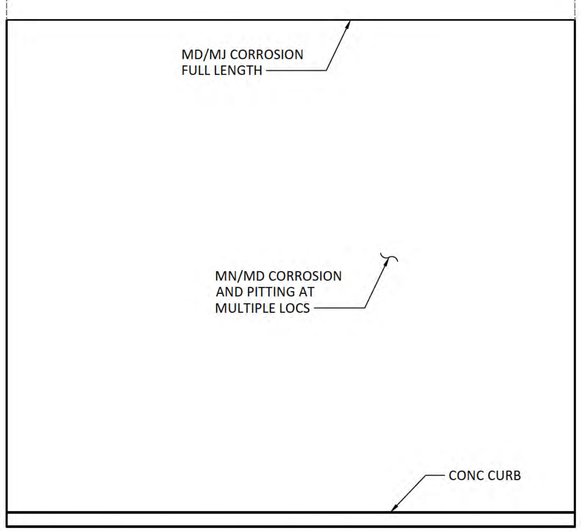

4 - **ELEVATION - TANK 8 WEST FACE**
SCALE: NTS

DAMAGE RATINGS

MN	MINOR DAMAGE
MD	MODERATE DAMAGE
MJ	MAJOR DAMAGE
SV	SEVERE DAMAGE

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FAX: (671) 646-6873

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Appendix G – PAG Sustainability and Resiliency Plan

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Sustainability and Resiliency Plan

Final

January 2025

This study was prepared under a contract with the Port Authority of Guam (PAG), with financial support from the Office of Local Defense Community Cooperation (OLDCC). The content reflects the views of the PAG and does not necessarily reflect the views of OLDCC.

In close coordination with the Port Authority of Guam (PAG), multiple consultants, and local stakeholders, this document was prepared to strengthen and align PAG's vision and goal for a more sustainable and resilient future for the Port, its staff, and the local community. Contributing entities provided valuable insight and expertise, as well as a broad view of recent and ongoing maritime port projects occurring across the United States and the world. The combined information provided by all contributors played a pivotal role in the development of this document. A list of primary contributors is provided below.

Conchita SN Taitano, MSEM, Port Authority of Guam Board of Directors Vice Chairperson

Congruent Environmental Strategies

Jacobs Engineering Group, Inc.

Praxis Strategic Communications

WSP USA, Inc.

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B Port of Guam Resolution No. 2022-15 Explore Membership in the International Association Of Ports And Harbors
C Guam Public Law 28-92 Recycling Enterprise Zone
D Site Screening Framework Development
E NOAA Storm Surge Maps
F Truck Turn Evaluations
G Permit Requirements
H Recommended Additions to the PAG Standard Lease Agreement
I IFB options and partnership opportunities
J Updates to the PAG Board Recycling Policy
K Implementation Roadmap
L Greenhouse Gas Inventory

Acronyms and Abbreviations

AAPA	American Association of Port Authorities
ADF	advanced disposal fee
Board	PAG Board of Directors
DPW	Department of Public Works
EMS	Environmental Management System
EPP	environmentally preferable purchasing
G3	Guam Green Growth
GCA	Guam Code Annotated
GEDA	Guam Economic Development Agency
GHG	greenhouse gas
GovGuam	Government of Guam
GPA	Guam Power Authority
GSA	General Services Agency
GSWA	Guam Solid Waste Authority
Guam EPA	Guam Environmental Protection Agency
IAPH	International Association of Ports and Harbors
IFB	invitation for bid
kgCO2e	kilogram(s) of carbon dioxide equivalent per year
LED	light-emitting diode
MCOG	Mayor's Council of Guam
MT CO2e/yr	metric ton(s) carbon dioxide equivalent per year
NOAA	National Oceanic and Atmospheric Administration
PAG	Port Authority of Guam
PL	Public Law
Plan	Sustainability and Resiliency Plan
Port	Port of Guam
RRF	Recycling Revolving Fund
SDG	Sustainable Development Goal
STOP	Staging and Transshipment Operation of Priority Wastes
S^2TOP	Shredding, Staging and Transshipment Operation of Priority Wastes
TDA	tire-derived aggregate
UN	United Nations
USEPA	United States Environmental Protection Agency
WPSP	World Ports Sustainability Program

1.0 Introduction

"Prioritizing sustainability isn't a trend. It's a vital strategy for securing the health and prosperity of an organization for years to come." (ISO 2024) Strong leadership that prioritizes sustainability with strategic approaches focused on developing more efficient operations, using fewer resources, and having a reduced environmental impact are critical to providing solutions related to creating a more sustainable future.

1.1 Purpose

The purpose of the Port Authority of Guam's (PAG) Sustainability and Resiliency Plan (Plan) is to create a comprehensive framework that enhances the operational resilience and environmental sustainability of the Port of Guam (Port). This Plan recognizes that sustainable port operations are vital to fostering economic growth, social development, and environmental stewardship. By integrating sustainable practices, the Plan aims to improve the Port's capacity to handle international and domestic freight efficiently while supporting local and national development, safeguarding environmental resources, and strengthening national security.

The Plan consists of a Zero Waste Strategy and Zero Emissions Strategy for the PAG. The Zero Waste Strategy includes evaluation of potential properties on or near the Port on which zero waste facilities can be located to increase recycling and reuse capacity in Guam. The Zero Waste Strategy also includes implementation of zero waste policies and practices at the Port that align with other island-wide zero waste and sustainability initiatives. The Zero Emissions Strategy involves a comprehensive assessment of the Port's scope 1 and 2 greenhouse gas (GHG) emissions (discussed in Section 4.0), establishing a foundation for targeted carbon reduction initiatives. It also includes evaluating climate change impacts, with data to be used in future phases for developing effective mitigation strategies. By identifying actionable next steps, the strategy aims to guide the Port towards achieving its Net Zero Emissions goal.

1.2 Intent

> "Prioritizing sustainability isn't a trend: it's a vital strategy for securing the health and prosperity of an organization for years to come." ISO 2024

This Plan intends to position the PAG as a leader in sustainable and resilient port operations by setting a benchmark for excellence in the Pacific Islands maritime industry. By fostering a balanced approach that meets the needs of commerce, military operations, local communities, and environmental stewardship, the Plan aims to contribute significantly to Guam's overall sustainable development and bolster national security. The PAG seeks to enhance the Port's adaptability to future challenges, ensuring it remains a pivotal regional and global trade hub. This Plan aspires to create a replicable model of sustainable port development in the Pacific region that can inspire and guide other regional ports. As conditions in Guam and worldwide evolve, updates to the Plan should incorporate additional strategies, revised benchmarks and measures, and/or optimized sustainability strategies.

2.0 Charting a Course for Sustainable and Resilient Solutions

Climate change is a defining issue of our time. Recognizing this reality, the PAG is investing in sustainability initiatives and adapting its operations and facilities to be more climate resilient.

2.1 Background

The Port represents critical infrastructure for delivering consumer goods onto the island and is an important transportation hub linking the Commonwealth of the Northern Marianas. As the region's largest commercial port, the Port plays a vital role in shipment of goods throughout Micronesia, eastern Asia, and the western United States. As a vital part of Guam's economic infrastructure, the Port handles more than 90 percent of the island's total imports for cars, household appliances, food, and other goods (Guam Business Magazine 2023).

Public Law (PL) 13-87 was passed in 1975, establishing the PAG as a legal public corporation and an autonomous GovGuam agency. The PAG is accountable for meeting the needs of ocean commerce, shipping, recreational, commercial/boating, and navigation on Guam. The PAG is also responsible for the development and/or operation of recreational boating facilities, public harbors, small boat marinas, and other associated marine facilities in Guam (PAG 2023).

As of June 2022, the PAG maintains leases and agreements with more than 40 tenants within the Port's facilities. The PAG receives revenue from more than 140 tenants at its two public marinas, Agat Marina and Gregorio D. Perez Marina.

2.2 Triple Bottom Line of Sustainability

The interconnected pillars of environmental, social, and economic sustainability—often referred to as the triple bottom line of sustainability—must be balanced to ensure that businesses and governments thrive economically while contributing to a sustainable future. As the PAG looks to the future, demonstrating leadership in the Micronesia region, aligning with broader GovGuam and international sustainability initiatives, and engaging in best practices related to the triple bottom line of sustainability is of the utmost importance.

Promoting long-term economic growth with an integrated approach to environmental and social sustainability isn't just good for the planet, it makes good business sense.

The use of energy-efficient measures and renewable energy can reduce operational costs. Implementing digital technologies that optimize ship arrival times can reduce fuel consumption and GHG emissions, leading to lower costs and improved efficiency (IAPH 2024). Increasing the beneficial reuse of recycled materials and recycling can result in a smaller environmental footprint. Creating space for recycling businesses to efficiently operate and increase capacity advances efforts for a circular economy on-island. Generating associated green jobs that pay a living wage will benefit Guam's economy.

Doc. No. 38GL-26-2386.*

Ultimately, engaging in these and other proactive mitigation techniques is a risk management technique that reduces exposure to climate change (IAPH 2024).

2.3 Resilience, Sustainability and Economic Growth

The PAG is committed to taking positive action to limit the impacts of climate change to Guam's infrastructure, economy, and natural resources. The following forward-looking directives with actionable commitments approved by the PAG Board of Directors (Board) demonstrating the Port's commitment to limiting climate change, building operational resilience, embracing sustainability and attaining long-term economic growth were used to guide the development of this Plan:

Resolution No. 2024-02 (**Appendix A**) memorializes the Board's commitment to the principles of sustainability, resilience and environmental stewardship. This resolution adopts the *2024 Look Ahead* plan (PAG 2024) as the guiding framework for strategic direction, operational priorities and key initiatives in 2024 and beyond. Resolution NO. 2024-02 directs the Port's General Manager and all relevant departments and personnel to diligently implement the strategies, initiatives and projects outlined in the *2024 Look Ahead* plan, ensuring that the PAG continues to be a pivotal contributor to Guam's prosperity, security and sustainability.

Resolution No. 2022-15 (**Appendix B**) tasks the Port's General Manager with exploring and pursuing membership in the International Association of Ports and Harbors (IAPH) World Ports Sustainability Program (WPSP) (PAG 2022). Engaging in the WPSP provides the Port with the opportunity to enhance and coordinate future sustainability efforts with ports worldwide and foster international cooperation with partners in the supply chain. This resolution also directs Port management to identify sustainable port projects to pursue that will do the following:

- Strengthen the Port's role in national security
- Develop quality, reliable, sustainable, and resilient infrastructure
- Optimize operations through digital technology implementation, infrastructure upgrades, and an enhanced health, safety and security culture
- Explore renewable energy solutions, regenerative waste management approaches and nature-based solutions
- Implement environmentally friendly policies
- Create added value for the local communities and the Micronesian islands
- Foster collaboration and knowledge sharing
- Align with international best practices

The strategies, initiatives and actions recommended for implementation in this Plan are also designed to provide positive contributions to commitments made by GovGuam included in the following:

- **Government of Guam Executive Order 2019-23**, signed by Governor Leon Guerrero and Lieutenant Governor Tenorio, which enacts the Guam Green Growth (G3) Action Framework. Guided by the United Nation's Sustainable Development Goals (UN SDGs), the G3 Action Framework promulgates goals, objectives, metrics, action items, action leads, and partnerships to achieve a more sustainable future for Guam (https://guamgreengrowth.org/g3-action-framework).
- **Guam's Priority Climate Action Plan,** published in March 2024, which serves to increase the island's resilience to climate change by presenting a baseline GHG inventory of priority sectors and a priority list of GHG reduction measures to be implemented to meet Guam's goals for immediate and necessary climate action (www.epa.gov/system/files/documents/2024-04/guam-pcap.pdf).

3.0 Navigating Toward a Zero Waste Future

The Zero Waste Strategy presented in this Plan aligns with Guam's broader sustainability initiatives, including the following:

- PAG Resolution Numbers 2024-02 and 2022-15, which direct the Port's General Manager to pursue sustainability projects related to developing zero waste strategies.
- Zero Waste Guam/Guam's 2023 Zero Waste Master Plan (Guam EPA 2023), which contains a Zero Waste blueprint designed to move Guam forward toward achieving increased waste diversion goals outlined in the Zero Waste Law passed in late 2022 (https://epa.guam.gov/wp-content/uploads/2023/09/GUAM_ZWMP2023.pdf).
- The Islandwide Beautification Task Force created under Public Law 23-19 in 2011. The Task Force collaborates with the Mayors' Council, government agencies, private individuals and organizations to establish greater community participation in environmental protection and cultural preservation activities.

- Public Law 28-92, passed by the Guam Legislature in 2005, authorizes the establishment of a Recycling Enterprise Zone at the Port to foster the creation of additional recycling resources and capacity (**Appendix C**).

3.1 Vision for The Future

In April 2024, representatives of the Office of the Governor of Guam, the PAG, and key public and private-sector stakeholders met at the Ricardo J. Bordallo Governor's Complex in Adelup for a Vision and Action session. During this session, stakeholder input was sought regarding launching the Port's sustainability and resiliency efforts with respect to zero waste and zero emissions.

Imagining the future and making it happen

Key takeaways from the visioning session specifically related to zero waste include the following:

- Increasing the island's resilience to climate change is a necessity.
- Cleaning up the island, in part through the removal of abandoned junk cars and waste tires, is one of the Leon Guerrero/Tenorio Administration's top priorities.
- Intergovernmental partnerships are important foundational building blocks for creating sustainable solutions to combat climate change.
- Recognizing that no one approach will combat climate change, the Port is committed to improving environmental conditions for future generations, starting with the progressive development of zero emissions and zero waste strategies for/at Port-owned properties.
- The Port seeks to engage in activities that will create opportunities that provide positive outcomes by reducing waste and GHG emissions, adding green jobs to the community and improving the quality of life on Guam.
- Creating additional reuse and recycling capacity and resources in Guam is critical.
- Time is of the essence in selecting a location for the establishment of a Recycling Enterprise Zone on/near Port property.

3.2 Targeted Wastes

Based on the outcomes of the visioning session and discussions with PAG management, the following target wastes are focused on in this Zero Waste Strategy:

- Wastes generated by Port operations, such as typical office wastes, maintenance wastes, and construction & demolition debris
- Priority wastes, including junk vehicles and waste tires
- White goods that are difficult to dispose of, including large electrical appliances used in residences such as refrigerators and washing machines

Existing conditions and relevant background information regarding the targeted wastes follow.

3.2.1 Wastes Generated by Port Operations

Port operations that generate solid waste include administrative services, industrial and waterfront cargo-handling operations, and engineering and construction. Tenant operations that generate waste include international shipping companies, marina operators, cruise commercial, transportation, and recreational maritime companies.

- Port-owned and tenant solid waste management collection and disposal practices:

  The PAG and tenants manage their solid waste via private hauler contracts. Cardboard is collected in dedicated bins and hauled to the Mr. Rubbishman facility in Harmon, where it is baled for shipment to fiber markets in Asia. Non-hazardous waste is hauled to the commercial transfer station in Harmon where it is aggregated with other waste for transport in full-sized transport trucks to the Layon Landfill. Used oil and batteries are collected and processed for shipment off-island by recyclers.

- Types of waste generated by the PAG and tenant operations:
  - Cardboard
  - Office paper
  - Food waste
  - Plastics
  - Scrap metal
  - Used oil
  - Batteries

Solid waste quantities generated by Port operations from 2019 through 2023 are estimated to be approximately 300 short tons annually.

3.2.2 Abandoned Junk Vehicles

The removal of abandoned junk vehicles is a significant problem in Guam. Although over 5,400 abandoned junk vehicles were taken off Guam's streets from 2018 to 2022, informal estimates indicate that as many as 3,000 remain. Some of these abandoned junk vehicles have been stored in centralized collection areas, while others proliferate in illegal-disposal sites littered throughout the island.

Without a clear mandate on ultimate responsibility for the junk vehicles and enforcement mechanisms in place, the Mayor's Council of Guam (MCOG), in conjunction with Lieutenant Governor Tenorio's abandoned vehicle working group and several GovGuam agencies, has stepped in and attempted to clean up abandoned junk vehicles. A movement to initiate an advanced disposal fee (ADF) on imported cars did not pass the legislature due to push back from vehicle manufacturers and dealerships. Instead, the Recycling Revolving Fund (RRF) was developed to manage the recycling of priority wastes like junk cars and tires, but also for lower priority wastes. The RRF is funded by annual fees on vehicle registrations, generating several million dollars annually; however, use of this fund has not been successful at managing the removal of junk vehicles, because the funding still falls short of the need and is used for other competing needs related to recycling.

Currently, RRF payments go to village mayors for uses that include removal of junk vehicles. Some village mayors sign contracts with haulers to move junk vehicles from villages to centralized junk vehicle lots. There are currently insufficient contracts in place to process the junk vehicles that have been brought to the centralized location and get them shipped off-island to recyclers.

3.2.3 Waste Tires

The following text is largely excerpted from the Guam Environmental Protection Agency (EPA) 2022 Waste Tire in Construction Applications Report and 2022 Integrated Solid Waste Management Plan.

Waste tires present unique and challenging recycling and disposal problems because they are heavy, bulky, and take up valuable landfill space. They also create environmental concerns when buried or disposed of aboveground. With a hollow, rounded shape, buried whole tires can trap methane gas generated during natural waste decomposition processes in a landfill and can bubble up, ripping through landfill liners in the process. Aboveground stockpiles of waste tires, either in organized piles or random remote locations, can be a breeding ground for pests and present a fire risk. Disease-carrying pests like rodents may live in tire piles, and mosquitoes can breed in the stagnant water that collects inside tires. Several rodents and mosquitoes carry vector-borne diseases, including hantavirus, plague, encephalitis, and dengue fever.

In Guam, waste tires have been banned from land disposal since approximately 2000. When purchasing new tires, retailers are required to dispose of old tires for a fee. Approximately 100,000 waste tires a year are legally disposed of in this manner. Consumers who seek to avoid this disposal cost and those who do not know how to dispose of waste tires often end up illegally dumping tires in ravines, the jungle, and underused industrial areas, along the side of the road, and on vacant lots. Tires in stockpiles are prone to heat retention and ignition, creating tire fires that are difficult to extinguish and can burn for months. These fires generate unhealthy smoke and contamination that leaches into the surrounding environment.

Although exact numbers are not available, as of September 2024, Guam EPA estimated that over 100,000 waste tires have piled up due to illegal dumping and cleanup activities undertaken in the aftermath of Typhoon Mawar. The cleanup of these waste tire stockpiles and other illegally dumped tires is ongoing.

The largest of the stockpiles are located at the Dededo transfer station, the old Tiyan carnival grounds, and Ypao Point (Guam EPA 2024).

3.2.4 White Goods

The illegal dumping of white goods—that is, large home and commercial appliances, including items such as washing machines, refrigerators and stoves—remains a persistent problem for communities in Guam. As with waste tires, consumers who have not paid for regular waste disposal services through the Guam Solid Waste Authority (GSWA) and seek to avoid disposal costs, as well as those who do not know how to dispose of white goods, often end up illegally dumping them in ravines, the jungle, and underused industrial areas, along the side of the road, or on vacant lots. Alongside the efforts to clean up abandoned junk vehicles, the MCOG allocates funds from the RRF to remove white goods from the environment. In Fiscal Year 2020, approximately 2,000 abandoned white goods were cleared from various communities across Guam. However, this cleanup effort did not deter future illegal dumping, as another 1,150 abandoned white goods were found and removed in Fiscal Year 2021 (The Guam Daily Post 2021).

3.3 Zero Waste Strategy

Translating the PAG's values and directives into action, the Zero Waste Strategy presented in this Plan includes six strategic initiatives recommended for implementation over a 5-year period. The initiatives aim to foster a more sustainable and resilient Guam, targeting priority wastes to protect the island's resources, implementing zero waste policies and practices at the Port, and benefiting the island by increasing recycling capacity and green job opportunities. Descriptions of the six strategic initiatives (shown on Figure 1) follow in Sections 3.3.1 through 3.3.6.

Figure 1. Zero Waste Roadmap

3.3.1 Strategic Initiative 1: Recycling Enterprise Zone

The first strategic initiative involves establishing a Recycling Enterprise Zone. A Recycling Enterprise Zone on Port property offers strategic advantages to Guam in moving toward a more sustainable future driven by a zero waste philosophy and circular economy promoting recycling and beneficial reuse of materials to minimize waste and support sustainable development. The initial goal of this initiative is to select locations either inside the Port's boundaries or near the Port on which to develop operations that facilitate recycling, with a follow-on goal of getting the Recycling Enterprise Zone ready for operations.

Guam Public Law 28-92 (2005)

- Enacted to support recycling to protect the island's natural resources and to address more effective management of solid waste generated on the island.
- Authorizes the establishment of a Recycling Enterprise Zone at the Jose D. Leon Guerrero Commercial Port to foster the creation of additional recycling resources for the transshipment of recyclable materials, including junk automobiles, waste tires, and enameled white goods.

3.3.1.1 How the Process Works

A Recycling Enterprise Zone is a designated area where businesses involved in recycling and manufacturing recycled products for beneficial reuse receive various incentives and support to promote economic growth and environmental sustainability. Recycling Enterprise Zones aim to create a thriving recycling industry that contributes to economic development and environmental protection.

Establishing a Recycling Enterprise Zone can build local resilience, promote environmental sustainability, and drive economic growth. Opportunities associated with the establishment of a Recycling Enterprise Zone include the following (Hayes 2020; Eastman and Kaeding 2019):

- Economic Growth: Recycling Enterprise Zones can stimulate local economies by attracting new businesses and creating jobs in the recycling and materials reuse sectors.
- Environmental Benefits: These zones promote recycling and the use of recycled materials, reducing waste and conserving natural resources.
- Financial Incentives: Businesses can access tax breaks, grants, and low-interest loans, lowering operational costs and encouraging investment.
- Technical and Business Support: Companies can access technical assistance and business development services, helping them navigate regulations and improve efficiency.
- Infrastructure Improvements: Enhanced infrastructure in these zones supports recycling activities, making operations more cost-effective.

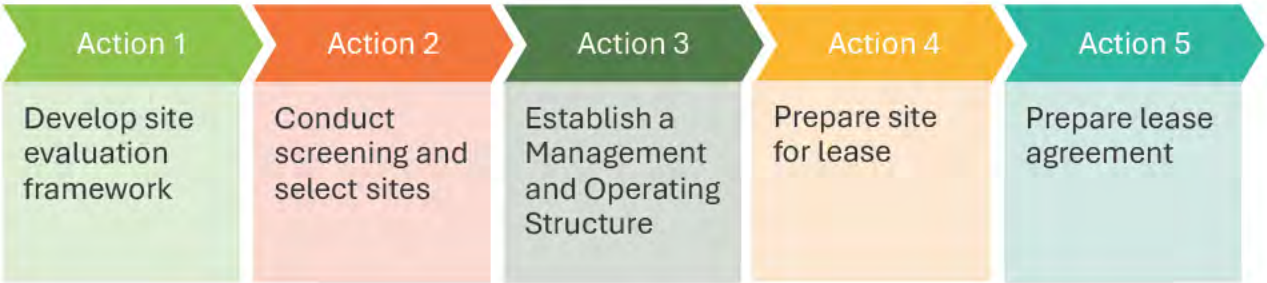
Guam PL 28-92 authorized the establishment of a Recycling Enterprise Zone at the Port in 2005. A recommended approach to turn that visionary legislation into reality is graphically presented on Figure 2, followed by a summary of action necessary to accomplish this strategic initiative.

Figure 2. Recycling Enterprise Zone Process

3.3.1.2 Implementation Process

Figure 3 presents the actions required for the implementation of Recycling Enterprise Zones. The following sections provide additional details on the actions necessary to implement this strategic initiative. Notably, considerable progress has been made since April 2024 in completing the first two actions identified for this strategic initiative.

Figure 3. Recycling Enterprise Zone Implementation Process



Action 1: Develop Recycling Enterprise Zone Site Evaluation Framework

Stakeholders	Responsibilities
PAG	Develop site-selection criteria applicable to Port and Recycling Enterprise Zone operations (completed)

Action 1 for the site-selection criteria initiative has been completed by the PAG developing a site evaluation framework using relevant environmental regulations, UN SDGs and G3 goals, and indicators from rating systems used worldwide to implement more sustainable and resilient maritime, waterfront, and infrastructure projects, including Green Marine, Waterfront Edge Design Guidelines (WEDG), and Envision (see **Appendix D** for further details) and Recycling Enterprise Zone operational objectives. The site evaluation framework included two screening phases, an initial site screening and secondary site screening (Figure 4), with differing evaluation criteria.

Initial Site Screening – Sites being considered for use in the Recycling Enterprise Zone were evaluated against the initial site screening criteria shown on Figure 5, using a pass/fail system for scoring. Sites that failed three or more of the criteria were removed from further consideration. Remaining sites under consideration were then evaluated in the secondary site screening.

Figure 4. Site Screening Process

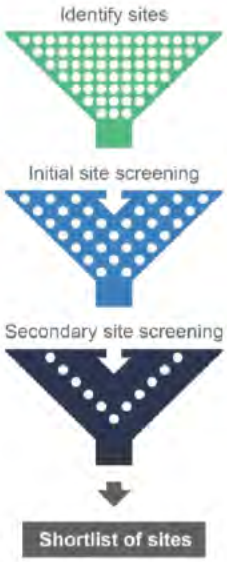


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Figure 5. Initial Site Screening Criteria

UN Sustainability Development Goals

- Minimize transport (SDG 13 Climate Action)
- Avoid impacts to valuable natural capital (SDG 13 Climate Action and SDG 14 Life Below Water)

G3 Action Framework

- Avoid impacts to nearby communities with noise (Healthy and Prosperous Communities),
- Avoid impacts to natural resources (Thriving Natural Resources)

Sustainability Rating Systems

- Protect existing biodiversity
- Minimize impacts (such as noise) to nearby communities

Source: UN 2023

Note: REZ = Recycling Enterprise Zone

Secondary Site Screening – Secondary site screening criteria are shown in Table 2. Sites advancing from the initial site screening phase were evaluated using the following criteria focused on technical and economic feasibility:

- Limited to no impact to wetlands or surface water bodies from operations
- Significant grading due to steep topography is not needed
- Availability of major utilities (electrical, water, telecommunications) onsite or nearby
- Minimal flooding potential during typhoons (see **Appendix E** for National Oceanic and Atmospheric Administration [NOAA] storm surge maps)

- Sufficient area to allow for heavy truck access and turning (see **Appendix F** for truck turn evaluations)
- Feasibility of providing site security and accessibility (such as fencing or paved access)
- No other considerations/operational restrictions that would preclude use
- Alignment with 2023 Master Plan

A pass/fail system was also used to score sites in the secondary site screening phase. Sites that failed fewer than two of the listed criteria were considered suitable for use as a Recycling Enterprise Zone location.

Action 2. Identify Initial List of Potential Sites, Conduct Site Screening, and Select Recycling Enterprise Zone Site(s)

Stakeholders	Responsibilities
PAG	Conduct site screening using evaluation framework described in Action 1 (completed)

In April 2024, consultants under contract to the PAG conducted interviews with PAG staff and solid waste stakeholders on Guam to develop an initial list of potential sites for use as a Recycling Enterprise Zone. Sites identified during the interviews and subsequent research were recommended for evaluation based on space availability, historical use and potential compatibility with Recycling Enterprise Zone program operations. Figure 6 presents a location map of the following 11 sites identified as potential candidates:

1) Heavily Vegetated Site along Route 1
2) Heavily Vegetated Site along Route 18
3) Old Hawaiian Rock Quarry Site
4) Future Container Yard
5) Chassis Lot
6) PAG Parking Lot
7) Sea Plane Ramp
8) Metals Recycling Yard
9) Polaris/Matson Leased Lot
10) Polaris/Smithbridge Leased Lot
11) Polaris/Vacant Private Lot

Evaluation of the 11 potentials sites was conducted using the framework described in Actions 1 and 2. Out of the 11 potential Recycling Enterprise Zone sites, 6 sites passed the initial site screening (**Table 1**).

Figure 6. Potential Recycling Enterprise Zone Sites

Table 1. Initial Site Screening Evaluation Results

Heavily Vegetated PAG Property along Route 1	1. Heavily Vegetated Site along Route 1	2. Heavily Vegetated Site along Route 18	3. Old Hawaiian Rock Quarry Site	4. Future Container Yard	5. Chassis Lot	6. PAG Parking Lot	7. Sea Plane Ramp	8. Metals Recycling Yard	9. Polaris/ Matson Leased Lot	10. Polaris/Smithbridge Leased Lot	11. Polaris/ Vacant Private Lot
Location											
Within Port boundary or owned by the Port	✓	✓	✓	✓	✓	✓	✓	✓	x	x	x
Less than or equal to 2 miles from Port gate/main entrance	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Sensitive/Protected Habitats, Ecosystems, Cultural/Historical Significance											
Site is not a greenfield or of high ecological value	x	x	✓	✓	✓	✓	✓	✓	✓	✓	✓
Site is not of high historical/cultural significance [a]	x	x	✓	✓	✓	✓	✓	✓	✓	✓	✓
Community Considerations											
Use of site will not create concerns about noise, traffic, light pollution, or similar	x	x	✓	✓	✓	✓	✓	✓	✓	✓	✓
Site Characteristics											
>1 acre in size	✓	✓	✓	✓	✓	x	✓	✓	✓	✓	✓
>10 acres in size	✓	✓	✓	x	x	x	x	x	✓	✓	x
Reuse of previously developed/disturbed site	x	x	✓	✓	✓	✓	✓	✓	✓	✓	✓
Zoned for Commercial or Industrial Use	x	x	✓	✓	✓	✓	✓	✓	✓	✓	✓
Property is available for use in near term	✓	✓	✓	✓	✓	✓	✓	✓	x	x	✓

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Heavily Vegetated PAG Property along Route 1	1. Heavily Vegetated Site along Route 1	2. Heavily Vegetated Site along Route 18	3. Old Hawaiian Rock Quarry Site	4. Future Container Yard	5. Chassis Lot	6. PAG Parking Lot	7. Sea Plane Ramp	8. Metals Recycling Yard	9. Polaris/ Matson Leased Lot	10. Polaris/Smithbridge Leased Lot	11. Polaris/ Vacant Private Lot
Technical Feasibility											
Requires minimal financial investment for site development/use compared to other sites under consideration or will require lease/sublease for use	x	x	✓	✓	✓	✓	✓	✓	x [b]	x [b]	x [b]
NUMBER OF CRITERIA PASSED	5	5	11	10	10	9	10	10	8	8	8
NUMBER OF CRITERIA FAILED	6	6	0	1	1	2	1	1	3	3	3
CONTINUE TO NEXT SCREENING ROUND? (NUMBER OF CRITERIA FAILED <3)	***NO***	***NO***	***YES***	***YES***	***YES***	***YES***	***YES***	***YES***	***NO***	***NO***	***NO***
6 OUT OF 11 SITES CONTINUE TO NEXT SCREENING ROUND											

[a] Historical/cultural significance was confirmed using geographic information system (GIS).

[b] Polaris Sites are currently leased by Guam Economic Development Agency (GEDA) at an average monthly rate of $1000/acre. If property becomes available for ownership or use by the Port at low cost, recommend these sites be reconsidered.

Four of the six evaluated sites passed the secondary site screening, as follows:

Recommended Recycling Enterprise Zone Sites

- Old Hawaiian Rock Site
- Future Container Yard
- PAG Parking Lot
- Metals Recycling Yard

Table 2 provides details on the secondary site screening. Four passing sites are considered suitable for use as a Recycling Enterprise Zone location. It is anticipated that the Port will initially operate one site and expand operations to additional (remaining) locations at a later date as capacity and operations in/at the Recycling Enterprise Zone expand.

Table 2. Secondary Site Screening Evaluation Results

Secondary Screening Criteria	Old Hawaiian Rock Quarry Site	Future Container Yard	Chassis Lot	PAG Parking Lot	Sea Plane Ramp	Metals Recycling Yard
Sensitive/Protected Habitats, Ecosystems, Cultural/Historical Significance						
No wetlands or surface water bodies onsite (within 100 feet of operations)	✓	✓	✓	✓	x	✓
Site Characteristics/Technical Feasibility for Intended Use						
Site will not require significant grading for use due to steep topography	✓	✓	✓	✓	✓	✓
Site access is paved/suitable for intended use	✓	✓	✓	✓	✓	✓
Site flooding potential is NOT high during typhoons	x	✓	✓	✓	x	✓
Major utilities (electrical, water, telecommunications) present at or nearby site	✓	✓	✓	✓	✓	✓
Site is partially or fully paved or graveled paved	✓	✓	✓	✓	✓	✓
Site is fenced or otherwise secured	✓	x	✓	x	x	✓
Site is of sufficient size that allows for easy heavy truck access and turning	✓	✓	✓	✓	✓	✓
No other considerations/operational restrictions that would preclude use	✓	✓	x[b]	✓	✓	✓
Alignment with 2023 Master Plan	✓	✓[a]	x[b]	✓	✓	✓
NUMBER OF CRITERIA PASSED	9	9	8	9	7	10
NUMBER OF CRITERIA FAILED	1	1	2	1	3	0
***PASS SCREENING?* (NUMBER OF CRITERIA FAILED <2)**	***YES*** [c]	***YES***	***NO***	***YES***	***NO***	***YES***
4 SITES SUITABLE FOR USE AS REZ LOCATION						

[a] The Future Container Yard area is planned for future development (expansion of the cargo-handling area) but in the interim is suitable for use as Recycling Enterprise Zone.

[b] The Chassis Lot is currently in use for PAG operations.

[c] Old Hawaiian Rock Quarry Site will not be available for the next 5 years because it will be used as laydown for the Glass Breakwater project. After that, it can be used as a Recycling Enterprise Zone site. Note that this site has potential for 1- to 3-foot inundation on the eastern side from Category 4 and 5 storms.

RECOMMENDED SITE FOR INITIAL USE

The Metals Recycling Yard (Site 8 as shown in Figure 6) is currently operating as a recycling area and is recommended as an initial Recycling Enterprise Zone location. If increased capacity is needed for recycling and beneficial reuse operations later, additional sites with different functional purposes can be added to the Recycling Enterprise Zone. Because the Future Container Yard, PAG Parking Lot, and Old Hawaiian Rock Site passed both the initial and secondary site screening phases, any or all of these sites could be added to the designated Recycling Enterprise Zone. Use of the Old Hawaiian Rock Site will be pushed back 5 years because it is slated for use as contractor laydown for the Glass Breakwater project. If more than 5 years elapse between adding any of these three sites to the Recycling Enterprise Zone, the sites should be reevaluated to ensure that conditions have not changed significantly and that each still meets the screening criteria detailed in Tables 1 and 2.

Note that existing lease agreements will need to be resolved before formally designating any site as part of the Recycling Enterprise Zone. Further, future property tenants must meet the substantive Qualifying Certificate requirements referenced in PL 28-92.

Action 3: Establish a Management and Operating Structure

Stakeholder	Responsibilities
PAG	Manage lease of Recycling Enterprise Zone
GovGuam Agencies	Issue applicable licenses and permits

A traditional property lease structure offers a streamlined initial management and operating structure that can be used for the Recycling Enterprise Zone. The PAG, as the landlord of the property on which the Recycling Enterprise Zone is located, has primary responsibility for managing the property. The lessee of the site (that is, the Operator) would then engage in operations at the site agreed to in the lease.

Collaboration with other GovGuam agencies through interagency agreements could be leveraged to use funding from the RRF (consistent with 10 Guam Code Annotated [GCA] 51 §51306) to prepare an Invitation for Bid (IFB) and manage the contract for collection, processing, and shipping of priority materials to recycling markets. Priority materials include, but are not limited to, junk vehicles, waste tires, and scrap metal associated with white goods. The IFB should provide an option for the successful bidder to lease space at the Recycling Enterprise Zone for staging of wastes awaiting transshipment in shipment containers. Minimum requirements for an Operator to use space at the Recycling Enterprise Zone would include meeting the substantive requirements for a Qualifying Certificate for recycling (that is, minimum investment and material processing). The IFB, awarded contract, and subsequent lease would require bidders to meet environmental permitting and other regulatory agency requirements applicable for operations. A 5-year term is recommended as the minimum lease period for the Recycling Enterprise Zone.

Over time, as Recycling Enterprise Zone operations expand and capacity is added, an evaluation of management and operational structures that could be beneficial to GovGuam, the PAG, and private entities should be undertaken. At a minimum, this

should include an evaluation of Public Private Partnerships and Project Management Organization contracts, as well as other viable management and operational structures compared to a traditional property lease structure.

Action 4: Prepare Recycling Enterprise Zone Site for Lease

Stakeholder	Responsibilities
PAG	Prepare Recycling Enterprise Zone site for operations (through clearing, grading, and similar)
GovGuam Agencies	Provide guidance regarding any specific GovGuam agency requirements for operating the site as a Recycling Enterprise Zone

Actions to be taken in this step include the following:

- Prepare the site for operations. Provide necessary clearing, grading, paved, or graveled roadways for trucks to load and unload shipping containers, fencing/gates, and access to utility hookups.
- Evaluate permitting requirements to be included in the lease agreement. See **Appendix G** for permit requirements, including the PAG Stormwater Pollution Prevention Plan.

Funding for preparing the site for Recycling Enterprise Zone operations may be collectively funded by the RRF along with other budgets identified.

Action 5: Prepare Lease Agreement

Stakeholder	Responsibilities
PAG	Update the PAG standard lease agreement, in consultation with legal counsel

Actions to be taken in this step include the following:

- Update the PAG standard lease agreement with additional terms resulting from management and permitting requirements discussed with GovGuam agencies. A list of recommended additions to the PAG standard lease agreement is described in **Appendix H.**
- Work with legal counsel to determine what, if any, of the updates recommended in **Appendix H** and/or additional terms are needed to the PAG's standard lease agreement.

3.3.2 Strategic Initiative 2: STOP Junk Vehicles

This strategic initiative (STOP Junk Vehicles) involves the staging and transshipment of junk vehicles. This initiative aligns with the existing priorities voiced in the April 2024 Visioning Kick-off session held at Adelup and is consistent with the intent of Guam PL 28-92.

The initial goal of the STOP Junk Vehicles strategic initiative is to do the following:

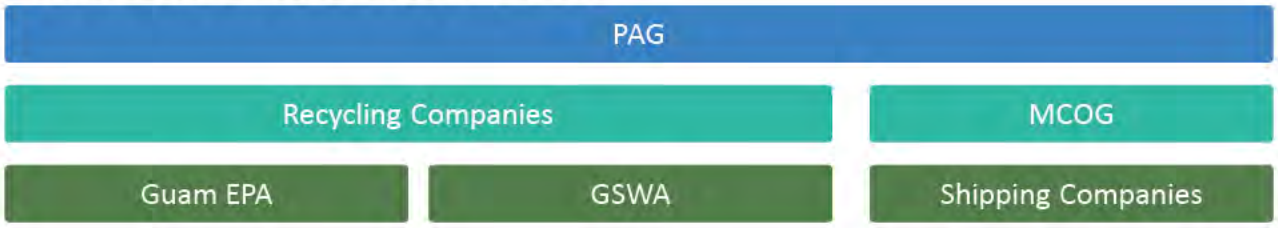
- Facilitate the island-wide consolidation and removal of abandoned junk vehicles.
- Prepare and containerize junk vehicles for staging and shipment. Draining of fluids, removal of non-recyclable materials, and similar would occur at the Operator's offsite facility to minimize environmental impacts to the Recycling Enterprise Zone site.
- Stage containerized vehicles within a Recycling Enterprise Zone at the Port.
- Allow for easier transshipment access and off-island recycling.

After the initial stage of this initiative is operating smoothly, a follow-on goal is to expand the operation's capacity through the addition of vehicle recycling and crushing equipment. Adding operational capacity will require additional operations space and environmental controls.

3.3.2.1 Key Stakeholders

The stakeholders identified on Figure 7 are essential for the successful launch and effectiveness of the STOP Junk Vehicles initiative.

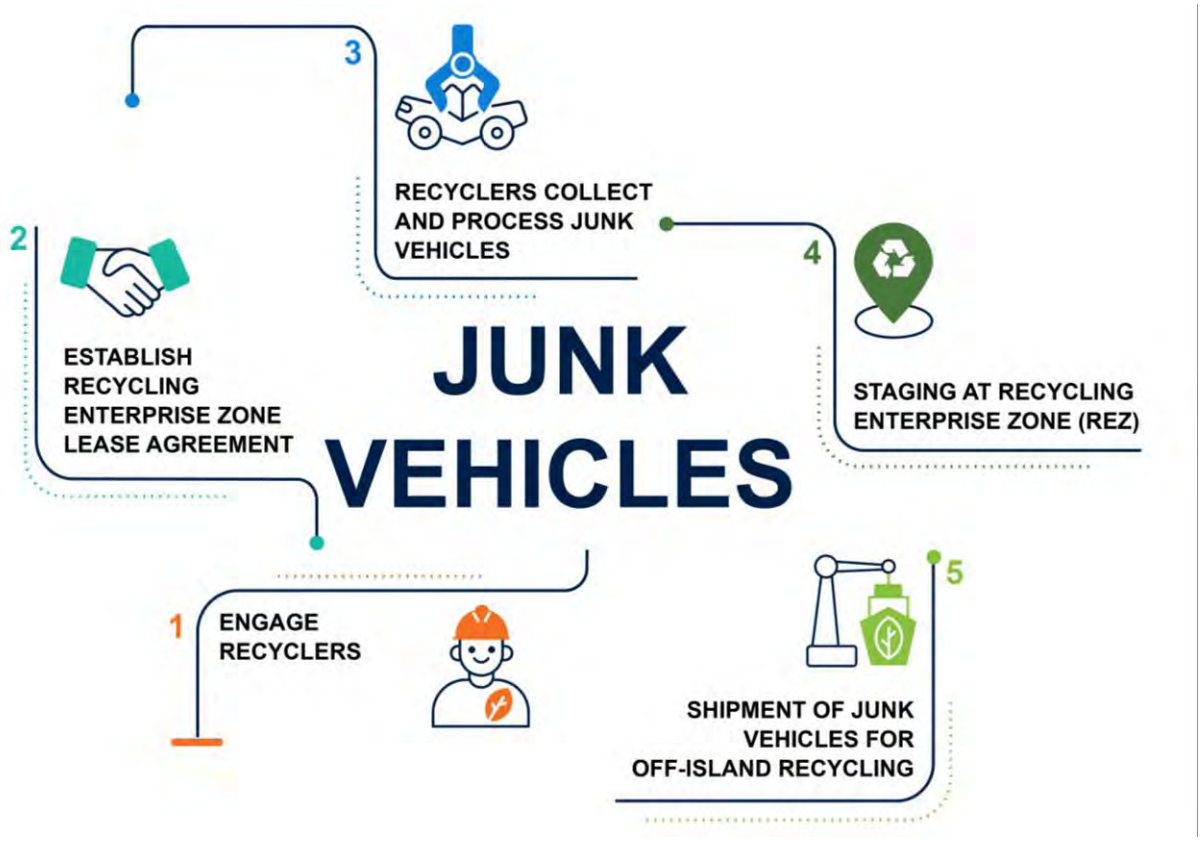
Figure 7. STOP Junk Vehicles Key Stakeholders



3.3.2.2 How the Program Works

Figure 8 presents the STOP Junk Vehicles Program process, while the following sections provide additional details on roles and responsibilities of each stakeholder under the STOP Junk Vehicles initiative.

Figure 8. STOP Junk Vehicles Program Process



3.3.2.3 Implementation Process

The implementation process presented graphically on Figure 9 and the actions that follow outline the responsibilities of stakeholders who will be essential to the successful launch and long-term success of this initiative. As previously described in Strategic Initiative 1, sites appropriate for use as a Recycling Enterprise Zone have been identified. As soon as the effort to secure one of these sites for use as a staging and transshipment operational site for junk vehicles is well underway, the following implementation actions should be launched.

Figure 9. STOP Junk Vehicles Implementation Process

Action 1	Action 2	Action 3	Action 4	Action 5	Action 6	Action 7
Develop IFB with contract and Recycling Enterprise Zone lease terms	Secure Recycling Company to Stage Junk Vehicles at Recycling Enterprise Zone	Prepare Recycling Enterprise Zone for lease	Startup and Operations at Recycling Enterprise Zone	Measure and Report	Optimize Existing Recycling Enterprise Zone Operations	Expand Operations

Action 1: Develop IFB with contract and Recycling Enterprise Zone lease terms

Stakeholders	Responsibilities
PAG	Lead efforts to develop an IFB for processing, staging and transshipment of abandoned/junk vehicles
GovGuam Agencies	Cooperate and facilitate agency actions, as requested/ needed to establish a Recycling Enterprise Zone at the Port of Guam
MCOG	Work with the PAG to collect junk vehicles from villages and transfer to a recycling company facility for processing (removal of fluids and containerizing) before staging at the Port Recycling Enterprise Zone

Actions to be taken in this step include the following:

- Develop an IFB for removing fluids, crushing, loading junk vehicles into shipping containers and coordinating transshipment for off-island recycling. The IFB should emphasizing that prior to staging at the Recycling Enterprise Zone, junk vehicles must be processed (for example, through draining of fluids and removal of non-recyclable materials) at the recycling company's offsite facility to minimize environmental impacts to the Recycling Enterprise Zone. See **Appendix I** for details on IFB options and partnership opportunities to consider.

- Secure program funding from the RRF or grants. At a minimum, the target funding should be equal to the amount needed to process, ship and recycle (off-island) all junk vehicles generated annually (approximately 2,000 vehicles annually).
- Make the Recycling Enterprise Zone available to the successful bidder for staging sealed shipping containers of processed, crushed junk vehicles.
- Determine measurement and payment for the processing and transshipment of vehicles to recycling markets.
- Include contract requirements for the PAG's junk vehicle recycling contractor to provide public outreach with stakeholders, including but not limited to haulers, adjacent landowners, and MCOG, regarding environmental controls and actions taken to mitigate nuisance impacts.

- Develop a comprehensive contract agreement that outlines terms, responsibilities (such as permitting and outreach), reporting, and payment details. Engage legal counsel to ensure a fair and legally binding contract.

Action 2: Secure Recycling Company to Process Junk Vehicles and Stage at Recycling Enterprise Zone

Stakeholders	Responsibilities
PAG and other GovGuam Agencies	The PAG leads effort with assistance, as needed from Guam EPA, GSWA, Guam Department of Public Works (DPW), GEDA, and other agencies, to obtain services from a recycling company/companies to collect, prepare, and locally transport junk vehicles for staging and transshipment at Recycling Enterprise Zone
Recycling Companies	Respond to request for services, engage in lease negotiations with the PAG

Actions to be taken in this step include the following:

- Engage in outreach. Notify recycling companies of opportunity to collect, process (prior to staging at Recycling Enterprise Zone), stage, and recycle junk vehicles off-island. Provide information on the availability of space at the Port and determine their interest in staging junk vehicles awaiting transshipment at the Recycling Enterprise Zone.
- Prequalify eligible businesses. In accordance with the terms of PL 28-92, leased space in the Recycling Enterprise Zone is available to companies meeting the substantive requirements of GEDA's Qualifying Certificates for recycling under guidelines established by the Guam Economic Development and Commerce Authority. For additional information, see the Qualifying Certificate Program at https://www.investguam.com/qualifying-certificate-qc-program.
- Secure lease agreement(s) with qualified business(es).

Action 3: Prepare Recycling Enterprise Zone for Lease

Stakeholder	Responsibilities
PAG	Prepare Recycling Enterprise Zone site for operations (through clearing, grading, and similar) Consult GovGuam agencies for environmental controls and permitting required at the stage

Actions to be taken in this step include the following:

- Resolve any existing lease agreements in the Recycling Enterprise Zone. Review lease agreement for minimum notice period and notify tenants, as necessary.
- Depending on existing site conditions and security requirements, the site may require fencing, clearing, grading and paving for trucks to load and unload shipping containers.
- In addition to permitting and environmental requirements to be met by the recycling company, consult with GovGuam agencies on environmental and permitting requirements needed during preparation of the site (for example, for grading and drainage, stormwater, and similar).
- Site preparation for Recycling Enterprise Zone operations may be funded by the RRF along with other budgets identified.

Action 4: Start Up and Operations at the Recycling Enterprise Zone

Stakeholder	Responsibilities
PAG	Monitor compliance with contract terms (for example, measurement for payment, documentation, and similar) Provide infrastructure and services to facilitate the shipment of junk vehicles, as needed
Government Agencies	Monitor compliance with permit requirements
Recycling Companies	Start up and begin staging of processed junk vehicles at Recycling Enterprise Zone (processing will occur at offsite facility prior to staging); responsible for communication, documentation, compliance, and coordinating with shipper(s), tracking and monitoring
Shipping Companies	Coordinate with recyclers' agents to facilitate shipment of junk vehicles off-island as expeditiously as possible

Actions to be taken in this step include the following:

- Recycling companies startup and begin operations of containerized junk vehicles staging at Recycling Enterprise Zone. For initial operation of the Recycling Enterprise Zone, operations at the site will be limited to staging of containerized junk vehicles. Processing (for example, draining of fluids and removal of non-recyclable materials) will need to be conducted at the recycling company's offsite facility.
- Note that if materials are simply staged at the Recycling Enterprise Zone for shipment, no waste collection or processing permits are needed from Guam EPA. However, other permits from GovGuam agencies may be required for operations at the Recycling Enterprise Zone and may require monitoring for compliance (see **Appendix G** for permit requirements).
- The PAG will work with shipping companies to expedite shipment of junk vehicles off-island.

Action 5: Measure and Report

Stakeholder	Responsibilities
PAG	Enforce reporting requirements and targets Report results to Governor's Office, Guam EPA, and United States Environmental Protection Agency (USEPA), as needed
Recycling Companies	Measure and report results to the PAG
GovGuam (DPW or GSWA)	Conduct public outreach and education Track and report results to Governor's Office and Guam EPA

Actions to be taken in this step include the following:

- Recycling companies should measure the quantity/number of materials shipped off-island for recycling and report quarterly results to the PAG. A baseline will be established to track results and measure against benchmarks. Recommended measurement and reporting metrics include the following:
  - Number of vehicles collected and processed
  - Amount of vehicle fluids drained and collected for recycling (gallons) and documentation of management methods

- Amount of non-recyclable materials generated and disposed of/managed from processing of junk vehicles (tons); and documentation of management methods
- Weight of scrap metal containerized, transported and staged at the Recycling Enterprise Zone (tons)
- Weight of shipment off-island (tons)

A baseline should be established by recording the metrics above monthly for the first year.

- To optimize initiative efforts, the PAG should work with appropriate GovGuam agencies to conduct public outreach and education efforts and report activities completed annually, at a minimum. Reporting metrics may include the following:
  - Type of outreach/education effort (such as report successes, targeted gaps, public awareness, education at schools, and job upskilling outreach)
  - Type of and number of businesses contacted
  - Number of attendees at outreach events (categorized by schools, residential, or university, as appropriate)
  - The PAG will report results to the Guam EPA, USEPA, and Governor's Office, as needed.

- Data and results should be reported annually (at minimum) and submitted online via the Guam Citizen Centric Report as seen at https://www.opaguam.org/audits-mandates/citizen-centric-reports-ccrs.

Action 6: Optimize Existing Recycling Enterprise Zone Operations

Stakeholder	Responsibilities
PAG	Request feedback from recycling and shipping companies regarding staging and transshipment operations at Recycling Enterprise Zone
Recycling and Shipping Companies	Provide feedback

Actions to be taken in this step include the following:

- PAG representatives to meet with operational stakeholders (that is, recycling and shipping companies) to identify what is going well and what operational impediments (if any) require PAG assistance in solving.

Action 7: Expand Recycling Enterprise Zone Operations to include Additional Recycling and Reuse Opportunities

Stakeholder	Responsibilities
PAG	Evaluate additional recycling and reuse opportunities at the Recycling Enterprise Zone
Recycling and Shipping Companies	Provide feedback

Actions to be taken in this step include the following:

- Once the initial Recycling Enterprise Zone operational site is functioning smoothly, an evaluation should be undertaken to determine if further operational sites are needed. If the decision is reached to add capacity to the existing operation, property previously identified as Recommended Recycling Enterprise Zone sites can be added to provide supplemental storage and/or processing areas to add operational capacity.
- Evaluate the feasibility of developing an IFB for a recycling company to purchase and operate a car crusher with self-contained fluids collection. Factors to consider in the feasibility evaluation should include environmental protection requirements, the increased processing capacity needed and associated costs, identification of funding sources, availability of funds, funding limitations, and schedule opportunities and constraints.

3.3.3 Strategic Initiative 3: STOP Waste Tires

This strategic initiative (STOP Waste Tires) involves the shredding and transshipment of waste tires. The initial goal of this initiative is to facilitate the removal of long-abandoned piles of waste tires on the island by shredding, staging the tire shreds in the Recycling Enterprise Zone for easier transshipment access, and off-island recycling. Existing legislation supporting this initiative includes PL 28-92 (2005).

A follow-on goal of this strategic initiative is to expand the operation by adding processing capabilities such as a small-scale crumb rubber operation. The crumb rubber could then feasibly be beneficially reused for one or more of the commercial opportunities identified in Guam EPA's 2022 Waste Tire Management Report.

3.3.3.1 Key Stakeholders

The stakeholders identified on Figure 10 are essential for the successful launch and effectiveness of the STOP Waste Tires initiative.

Figure 10. STOP Waste Tires Key Stakeholders

Doc. No. 38GL-26-2386.*

3.3.3.2 How the Program Works

Figure 11 presents the STOP Waste Tires Program process, while the following sections provide additional details on roles and responsibilities of each stakeholder under the STOP Waste Tires initiative.

Figure 11. STOP Waste Tires Program Process

3.3.3.3 Implementation Process

The PAG has identified areas within and near Port property appropriate for use as a Recycling Enterprise Zone. The Recycling Enterprise Zone will include several operational sites that are or will be developed for use over time. The implementation steps and activities identified on Figure 12 for the STOP Waste Tires initiative should be launched as soon as the effort to identify and secure a Recycling Enterprise Zone for use as a processing, staging, and transshipment operational site for waste tires is underway.

Figure 12. STOP Waste Tires Implementation Steps and Activities

Action 1: Develop IFB with contract and Recycling Enterprise Zone lease terms

Stakeholder	Responsibilities
PAG	Lead efforts to develop an IFB for processing, staging and transshipment of waste vehicles Manage grant applications and construction of building for equipment
Guam EPA, Guam DPW, MCOG	Provide input in developing IFB and program for recycling tires

Actions to be taken in this step include the following:

- PAG staff to lead the engagement of stakeholders to develop an IFB for collecting legacy tires, supplying shredding equipment (if necessary), removing steel bands, producing acceptable shreds for end market, and transshipment of waste tires. Note that there is a potential partnership opportunity with GSWA (to furnish and operate a waste shredder for legacy tire piles). See **Appendix I** for details on IFB options and partnership opportunities to consider.
- Secure program funding from the RRF or grants. Grant funding may be available for design and construction of a building and utilities to house a tire shredder.
- Determine measurement and payment for the shredding, staging, and transshipment of tires to responsible recycling markets.
- Make the Recycling Enterprise Zone available as an option to lease for the successful bidder for processing and/or staging of shredded tires. The Recycling Enterprise Zone site could also supply tires for on-island markets as they develop.

- Establish reporting requirements to be performed by the recycling company (as part of measurement for payment); include quarterly tracking of the tire type (commercial vs. passenger), weights, and number of tires collected, shredded, reused and shipped for recycling. Require documentation to demonstrate proof of acceptance at final recycling or disposal facility.
- Require that each Recycling Enterprise Zone Operator report to the PAG and any other appropriate GovGuam agencies a minimum of annually environmental controls and actions taken to mitigate nuisance impacts (that is, vectors including mosquitoes and fire hazards).
- Develop a comprehensive contract agreement that outlines terms, responsibilities (such as permitting and outreach), and payment details. Engage legal counsel to ensure a fair and legally binding contract.

Action 2: Secure Recycling Company to Stage Shredded Waste Tires at Recycling Enterprise Zone

Stakeholder	Responsibilities
PAG and other GovGuam Agencies	The PAG leads effort with assistance, as needed, from Guam EPA, GSWA, Guam DPW, GEDA, and other agencies, to obtain services from a recycling company/companies to collect, prepare, and locally transport waste tires for staging and transshipment at Recycling Enterprise Zone
Recycling Company	Respond to request for services, engage in lease negotiations with PAG

Actions to be taken in this step include the following:

- Engage in outreach. Notify recycling companies of opportunity to collect, process, stage, and recycle waste tires off-island. Provide information on the availability of space at the Port and determine their interest in staging shredded waste tires awaiting transshipment at the Recycling Enterprise Zone.
- Prequalify eligible businesses. In accordance with the terms of PL 28-92, lease space in the Recycling Enterprise Zone is available to companies meeting the substantive requirements of GEDA's Qualifying Certificates for recycling under guidelines established by the Guam Economic Development and Commerce Authority. For additional information, see the Qualifying Certificate Program at https://www.investguam.com/qualifying-certificate-qc-program.
- Secure lease agreement(s) with qualified business(es).

Action 3: Prepare Recycling Enterprise Zone for Lease

Stakeholder	Responsibilities
PAG	Resolve existing lease agreements on the Recycling Enterprise Zone operational site, if any Prepare the Recycling Enterprise Zone site for leasing (through clearing, grading, and similar) Consult GovGuam agencies for environmental controls and permitting required at this stage

Actions to be taken in this step include the following:

- Review existing lease agreement(s) for occupants (if any) of Recycling Enterprise Zone site and resolve the lease for convenience if required to provide the required space.

- Depending on existing site conditions and security requirements, perform required actions; the site may require fencing, clearing, grading, and paving for trucks to load and unload shipping containers.
- In addition to permitting and environmental requirements to be met by Recycling Company, consult with GovGuam agencies on environmental and permitting requirements needed by the Port during preparation of the site (for example, grading, drainage, or stormwater).
- Funding for preparing the site for Recycling Enterprise Zone operations may be collectively funded by the RRF along with other grants/budgets identified.

Action 4: Startup and Operations at Recycling Enterprise Zone

Stakeholder	Responsibilities
Recycling Companies	Start up and begin operations for shredding legacy tires for reuse and transshipment Engage with shipping companies for transshipment
PAG	Monitor compliance with contract terms (such as measurement for payment and documentation) Provide infrastructure and services to facilitate the shipment of waste tires, as needed
Government Agencies	Monitor compliance with permit requirements Provide support in purchasing shredded tires for use in civil engineering applications; see The Waste Tire Management Report (Guam EPA 2022) for applications
Shipping Companies	Coordinate with recyclers' agents to facilitate shipment off-island as expeditiously as possible

Actions to be taken in this step include the following:

- Recycling companies to begin operation of mobile shredding equipment and containment at legacy waste tire stockpiles and other legacy waste tire illegal-disposal areas. Begin storage of shredded tires for reuse on-island or transshipment staging at the Recycling Enterprise Zone.
- Note that if materials are simply staged at the Recycling Enterprise Zone for shipment, no waste collection or processing permits are needed from Guam EPA. However, other permits from GovGuam agencies may be required for operations at the Recycling Enterprise Zone and may require monitoring for compliance (see **Appendix G** for permit requirements).
- Government agencies purchase shredded waste tires as tire-derived aggregate (TDA) for beneficial reuse in civil engineering applications. The Waste Tire Management Report (Guam EPA 2022) provides a range of civil engineering applications for TDA.

Action 5: Measure and Report

Stakeholder	Responsibilities
PAG, Guam EPA	Enforce reporting requirements and targets Report results to USEPA and Governor's Office
Recycling Companies	Measure quantities and tonnages recycled and reused, provide documentation, and report results to the PAG
GovGuam (DPW or GSWA)	Conduct public outreach and education Track and report results to Governor's Office and Guam EPA

Actions to be taken in this step include the following:

- Recycling companies should measure the quantity of materials reused on-island and shipped off-island for recycling and report quarterly results to the PAG. A baseline will be established to track progress and measure against goals. Measurements are to be verified for payment as described in contract terms. Recommended measurement and reporting metrics include the following:

  - Number and type of tires collected and processed
  - Amount of other recyclable and non-recyclable materials generated and disposed of /managed from processing of tires (tons) and documentation of management methods
  - Weight of shredded tires reused on-island (tons) and documentation of use
  - Weight of shredded tires containerized, transported, and staged at the Recycling Enterprise Zone (tons)
  - Weight of shipment off-island (tons)

  A baseline should be established by recording the above metrics monthly for the first year.

- To optimize initiative efforts, the PAG should work with appropriate GovGuam agencies to conduct public outreach and education efforts and report activities completed annually, at a minimum. Reporting metrics may include the following:

  - Type of outreach/education effort (such as report successes, targeted gaps, public awareness, education at schools, and job upskilling outreach)
  - Number of persons contacted
  - Number of outreach events (categorized by schools, residential, or university, as appropriate)

  The PAG will report results to the Guam EPA, USEPA, and Governor's Office, as needed. Data and results should be reported annually (at minimum) and submitted online via the Guam Citizen Centric Report as seen at https://www.opaguam.org/audits-mandates/citizen-centric-reports-ccrs.

Action 6: Optimize Existing Recycling Enterprise Zone Operations

Stakeholder	Responsibilities
PAG	Request feedback from recycling and shipping companies regarding staging and transshipment operations at Recycling Enterprise Zone
Recycling and Shipping Companies	Provide feedback

Actions to be taken in this step include the following:

- PAG representatives to meet with operational stakeholders (that is, recycling and shipping companies) to identify what is going well and what operational impediments (if any) require government assistance in solving.

Action 7: Expand Recycling Enterprise Zone Operations to include Additional Recycling & Reuse Opportunities

Stakeholder	Responsibilities
PAG	Evaluate additional recycling and reuse opportunities at the Recycling Enterprise Zone
Recycling and Shipping Companies	Provide feedback

Actions to be taken in this step include the following:

- Once the initial Recycling Enterprise Zone operational site is functioning smoothly, additional operational sites should be secured for adding recycling capacity. Port property, or property in the immediate vicinity of the Port, can be added to this initiative to provide additional storage and/or processing capabilities focused on processing waste tires for recycling.
- Evaluate the feasibility of using one of the Recycling Enterprise Zone sites for a small-scale crumb rubber operation. Develop a plan to include operations at the Recycling Enterprise Zone within 5 years unless the process is established elsewhere on the island.

Doc. No. 38GL-26-2386.*

3.3.4 Strategic Initiative 4: STOP White Goods Waste

3.3.4.1 Overview

This strategic initiative (STOP White Goods Waste) involves the staging and transshipment of illegally dumped or abandoned white goods (such as washing machines, dryers, refrigerators, and freezers) for recycling. A total of 1,151 abandoned white goods were estimated to have been removed from Guam village streets during Fiscal Year 2021 (The Guam Daily Post, 2021). Based on reports from the MCOG, the annual number of abandoned white goods is expected to be around 1,000 white goods per year. This initiative aligns with the existing priorities articulated in the April 2024 Visioning Kick-off session and is consistent with the intent of Guam PL 28-92.

The initial goal of the STOP White Goods Waste strategic initiative is to do the following:

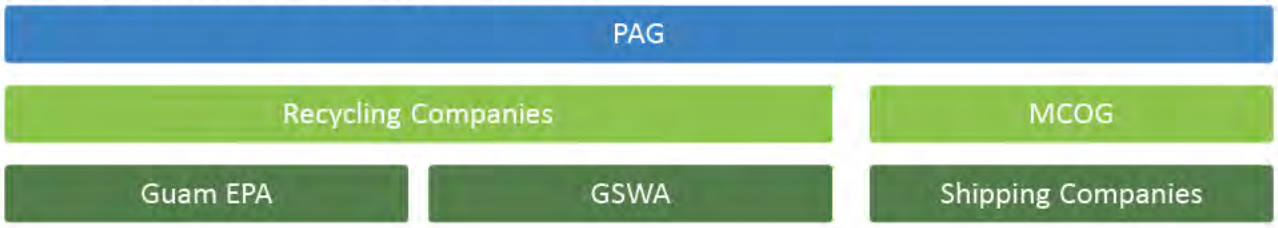
- Facilitate the island-wide consolidation and removal of abandoned white goods
- Stage containerized white goods within a Recycling Enterprise Zone at the Port
- Allow for easier transshipment access and off-island recycling

After the initial stage of this initiative is operating smoothly, a follow-on goal is to expand the operation's capacity and efficiency through the addition of white goods processing and management equipment. Develop a plan to include operations at the Recycling Enterprise Zone within 5 years.

3.3.4.2 Key Stakeholders

The stakeholders identified on Figure 13 are essential for the successful launch and effectiveness of the STOP White Goods Waste initiative.

Figure 13. STOP White Goods Key Stakeholders



Doc. No. 38GL-26-2386.*

3.3.4.3 How the Program Works

Figure 14 presents the STOP White Goods Program process, while the following sections provide additional details on roles and responsibilities of each stakeholder under the STOP White Goods Waste initiative.

Figure 14. STOP White Goods Program Process

3.3.4.4 Implementation Process

The following implementation process outlines the responsibilities of stakeholders who will be essential to the successful launch and long-term success of this initiative. As previously described in Section 3.3.1, Strategic Initiative 1, areas appropriate for use as a Recycling Enterprise Zone have been identified. As soon as the effort to secure one of these sites for use as a processing, staging and transshipment for white goods is well underway, the implementation steps and activities identified on Figure 15 should be launched.

Figure 15. STOP White Goods Implementation Steps and Activities

Action 1: Develop IFB with contract and Recycling Enterprise Zone lease terms

Stakeholders	Responsibilities
PAG	Lead efforts to develop an IFB for processing and transshipment of abandoned white goods with the option to stage the processed metal at the Recycling Enterprise Zone
MCOG	Contract with waste hauler to collect abandoned white goods from villages and transfer to recycling company facility for processing

Actions to be taken in this step include the following:

- Develop an IFB for processing offsite (for example, removing fluids from compressors, refrigerants, and similar and loading white goods into shipping containers), with an option to stage recycled metal at the Recycling Enterprise Zone and coordinating the transshipment for off-island recycling. To protect the environment, proper removal of fluids and handling of refrigerants needs to be conducted at an offsite facility until appropriate enclosed facilities are constructed at the Recycling Enterprise Zone sites. See **Appendix I** for details on IFB options and partnership opportunities to consider.

- Secure program funding from the RRF or grants. The target funding should be equal to the amount needed to process and recycle all white goods generated annually (estimated 1,000 white goods annually).
- Make the Recycling Enterprise Zone available as an option to the successful bidder for staging sealed shipping containers of processed white goods.
- Determine measurement and payment for the processing and transshipment of white goods to recycling markets.
- Include contract requirements for the PAG's white goods recycling contractor to provide outreach to stakeholders, including but not limited to haulers, adjacent landowners, and MCOG, regarding environmental controls and actions taken to mitigate nuisance impacts.

- Develop a comprehensive contract agreement that outlines terms, responsibilities (such as permitting and outreach), reporting, and payment details. Engage legal counsel to ensure a fair and legally binding contract.

Action 2: Secure Recycling Company to Stage White Goods at Recycling Enterprise Zone

Stakeholders	Responsibilities
PAG and other GovGuam Agencies	The PAG leads effort with assistance, as needed from Guam EPA, GSWA, Guam DPW, GEDA, and other agencies, to obtain services from a recycling company/companies to collect, prepare, and locally transport waste tires for staging and transshipment at Recycling Enterprise Zone
Recycling Company	Respond to request for services and engage in lease negotiations with PAG

Actions to be taken in this step include the following:

- Engage in outreach. Notify recycling companies of opportunity to collect, process (prior to staging at Recycling Enterprise Zone), stage, and coordinate shipping of abandoned white goods for off-island recycling. Provide information about the option to stage containerized white goods awaiting transshipment at the Recycling Enterprise Zone.
- Prequalify eligible businesses. In accordance with the terms of PL 28-92, lease space in the Recycling Enterprise Zone is available to companies meeting the substantive requirements of GEDA's Qualifying Certificates for recycling under guidelines established by the Guam Economic Development and Commerce Authority. For additional information, see the Qualifying Certificate Program at https://www.investguam.com/qualifying-certificate-qc-program.
- Secure lease agreement(s) with qualified business(es).

Action 3: Prepare Recycling Enterprise Zone for Lease

Stakeholder	Responsibilities
PAG	Prepare Recycling Enterprise Zone site for operations (through clearing, grading, and similar)

Actions to be taken in this step include the following:

- Resolve any existing lease agreements on the Recycling Enterprise Zone operational site. Review lease agreement for minimum notice period and notify tenants, as necessary.
- Depending on existing site conditions and security requirements, the site may require fencing, clearing, grading, and paving for trucks to load and unload shipping containers.
- In addition to permitting and environmental requirements to be met by recycling company, consult with GovGuam agencies on environmental and permitting requirements needed during preparation of the site for staging of containerized white goods.
- Funding for preparing the site for Recycling Enterprise Zone operations may be collectively funded by the RRF along with other budgets identified.

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Action 4: Start Up and Operations at the Recycling Enterprise Zone

Stakeholder	Responsibilities
PAG	Enforce lease requirements Provide infrastructure and services to facilitate shipment of white goods, as needed
Guam EPA	Issue applicable licenses and permits
Recycling Companies	Start up and begin staging of processed white goods at Recycling Enterprise Zone
Shipping Companies	Coordinate with recyclers' agents to expedite the shipment of white goods off-island

Actions to be taken in this step include the following:

- Recycling companies start up and begin operations of containerized white goods staging at Recycling Enterprise Zone. Note: Before staging at the Recycling Enterprise Zone, white goods will need to be processed for staging and shipment (for example, removal of non-recyclable materials) at the recycling company's offsite facility.
- Note that if materials are simply staged at the Recycling Enterprise Zone for shipment, no waste collection or processing permits are needed from Guam EPA. However, other permits from GovGuam agencies may be required for operations at the Recycling Enterprise Zone and may require monitoring for compliance (see **Appendix G** for permit requirements).
- Recycling companies will work with shipping companies to expedite shipment of white goods off-island.

Action 5: Measure and Report

Stakeholder	Responsibilities
PAG	Enforce reporting requirements and targets Report results to Governor's Office, Guam EPA, and USEPA, as needed
Recycling Companies	Measure and report results to the PAG
GovGuam (DPW or GSWA)	Conduct public outreach and education Track and report results to Governor's Office and Guam EPA

Actions to be taken in this step include the following:

- Recycling companies should measure the quantity/number of materials shipped off-island for recycling and report quarterly results to the PAG. A baseline will be established to track progress and measure against goals. Suggested reporting metrics include the following:
  - Number of abandoned white goods collected and processed
  - Amount of materials collected for recycling/disposal (including refrigerants) and documentation of management methods
  - Amount of non-recyclable materials generated and disposed/managed from processing of white goods (tons); and documentation of management methods

- Weight of recyclables containerized, transported and staged at the Recycling Enterprise Zone (tons)
- Weight of shipment off-island (tons)

A baseline will be established by recording the metrics above on a monthly basis for the first year (tons/month for 1 year).

- To optimize initiative efforts, the PAG should work with appropriate GovGuam agencies to conduct public outreach and education efforts and report activities completed annually, at a minimum. Reporting metrics may include:
  - Type of outreach/education effort (such as report successes, targeted gaps, public awareness, education at schools, and job upskilling outreach)
  - Number of persons contacted/reached
  - Number of outreach events (categorized by schools, residential, or university, as appropriate)
- The PAG to report results quarterly to the Guam EPA, USEPA, and Governor's Office, as needed. Data and results should be reported annually (at minimum) and submitted online via the Guam Citizen Centric Report as seen at https://www.opaguam.org/audits-mandates/citizen-centric-reports-ccrs.

Action 6: Optimize Existing Recycling Enterprise Zone Operations

Stakeholder	Responsibilities
PAG	Request feedback from recycling and shipping companies regarding staging and transshipment operations at Recycling Enterprise Zone
Recycling and Shipping Companies	Provide feedback

Actions to be taken in this step include the following:

- PAG representatives to meet with operational stakeholders (that is, recycling and shipping companies) to identify what is going well and what operational impediments (if any) require government assistance in solving.

Action 7: Expand Recycling Enterprise Zone Operations to include Additional Recycling & Reuse Opportunities

Stakeholder	Responsibilities
PAG	Evaluate additional recycling and reuse opportunities at the Recycling Enterprise Zone
Recycling and Shipping Companies	Provide feedback

Actions to be taken in this step include the following:

- Once the initial Recycling Enterprise Zone operational site is functioning smoothly, an evaluation should be undertaken to determine if additional recycling capacity is needed to address abandoned white goods, and if so, if further operational sites are needed in the Recycling Enterprise Zone. Properties previously identified in Table 2, Secondary Site Screening Evaluation Results, can be added to provide supplemental storage and/or processing areas used to prepare abandoned white goods for off-island recycling.

3.3.5 Strategic Initiative 5: Green Purchasing

GREEN PURCHASING

Also consistent with recommendations in both the 2013 *Guam Zero Waste Plan* (GovGuam 2013) and *Zero Waste Guam,* Guam's updated 2023 Zero Waste Master Plan (Guam EPA 2023), this strategic initiative (Green Purchasing) involves establishing an Environmentally Preferable Purchasing (EPP) Policy for the Port. This initiative will be a first for an autonomous GovGuam agency and a significant step forward in Guam's journey towards zero waste. The initial goal of this initiative is to develop a Port policy focused on identifying, selecting, and purchasing products with fewer adverse environmental impacts than competing products. Note that the Port is currently working with the Guam GSA for purchase of recycled-content paper. This strategic initiative aims to increase current efforts. Existing legislation supporting EPP policies includes Public Law 21-22 and Federal Executive Order 14057.

Guam Public Law 21-22 (1991)

- *The General Services Administration, Department of Administration, The Superior Court of Guam, Autonomous Agencies, and the Legislature is hereby directed to amend existing procurement rules and regulations and develop such additional rules and regulations as are necessary to insure that in all purchases of goods by the government of Guam, when possible, emphasis shall be placed on the* ***purchase of products that are biodegradable, reusable, recyclable, recycled, or any combination****.*

Federal Executive Order 14057 (2021)

- *Sec. 208. (a) Agencies shall reduce emissions, promote environmental stewardship, support resilient supply chains, drive innovation, and incentivize markets for sustainable products and services by […]* ***purchasing products that contain recycled content, are biobased, or are energy and water efficient****, in accordance with relevant statutory requirements; and,* ***to the maximum extent practicable, purchasing sustainable products and services identified or recommended by the Environmental Protection Agency (EPA).***

3.3.5.1 Key Stakeholders

The stakeholders identified on Figure 16 are essential for the successful launch and effectiveness of the Green Purchasing initiative.

Figure 16. Green Purchasing Key Stakeholders

Doc. No. 38GL-26-2386.*

3.3.5.2 How the Program Works

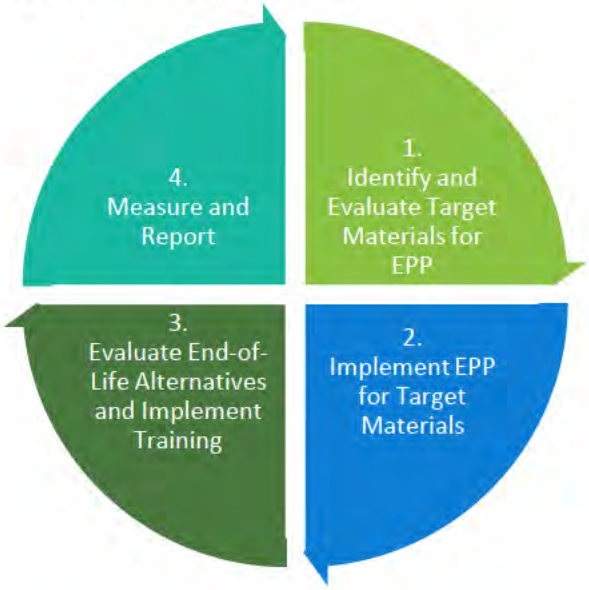
Figure 17 presents the Green Purchasing Program process, while the following sections provide additional details on roles and responsibilities of each stakeholder under the Green Purchasing initiative.

Figure 17. Green Purchasing Program Process

3.3.5.3 Implementation Process

Implementation of an expanded Green Purchasing Program for the PAG consists of the steps presented on Figure 18. The following sections describe the steps required for implementation of an EPP Policy for the PAG.

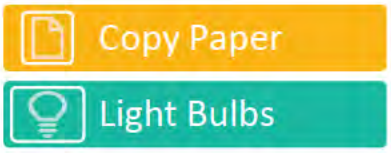
Figure 18. Green Purchasing Implementation Process



Action 1: Identify and Evaluate Target Materials for EPP

Stakeholder	Responsibilities
PAG	Evaluate suitability and feasibility of target materials (completed)

Actions to be taken in this step included identifying and evaluating the suitability and feasibility of target materials for EPP. Port of Guam inventory was sorted by category and evaluated based on purchasing recommendations from the United States General Services Agency (GSA) Sustainable Facilities Tool (https://sftool.gov/greenprocurement/green-products-workspaces/87/support-area). The following target materials were identified:



Purchase of these target materials would support the following sustainability metrics:

For more information on energy savings and related GHG emissions reduction, see Section 4.0, Zero Emissions Strategy. For future expansion of the EPP program, additional target materials for the Port to consider include used building materials for future construction and maintenance projects. This could include concrete aggregate, recycled asphalt pavement, and/or wood materials (NYCEDC 2023).

Action 2: Implement EPP for Target Materials

Stakeholder	Responsibilities
PAG	Implement EPP for target materials
Guam GSA	Provide recommendations on environmentally preferred products for purchase

How EPP is implemented depends on the target material selected and may require incremental implementation. For target materials that will replace current Port purchases, the first stage of implementation involves initial testing for an adequate alternative. For target materials that are past initial testing, the second stage involves evaluating whether purchase of these products is already required and backed by policy or revising or developing a policy if current requirements are insufficient.

Note that the Port is currently working with the Guam GSA for purchase of recycled-content paper. This strategic initiative aims to increase current efforts, adding a requirement to specify 30% postconsumer recovered fiber content paper.

Figure 19. EPP Program Phases

The following implementation stage and corresponding activities are identified for the target materials:

Copy Paper - (Stage 1 Completed) Stage 2 Implementation:

- Develop and approve new PAG Purchasing Policy requiring a minimum **30% postconsumer** recovered fiber content for copy paper.
- If 30% postconsumer recovered fiber content copy paper is not available through https://gsa.doa.guam.gov/ from the supplier (COMIX), the new Policy would require issuing a solicitation for 30% postconsumer recovered fiber content content copy paper to other vendors.

Light Bulbs - Stage 1 Implementation:

- Phase out any future purchases of 4-foot linear fluorescent bulbs.
- Test and evaluate light-emitting diode (LED) fluorescent replacement tubes compatible with existing fixture technology to determine a suitable alternative.
- Issue soliciation for LED fluorescent replacement tubes.
- Look for budget opportunities to replace existing fluorescent fixtures with more efficient fixtures.

Note that the use of the identified EPP target materials will continue unless the following occurs:

- There are adverse impacts to Port Operations.
- A better alternative product is identified.

Action 3: Evaluate End-of-Life Alternatives and Implement Training

Stakeholder	Responsibilities
PAG	Evaluate end-of-life alternatives Implement training
iRecycle/Non-profit	Pickup and deliver shredded paper products to farmers for use as agricultural bedding

Actions to be taken in this step include evaluating end-of-life alternatives for target materials and implementing training, as well as updating the policies developed in Action 2 to address end-of-life disposal, as follows:

Copy Paper

- Collect, shred, and bag paper products for pickup by Peggy Denney, Executive Director of iRecycle, for delivery to farmers for use as agricultural bedding.
- Research methods and policy to store audit files electronically.

Light Bulbs

- Recycle fluorescent bulbs at the Harmon Residential Transfer Station. The facility uses a drum-top bulb crusher for fluorescent light bulbs to reduce the volume of the bulbs to be recycled/shipped off-island.

Action 4: Measure and Report Sustainability Metrics

Stakeholder	Responsibilities
PAG	Measure and report sustainability metrics

Actions to be taken in this step include Port tracking sustainability metrics (as developed in Action 1) based on procurement records such as copies of invoices, receipts, or other proof of purchase. An annual report is prepared summarizing the Port's environmentally responsible purchasing actions and their effectiveness in reducing the environmental impacts of Port procurement. Establishing an incentive program to recognize successful promoters of EPP should be considered. Applicable data should be reported annually (at minimum) and submitted online via the Guam Citizen Centric Report as seen at https://www.opaguam.org/audits-mandates/citizen-centric-reports-ccrs.

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3.3.6 Strategic Initiative 6: Port Strong Recycles

Aligning directly with the 2023 Zero Waste Management Plan initiative to enact mandatory effort to solid waste reduction at or in all GovGuam facilities and public spaces, this strategic initiative (Port Strong Recycles) involves increased recycling efforts at Port-owned operations in accordance with Public Law 24-304, an act to mandate GovGuam on the reduction of solid waste. While the Port already has voluntary recycling in place, this initiative would move the Port forward by updating its existing policy to make recycling mandatory, would include a list of wastes to be recycled, and would recommend beneficial end-use markets, preferably on-island, for the targeted materials.

Guam Public Law 24-304 (1998)

- "All government of Guam departments, agencies and instrumentalities, including autonomous agencies, and any other Guam entities: (1) shall make every effort to solid waste reduction..."
- "Each director, manager, or agency head shall ensure regular collection periods and maintain a record of weight or volume, type of recyclable items…"

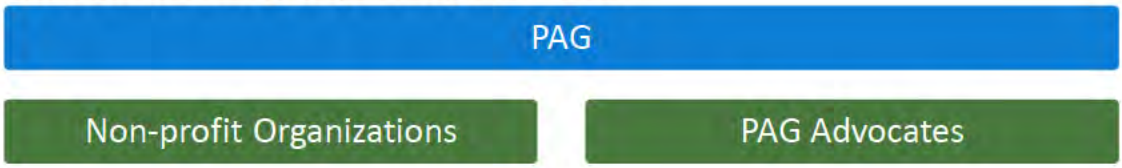
In August 2024, updates to the Board policy and expansion of the recycling program for PAG facilities were discussed and evaluated. Resulting actions from the meeting include the following:

- Received support from various departments to support expansion of the PAG's Recycling Program
- Reviewed the PAG policy and updated list of recyclable materials with cardboard and oil filters (see **Appendix J** for a full list of recyclable materials listed in the policy)
- Identified target materials for expansion of recycling program: shredded copy paper and aluminum cans
- Discussed availability of non-profit agency (iRecycle) to perform collection and reuse/recycling shredded copy paper and aluminum cans

3.3.6.1 Key Stakeholders

The stakeholders identified on Figure 20 are essential for the successful launch and effectiveness of the Port Strong Recycles initiative.

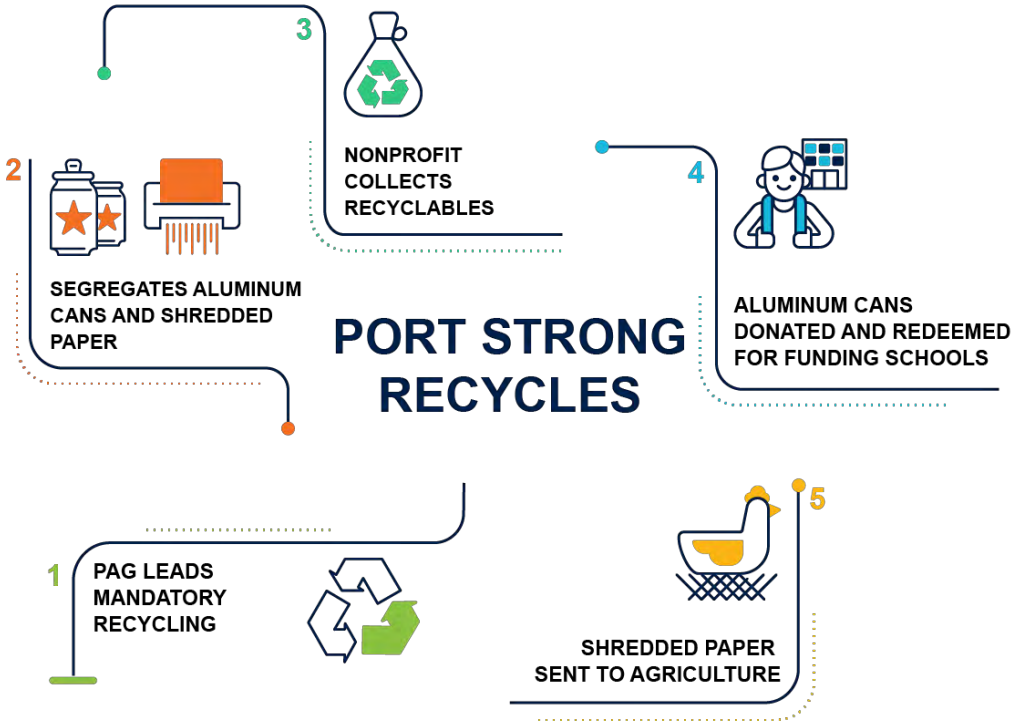
Figure 20. Port Strong Recycles Key Stakeholders



3.3.6.2 How the Program Works

Figure 21 presents the Port Strong Recycles Program process, while the following sections provide additional details on roles and responsibilities of each stakeholder under the Port Strong Recycles initiative.

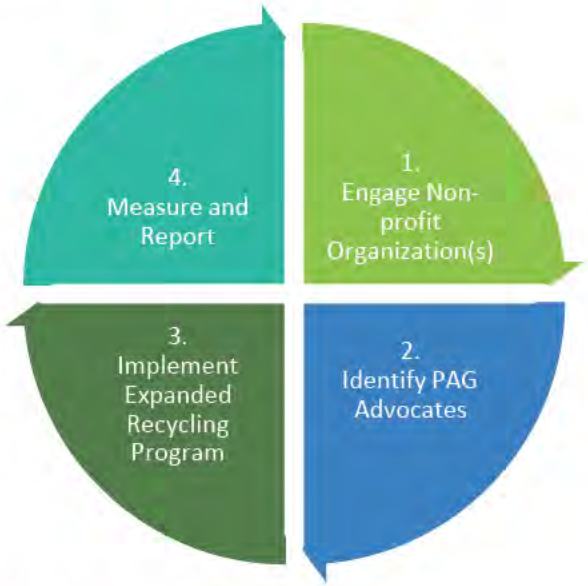
Figure 21. Port Strong Recycles Program Process



3.3.6.3 Implementation Process

Figure 22 presents the steps for implementation of the expanded PAG recycling program.

Figure 22. Port Strong Recycles Implementation Process



Action 1: Engage with Non- Profit Organizations

Stakeholder	Responsibilities
PAG	Engage in discussions with non-profit to solidify a plan and process for collection of recyclables from Port facilities (completed)
Non-profit Organization	Work in partnership (completed)

Action 1 for the Port Strong Recycles initiative has been completed as follows:

- PAG engaged with a non-profit organization to discuss the plan and process of collecting eligible recyclable materials from the Port facilities.
- As a starting point, iRecycle non-profit program has committed to collect shredded paper and aluminum cans. Shredded paper will be collected and distributed to the Department of Agriculture for use as bedding. Aluminum cans will be donated to local schools for the redemption of beverage container fees.

Action 2: Identify PAG Advocates to Champion Recycling Program

Stakeholder	Responsibilities
PAG	Identify internal staff advocates for the expanded recycling program
PAG Advocates	Champion PAG recycling initiatives

Actions to be taken in this step will include advocates for each floor/area being identified to champion new recycling practices, including through the following:

- Inform staff of new recyclable materials to be collected and procedures.
- Gather feedback from staff to increase ownership and participation.

Action 3: Implement Expansion of Recycling Program

Stakeholder	Responsibilities
PAG	Provide training to staff. Purchase containers and signage
Non-profit	Collect and transport recyclables

Actions to be taken in this step include the following:

- Provide training for staff of new recyclable materials to be collected and procedures for segregating and collection.
- Purchase and set up new containers for recyclables and signage. Consider consistent signage, image-based signs, consistent color for certain materials, and similar.
  - Ensure signage for shredded paper to be donated includes restrictions on coated paper. Note that glossy paper, paper bags with coating on the inside, and paper plates have been found to contain poly-fluorinated alkyl substances (PFAS) and should not be included in shredded paper sent to agriculture.
- Non-profit organization to collect recyclable materials.

Action 4: Measure and Report

Stakeholder	Responsibilities
PAG/PAG Advocates	Track and report volumes to PAG employees Celebrate progress, beneficial reuse and donations made Evaluate other materials/stakeholders to include in the recycling program

- Actions to be taken in this final step include measuring the quantity/amount of recyclable materials collected for recycling. A baseline will be established to track progress and measure against goals. Recommended measurement practices and metrics include the following:

  - Weight of cans and shredded paper collected by iRecycle per month.
  - Document where and when materials are donated (dates and amount received, names of school and organizations).
  - Conduct regular inspections of shredded paper to assess and address any contamination of coated or glossy paper before scheduled pickup; documenting dates of inspections, any contamination observed, and corrective measures.
  - Conduct regular inspections of waste containers collected by hauler before scheduled pickup; documenting percent capacity (% full) to determine effectiveness of recycling program (reduction of waste to landfill) and optimize waste collection costs. If applicable, consider option to reduce container sizes or collection frequency to save on waste collection costs.

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A baseline will be established by recording the metrics above on a monthly basis for the first year (pounds/month for 1 year).

- Report results internally to track progress, announce achievements and optimize the program. Applicable data should be reported annually (at minimum) and submitted online via the Guam Citizen Centric Report as seen at https://www.opaguam.org/audits-mandates/citizen-centric-reports-ccrs.
- Evaluate progress and needs for improvement or expansion of program (for example, evaluate feasibility of recycling fluorescent light bulbs or expanding program to PUG facilities).

3.4 Investing in the Future

Six strategic initiatives are recommended for implementation in the Zero Waste Strategy presented in Section 3.3. These strategic initiatives, shown in the outer ring of Figure 23, represent an investment in the future designed to facilitate Guam's transition to zero waste and a green circular economy. Implementation of the strategic initiatives will also create positive environmental, social, and economic impacts associated with the UN SDGs identified in the figure's inner ring.

Figure 23. PAG's Zero Waste Strategy: A Vision in Action

In summary, the six strategic initiatives provide meaningful contributions to Guam's efforts to combat climate change and include the following:

- Selecting a site on or near Port property and providing recycling operators with a staging area for wastes awaiting transshipment off-island for recycling and/or disposal (Recycling Enterprise Zone). Operations in the Recycling Enterprise Zone could be expanded to include sustainable beneficial reuse processing capabilities at a later date. This strategic initiative would increase Guam's recycling capacity by freeing up existing storage space in recyclers' yards, promote investments in sustainable technologies focused on the beneficial reuse of recycled materials, and create green jobs for Guam's citizens.

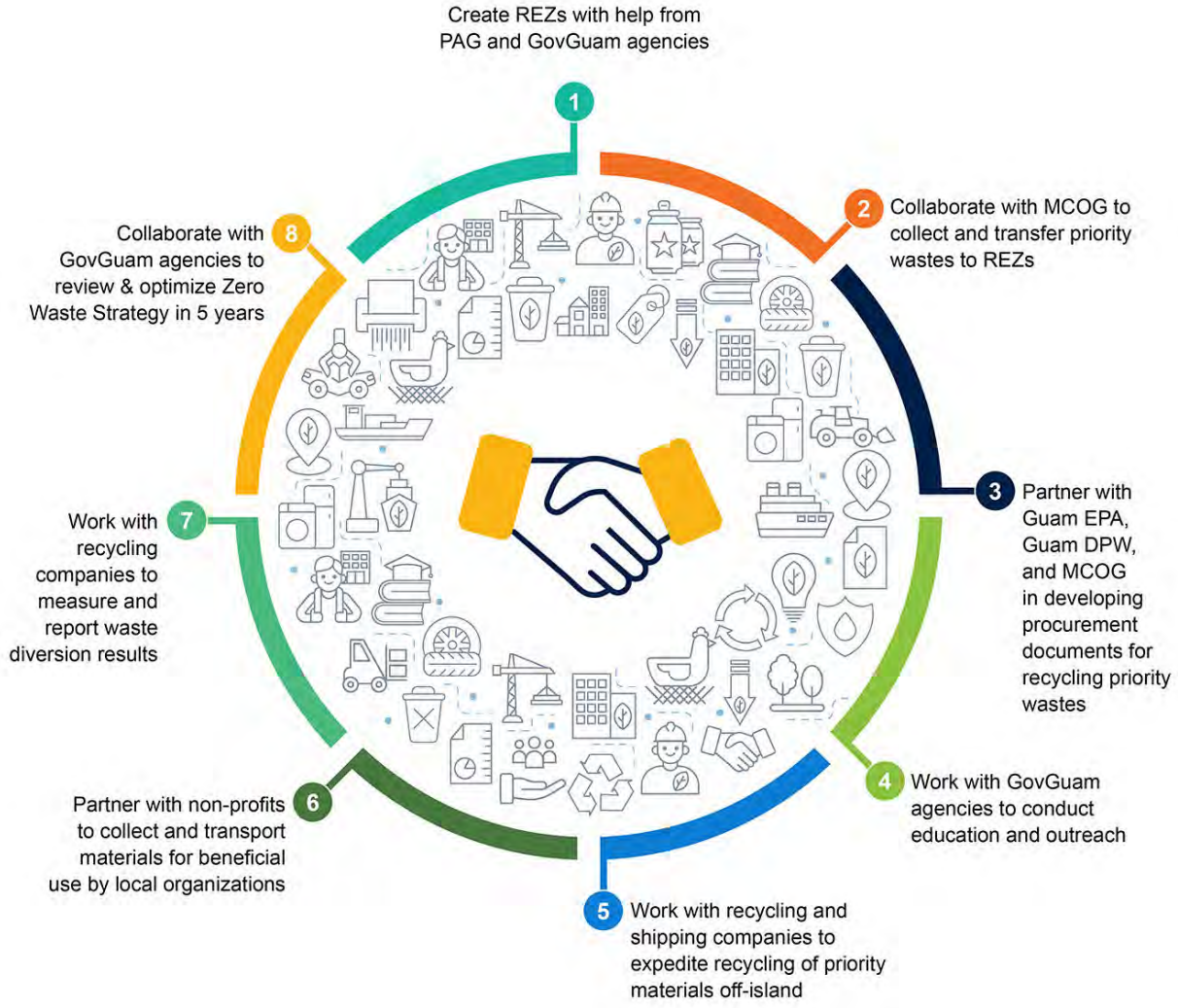
- Providing space within the Recycling Enterprise Zone to stage priority wastes, including abandoned junk vehicles, waste tires, and white goods awaiting transshipment off-island for recycling and/or disposal (STOP Junk Vehicles, STOP Waste Tires, and STOP White Goods, respectively). These strategic initiatives would initially facilitate island-wide cleanup activities by providing staging/temporary storage space near transshipment departure points. Over time, additional processing capacity could be added to support more sustainable technologies focused on beneficial reuse, green business opportunities, and jobs. These strategic initiatives would reduce the environmental impacts of illegal dumping and expand existing recycling and reuse programs.

- Establishing a policy for the Port focused on identifying, selecting, and purchasing products with fewer adverse environmental impacts than competing products (Green Purchasing). This strategic initiative would eliminate or reduce waste at the source, build resiliency, and advance the island towards a circular economy.

- Enacting a mandatory recycling program for PAG-owned facilities and employees (Port Strong Recycles) The Port already has voluntary recycling, but this strategic initiative would move the Port forward by updating its existing policy to make recycling mandatory, include a list of recycled wastes, and recommend beneficial end-use markets, preferably on-island, for the targeted materials. The compulsory recycling program will contribute support for a non-profit organization benefiting local schools, forming a sustainable alliance that aims to benefit the well-being of students on-island.

Moving forward with the zero waste initiatives will require the PAG to actively seek and rely on partnerships. These relationships are crucial to our success of the Zero Waste Strategy (Figure 24). By collaborating with others, the PAG can leverage diverse strengths, share knowledge, and allow innovation, ensuring that Guam achieves its sustainability goals in the most effective way. Working together with our government agencies, businesses, non-profits, and communities will enable the PAG to make the greatest contribution to Guam's future.

Figure 24. Investing in the Future Together

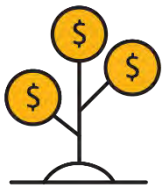


3.5 Additional Considerations

The following sections present additional global considerations for the PAG to consider pursuing related to implementing the Zero Waste Strategy outlined in this Plan.

3.5.1 Advanced Disposal Fees

GovGuam, local village leaders, and the Guam legislature continue to acknowledge the need for recycling priority materials including junk vehicles, tires, waste oil, and white goods. One possible funding strategy is ADF, which involves collection of fees at the time of import or point of sale of a recyclable product to cover the costs of recycling the products.



In Guam, the ADF concept was introduced in 2005 for all imported goods coming through the commercial port or airport as a means of funding recycling of the goods. In this early legislation, it was proposed that variable fees be collected by the Customs and Quarantine Agency and paid to the Treasurer of Guam using various payment forms, registration forms, and exceptions and reporting requirements. Under this early legislation, each product was to be assigned a different recycling/disposal fee, such as $200 per vehicle. With input from the Guam Automobile Dealers Association and other public input, this ADF legislation was transitioned to the simplified current model of an annual non-refundable assessment of $25 on existing registration for each vehicle, paid into the RRF administered by Guam EPA.

The RRF continues to be used successfully to fund the recycling of priority wastes including junk vehicles and tires, but there is a need to increase this funding. The RRF is used to fund local contracts for hauling junk vehicles out of villages to centralized junk car lots. It is recommended that additional RRF funding be used to complete the recycling process of junk vehicles to include draining fluids, crushing, hauling, and shipping the junk vehicles to recycling markets. Contracts for completing this recycling process should incorporate the recycling industry economic stimulus program with sliding scale as documented in 10 GCA 51 § 51308. The Recycling Enterprise Zone at the Port can be used to facilitate these additional steps as outlined in the STOP Junk Vehicles strategic initiative included in this Plan.

3.5.2 Environmental Management System

In addition to a formal sustainability plan, implementing an Environmental Management System (EMS) is a powerful strategy for both environmental stewardship and economic sustainability. An EMS consists of a set of policies, procedures, and practices designed to help organizations minimize their environmental footprint. It offers a systematic method to identify, assess and address environmental realities and risks. Critical aspects of an EMS (ISO 2024) include the following:

- Ensuring compliance with environmental regulations
- Promoting efficient resource use
- Reducing waste and pollution (including GHG emissions)
- Continuously improving environmental performance
- Centralized environmental management and reporting

The following organizations provide valuable resources and guidelines to implement an effective EMS for the PAG:

- The International Organization for Standardization (ISO) EMS Standard, commonly referred to as ISO 14001. The standard is used by organizations worldwide to systematically evaluate, manage, and address the realities and risks associated with their environmental operations (ISO 2015).
- IAPH's WPSP database of best management practices focuses on various sustainability aspects, including environmental management (IAPH 2024).
- The American Association of Port Authorities (AAPA) Environmental Management Handbook is designed to help ports effectively manage their environmental issues (AAPA 1998).
- The Inter-American Committee on Ports (CIP) Guide to Environmental Certification and Sustainability Reporting provides reference tools explicitly tailored to environmental protection in a port setting (CIP 2020).

Implementing an EMS not only saves organizations money but also enhances their public image. This is achieved through cost avoidance and savings, such as reducing incidents that lead to liability costs,

securing more affordable insurance, and conserving input materials and energy through systematic reduction efforts. The positive public image that comes with implementing sustainability initiatives and having an established EMS are key factors that will be viewed favorably by investors, if the PAG decides to explore green bonds as a financing mechanism for future sustainability initiatives.

4.0 Zero Emissions Strategy

The Zero Emissions Strategy involves a comprehensive assessment of the Port's scope 1 and 2 GHG emissions (Figure 25), establishing a foundation for targeted carbon reduction initiatives. It also includes evaluating climate change impacts, with data to be used in future work for developing effective mitigation strategies. By identifying next steps, the strategy aims to guide the Port towards achieving its Net Zero Emissions goal.

The following sections provide a summary of the methodology and findings of the Zero Emissions Strategy. It is intended to provide additional supporting information to the Executive Summary (ES) Zero Emissions Strategy, which delivers the holistic perspective on these findings and how they will be used to achieve carbon reduction. Appendix K, the Implementation Roadmap, provides a deeper dive into the five next step solutions identified, and Appendix L, the GHG Inventory, provides the calculations that informed the scope 1 and 2 GHG emissions inventory. The information used to quantify the GHG inventory and potential solutions was collected through a variety of sources, including desktop research, expert opinion, and financial and operational documents provided by the PAG.

4.1 Greenhouse Gas Inventory

The methodology used for the scope 1 and 2 GHG emissions inventory is defined in *A Corporate Accounting and Reporting Standard* (Greenhouse Gas Protocol 2015). The Zero Emissions Strategy uses an operational control boundary when quantifying leased assets; indicating that GHG emissions were only quantified as scope 1 or scope 2 if they were under the direct or operational control of the PAG. Emission factors used in the calculations were taken from the Intergovernmental Panel on Climate Change Fifth Assessment Report (IPCC 2014), The Climate Registry (2024), and USEPA emission factors (USEPA 2024).

Table 3 provides a summary of the scope 1 and scope 2 PAG emissions baseline. Consistent with the GHG Protocol, the GHG baseline was estimated as an average across 2021 and 2022 as this was the most representative baseline value; in this document, these values will be referred to as the GHG baseline. Tables 4 and 5 provide further breakdown for the emission sources within these two categories (scope 1 and 2).

Figure 25. The Port's Emission Scopes

SCOPE 1 Emissions | Direct Emissions

These are GHG emissions occurring from operations or processes directly controlled by the Port. These include tailpipe emissions from vehicles, yard equipment and generators.

SCOPE 2 Emissions | Indirect Emissions

These are GHG emissions occurring from the electricity consumption of the Port. These are influenced by the carbon intensity of the electrical grid on Guam.

SCOPE 3 Emissions | Indirect Emissions

These are any remaining emissions that were not counted for in Scope 1 & 2 and include the ports supply chain both upstream and downstream. Emissions from berthing ships and transportation of materials are included in this category.

Table 3. GHG Baseline as Average across Years 2021 and 2022

Total GHG emissions per year	Baseline	Unit
Scope 1	2,073	MT CO2e/yr
Scope 2	2,670	MT CO2e/yr
Total	**4,743**	**MT CO2e/yr**

Note: MT CO2e/yr = metric ton(s) carbon dioxide equivalent

Table 4. Scope 1 Emissions (Direct Emissions)

Emission Source	Emissions (Baseline)	Units
Mobile : Yard Equipment	1,749	MT $CO2_e$/yr
Mobile : Passenger Fleet	199	MT $CO2_e$/yr
Stationary	52	MT $CO2_e$/yr
Fugitive	73	MT $CO2_e$/yr
Total	**2,073**	**MT $CO2_e$/yr**

Table 5. Scope 2 Emissions (Indirect Emissions)

Emission Source	2023 Usage in kWh per Year (Baseline)	Emission Factor in $kgCO2_e$ per kWh	Emissions (Baseline)	Units
Electricity Consumption	3,466,888	0.77	2,670	MT $CO2_e$ per year

Notes:

kgCO2e = kilogram(s) of carbon dioxide equivalent per year
kWh = kilowatt-hour(s)
Emission Factor applicable for power purchased from Guam Power Authority (GPA). Value is derived from the *Guam's Priority Climate Action Plan* (CCRC and UOG CIS&SG 2024).

Scope 2 emissions were calculated for the year 2023, as this was the most complete and accurate data set. Energy consumption was quantified across all five load centers, with the meter at Load Center 1 providing the overall values for Load Centers 2 and 3.

4.2 Decarbonization Solutions Roadmap

Once a baseline was established for the GHG inventory, the process of quantifying the reduction potential of solutions was undertaken. Carbon reductions for potential solutions were based on industry best practice, up-to-date technology information, and energy demand calculations.

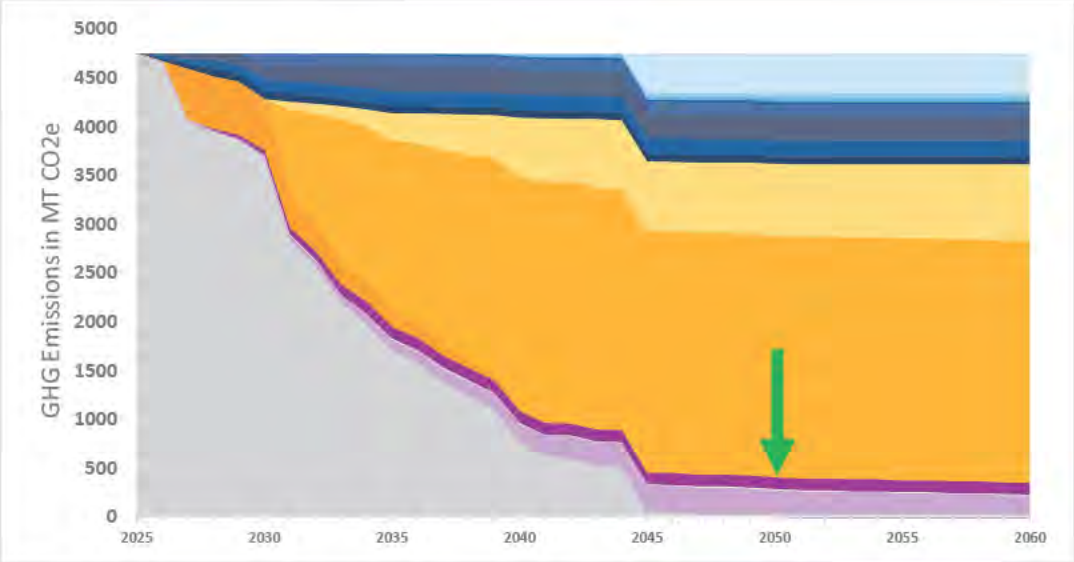
Results from quantifying the carbon reduction potential were used to develop an Excel-based tool referred to as the PAG Wedge Diagram; Carbon Reduction Potential (Wedge Diagram). This tool superimposed solutions in order of projected implementation year to track the reduction of carbon emissions over time. The date on which carbon emissions reached zero was used as the target date for the PAG to achieve Net Zero (Figure 26).

Solutions were categorized in one of the following three ways:

- Direct actions, represented as the variations of blue wedges on Figure 26. Direct actions represent solutions that the PAG can implement without the need for collaboration or partnership with external entities.
- Collaborative actions, represented as the variations of gold wedges on Figure 26. These actions are similar to direct actions but require collaboration and partnership with external entities.
- Nature-based solutions, represented as the variations of pink wedges on Figure 26. These are solutions that take a nature-based approach and provide social, environmental, and economic benefits.

Once solutions had been identified, a Zero Emission Workshop was held with key personnel across the PAG and supporting stakeholders to discuss the potential solutions and agree upon a timeline for implementation. The Wedge Diagram was used as a tool to inform this workshop and agree upon the dates for each solution. The outcome of this workshop informed the graph depicted on Figure 26 and forms the foundation of the Zero Emission Strategy. With discussed implementation dates, it was agreed the target date for reaching Net Zero for scope 1 and 2 emissions is the year 2050.

Figure 26. The Wedge Diagram



Note: Green arrow indicates agreed target date for Net Zero as 2050.

4.3 Decarbonization Solutions

Implementation dates for proposed solutions supported the development of a timeline for action. The key solutions were identified as the critical next steps that need to be taken to support the reduction of GHG emissions from scope 1 and 2 sources.

Table 6 provides the summary of the five identified key solutions. It lists the emission sources (scope 1 or 2) that the solutions aim to reduce, the action category they fall under, and the corresponding solutions (that is, the activity suggested). Further information on what these solutions are and how they can be realized is provided in Appendix K, Implementation Roadmap.

Table 6. Five Key Solutions for Implementation

Solution	Emission Source	Action Category	Guam Priority Climate Action Plan Initiatives
Electrification of Port Passenger Fleet (focusing on on-road vehicles such as pickup trucks and vans)	Scope 1; reducing emissions associated with on-road vehicles	Direct Action	Transportation Measures
Completion of Internal and External Lighting Upgrades	Scope 2; reducing emissions associated with electricity consumption	Direct Action	Energy Measures
Submetering	Scope 2; reducing emissions associated with electricity consumption	Direct Action	
Engagement with Guam Power Authority (GPA)	Scope 2; reducing emissions associated with electricity consumption	Collaborative Action	
Explore Mangrove & Environmental Restoration Opportunities	Scope 1 and 2; reducing residual emissions through offsetting	Nature-based Solutions	Forestry Measures

Additional solutions were also quantified to inform the Net Zero target date, helping to understand the long-term action that needs to be undertaken by the PAG to achieve Net Zero. Table 7 provides the complete list of solutions identified to date. Understanding what will eventually need to be implemented will help the decision-making process for the PAG when looking at future improvements and projects.

Table 7. Full List of Potential PAG Solutions for Reducing Carbon Emissions from Scope 1 and 2 Sources

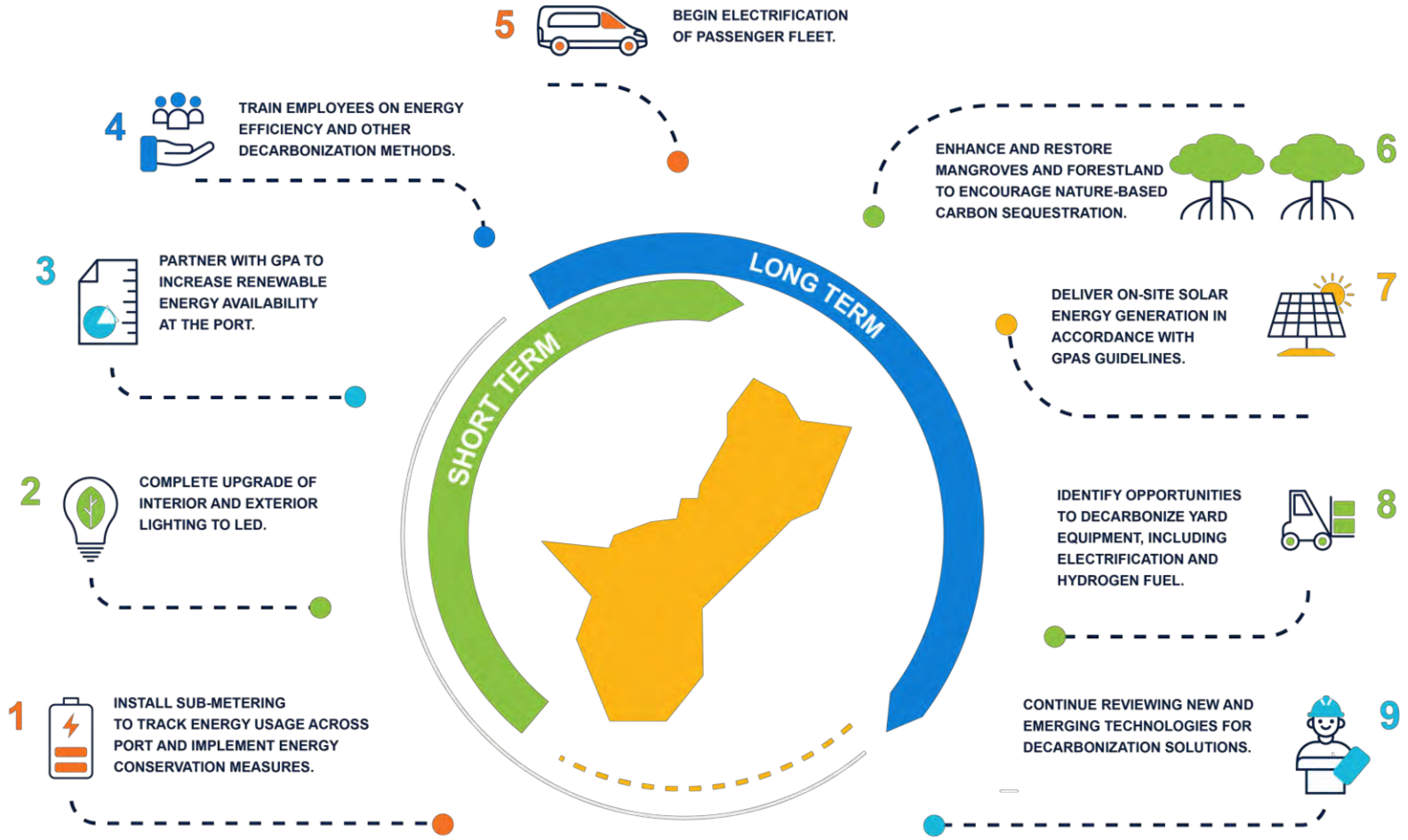
Emission Source	Action Category	Solution
Scope 1	Direct Action	Electrification of Passenger Fleet
Scope 1	Direct Action	Decarbonization of Yard Equipment
Scope 1	Direct Action	Electrification or Hybridization Retrofit of Ship-to-shore Gantry Cranes
Scope 1 and 2	Direct Action	Employee Training Programs
Scope 2	Direct Action	Energy Conservation Measures (including lighting upgrades)
Scope 2	Direct Action	Submetering
Scope 2	Direct Action	Installation of 100-kilowatt Solar Panels
Scope 2	Collaborative Action	Partner/Collaborate with GPA (includes potential onsite renewable energy generation and power purchase agreements)
Scope 1 and 2	Nature-based Solutions	Reforestation of Mangroves and Coastal Ecosystems
Scope 1 and 2	Nature-based Solutions	Support Community-based strategies in Surrounding Region of Piti

4.4 Implementation Roadmap

It is important to note that while many of these solutions are critical for reducing scope 1 and 2 emissions, their priority for implementation may change once a full scope 3 GHG inventory has been conducted. Furthermore, as time progresses, the availability of technology may influence the implementation plan for some of these solutions. These solutions should be understood as the first steps and key milestones, with the advance towards Net Zero maintaining a dynamic approach. Reducing emissions is critical, but the PAG must be pragmatic in approach and implementation.

Figure 27 provides a roadmap for implementing these identified solutions. Once the scope 3 inventory has been conducted, this roadmap will be updated to provide additional steps for reduction.

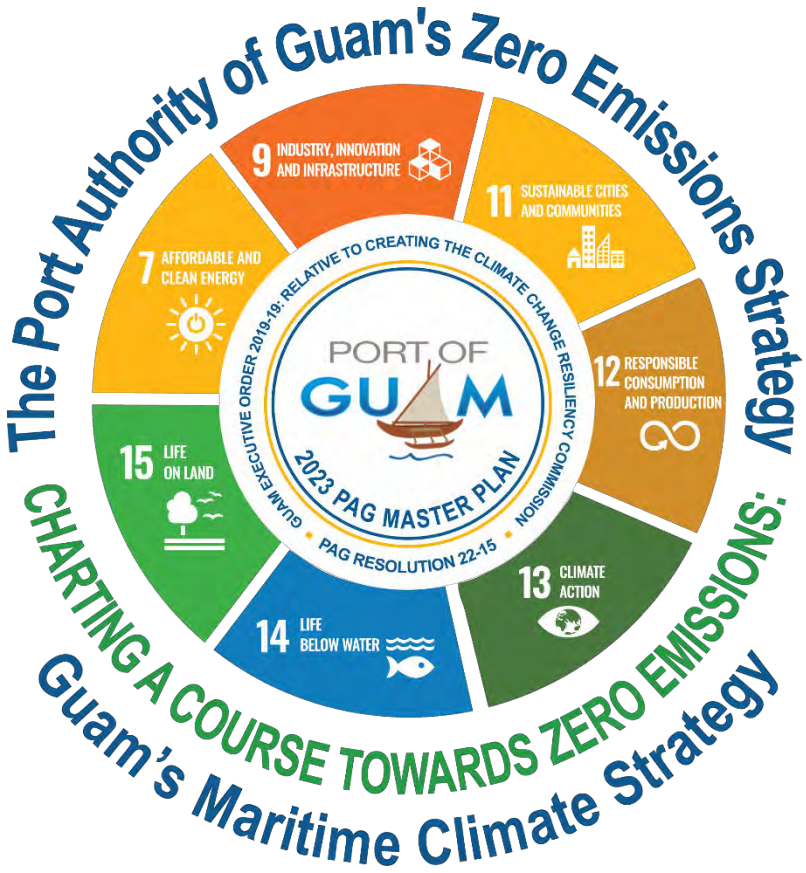
Figure 27. Zero Emissions Implementation Roadmap: Short and Long-term Solutions



4.5 Summary and Next Steps

As part of the G3 initiative, the PAG continually strives to incorporate the UN SDGs into their ways of working. These goals are based on decades of work by countries across the globe to create a fairer, safer, and more prosperous world for everyone. At the heart of our Zero Emissions Strategy are seven UN SDGs. These goals underpin our approach to the Zero Emission Strategy, which is why our Zero Emission logo reflects these goals and why our solutions consider benefits beyond carbon reduction (Figure 28).

Figure 28. PAG's Zero Emissions Strategy



The Zero Emission Strategy establishes the first critical steps for the PAG's journey in reducing emissions and addressing climate change. To be successful in this journey, the PAG will need to continue to evolve and adapt their efforts in line with new technologies and best practices. Table 8 summarizes the goals, objectives, and next steps to move toward the goal of Net Zero by 2050, and ultimately Zero Emissions.

Table 8. Net Zero Goals, Objectives, and Next Steps

Goal	Action Type	Objectives	Next Steps
Reduce Scope 1 GHG Emissions	Direct Action	Reduce emissions associated with PAGs passenger fleet.	Identify electric vehicle transition options to decarbonize for passenger fleet. Assess the need for charging infrastructure across Port property.
	Direct Action	Reduce emissions from yard equipment and stationary assets (including generators and ship-to-shore gantry cranes).	Explore opportunities for electric power or hydrogen fuel for yard equipment and stationary assets. Assess retrofit, operational or upgrade options for current assets to improve fuel efficiency.
Reduce Scope 2 GHG Emissions	Direct Action	Measure energy consumption of buildings and assets.	Install submetering at identified locations across Port property and compare results against current GHG baseline.
	Direct Action	Reduce energy consumption of buildings.	Implement the identified energy conservation measures, such as upgrading lighting and optimizing air-conditioning operations.
	Direct Action	Reduce energy consumption of lighting and assets.	Implement energy conservation measures, including lighting upgrades.
	Collaborative Action	Increase renewable energy availability for Port operations.	Engage with GPA to identify opportunities to increase renewable energy availability at the Port. Consider ways the Port can support GPA's goals for 50% renewable energy by 2030, and determine how 100% of the PAG's energy can be zero GHG by 2050.
Offset Residual GHG Emissions	Nature-based Solutions	Enhance and restore mangroves and forested land to encourage carbon sequestration.	Collaborate with local scientists and specialists to identify enhancement areas. Secure funding and research opportunities.
Reduce Scope 3 GHG Emissions	Direct Action	Finalize GHG inventory baseline for scope 1, 2, and 3 emissions.	Quantify scope 3 emissions and identify reduction opportunities. Integrate solutions with scope 1 and 2 reductions.
Improve Climate Resiliency of Ports Assets and Operations	Direct Action	Use findings from climate change quantification to inform strategy and planning for the Port.	Conduct a full vulnerability assessment of assets, infrastructure, and operations to understand mitigation solutions available to the Port based on exposure to current conditions and future projected climate change.

Doc. No. 38GL-26-2386.*

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6.0 Appendices

A. Port of Guam Resolution No. 2024-02 Adopting the “2024 Look Ahead” Plan

B. Port of Guam Resolution No. 2022-15 Explore Membership in the International Association Of Ports And Harbors

C. Guam Public Law 28-92 Recycling Enterprise Zone

D. Site Screening Framework Development

E. NOAA Storm Surge Maps

F. Truck Turn Evaluations

G. Permit Requirements

H. Recommended Additions to the PAG Standard Lease Agreement

I. IFB options and partnership opportunities

J. Updates to the PAG Board Recycling Policy

K. Implementation Roadmap

L. Greenhouse Gas Inventory

Appendix A
Port of Guam Resolution No. 2024-02
Adopting the “2024 Look Ahead” Plan

Doc. No. 38GL-26-2386.*

BOARD OF DIRECTORS
Dorothy P. Harris, Chairperson
Conchita S.N. Taitano, Vice Chairperson
Fe R. Valencia-Ovalles, Board Secretary

PORT OF GUAM

Resolution No. 2024-02

RELATIVE TO ADOPTING THE "2024 LOOK AHEAD" PLAN: A RESOLUTION FOR SUSTAINABILITY, SECURITY, AND STRATEGIC GROWTH AT THE PORT AUTHORITY OF GUAM.

BE IT RESOLVED BY THE BOARD OF DIRECTORS OF THE PORT AUTHORITY OF GUAM:

WHEREAS, the Port Authority of Guam is integral to the economic and national security interests of Guam and the broader Indo-Pacific region, necessitating a forward-looking and strategic approach to address current and future challenges; and

WHEREAS, the "2024 Look Ahead" document underscores the development of a Medical Complex, Integrated Healthcare System for Guam and the region, as part of Governor Lou Leon Guerrero and Lt. Governor Josh Tenorio's initiative to enhance healthcare infrastructure in line with the One Guam approach, emphasizing the importance of modernizing the public hospital's infrastructure, related medical services, and incorporating a veterans' facility as a priority concern; and

WHEREAS, the ongoing military buildup and the imperative for substantial federal investment highlight the need for a strategic framework that aligns with the One Guam approach, focusing on national security, skilled labor development, and robust civilian infrastructure as core priorities; and

WHEREAS, the comprehensive strategic framework prioritizes the enhancement of port infrastructure, operational efficiency, and the professional development of all Port employees; and

WHEREAS, environmental sustainability is a cornerstone of the "2024 Look Ahead" plan, emphasizing initiatives such as the Port Sustainability Plan to minimize the ecological footprint, manage waste effectively, and pursue funding opportunities for sustainable operations, in alignment with the overarching goals of reducing carbon emissions and enhancing energy efficiency; and

WHEREAS, key initiatives outlined in the Port Authority's 2023 Master Plan, including the replacement of Ship-to-Shore (STS) Cranes, Fuel Piers, and Wharf, alongside significant IT improvements, are critical for supporting the military buildup and ensuring the Port's operational excellence; and

WHEREAS, the empowerment and well-being of all Port employees are central to the Port's operational efficiency, advocating for professional development, safety, and fair labor practices in alignment with the Collective Bargaining Agreement; and

WHEREAS, financial stability, accountability, and transparency are underscored as vital principles guiding the Port's operations, ensuring integrity, trust, and responsible governance; and

WHEREAS, ongoing collaboration with Customs for cargo inspection and the monitoring of boat operators at Marinas is essential for maintaining high levels of safety and efficiency in cargo processing, thereby enhancing security and facilitating trade; and

WHEREAS, the focus on customer service digitization and community engagement through the Port Community Portal aims to strengthen relationships with port users and stakeholders, improving service delivery and promoting operational transparency; now therefore, be it

RESOLVED, that the Board of Directors of the Port Authority of Guam hereby adopts the "2024 Look Ahead" plan as the guiding framework for the Authority's strategic direction, operational priorities, and key initiatives for 2024 and beyond, reflecting a comprehensive commitment to national security, infrastructure enhancement, environmental sustainability, healthcare improvement, and the professional growth of its workforce; and be it further

RESOLVED, that this Board hereby memorializes its unwavering commitment to the principles of sustainability, resilience, and environmental stewardship, recognizing these as foundational pillars in the "2024 Look Ahead" plan. We commit to implementing sustainable practices, pursuing green initiatives, and engaging in actions that protect and enhance our environment for future generations. This commitment is reflective of our dedication to the well-being of our community, the preservation of our natural resources, and the promotion of a sustainable economic future for the Port of Guam and its surrounding region; and be it further

RESOLVED, that the Board directs the General Manager and all relevant departments and personnel to diligently implement the strategies, initiatives, and projects outlined in the "2024 Look Ahead" plan, ensuring that the Port Authority of Guam continues to be a pivotal contributor to our island's prosperity, security, and sustainability; and be it further

RESOLVED, that the Chairperson certify, and the Secretary attest to, the adoption hereof, and that copies of the same be transmitted to Governor Lou Leon Guerrero; Lt. Governor Joshua Tenorio; Speaker Therese Terlaje; Port's Legislative Oversight Chairperson Senator Amanda Shelton; and the 37th Guam Legislature.

PASSED AND ADOPTED UNANIMOUSLY BY THE BOARD OF DIRECTORS THIS 25th DAY OF APRIL, 2024.

DOROTHY P. HARRIS
CHAIRPERSON, BOARD OF DIRECTORS
PORT AUTHORITY OF GUAM

FE R. VALENCIA-OVALLES
SECRETARY, BOARD OF DIRECTORS
PORT AUTHORITY OF GUAM

Doc. No. 38CL-26-2386.*

PORT AUTHORITY OF GUAM
A Look Ahead at **2024**

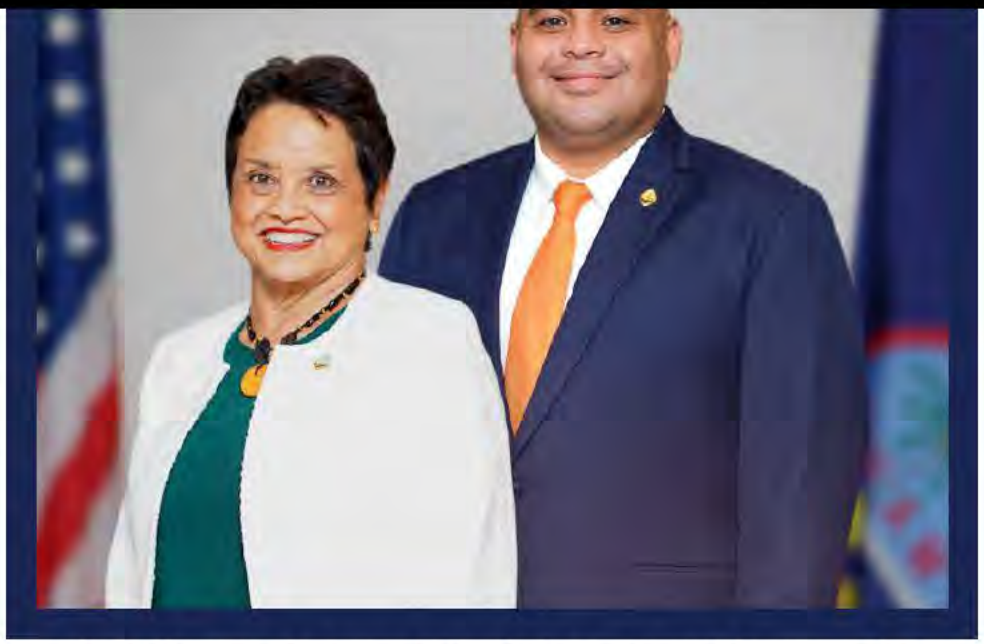
LOOK AHEAD
2024

The Port Authority of Guam's 2024 Look Ahead is our guiding roadmap. While we have kept pace with current demands, we continue to face significant challenges, particularly due to the ongoing military buildup that requires substantial federal investment. This document will be our essential tool in maintaining a focused approach to overcoming challenges.

Doc. No. 38GL-26-2386.*

FRAMEWORK

Aligning with Governor Lourdes A. Leon Guerrero and Lt. Governor Joshua F. Tenorio's Strategic Framework presented in a One Guam approach to the military buildup that requires substantial federal investment, this framework prioritizes Guam's key concerns with a focus on National Security.



KEY ELEMENTS

- The Department of Defense (DOD) commits to a strategic One Guam framework for a mutually beneficial outcome from the buildup.
- Advocate for increased defense spending outside the military fence to support civilian infrastructure, aligning with military objectives and benefiting both Guam and the Indo-Pacific region.
- Prioritize healthcare, infrastructure, and skilled labor, in line with national security interests and the military's Indo-Pacific Strategy and Pacific Deterrence Initiatives.
- Implement a One Guam approach to the Guam Buildup, including comprehensive healthcare, streamlined veteran's services, a skilled workforce (with H2B visa waiver program), robust infrastructure, defense access roads, and military spending outside the fence to enhance national security.

Port enhancements are among the Governor and Lt. Governor's following priority concerns (see *Efficient Transportation of Goods and Services*):

- Medical Complex, Integrated Healthcare System for Guam and Region: Ensuring healthcare facilities in Guam are equipped to provide excellent care, including modernizing the public hospital's infrastructure and related medical services and incorporating a veterans' facility.
- Efficient Transportation of Goods and Services: Advocating for federal support to enhance the efficiency and reliability of supply chain transportation and logistics networks in Guam, vital for a thriving economy.
- Road Infrastructure: Securing funding and technical expertise to improve road safety and connectivity, essential for residents' daily lives and strategic operations in Guam.
- Utilities, Telecommunications, and Cybersecurity: Focusing on reliable access to essential

Port's 2023 Master Plan Priority Initiatives

- **STS Crane Replacement**: The three operational Ship-to-Shore (STS) Gantry Cranes have reached the end of their 40-year lifespan (with a mid-life refit) and require immediate replacement. This is crucial to support the military buildup and ensure continued commercial and military usage.
- **Fuel Pier Replacement**: The Port currently operates two vital fuel piers, Golf Pier and F1 Pier, which serve as the primary fuel source for Guam residents, Guam Power Authority (GPA), and a secondary source for the military. Due to their critical condition, these facilities need urgent replacement to prevent costly and disruptive service interruptions.
- **Hotel Wharf and Access Roadway Rehabilitation and Upgrade**: This project involves the reconstruction and expansion of a wharf constructed in 1948, including a new sheet pile bulkhead retaining wall, along with upgrades to the existing access roadway leading to the wharf. The project also encompasses the demolition of surface facilities and the construction of additional structural components.

- **Wharf Replacement**: The Port's operations at Berths F2 through F6 handle containers, general cargo, and bulk cargo. These berths, dating back to the 1960s, have exceeded their useful life, making them susceptible to earthquake damage. Continuing to operate them necessitates costly service life extensions. To ensure future resiliency, it is imperative to harden these facilities by replacing deteriorated structural elements and upgrading the overall structures.
- **Area A Fuel Storage Facility Rehabilitation/Upgrade**: This initiative involves the replacement of above-ground fuel storage tanks and related infrastructure. It aims to create an ideal secondary/alternate fuel depot to support the anticipated fuel capacity requirements of DOD in the Indo-Pacific Theater.
- **IT Improvements**: This includes upgrading the Terminal Operating System (TOS), developing IT Infrastructure, and creating Cyber Security roadmaps to enhance the Port's efficiency and security. These improvements will facilitate better collaboration with DOD and port users.
- **Port Buildings Demolition & Replacement**: The plan involves demolishing buildings from the 1960s that have exceeded their useful life. Replacement structures will be developed to accommodate current and future functions.

and the need for updated infrastructure to support both our commercial and defense activities. These improvements, including the Port upgrades and projects like the proposed integrated medical complex in Guam, are all being planned with national security as a key consideration.

Given the Port's crucial role, it is imperative that federal spending aligns with and supports the key issues identified in the Governor and Lt. Governor's Strategic Framework presented in a One Guam approach to the military buildup.

2024 ROADMAP

Port Strong: Empowering ALL Port Employees with Succession Planning for Success, Resilience, and Operational Efficiency

Our top priority is the well-being, professional development, and operational efficiency of every Port employee, whether they are working on the dockside or in administrative roles. We are committed to fostering equal opportunities for skill development and career growth, with a focus on promoting from within whenever possible. Ensuring the safety of our team is paramount. To achieve this, we maintain a proactive stance, regularly updating our safety protocols, keeping staff certifications up to date, and continuously pursuing training and development opportunities, including in areas of emergency preparedness and response.

As part of our ongoing efforts to maintain operational efficiency, we remain committed to optimizing personnel scheduling in strict accordance with the Collective Bargaining Agreement, the Port's Personnel Rules and Regulations, and all applicable laws. This commitment includes ensuring equitable scheduling for our employees, balancing both regular time off and necessary overtime work. Our focus is on providing fair opportunities for everyone to have days off and to earn overtime, ensuring

strategic decision-making, characterized by collaboration, consensus-building, and a bottom-up approach whenever possible. We continuously seek ways to secure the financial stability of the Port. This commitment extends to maintaining a strong dedication to transparency and accountability in all operational and financial transactions.

By seamlessly integrating transparent practices and accountability into our strategic decision-making and financial management, we uphold the highest standards of integrity and foster trust with stakeholders. This trust forms the foundation of our sustainable growth and the support we receive from the community. It also plays a key role in maintaining our low-risk auditee status, which we have proudly earned since 2019.

As we move forward, our unwavering commitment to strategic decision-making, financial stability, transparency, and accountability remains steadfast, ensuring a positive future for both the Port as well as the local and regional communities we serve.

Continued Partnership in Upholding Customs Cargo Inspection at the Port of Guam and Monitoring of Boat Operators at Marinas

We remain dedicated to our ongoing collaboration with Customs in supporting their essential mandate for cargo inspection at the Port Authority of Guam and monitoring of all boat operators at the Marinas. This partnership ensures the thorough and efficient inspection of cargo, fully compliant with all relevant regulations and security protocols.

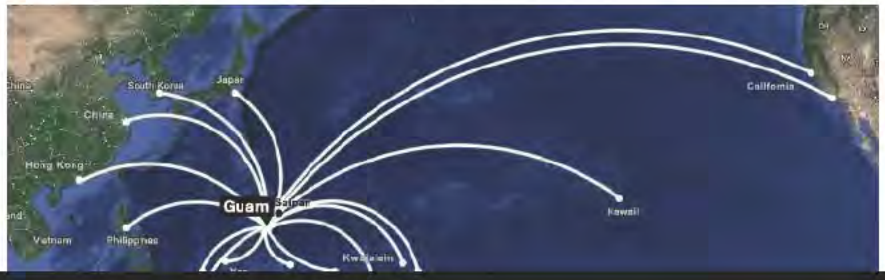
By working together seamlessly, we facilitate the smooth flow of goods while upholding the highest standards of safety and security. This collaborative effort not only benefits the Port by ensuring timely cargo processing but also plays a crucial role in preventing the entry of illegal drugs, invasive species, and other contraband into our borders. This commitment significantly contributes to the overall well-being and prosperity of Guam.

Our continued dedication to this partnership underscores our shared responsibility for the safety and security of our island communities

Our commitment goes beyond infrastructure upgrades; we prioritize addressing the concerns of the Port Users Group whenever practicable, pride ourselves in excellence in customer service, and community engagement. We strive to foster strong relationships with shipping companies, its shipping agents, the Port Users Group, and various stakeholders, recognizing their pivotal role in keeping what it takes to keeping the supply chain moving in and out of Guam and our region.

To further strengthen these relationships and enhance service delivery, we are embarking on a digitization journey that includes the development of a Port Community Portal. This digital platform will serve as a central hub for communication and collaboration, providing our partners with real-time access to information, data, and resources related to Port activities.

Our focus on improving customer service ensures that we efficiently and effectively meet the needs of our partners through digital channels and streamlined processes. This emphasis on building strong partnerships, coupled with the power of digitization, contributes to the sustainable growth of the Port, fostering a positive impact on the local and regional economy. Furthermore, our dedication to community engagement underscores our commitment as responsible corporate citizens. We work collaboratively with our neighbors and stakeholders through the Port Community Portal to address concerns, promote transparency, and ensure that our operations benefit both our local and regional communities.



The Port's 2024 budget outlines several key federal grant projects and yard equipment purchases, totaling $40.2 million in the Capital Improvement Program (CIP). These investments include:

1. F1 to Golf Pier Fuel Connectivity
2. DERA Tractor Replacement
3. MARAD AMHP Acquisition of Specialized Container Yard Equipment
4. PSGP Acquisition of Transportation Worker Identification Credentialing (TWIC) System
5. PSGP Acquisition of Vessel Tracking/Radar Intrusion System
6. PSGP Acquisition of Two Unmanned Aerial Vehicles
7. Wharves Service Life Extension from F1 to F6
8. Welding Shop Repairs and Upgrades

These strategic allocations aim to enhance port infrastructure and yard capabilities while ensuring compliance with the latest security and operational standards.

strong emphasis on environmental sustainability and responsibility as its core objectives. It clearly solidifies the Leon Guerrero/Tenorio's, in conjunction with the First Gentlemen's Zero Waste Task Force, unwavering commitment to minimizing its ecological footprint, mitigating environmental impacts, and championing responsible practices throughout its operations. This comprehensive plan encompasses a wide array of strategies designed to enhance energy efficiency, reduce emissions, manage waste effectively, and preserve natural resources.

Through the implementation of these environmentally sustainable initiatives, the Port not only ensures the protection of the environment, but also actively contributes to the well-being of the community while working towards a more sustainable future for all stakeholders.

GUAM GREEN GROWTH

To further these goals, the Port has successfully secured a grant from OLCC, enabling the commissioning of a Port Sustainability and Resiliency Study. This collaborative effort, spearheaded by the Port's owner agent WSP, together with its subconsultant, Jacobs Engineering Group Inc., encompasses various critical analyses. These analyses are aimed at crafting a comprehensive plan for the Port Authority of Guam (PAG) that seamlessly aligns with Guam's broader sustainability initiatives.

The study encompasses several pivotal tasks, including:

- Zero Emissions: This task entails a thorough review of Guam's Zero Emissions Strategy, the identification of the Port's current emission reduction initiatives, and

The Guam Green Growth **Action Framework** is focused on five categories of action

- Zero Waste: This aspect centers on a comprehensive review of Guam's Zero Waste Master Plan. It identifies Port-related initiatives, such as Recycling Enterprise Zones, and explores potential waste streams that could be effectively managed at the Port. The task also involves research into best practices for waste management and collaborative brainstorming with PAG experts to devise zero waste initiatives.
- Property Identification: The identification of properties owned by PAG that are suitable for hosting Zero Waste Facilities, along with the identification of additional property requirements for future waste management initiatives.
- Strategy Development: This task focuses on formulating a strategy for implementing Zero Waste improvements under the leadership of PAG. It includes the development of a conceptual framework for a Recycling Enterprise Zone, drawing from the success of similar initiatives elsewhere. The strategy encompasses various elements, such as securing and developing properties for a Recycling Enterprise Zone, creating a commercial lease agreement, piloting zero-waste initiatives, and exploring the feasibility of collecting advanced disposal fees for targeted priority products.

Upon the completion of both the Zero Emissions and Zero Waste plans, these studies will be seamlessly integrated into a single, comprehensive Port Sustainability and Resiliency Plan Report. This significant undertaking underscores the Port's steadfast commitment to reducing carbon emissions, embracing sustainable practices, and actively participating in the preservation of Guam's environment and marine ecosystem.

Moreover, by undertaking these studies and engaging in sustainability initiatives, the Port not only showcases its dedication to environmental stewardship, but also enhances its qualifications for funding from the USEPA Inflation Reduction Act (IRA) and other grant programs. These activities are crucial in accessing funds that will modernize Port operations and align them with the goals of the USEPA IRA grant program.

at a pivotal juncture, poised to embrace the challenges and opportunities that lie ahead. Our comprehensive strategic plan, in alignment with the vision of Governor Lou Leon Guerrero and Lt. Governor Josh Tenorio, is designed to enhance our capabilities and address key concerns in national security, infrastructure, healthcare, and environmental sustainability.

RORY J. RESPICIO
General Manager

We acknowledge the substantial efforts and dedication of every team member, whose resilience and commitment have been instrumental in overcoming past challenges and setting the stage for future success. Moving forward, we remain focused on maintaining operational efficiency, fostering professional development, and ensuring the safety and well-being of all employees.

Our unwavering commitment to collaboration, financial stability, accountability, and transparency will continue to guide our actions. This dedication is crucial in ensuring that the Port Authority of Guam continues to fulfill and exceed the expectations of our local and regional communities, employees, port users, and all stakeholders.

Si Yu'os Ma'åse for your unwavering support and dedication to our shared goals and vision. Together, we are Port Strong ready to navigate the future with confidence and determination.

ERIKKA LLORENTE/PDN

Acting Gov. Joshua Tenorio, third from left, joins senators and other dignitaries in recognizing Port Authority of Guam retirees, including Frankie R.J Cruz, fourth from left, who was a port transportation supervisor for 35 years, during the celebration of the 48th anniversary of the Jose D. Leon Guerrero Commercial Port of Guam on Oct. 16, 2023.

Port celebrates 48 years

ERIKKA LLORENTE/PDN

Acting Gov. Joshua Tenorio joins the Guam Police Department and other dignitaries and guests during the "Stand Ye Guamanians" anthem at the celebration of the 48th anniversary of the Jose D. Leon Guerrero Commercial Port of Guam on Oct. 16, 2023.

Pacific Daily News

A crowd gathered to join the management and staff of the Jose D. Leon Guerrero Commercial Port of Guam in marking the institution's 48th anniversary on Oct. 16 at the port.

A parade of trucks and a Port Week opening ceremony kicked off the celebration organized by the Port Authority of Guam.

The port also put on display some of its new equipment.

The port was established on Oct. 31, 1975 as a public corporation and autonomous instrumentality, naming it the Port Authority of Guam. On its 48th year, it has a total of 382 employees.

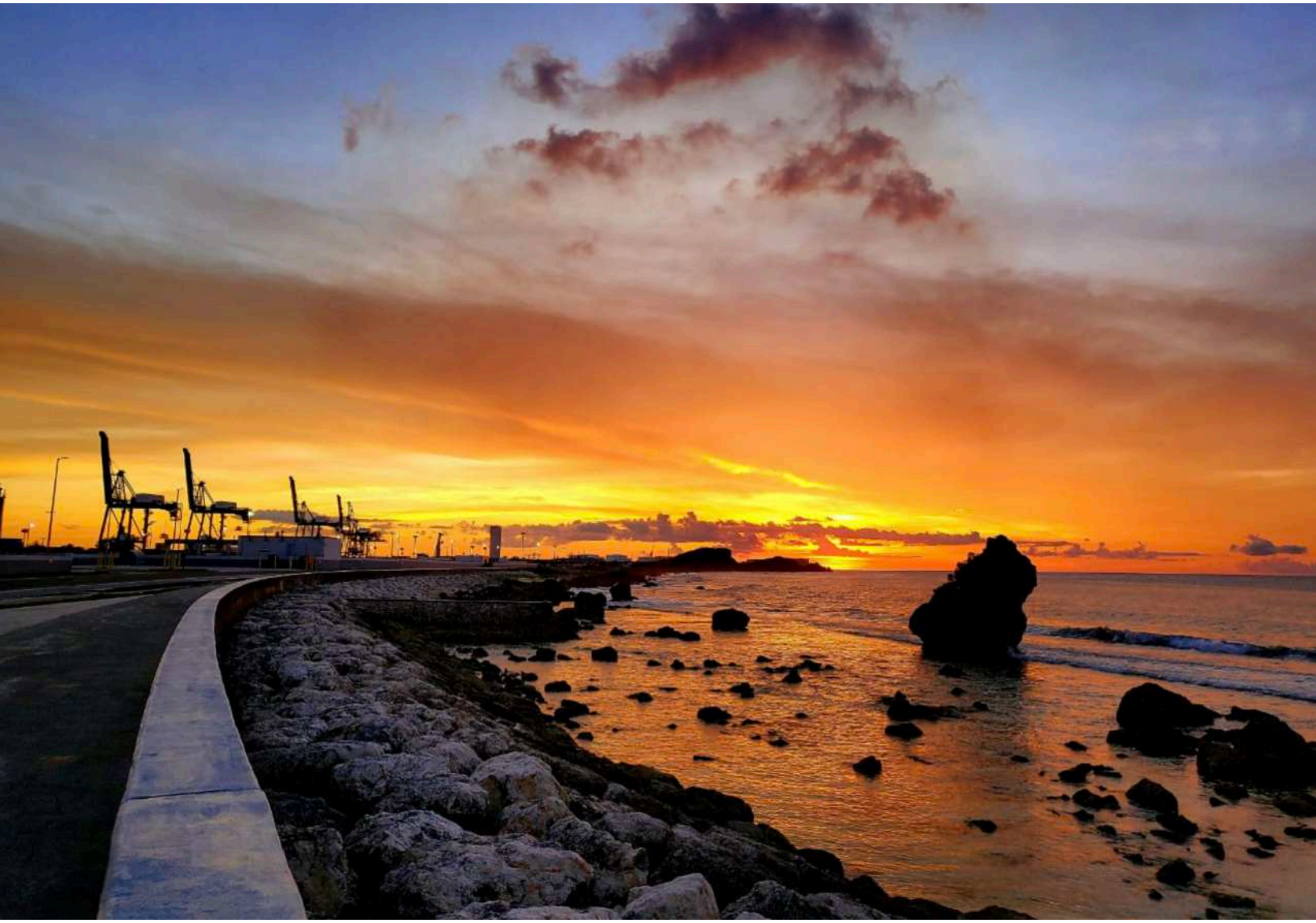
ERIKKA LLORENTE/PDN

The Jose D. Leon Guerrero Commercial Port of Guam front gate on Oct. 16, 2023.

THE PACIFIC DAILY NEWS guampdn.com
esday, October 18, 2023

PORT OF GUAM

Jose D. Leon Guerrero Commercial Port



GET IN TOUCH WITH US!

671-477-5931

1026 Cabras Highway, Suite 201
Piti, Guam 96915

news@portofguam.com

www.portofguam.com

Appendix B
Port of Guam Resolution No. 2022-15
Explore Membership in the International Association Of Ports And Harbors

Doc. No. 38GL-26-2386.*

BOARD OF DIRECTORS
Francisco G. Santos, Chairman
Dorothy P. Harris, Vice Chairperson
Dr. Judith P. Guthertz, Board Secretary
Conchita S.N. Taitano, Member

PORT OF GUAM

Resolution No. 2022-15

RELATIVE TO AUTHORIZING THE GENERAL MANAGER TO EXPLORE AND PURSUE THE BENEFITS OF BECOMING A MEMBER OF THE INTERNATIONAL ASSOCIATION OF PORTS AND HARBORS (IPAH) AND REPORT FINDINGS TO THE BOARD OF DIRECTORS

BE IT RESOLVED BY THE BOARD OF DIRECTORS OF THE PORT AUTHORITY OF GUAM:

WHEREAS, from an economic, social, and environmental point of view, sustainable port development is a critical issue for Ports worldwide and has a direct impact on international and domestic freight transportation, as well as local and national economic and social development and environmental protection; and

WHEREAS, since Ports emit not only carbon dioxide but also various air pollutants through cargo handling equipment, related facilities, and berthing vessels, there is a need to introduce and diffuse environmental friendly policies for the Port; and

WHEREAS, such policies should focus on fostering progress towards developing quality, reliable, sustainable, and resilient infrastructure, upgrading infrastructure and retrofitting industries to make them sustainable, with increased resource-use efficiency and greater adoption of clean and environmental sound technology and industrial processes; and

WHEREAS, through the direction of the Board of Directors, Port management has been working closely with the Port's Owner Agent Engineer consultants and has identified sustainable port projects to be pursued, such as,

- **Digitalization:** implement digital technologies on data collaboration with our stakeholders, improve process and documentation flow and enhance port call optimization;
- **Infrastructure:** address major infrastructural and service challenges in Port and optimize the use of the existing port capacity;
- **Health Safety & Security:** promote the health and safety culture of employees and Port visitors as a response to the COVID pandemic; innovation in security controls, inspections of cargoes and passengers, working in automated environments and implementation of cybersecurity measures; and
- **Environmental Care:** addressing air pollution, dust, noise, and water pollution, re-use and recycling initiatives; protecting freshwater resources; targeted marine litter initiatives; addressing soil and sediment contamination and protecting habitats and enhancing biodiversity; and

WHEREAS, as part of the Port's sustainable projects, Port management is developing a study on the benefits of installing solar panels on Port buildings, as well as reducing the Port's reliance on the island's power grids by utilizing its generators to assist Guam Power Authority in avoiding rolling power black-outs; and

WHEREAS, the International Association of Ports and Harbors (IAPH), with the membership of over 160 ports and 120 port-related businesses in 87 countries, in May 2017 developed a World Ports Sustainability Program (WPSP) whose primary objective is to enhance and coordinate future sustainability efforts of ports worldwide and foster international cooperation with partners in the supply chain; and

RESOLVED, the Board of Directors authorizes the General Manager to explore and pursue the benefits of becoming a member of IAPH and provide such findings to the Board of Directors; and be it further

RESOLVED, the Chairman certify to, and the Secretary attest to, the adoption hereof and that a copy of this resolution be transmitted to the Guam Legislature.

PASSED AND ADOPTED UNANIMOUSLY BY THE BOARD OF DIRECTORS THIS 14th DAY OF JULY, 2022.

FRANCISCO G. SANTOS
CHAIRMAN, BOARD OF DIRECTORS
PORT AUTHORITY OF GUAM

DR. JUDITH P. GUTHERTZ
SECRETARY, BOARD OF DIRECTORS
PORT AUTHORITY OF GUAM

PORT AUTHORITY OF GUAM * GOVERNMENT OF GUAM *

Appendix C
Guam Public Law 28-92 Recycling Enterprise Zone

Doc. No. 38GL-26-2386.*

Office of the Governor of Guam
P.O. Box 2950 Hagåtña, Guam 96932
TEL: (671) 472-8931 • FAX: (671) 477-4826 • EMAIL: governor@mail.gov.gu

Felix Perez Camacho
Governor

Kaleo Scott Moylan
Lieutenant Governor

13 DEC 2005

The Honorable Mark Forbes
Speaker
Mina' Bente Ocho Na Liheslaturan Guåhan
155 Hessler Street
Hagåtña, Guam 96910

Dear Mr. Speaker:

Transmitted herewith is Bill No. 139 (EC), "AN ACT TO CREATE A RECYCLING ENTERPRISE ZONE AT THE JOSE D. LEON GUERRERO COMMERCIAL PORT" which I signed into law on December 12, 2005, as **Public Law 28-92**.

Sinseru yan Magåhet,

FELIX P. CAMACHO
I Maga'låhen Guåhan
Governor of Guam

Attachment: copy attached of signed bill

cc: The Honorable Eddie Baza Calvo
Senator and Legislative Secretary

Senator Edward J.B. Calvo
SECRETARY OF THE LEGISLATURE
ACKNOWLEDGEMENT RECEIPT
Rcv'd by: _____
Print Name & Initial
Time: 11:50 ***Date:*** 12-5-05

489

Office of the Speaker
MARK FORBES
Date: 12/14/05
Time: 10:20 am
Rec'd by: _____
Print Name: _____
28-05-0487

I MINA'BENTE OCHO NA LIHESLATURAN GUÅHAN
2005 (FIRST) Regular Session

CERTIFICATION OF PASSAGE OF AN ACT TO *I MAGA'LAHEN GUÅHAN*

This is to certify that **Bill No. 139 (EC), "AN ACT TO CREATE A RECYCLING ENTERPRISE ZONE AT THE JOSE D. LEON GUERRERO COMMERCIAL PORT"** was on the 30th day of November, 2005, duly and regularly passed.

Mark Forbes
Speaker

Attested:

Edward J.B. Calvo
Senator and Secretary of the Legislature

This Act was received by *I Maga'lahen Guåhan* this 30 day of NOV, 2005, at 5 o'clock P.M.

Assistant Staff Officer
Maga'lahi's Office

APPROVED:

FELIX P. CAMACHO
I Maga'lahen Guåhan

Date: 12 DEC 2005

Public Law No. 28-92

I MINA'BENTE OCHO NA LIHESLATURAN GUÅHAN
2005 (FIRST) Regular Session

Bill No. 139 (EC)
As amended.

Introduced by:

R. J. Respicio
B. J.F. Cruz
F. B. Aguon, Jr.
J. M.S. Brown
Edward J.B. Calvo
Mike Cruz
Mark Forbes
L. F. Kasperbauer
R. Klitzkie
L. A. Leon Guerrero
J. A. Lujan
A. B. Palacios
Ray Tenorio
A. R. Unpingco
J. T. Won Pat

AN ACT TO CREATE A RECYCLING ENTERPRISE ZONE AT THE JOSE D. LEON GUERRERO COMMERCIAL PORT.

BE IT ENACTED BY THE PEOPLE OF GUAM:

Section 1. Legislative Findings and Intent. *I Mina'Bente Ocho Na Liheslaturan Guåhan* finds that it is the established policy of the government of Guam to promote and support recycling as an essential means to protect the environment and to effectively manage the solid waste generated by the community. This policy is clearly reflected in the Integrated Solid Waste Management Plan as adopted in Public Law No. 25-175. Numerous other public laws also support recycling through policy initiatives and incentives, including Public Law No. 25-127, which provided for tax incentives for recycling operations inclusive of the

transshipment of recyclable materials.

I Liheslatura finds that, with respect to Section 7.10.4 of the Integrated Solid Waste Management Plan, the setting aside of land at the Jose D. Leon Guerrero Commercial Port for a center to recycle automobiles, one of the major environmental concerns for our community, is a key component.

I Liheslatura finds that the absence of effective recycling and disposal operations has resulted in a proliferation of junk automobiles throughout the island, in particular, in areas over the Northern Aquifer, thus creating a serious threat to the aquifer that is the island's major source for drinking water.

It is therefore the intent of *I Liheslatura* to implement Section 7.10.4 of the Integrated Solid Waste Management Plan and establish a Recycling Enterprise Zone at the Jose D. Leon Guerrero Commercial Port in order to foster, in concert with existing incentives established by statute, the establishment of private sector operated recycling enterprises for automobiles, trucks and tires.

Section 2. Definitions. For purposes of this Act, and except as otherwise provided, the following words and phrases, together with all of the common derivatives thereof, shall have the meaning ascribed to them as follows:

(a) 'JLGCP' shall mean the Jose D. Leon Guerrero Commercial Port.

(b) 'Recycle' or 'Recycling' means the method by which recovered resources are converted for use as raw material or feedstock to make new products, as defined in §51102 (35) of Chapter 51, Title 10 of the Guam Code Annotated.

(c) 'Recycling company' means any business licensed by the Department of Revenue and Taxation, and has been issued a permit as required in §51104 of Chapter 51, Title 10 of the Guam Code Annotated by the Guam

Environmental Protection Agency ('GEPA') to conduct business on Guam and that specifically commits eighty percent (80%) of its operations to recycling.

(d) 'Transshipment' shall mean to transfer for further transportation from one (1) ship or conveyance to another.

(e) 'Recyclable materials' means materials that still have useful physical or chemical properties after serving a specific purpose for the same or other purpose. Recyclable materials are as follows:

(1) batteries (i.e., lead-acid, portable computer batteries, nickel-cadmium, sealed types for power backup);

(2) automobiles, buses, and trucks or any form of motorized vehicle;

(3) tires (passenger/commercial);

(4) enameled white goods;

(5) home appliances (other small appliances that are not considered enameled white goods);

(6) glass and plastic bottles;

(7) foam padding;

(8) lead;

(9) metals (ferrous/non-ferrous);

(10) organic material (i.e., tree trimmings, palm fronds, grass, food waste, soiled cardboard);

(11) paper products;

(12) wood pallets and scrap wood;

(13) construction and demolition debris ('C&D');

(14) x-ray film;

(15) automobile oil and fluids;

(16) freon and other refrigerant gases;

(17) electronic waste (i.e., computers, circuit boards, televisions, and portable phones);

(18) heavy equipment; and

(19) other recyclable materials deemed recyclable by GEPA pursuant to the Rules and Regulations.

Section 3. Establishment of Recycling Enterprise Zone. There is established a "Recycling Enterprise Zone" at the Jose D. Leon Guerrero Commercial Port for use by recycling companies for the processing of automobiles, trucks, and tires for recycling purposes and the transshipment of recyclable materials. The size of the zone and its site on the JLGCP property shall be designated by the Board of Directors of the Port Authority of Guam and guided by the provisions of Section 7.10.4 of the Integrated Solid Waste Management Plan. Such designation shall be made within sixty (60) days of the enactment hereof and the site shall be made available for lease to recycling companies eligible under Section 4 of this Act. The Board of Directors of the Port Authority of Guam shall determine and charge a reasonable rate for the lease of said property.

Section 4. Eligibility of Recycling Companies for use of the Recycling Enterprise Zone. Lease space in the Recycling Enterprise Zone shall only be available to companies that qualify for Qualifying Certificates as recycling companies under guidelines established by the Guam Economic Development and Commerce Authority.

6

I MINA' BENTE OCHO NA LIHESLATURAN GUAHAN

2005 (FIRST) Regular Session

Date: 11/30/05
12:21 P

VOTING SHEET

Bill No. 139 (EC)
Resolution No. _____
Question: _____

NAME	YEAS	NAYS	NOT VOTING/ ABSTAINED	OUT DURING ROLL CALL	ABSENT
AGUON, Frank B., Jr.					✓
BROWN, Joanne M.S.	✓				
CALVO, Edward J.B.	✓				
CRUZ, Benjamin J.F,	✓				
CRUZ, Michael (Dr.)	✓				
FORBES, Mark	✓				
KASPERBAUER, Lawrence F.	✓				
KLITZKIE, Robert	✓				
LEON GUERRERO, Lourdes A.	✓				
LUJAN, Jesse A.	✓				
PALACIOS, Adolpho B.	✓				
RESPICIO, Rory J.	✓				
TENORIO, Ray	✓				
UNPINGCO, Antonio R.	✓				
WON PAT, Judith T.	✓				
TOTAL	14	0	0	0	1

CERTIFIED TRUE AND CORRECT:

_____
Clerk of the Legislature

*3 Passes = No vote
EA = Excused Absence

P.L. 28-92

I Mina' Bente Ocho Na Liheslaturan Guahan
The 28th Guam Legislature

155 Hesler Place
Hagatna, Guam 96910
Office (671) 472-3409 • Fax (671) 472-3510

Speaker Mark Forbes

November 7, 2005

Speaker Mark Forbes
I Mina' Bente Ocho Na Liheslaturan Guahan
155 Hesler Place
Hagatna, Guam 96910

The Committee on General & Omnibus Matters to which Bill No. 139 was referred, wishes to report its findings and recommendations **TO DO PASS BILL No. 139 (EC):** "An Act To Create A Recycling Enterprise Zone At The Jose D. Leon Guerrero Commercial Port".

Transmitted herewith for your consideration and action is our committee report on the above subject matter.

The voting record is as follows:

5 TO PASS

0 NOT TO PASS

1 TO REPORT OUT ONLY

0 ABSTAIN

0 INACTIVE FILE

Copies of the Committee Report and other pertinent documents are attached. Thank you and si Yu'os ma'ase for your attention to this matter.

MARK FORBES

Attachments

MEMORANDUM

TO: Committee Members

FROM: Chairman

SUBJECT: Committee Report- BILL No. 139 (EC): "An Act To Create A Recycling Enterprise Zone At The Jose D. Leon Guerrero Commercial Port".

Transmitted herewith for your information and action is the report on BILL No. 139 (EC) from the Committee on General and Omnibus Matters.

This memorandum is accompanied by the following:

1. Committee Voting Sheet
2. Committee Report
3. BILL No. 139 (EC)
4. Public Hearing Sign-In Sheet
5. Fiscal Note/ Fiscal Note Waiver
6. Notice of Public Hearing

Please take the appropriate action on the voting sheet. Your attention and cooperation in this matter is greatly appreciated.

Should you have questions regarding the report or accompanying documents, please do not hesitate to contact me.

Thank you and si Yu'os ma'ase.

MARK FORBES

Attachments

COMMITTEE ON GENERAL AND OMNIBUS MATTERS

I MINA'BENTE OCHO NA LIHESLATURAN GUÅHAN
155 HESLER PLACE, HAGÅTNA, GUAM 96910

An Act To Create A Recycling Enterprise Zone At The Jose D. Leon Guerrero Commercial Port.

VOTING SHEET

	SIGNATURE	TO PASS	NOT TO PASS	TO REPORT OUT OF COMMITTEE	ABSTAIN	INACTIVE FILE
Mark Forbes, Chairman		✓				
Edward J.B. Calvo		✓				
Lawrence F. Kasperbauer, Ph.D.				✓		
Jesse A. Lujan						
Ray Tenorio						
Michael Cruz, M.D.		✓				
Lou A. Leon Guerrero		✓				
Judith T. Won Pat		✓				
Benjamin J.F. Cruz						

2nd
11/22/05
POF
11/22/05

~~3rd~~
~~11/22/05~~

Introduced
MAY 18 2005
Read

I MINA'BENTE OCHO NA LIHESLATURAN GUÅHAN
2005 (FIRST) Regular Session

Bill No. 139 (EC)

Introduced by: R.J. Respicio
B.J. Cruz

AN ACT TO CREATE A RECYCLING ENTERPRISE ZONE AT THE JOSE D. LEON GUERRERO COMMERCIAL PORT.

BE IT ENACTED BY THE PEOPLE OF GUAM:

Section 1. Legislative Findings and Intent. *I Mina'bente Ocho Na Liheslaturan Guåhan* finds that it is the established policy of the government of Guam to promote and support recycling as an essential means to protect the environment and to effectively manage the solid waste generated by the community. This policy is clearly stipulated in the Integrated Solid Waste Management Plan as adopted in Public Law No. 25-175. Numerous other public laws also support recycling through policy initiatives and incentives, including Public Law No. 25-127 which provided for tax incentives for recycling operations inclusive of the transshipment of recyclable materials.

I Liheslatura finds that, with respect Section 7.10.4 of the Integrated Solid Waste Management Plan, the setting aside of land at the Jose D. Leon Guerrero Commercial Port for a center to recycle automobiles, one of the major environmental concerns for our community is a key component.

I Liheslatura finds that the absence of effective recycling and disposal operations has resulted in a proliferation of junk automobiles throughout the island, in particular, in areas over the Northern Aquifer. The presence of

these junk automobiles, and the hazardous materials which these automobiles carry, are a serious threat to the aquifer that is the island's major source for drinking water.

It is therefore the intent of *I Liheslatura* to implement, in the public interest, Section 7.10.4 of the Integrated Solid Waste Management Plan and establish a Recycling Enterprise Zone at the Jose D. Leon Guerrero Commercial Port so that, in concert with existing incentives established by statute, public policy shall foster the establishment of private sector operated recycling enterprises for automobiles, trucks, and tires.

Section 2. Definitions. For purposes of this Act, and except as otherwise provided, the following words and phrases, together with all of the common derivatives thereof, shall have the meaning ascribed to them as follows:

(i) 'JLGCP' shall mean the Jose D. Leon Guerrero Commercial Port.

(ii) 'Recycling' means the process by which recovered resources are transformed into new products in such a manner that products lose their identity, as defined in §51102.(18) of Chapter 51, Title 10 of the Guam Code Annotated.

(iii) 'Recycling company' means any business licensed by the Department of Revenue and Taxation, and has been issued a permit, as required in §51104 of Chapter 51, Title 10 of the Guam Code Annotated, from the Guam Environmental Protection Agency ('GEPA') to conduct business on Guam in which eighty percent (80%) of its operations is specifically committed to recycling.

(iv) 'Transshipment' shall mean to transfer for further

transportation from one (1) ship or conveyance to another.

(v) 'Recyclable materials' means materials that still have useful physical or chemical properties after serving a specific purpose for the same or other purpose. Recyclable materials are as follows:

(1) batteries (i.e., lead-acid, portable computer batteries, nickel-cadmium, sealed types for power backup);

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(4) enameled white goods;

(5) home appliances (other small appliances that are not considered enameled white goods);

(6) glass and plastic bottles;

(7) foam padding;

(8) lead;

(9) metals (ferrous/non-ferrous);

(10) organic material (i.e., tree trimmings, palm fronds, grass, food waste, soiled cardboard);

(11) paper products;

(12) wood pallets and scrap wood;

(13) construction and demolition debris ('C&D');

(14) x-ray film;

(15) automobile oil and fluids;

(16) freon and other refrigerant gases;

(17) electronic waste (i.e., computers, circuit boards, televisions, and portable phones);

(18) heavy equipment; and

(19) other recyclable materials deemed recyclable by GEPA pursuant to the Rules and Regulations.

Section 3. Establishment of Recycling Enterprise Zone. There is established a "Recycling Enterprise Zone" at the Jose D. Leon Guerrero Commercial Port for use by recycling companies for the processing of automobiles, trucks, and tires for recycling purposes and the transshipment of recyclable materials. The size of the zone and site on the JLGCP property shall be designated by the Board of Directors of the Port Authority of Guam and guided by the provisions of Section 7.10.4 of the Integrated Solid Waste Management Plan. Such determination shall be made within sixty (60) days of the enactment of this Section and shall be made available for leasing to recycling companies eligible under Section 4 of this Act. The Board of Directors of the Port Authority of Guam shall determine a reasonable rate for the lease of such property.

Section 4. Eligibility of Recycling Companies for use of the Recycling Enterprise Zone. Lease space in the Recycling Enterprise Zone shall only be made available to companies that satisfy the requirements to qualify for Qualifying Certificates as recycling companies under the guidelines established by the Guam Economic Development and Commerce Authority.

I MINA' BENTE OCHO NA LIHESLATURAN GUÅHAN
COMMITTEE ON GENERAL & OMNIBUS MATTERS
SPEAKER MARK FORBES, CHAIRMAN

COMMITTEE REPORT
ON
BILL NO. 139 (EC)

An Act To Create A Recycling Enterprise Zone At The Jose D. Leon Guerrero Commercial Port.

I. OVERVIEW

The Committee on General and Omnibus Matters held a public hearing at 9:00 a.m.. on September 01, 2005 in the Public Hearing Room, I Liheslaturan Guåhan. Public notice was given to all media (see facsimile confirmation page) on August 25 and August 29, 2005 and posted in the Government Meetings Section in the August 31, 2005 edition of the PDN.

Senators present at the public hearing were:

Speaker Mark Forbes, Chairman
Senator Lawrence F. Kasperbauer, Ph.D., Member
Senator Jesse A. Lujan, Member
Senator Ray Tenorio, Member
Senator Judith T. Won Pat, Member
Senator Benjamin J. F. Cruz, Member
Vice Speaker Joanne M.S. Brown
Senator Robert Klitzkie
Senator Adolpho B. Palacios, Sr.
Senator Rory J. Respicio

II. SUMMARY OF TESTIMONY

Individuals that appeared before the Committee to present oral and written testimony on the bill were as follows:

There are no oral testimonies on this bill.

Remarks:

The author of the bill, Senator Respecio, briefly made remark of Bill No. 139 . He said that Bill 139 was an idea brought up in the last legislature and was vetoed by Governor Camacho. He said the bill was unable to get an override and that he hopes this legislature would consider its passage.

Written testimonies submitted:

Randel L. Sablan, Acting Administrator, GEPA, In Support of Bill No. 139 (see attachment).

III. FINDINGS AND RECOMMENDATION

The Committee on General and Omnibus Matters finds that the intent of Bill No. 139 will establish private operated recycling centers at the commercial port to foster recycling efforts of junk automobiles, trucks, tires and other recyclable materials specified in GEPA Rules and Regulations. This measure will allow for additional revenues to be generated into the local economy and provide for a new direction in the disposal of Guam's waste products and materials.

Accordingly, the Committee on General and Omnibus Matters to which BILL No. 139 (EC) was referred does hereby submit its findings and recommendations to I Mina' Bente Ocho Na Liheslaturan Guåhan **TO DO**

PASS BILL No. 139 (EC), "An Act To Create A Recycling Enterprise Zone At The Jose D. Leon Guerrero Commercial Port."

IV. PUBLIC HEARING AGENDA

AGENDA

COMMITTEE ON GENERAL & OMNIBUS MATTERS, and EXECUTIVE COMMITTEE

Public Hearing
Thursday, September 01, 2005, 9:00 a.m.

The following appointments will be heard;

Antonio M. Palomo: Member, Guam Historic Preservation Review Board
Rebecca Ann Duenas: Member, Guam Historic Preservation Review Board
Mark Zhao: Member, Guam Real Estate Commission

The following Bills will be heard by the Committee on General & Omnibus Matters;

Bill No. 66 (EC) - by F. B. Aguon Jr.
An Act Relative To Requiring The Proper Restoration Of Roadways And Highways That Are Partially Damaged Due To Construction Work To Their Pre-Construction Condition By The Contractor Prior To The Full Disbursement Of Public Construction Funds For Such Projects, And Empowering Guam's Village Mayors To Certify The Completion And Proper Re-Surfacing Of The Roadway Or Highway To Its Previous Condition.

Bill No. 75 (EC) - by Ray Tenorio
An Act To Amend Section 1903 Of Chapter 19 Of Title 1 0f The Guam Code Annotated Relative To The Term Of Office Of The Public Auditor.

Bill No. 96 (EC) - by J. T. Won Pat
An Act To Repeal And Reenact Sections 15409, 15410 And 15411 Of Article 4, Chapter 15, Of Title 4, Guam Code Annotated, To Add New Sections 15412 And 15413 Of Article 4, Chapter 15 Of Title 4, Guam Code Annotated And To Repeal Sections 43116 And 43117 Of Article 1, Chapter 43, Division 4 Of Title 5, Guam Code Annotated, Relative To Establishing An Ethics In Government Program For Elected Officials And Any Person Who Is Appointed To A Position As Board Or Commission Member, Director, Deputy Director, Or By Whatever Title Denotes The Head And First Assistant Of A Government Of Guam Agency, Department, Public Corporation, Authority, Or Any Other Entity Of The Executive Branch.

Bill No. 104 (LS) - by J. A. Lujan
An Act To Establish Strict Accountability For Adverse Effects On Personal Health And Environmental Quality As A Result Of New Landfill Facility Construction, Operation, Closing And Monitoring.

Bill No. 105 (LS) - by J. A. Lujan
An Act To Affirm Public Responsibility For Real Property Valuation Lost As A Result Of Landfill Construction And Operation.

Bill No. 125 (EC) - by E. J. B. Calvo
An Act Authorizing I Maga'lahen Guåhan To Exchange A Portion Of Government Land Within Lot Number 10120-R16, Municipality Of Dededo, With Lot Number 5400-R6, Municipality Of Mangilao, On A Value For Value Basis To Address The Protective Buffer Zone Requirements For The Department Of Corrections Pursuant To Public Law 17-54.

Bill No. 132 (EC) - by A. B. Palacios
An Act To Add Article 2 To Chapter 30 Of Title 5 Of The Guam Code Annotated, Relative To Creating The "Independent Counsel Act Of 2005."

Bill No. 139 (EC) - by R. J. Respicio
An Act To Create A Recycling Enterprise Zone At The Jose D. Leon Guerrero Commercial Port. .

Bill No. 152 (LS) - By F. B. Aguon, Jr.
An Act Relative To Providing Additional Representation And Support To The People In The Villages Of Yigo And Mangilao At The Municipal Level Through The Establishment Of A Vice-Mayor Position For Each Of These Villages, In Recognition Of The Growing Resident Population In These Areas As The Second And Fourth Most Heavily Populated Villages In Guam And To Address The Corresponding Increasing Needs Of Its Residents; Thus Amending §§40101, Chapter 40, Division 4, Title 5, Guam Code Annotated.

Bill No. 170 (EC) - by Committee on Calendar, request of I Maga'lahen Guåhan the Governor of Guam in accordance with the Organic Act of Guam
An Act To Authorize The Lease For An Education Facility On Lot Marbo Base Command "B"-4, Approve The Request For Proposal And Reservation Of Funds For The Same.

Committee on General & Omnibus Matters, and Executive Committee

Public Hearing
September 01, 2005
9:00 a.m..
I Liheslaturan Guahan, Hagåtña

Bill No. 139 (EC) - by R. J. Respicio
An Act To Create A Recycling Enterprise Zone At The Jose D. Leon Guerrero Commercial Port.

NAME (please print)	AGENCY/ ORGANIZATION	ORAL TESTIMONY	WRITTEN TESTIMONY	IN FAVOR	NOT IN FAVOR	CONTACT NUMBER
Randy Sablan	GEPA		✓			

I Mina' Bente Ocho Na Liheslaturan Guahan
The 28th Guam Legislature

155 Hesler Place
Hagatna, Guam 96910
Office (671) 472-3409 • Fax (671) 472-3510

Speaker Mark Forbes

WAIVER OF FISCAL NOTE

In accordance with §9105 Title 2 GCA, I hereby certify that prompt committee action on Bill 139 is necessary to the proper conduct of legislative business. Therefore, I am waiving requirement of a fiscal note on Bill 139.

MARK FORBES
Speaker and Chairman,
Committee on General and Omnibus Matters

I Mina' Bente Ocho Na Liheslaturan Guahan
The 28th Guam Legislature

155 Hesler Place
Hagatna, Guam 96910
Office (671) 472-3409 • Fax (671) 472-3510

Speaker Mark Forbes

August 25, 2005

MEMORANDUM

TO:	All Media:			
	Pacific Daily News;	477-3079	KUAM;	637-9870
	Marianas Variety;	648-2007	K-57/Power 98;	477-3982
	K-Stereo;	477-6411	Hit Radio 100;	472-7663
	Glimpses-Gu. Business	649-8883	Adventist World Radio	565-2983
	Harvest Family Radio	477-7136	KPRG	734-2958
	KISH	477-6411	Rlene Live	

FROM: Speaker
Chairman, Committee on General & Omnibus Matters, and
Executive Committee

SUBJECT: Notice of Public Hearing- **Thursday, September 01, 2005**

Please be informed that I have scheduled a public hearing on Thursday, September 01, 2005, 9:00 a.m., at the Public Hearing Room, Temporary Legislative Building, on the following appointments and bills:

The following appointments and bills will be heard;

Antonio M. Palomo: Member, Guam Historic Preservation Review Board
Rebecca Ann Duenas: Member, Guam Historic Preservation Review Board
Mark Zhao: Member, Guam Real Estate Commission

Bill No. 66 (EC) - by F. B. Aguon Jr.
An Act Relative To Requiring The Proper Restoration Of Roadways And Highways That Are Partially Damaged Due To Construction Work To Their Pre-Construction Condition By The Contractor Prior To The Full Disbursement Of Public Construction Funds For Such Projects, And Empowering Guam's Village Mayors To Certify The Completion And Proper Re-Surfacing Of The Roadway Or Highway To Its Previous Condition.

Bill No. 75 (EC) - by Ray Tenorio
An Act To Amend Section 1903 Of Chapter 19 Of Title 1 0f The Guam Code Annotated Relative To The Term Of Office Of The Public Auditor.

Bill No. 96 (EC) - by J. T. Won Pat
An Act To Repeal And Reenact Sections 15409, 15410 And 15411 Of Article 4, Chapter 15, Of Title 4, Guam Code Annotated, To Add New Sections 15412 And 15413 Of Article 4, Chapter 15 Of Title 4, Guam Code Annotated And To Repeal Sections 43116 And 43117 Of Article 1, Chapter 43, Division 4 Of Title 5,

I Mina' Bente Ocho Na Liheslaturan Guahan
The 28th Guam Legislature

155 Hesler Place
Hagatna, Guam 96910
Office (671) 472-3409 • Fax (671) 472-3510

Speaker Mark Forbes

August 29, 2005

MEMORANDUM

TO:	All Media:			
	Pacific Daily News;	477-3079	KUAM;	637-9870
	Marianas Variety;	648-2007	K-57/Power 98;	477-3982
	K-Stereo;	477-6411	Hit Radio 100;	472-7663
	Glimpses-Gu. Business	649-8883	Adventist World Radio	565-2983
	Harvest Family Radio	477-7136	KPRG	734-2958
	KISH	477-6411	Rlene Live	

FROM: Speaker
Chairman, Committee on General & Omnibus Matters, and
Executive Committee

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Transmission Report

Date/Time 8-25-05; 4:23PM
Local ID 4723510
Local Name Guam Legislature
Company Logo

his document was confirmed.
(reduced sample and details below)
Document Size Letter-S

I Mina' Bente Ocho Na Liheslaturan Guahan
The 28th Guam Legislature

155 Hesler Place
Hagatna, Guam 96910
Office (671) 472-3400 • Fax (671) 472-3510

Speaker Mark Forbes

FACSIMILE

Date: August 25, 2005 **Time:**

Fax No.: 477-3079 **No. of Pages:**

To: PDN Government Meetings

From: The Office of Speaker Mark Forbes

Re: Public Hearing Notice- Thursday, September 01, 2005

Note: We would like to reserve space in the government meeting notice section of the Pacific Daily News for Friday, August 26 and Saturday, August 27, 2005 to read:

"Committee on General and Omnibus Matters & Executive Committee: Public Hearing, Thursday, September 01, 2005, 9:00 A.M., Public Hearing Room, Temporary Legislative Building, Hagatña, Guam.

The following appointments and bills will be heard:

Antonio M. Palomo: Member, Guam Historic Preservation Review Board
Rebecca Ann Ducmar: Member, Guam Historic Preservation Review Board
Mark Zhao: Member, Guam Real Estate Commission

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Bill No. 75 (EC) - by Ray Tenorio
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Total Pages Scanned : 2 Total Pages Confirmed : 2

No.	Doc	Remote Station	Start Time	Duration	Pages	Mode	Comments	Results
1	960	pdn	8-25-05; 4:21PM	1'45"	2/ 2	EC		CP 12.0

Notes :
EC: Error Correct
BC: Broadcast Send
CP: Completed
HS: Host Scan
HF: Host Fax
RE: Resend
MP: Multi-Poll
RM: Receive to Memory
HP: Host Print
HR: Host Receive
PD: Polled by Remote
PG: Polling a Remote
DR: Document Removed
FO: Forced Output
FM: Forward Mailbox Doc.
MB: Receive to Mailbox
PI: Power Interruption
TM: Terminated by user
WT: Waiting Transfer
WS: Waiting Send

I Mina' Bente Ocho Na Liheslaturan Guahan
The 28th Guam Legislature

155 Hesler Place
Hagatna, Guam 96910
Office (671) 472-3409 • Fax (671) 472-3510

Speaker Mark Forbes

FACSIMILE

Date: August 29, 2005 **Time:**

Fax No.: 477-3079 **No. of Pages:**

To: PDN Government Meetings

From: The Office of Speaker Mark Forbes

Re: Public Hearing Notice- Thursday, September 01, 2005

Note: We would like to reserve space in the government meeting notice section of the Pacific Daily News for Tuesday, August 30, Wednesday, August 31 and Thursday, September 01, 2005 to read:

"Committee on General and Omnibus Matters & Executive Committee: Public Hearing, Thursday, September 01, 2005, 9:00 A.M., Public Hearing Room, Temporary Legislative Building, Hagatña, Guam.

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Activity Report

Date/Time 8-29-05;10:14AM
Local ID 4723510
Local Name Guam Legislature
Company Logo

Calling **

No.	Doc	Remote Station	Start Time	Duration	Pages	Mode	Comments	Results
1	14	clerks	8-26-05;10:38AM	1'11"	2/ 2	EC		CP 12.0
2	21	sen frank aguon	2:16PM	27"	-/ 4		BC	0536
3	21	vice spkr brown	2:17PM	6'16"	4/ 4	EC	BC	CP 7200
4	21	sen calvo	2:23PM	1'43"	4/ 4	EC	BC	CP 21.6
5	21	sen bj cruz	2:26PM	2'12"	4/ 4	EC	BC	CP 24.0
6	21	sen m cruz	2:28PM	1'08"	1/ 4	EC	BC	0513 28.8
7	21	sen kasperbauer	2:30PM	2'17"	4/ 4	EC	BC	CP 14.4
8	21	sen leon guerrero	2:32PM	2'34"	4/ 4	EC	BC	CP 12.0
9	21	lujann	2:35PM	0"	-/ 4		BC	056D
10	21	sen palacios	2:36PM	1'51"	4/ 4	EC	BC	CP 19.2
11	21	sen respecio	2:38PM	3'00"	4/ 4	G3	BC	CP 12.0
12	21	sen tenorio	2:42PM	6'14"	4/ 4	G3	BC	0223 4800 2,4
13	21	sen unpingco	2:48PM	2'50"	4/ 4	EC	BC	CP 9600
14	21	sen won pat	2:51PM	0"	-/ 4		BC	056D
15	21	sen frank aguon	2:53PM	1'42"	4/ 4	EC	RE	CP 28.8
16	21	sen m cruz	2:55PM	0"	1/ 4		RE	056D
17	23	pdn	2:57PM	2'47"	4/ 4	EC	BC	CP 9600
18	23	marianas variety	3:01PM	2'42"	4/ 4	EC	BC	CP 12.0
19	23	kuam	3:05PM	1'56"	4/ 4	EC	BC	CP 14.4
20	23	hit radio	3:08PM	1'40"	4/ 4	EC	BC	CP 28.8
21	21	klitzkie	3:10PM	0"	-/ 4		BC	056A
22	23	guam business	3:12PM	0"	-/ 4		BC	056D
23	23	power ninty eight	3:19PM	0"	-/ 4		BC	056D
24	23	k stereo/klsh	3:29PM	0"	-/ 4		BC	056B
25	23	world radio	3:30PM	0"	-/ 4		BC	056A
26	23	family radio	3:30PM	0"	-/ 4		BC	056B
27	23	kprg	3:31PM	0"	-/ 4		BC	056B
28	23	riene steffy	3:31PM	0"	-/ 4		BC	056B
29	24	pdn	3:32PM	1'52"	3/ 3	EC		CP 14.4
30	28	DPW	3:34PM	36"	1/ 1	EC		CP 26.4
31	29	96479224	3:35PM	1'08"	1/ 1	EC		CP 14.4
32	30	94727951	3:36PM	1'06"	1/ 1	EC		CP 24.0
33	31	94774826	3:38PM	45"	1/ 1	EC		CP 16.8
34	32	96462335	3:39PM	29"	1/ 1	EC		CP 28.8
35	33	94779402	3:40PM	30"	1/ 1	EC		CP 26.4
36	34	94770883	3:41PM	29"	1/ 1	EC		CP 28.8
37	35	94737024	3:41PM	1'08"	1/ 1	G3		CP 9600
38	36	94772689	3:43PM	60"	1/ 1	EC		CP 12.0
39	37	94725003	3:44PM	25"	1/ 1	EC		CP 28.8
40	41	97344130	3:46PM	1'17"	1/ 1	EC		CP 9600
41	39	GUAM ATTY GEN'L	3:48PM	59"	1/ 1	EC		CP 9600
42	38	94778777	3:49PM	0"	-/ 1			056D
43	42	96469403	3:50PM	44"	1/ 1	EC		CP 24.0
44	43	96440010	3:52PM	35"	1/ 1	EC		CP 24.0
45	79	DPW	4:09PM	34"	1/ 1	EC		CP 28.8
46	81	947787777	4:13PM	1'18"	1/ 1	G3		0223 9600 1
47	85	94778777	4:20PM	1'57"	1/ 1	G3		0223 4800 1
48	92	klitzkie	8-29-05; 9:15AM	0"	-/ 1			056B

Total 79

** Called **

No.	Doc	Remote Station	Start Time	Duration	Pages	Mode	Comments	Results
1	12	6716497766	8-26-05;10:01AM	1'14"	1	EC		CP 7200
2	17	4775984	10:51AM	60"	1	EC		CP 21.6
3	19	4775984	10:54AM	56"	1	EC		CP 21.6
4	77	671 4778082	3:55PM	4'11"	2	EC		CP 12.0
5	88	6714775637	8-28-05; 3:00PM	2'23"	1	G3		CP 4800
6	90	6716478860	11:23PM	3'20"	1	EC		CP 21.6

Total 7

Notes :
EC: Error Correct
BC: Broadcast Send
CP: Completed
HS: Host Scan
HF: Host Fax
RE: Resend
MP: Multi-Poll
RM: Receive to Memory
HP: Host Print
HR: Host Receive
PD: Polled by Remote
PG: Polling a Remote
DR: Document Removed
FO: Forced Output
FM: Forward Mailbox Doc.
MB: Receive to Mailbox
PI: Power Interruption
TM: Terminated by user
WT: Waiting Transfer
WS: Waiting Send

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ss + 1: $40.00
plit or All: $45.00
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$1.19
TLE ANGELS FIGURINES
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Reg. $3.69
$2.89
YSTAL NUGGETS
TD. COLORS
Reg. $1.99
$1.19
ATIVE VASE DRY FOAM
DY TO USE FOR
& DRIED FLOWERS

LOCAL NEWS

Wildlife refuge closed on Labor Day

The Guam National Wildlife Refuge, Ritidian Unit, will be closed to the public on Monday in observance of the federal Labor Day holiday, a statement from the refuge said. The refuge will resume regular hours of operation of 8:30 a.m. to 4 p.m., seven days a week, on Tuesday, the statement added.

Pacific Collection closed on Fridays

The University of Guam's Richard F. Taitano Micronesian Area Research Center's Pacific Collection will be closed on Fridays, according to a UOG statement. Call 735-2150 for more information.

Pacific Daily News

GOVERNMENT MEETINGS

Aug. 31

Guam Housing Corp. board of directors' regular meeting: 3 p.m. Aug. 31, GHC conference room, Suite 535, ITC Building, Tamuning. For special accommodations, call 647-4143, ext. 140.

Guam Parole Board regular hearing: 8:30 a.m. Aug. 31, Parole Services Division, 404 East Sunset Blvd., Tiyan. Call 473-7001/7005.

Sept. 1

A.B. Won Pat Guam International Airport Authority board of directors regular meeting: 3 p.m. Sept. 1, terminal conference room 3, Tamuning. Agenda copies available during meeting; parking is available in the public parking lot. For special accommodations, call 646-0300.

Committee on General and Omnibus Matters public hearing: Public hearing 9 a.m. Sept. 1, Legislature's public hearing room, Hagåtña.

Appointments of Antonio M. Palomo and Rebecca Ann Duenas as members, Guam Historic Preservation Review Board; and Mark Zhao, member, Guam Real Estate Commission.

▲ Bill 66, requiring proper restoration of roadways and highways that are partially damaged due to construction work to their preconstruction condition by the contractor prior to the full disbursement of public construction funds for such projects, and empowering Guam's village mayors to certify completion and proper resurfacing of roadway/highway to its previous condition;

▲ Bill 75, relative to the term of office of the Public Auditor;

▲ Bill 96, relative to establishing an ethics in government program for elected officials and any person who is appointed as board or commission member, director, deputy director, or by whatever title denotes the head and first assistant of a government of Guam agency, department, public corporation, authority, or any other entity of the executive branch;

▲ Bill 104, establishing strict accountability for adverse effects on personal health and environmental quality as a result of new landfill facility construction, operation, closing and monitoring;

▲ Bill 105, affirming public responsibility for real property valuation lost as a result of landfill construction and operation;

▲ Bill 125, authorizing the governor to exchange a portion of government land within Lot 10120-R16, Dededo, with Lot 5400-R6, Mangilao, on a value-for-value basis to address the protective buffer zone requirements for the Department of Corrections;

▲ Bill 132, relative to creating the Independent Counsel Act of 2005;

▲ Bill 139, to create a recycling enterprise zone at the Jose D. Leon Guerrero Commercial Port;

▲ Bill 152, to provide additional representation and support to residents of Yigo and Mangilao at the municipal level through the establishment of a vice mayor position for these villages;

▲ Bill 170, authorizing the lease for an education facility at Marbo base command B-4, and approve request for proposal and reservation of funds for same, requested by the governor. Call 472-3409.

Workers Compensation Commission, Department of Labor, meeting: 6:30 p.m. Sept. 1, third floor, GCIC Building, Hagåtña. Agenda copies available at commission's office. For special accommodations, call 475-7033.

ON THE NET

▲ For the complete, searchable database of upcoming government meetings, visit www.guampdn.com

Testimony of Randel L. Sablan

Acting Administrator, Guam Environmental Protection Agency

Before The Committee On General & Omnibus Matters, and Executive Committee

Hearing On Bill 139(EC): An Act To Create A Recycling Enterprise Zone At The Jose D. Leon Guerrero Commercial Port

September 1, 2005

The Guam Environmental Protection Agency (GEPA) appreciates the opportunity to comment and provide information on the intent and scope of Bill 139.

GEPA supports the intent of Bill 139 and recognizes that there is limited suitable land area at the present time to properly locate a number of solid waste recycling operations in close proximity to the Jose D. Leon Guerrero Commercial Port. Operations which permit the processing of recyclable material and temporary staging or storage in preparation for transshipment should be strategically located. GEPA understands that the Port Authority of Guam (PAG) may have concerns regarding environmentally safe operations and long-term pollution liability. The Agency will work with the PAG to develop permit provisions that would minimize the risk of environmental liability exposure.

Thank you.

****

I MINA'BENTE OCHO NA LIHESLATURAN GUÅHAN
2005 (FIRST) Regular Session

Bill No. 139 (EC)

Introduced by: R.J. Respicio
B.J. Cruz

AN ACT TO CREATE A RECYCLING ENTERPRISE ZONE AT THE JOSE D. LEON GUERRERO COMMERCIAL PORT.

BE IT ENACTED BY THE PEOPLE OF GUAM:

Section 1. Legislative Findings and Intent. *I Mina'bente Ocho Na Liheslaturan Guåhan* finds that it is the established policy of the government of Guam to promote and support recycling as an essential means to protect the environment and to effectively manage the solid waste generated by the community. This policy is clearly stipulated in the Integrated Solid Waste Management Plan as adopted in Public Law No. 25-175. Numerous other public laws also support recycling through policy initiatives and incentives, including Public Law No. 25-127 which provided for tax incentives for recycling operations inclusive of the transshipment of recyclable materials.

I Liheslatura finds that, with respect Section 7.10.4 of the Integrated Solid Waste Management Plan, the setting aside of land at the Jose D. Leon Guerrero Commercial Port for a center to recycle automobiles, one of the major environmental concerns for our community is a key component.

I Liheslatura finds that the absence of effective recycling and disposal operations has resulted in a proliferation of junk automobiles throughout the island, in particular, in areas over the Northern Aquifer. The presence of

these junk automobiles, and the hazardous materials which these automobiles carry, are a serious threat to the aquifer that is the island's major source for drinking water.

It is therefore the intent of *I Liheslatura* to implement, in the public interest, Section 7.10.4 of the Integrated Solid Waste Management Plan and establish a Recycling Enterprise Zone at the Jose D. Leon Guerrero Commercial Port so that, in concert with existing incentives established by statute, public policy shall foster the establishment of private sector operated recycling enterprises for automobiles, trucks, and tires.

Section 2. Definitions. For purposes of this Act, and except as otherwise provided, the following words and phrases, together with all of the common derivatives thereof, shall have the meaning ascribed to them as follows:

(i) 'JLGCP' shall mean the Jose D. Leon Guerrero Commercial Port.

(ii) 'Recycling' means the process by which recovered resources are transformed into new products in such a manner that products lose their identity, as defined in §51102.(18) of Chapter 51, Title 10 of the Guam Code Annotated.

(iii) 'Recycling company' means any business licensed by the Department of Revenue and Taxation, and has been issued a permit, as required in §51104 of Chapter 51, Title 10 of the Guam Code Annotated, from the Guam Environmental Protection Agency ('GEPA') to conduct business on Guam in which eighty percent (80%) of its operations is specifically committed to recycling.

(iv) 'Transshipment' shall mean to transfer for further

transportation from one (1) ship or conveyance to another.

(v) 'Recyclable materials' means materials that still have useful physical or chemical properties after serving a specific purpose for the same or other purpose. Recyclable materials are as follows:

(1) batteries (i.e., lead-acid, portable computer batteries, nickel-cadmium, sealed types for power backup);

(2) automobiles, buses, and trucks or any form of motorized vehicle;

(3) tires (passenger/commercial);

(4) enameled white goods;

(5) home appliances (other small appliances that are not considered enameled white goods);

(6) glass and plastic bottles;

(7) foam padding;

(8) lead;

(9) metals (ferrous/non-ferrous);

(10) organic material (i.e., tree trimmings, palm fronds, grass, food waste, soiled cardboard);

(11) paper products;

(12) wood pallets and scrap wood;

(13) construction and demolition debris ('C&D');

(14) x-ray film;

(15) automobile oil and fluids;

(16) freon and other refrigerant gases;

(17) electronic waste (i.e., computers, circuit boards, televisions, and portable phones);

(18) heavy equipment; and

(19) other recyclable materials deemed recyclable by GEPA pursuant to the Rules and Regulations.

Section 3. Establishment of Recycling Enterprise Zone. There is established a "Recycling Enterprise Zone" at the Jose D. Leon Guerrero Commercial Port for use by recycling companies for the processing of automobiles, trucks, and tires for recycling purposes and the transshipment of recyclable materials. The size of the zone and site on the JLGCP property shall be designated by the Board of Directors of the Port Authority of Guam and guided by the provisions of Section 7.10.4 of the Integrated Solid Waste Management Plan. Such determination shall be made within sixty (60) days of the enactment of this Section and shall be made available for leasing to recycling companies eligible under Section 4 of this Act. The Board of Directors of the Port Authority of Guam shall determine a reasonable rate for the lease of such property.

Section 4. Eligibility of Recycling Companies for use of the Recycling Enterprise Zone. Lease space in the Recycling Enterprise Zone shall only be made available to companies that satisfy the requirements to qualify for Qualifying Certificates as recycling companies under the guidelines established by the Guam Economic Development and Commerce Authority.

Appendix D
Site Screening Framework Development

Site Screening Framework Development

Background

The Recycling Enterprise Zone (REZ) will initially be used as a laydown and temporary storage area for shipping containers that will eventually be shipped to recycling facilities off-island. The project team has evaluated numerous potential sites to be used for the REZ: Eight sites are located on the Port of Guam (Port) property while the last three options are located off Port property, as shown on Figure 1. Nine of the eleven sites are previously developed or disturbed, while the two heavily vegetated Port Authority of Guam (PAG) property sites along Route 1 and Route 18 are previously undeveloped. Photos 1 and 2 show samples of developed areas at the Old Hawaiian Rock Site and Future Container Yard.

The following potential REZ sites are inside the Port property:

- Heavily Vegetated PAG Property along Route 1
- Heavily vegetated PAG Property along Route 18
- Old Hawaiian Rock site
- Future Container Yard
- Chassis Lot
- Seaplane Ramp
- Metals Recycling Yard
- PAG Parking Lot

The following potential REZ sites are outside the Port property:

- Polaris/Matson Leased Lot
- Polaris/Smithbridge Leased Lot
- Polaris/Vacant Lot

Photo 1. Developed Area of Old Hawaiian Rock Site (Site 3)

Photo 2. Developed Area of Future Container Yard (Site 4)

Figure 1. Potential Recycling Enterprise Zone Locations

Basis of Site Screening Framework

To ensure the United Nations's Sustainable Development Goals (UN SDGs) were considered in the site selection process for the REZ and that the project will align with the developing Guåhan 2050 Sustainability Plan and Guam's Priority Climate Action Plan, numerous sustainability and resilience certification programs were reviewed for applicability and suitability for this project. Three were ultimately identified as most appropriate to provide guidance for planning, designing, and constructing an infrastructure project, particularly one that is adjacent to a water body. The certifications are as follows:

- Envision: Applicable to all infrastructure project types,
- Waterfront Edge Design Guidelines (WEDG): Tailored toward publicly accessible waterfront projects, and
- Green Marine: Certifications for the marine industry including one focused specifically on projects located in Ports.

Using these systems' guidance, a site evaluation matrix was created to aid with the site selection process. The criteria for these certifications were reviewed in detail; project-applicable considerations specifically for the REZ were consolidated into the tailored matrix, organized by project aspects. A focused version of the matrix is shown in Table 1; the summary identifies those sustainability and resilience topics deemed most impactful for the project. The full matrix can be found in Attachment D.1.

The focused matrix highlights the most relevant guidance from each certification mentioned above. The sustainability matrix is divided into five categories: Thoughtful Design (pink), Site (green), Energy (orange), Construction Activities (yellow), and Operations (teal). Thoughtful Design focuses on early planning stages of a project, taking into account all overarching environmental, social, and governance considerations. Site focuses on environmental factors on the project site such as nearby habitats and ecosystems. Energy is focused on the energy consumption of the project. Construction Activities and Operations focus on reducing impacts related to waste, pollution, and resource consumption at each respective project phase.

Each individual topic was ranked with an Impact Level of Low, Medium, or High, illustrating the influence on the overall sustainability of the project. The primary considerations reflected in high impact credits are siting the project on developed vs. undeveloped land, the potential impact on natural habitats including both aquatic ecosystems and land-based ecosystems, and lastly, the potential ocean pollution from stormwater runoff.

Table 1. Focused Sustainability Ranking Matrix

		Rating System			Impact Level
Topics	Details	Envision	WEDG	Green Marine	High
Material Reuse	Reuse of existing buildings and materials; planning for end-of-life	●	●	●	●
Greenfield Protection	No building on greenfield, prime farmland, floodplain, within 50' of wetlands or 100' of water bodies, or protected habitat	●			●
Habitat Preservation	Maintain reference habitat, adaptive plan, maintenance plan, Native/adapted plants only, biodiversity, pollinator habitats creation, integrated pest management	●	●	●	●
Restore Degraded Sites	Reduce contamination in the environment from past industrial uses, and restore impacted project areas.	●	●		●
Practice Sustainable Soil Management	Reduce environmental impacts associated with soil use and management.	●	●		●
Responsible Stormwater Management	Low-impact development, minimization of impervious hardscape, retention/detention, on-site/natural infiltration, aquifer recharge, quality	●	●	●	●
Provide Effective Shoreline Buffer	Ensure the sustainability of the shoreline using a waterfront edge that has the greatest possible positive impact on the environment and community, given the intended use and context.	●	●		●
Ground & Surface Water Protection	Protect from runoff/pollution, monitor quality, pursue improvements	●	●	●	●
Site Energy Use Reduction	Efficient and minimal site lighting, automated controls & sensors	●	●		●
Activity Containment	Reduce dust, noise, vibration, light pollution, runoff, dirt tracking, construction vehicle congestion, no idling	●	●		●
Construction Waste Management	CWM plan, targeted waste streams for diversion, detailed tracking, on-site reuse	●	●		●
Reduce Noise	Reduce operational noise impacting nearby communities and ecosystems	●	●	●	●

If the project wishes to pursue a certification program in the future, Envision is the recommended framework for use based on applicability and flexibility. Envision provides a broad approach that can be used for a wide variety of infrastructure projects and provides criteria that would be effective in evaluating a small-scale project like the REZ. Envision is also beneficial in the event that REZ develops into a full building recycling facility at a future time; the criteria include practices that can also extend to building design and construction.

Both WEDG and Green Marine are more limited in both the breadth, and number of sustainability aspects that could be taken into consideration for the project, but could still be used as a resource for industry best practices for projects more closely associated with waterfront work.

Initial Site Screening Framework

The initial screening matrix for REZ site selection (Table 2) was developed based on the previously described sustainability criteria, the UN SDGs, and Guam Green Growth (G3) goals. A focus on the protection of sensitive habitats, ecosystems, and areas of cultural or historical significance, community considerations, reuse of previously developed or disturbed land, the proximity to the Port, and zoning (commercial or industrial use) were used as criteria for evaluating all 11 sites.

Table 2. Initial Site Screening Evaluation Results

Heavily Vegetated PAG Property along Route 1	1. Heavily Vegetated Site along Route 1	2. Heavily Vegetated Site along Route 18	3. Old Hawaiian Rock Quarry Site	4. Future Container Yard	5. Chassis Lot	6. PAG Parking Lot	7. Sea Plane Ramp	8. Metals Recycling Yard	9. Polaris/Matson Leased Lot	10. Polaris/Smithbridge Leased Lot	11. Polaris/ Vacant Private Lot
Location											
Within Port boundary or owned by the Port	✓	✓	✓	✓	✓	✓	✓	✓	x	x	x
Less than or equal to 2 miles from Port gate/main entrance	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Sensitive/Protected Habitats, Ecosystems, Cultural/Historical Significance											
Site is not a greenfield or of high ecological value	x	x	✓	✓	✓	✓	✓	✓	✓	✓	✓
Site is not of high historical/cultural significance [a]	x	x	✓	✓	✓	✓	✓	✓	✓	✓	✓
Community Considerations											
Use of site will not create concerns about noise, traffic, light pollution, or similar	x	x	✓	✓	✓	✓	✓	✓	✓	✓	✓
Site Characteristics											
>1 acre in size	✓	✓	✓	✓	✓	x	✓	✓	✓	✓	✓
>10 acres in size	✓	✓	✓	x	x	x	x	x	✓	✓	x
Reuse of previously developed/disturbed site	x	x	✓	✓	✓	✓	✓	✓	✓	✓	✓
Zoned for Commercial or Industrial Use	x	x	✓	✓	✓	✓	✓	✓	✓	✓	✓
Property is available for use in near term	✓	✓	✓	✓	✓	✓	✓	✓	x	x	✓

Heavily Vegetated PAG Property along Route 1	1. Heavily Vegetated Site along Route 1	2. Heavily Vegetated Site along Route 18	3. Old Hawaiian Rock Quarry Site	4. Future Container Yard	5. Chassis Lot	6. PAG Parking Lot	7. Sea Plane Ramp	8. Metals Recycling Yard	9. Polaris/ Matson Leased Lot	10. Polaris/Smithbridge Leased Lot	11. Polaris/ Vacant Private Lot
Technical Feasibility											
Requires minimal financial investment for site development/use compared to other sites under consideration or will require lease/sublease for use	x	x	✓	✓	✓	✓	✓	✓	x [b]	x [b]	x [b]
NUMBER OF CRITERIA PASSED	5	5	11	10	10	9	10	10	8	8	8
NUMBER OF CRITERIA FAILED	6	6	0	1	1	2	1	1	3	3	3
CONTINUE TO NEXT SCREENING ROUND? (NUMBER OF CRITERIA FAILED <3)	***NO***	***NO***	***YES***	***YES***	***YES***	***YES***	***YES***	***YES***	***NO***	***NO***	***NO***
6 OUT OF 11 SITES CONTINUE TO NEXT SCREENING ROUND											

[a] Historical/cultural significance was confirmed using geographic information system (GIS).

[b] Polaris Sites are currently leased by Guam Economic Development Agency (GEDA) at an average monthly rate of $1000/acre. If property becomes available for ownership or use by the Port at low cost, recommend these sites be reconsidered.

Secondary Site Screening Framework

After the results of the initial site screening are determined, a refined secondary screening was conducted (Table 3). This screening provided more detailed requirements considering a focused emphasis on operational objectives for the REZ including technical and economic feasibility (e.g., whether the site has preexisting security measures, or sufficient workspace for freight trucks).

Table 3. Secondary Site Screening Evaluation Results

Secondary Screening Criteria	Old Hawaiian Rock Quarry Site	Future Container Yard	Chassis Lot	PAG Parking Lot	Sea Plane Ramp	Metals Recycling Yard
Sensitive/Protected Habitats, Ecosystems, Cultural/Historical Significance						
No wetlands or surface water bodies onsite (within 100 feet of operations)	✓	✓	✓	✓	x	✓
Site Characteristics/Technical Feasibility for Intended Use						
Site will not require significant grading for use due to steep topography	✓	✓	✓	✓	✓	✓
Site access is paved/suitable for intended use	✓	✓	✓	✓	✓	✓
Site flooding potential is NOT high during typhoons	x	✓	✓	✓	x	✓
Major utilities (electrical, water, telecommunications) present at or nearby site	✓	✓	✓	✓	✓	✓
Site is partially or fully paved or graveled paved	✓	✓	✓	✓	✓	✓
Site is fenced or otherwise secured	✓	x	✓	x	x	✓
Site is of sufficient size that allows for easy heavy truck access and turning	✓	✓	✓	✓	✓	✓
No other considerations/operational restrictions that would preclude use	✓	✓	x[b]	✓	✓	✓
Alignment with 2023 Master Plan	✓	✓[a]	x[b]	✓	✓	✓
NUMBER OF CRITERIA PASSED	9	9	8	9	7	10
NUMBER OF CRITERIA FAILED	1	1	2	1	3	0
***PASS SCREENING?* (NUMBER OF CRITERIA FAILED <2)**	***YES*** [c]	***YES***	***NO***	***YES***	***NO***	***YES***
4 SITES SUITABLE FOR USE AS REZ LOCATION						

[a] The Future Container Yard area is planned for future development (expansion of the cargo handling area) but in the interim is suitable for use as Recycling Enterprise Zone.

[b] The Chassis Lot is currently in use for PAG operations.

[c] Old Hawaiian Rock Quarry Site will not be available for the next 5 years because it will be used as laydown for the Glass Breakwater project. After that, it will be used as a Recycling Enterprise Zone site. Note that this site has potential for 1- to 3-foot inundation on the eastern side from Category 4 and 5 storms.

Site Screening Results

Four of the six sites considered in this round of screening passed, leaving the Old Hawaiian Rock Quarry, Future Container Yard, PAG Parking lot and Metals Recycling Yard sites for consideration as the most suitable REZ sites utilizing the abovementioned evaluation frameworks.

Attachment D.1
Site Evaluation Matrix

X Main Impact
X Smaller Impact

		Topics	Details	Project Phase Impact				Rating System			Impact Level		
				Pre-Design	Design	Construction	Operations	Envision v3	WEDG	Green Marine	Low	Medium	High
INTEGRATIVE DESIGN PROCESS	GENERAL	**Proximity to Transit Services**	Bicycle Hubs, Bus Stops, Subway Stations, Commuter Lines	X				•			•		
		Proximity to Community Services	Restaurants, Groceries, Gov't Services, Spiritual, Childcare/Schools, etc.	X				•			•		
		Culture Preservation	Reflect culture of immediate area and residents	X	X			•			•		
		Respite Provision	Escape from overstimulation (indoor and outdoor)	X	X			•			•		
		Educational	Provide programming, events, literature, training		X	X	X	•			•		
		Matches Area Density	Appropriate scale for neighborhood	X	X			•			•		
		Universal Design	Allow equitable access to project, accessible to all with disabilities (above ADA/ABA), provides alternative communications, inclusive design	X	X		X	•			•		
		Stakeholder Collaboration	Heavily engage community and users during the design process	X	X	X	X	•			•		
		Living Economy Support	Support local businesses and residents through relationships with project; provides project-related training	X	X	X	X	•			•		
		Social Equity in the Project	Address equity issues in the project community, supply chain, and within the design and construction teams.	X	X	X	X	•			•		
		Smoke-free Environment	No smoking (tobacco or other) or e-cigarettes on property or inside building(s)		X	X	X	•			•		
		Heat Island Reduction	Site and building reflectivity/absorption	X	X			•			•		

X Main Impact
X Smaller Impact

		Topics	Details	Project Phase Impact				Rating System			Impact Level		
				Pre-Design	Design	Construction	Operations	Envision v3	WEDG	Green Marine	Low	Medium	High
INTEGRATIVE DESIGN PROCESS	THOUGHTFUL DESIGN	**Low-impact Materials**	Low embodied carbon, recycled materials, recyclable, low- or no-VOC content/emissions	X	X	X		•			•		
		Material Reuse	Reuse of existing buildings and materials; planning for end-of-life	X	X	X		•			•		
		Local Materials	Integration of locally-produced materials/products in the design	X	X	X		•			•		
		Industry Accountability	Support of manufacturer and product transparency and accountability	X	X	X		•			•		
		Passive Design	Design first with passive design strategies to reduce dependence and demand for artificial systems	X	X			•			•		
		Flexible Design	Movable/demountable interior components, plug-and-play lighting/electrical systems, plan for expansion		X		X	•			•		
		Diversity of Space	Provide a variety of work, collaboration, and casual spaces. Include gathering places to connect with the community.	X	X			•			•		
		Biophilic Design	Connection to/inclusion of nature, public art, connection to place	X	X			•			•		
		Active Design	Stair visibility and inviting design, open access between floors, site and building activity amenities	X	X		X	•			•		

X Main Impact
X Smaller Impact

		Topics	Details	Project Phase Impact				Rating System			Impact Level		
				Pre-Design	Design	Construction	Operations	Envision v3	WEDG	Green Marine	Low	Medium	High
INTEGRATIVE DESIGN PROCESS	SITE	**Greenfield Protection**	No building on greenfield, prime farmland, floodplain, within 50' of wetlands or 100' of water bodies, or protected habitat	X	X			•			•		
		Habitat Preservation	Maintain reference habitat, adaptive plan, maintenance plan, Native/adapted plants only, biodiversity, pollinator habitats creation, integrated pest management	X	X			•			•		
		Responsible Stormwater Management	Low-impact development, minimization of impervious hardscape, retention/detention, on-site/natural infiltration, aquifer recharge, quality	X	X	X		•			•		
		Ground & Surface Water Protection	Protect from runoff/pollution, monitor quality, pursue improvements	X	X			•			•		
		Light Trespass	Reduce backlight, uplight, and glare from site and building lighting sources	X	X			•			•		
		Pedestrian-Oriented Design	Prioritize pedestrian safety, access, and experience over vehicular-oriented design		X		X	•			•		
		Minimization of Private Vehicle Parking	Provide minimum or no on-site parking for privately-owned vehicles	X	X			•			•		
		Supports Alternative Transportation Means	Priority parking for alternative fuel vehicles, alternative fueling stations, bicycle access, storage, and tools. Supports employee commuting strategies.	X	X			•			•		
		Supports Garden Space	Dedicate % of project area to agriculture for occupants	X	X			•			•		

X Main Impact
X Smaller Impact

		Topics	Details	Project Phase Impact				Rating System			Impact Level		
				Pre-Design	Design	Construction	Operations	Envision v3	WEDG	Green Marine	Low	Medium	High
INTEGRATIVE DESIGN PROCESS	WATER	**Eliminate Site Potable Water Use**	No potable water use within the project site area	X	X		X	•			•		
		****Reduced Building Potable Water Use****	Utilize water-efficient fixtures inside building	X	X		X	•			•		
		Collect/Treat Rainwater for Reuse	Rainwater and/or stormwater collection, treatment, and reuse within project site	X	X		X	•			•		
		Collect/Treat Grey/Black Water	Greywater and/or blackwater collection and treatment, and managed within project site	X	X	X	X	•			•		
		****Indoor Water Quality****	Address quality of water intended for human consumption (lavatories, showers, sinks, drinking)		X		X	•			•		
		****Water Metering****	Metering and submetering of water-using systems within project boundary (site and building)		X		X	•			•		
		****Process Water Use Reduction****	No refrigeration equipment using once-through cooling with potable water, no garbage disposals, water-efficient appliances, water reuse where possible		X			•			•		
		****Water Systems Commissioning****	Review of design project documents, water systems tests, balancing, review reports, site observations, O&M training		X	X		•			•		

X Main Impact
X Smaller Impact

		Topics	Details	Project Phase Impact				Rating System			Impact Level		
				Pre-Design	Design	Construction	Operations	Envision v3	WEDG	Green Marine	Low	Medium	High
INTEGRATIVE DESIGN PROCESS	ENERGY	**Site Energy Use Reduction**	Efficient and minimal site lighting, automated controls & sensors	X	X			•			•		
		Building Energy Use Reduction	Passive design strategies, load reduction, envelope optimization, improved mechanical system efficiencies, smart operational strategies, automated controls, minimal lighting, efficient appliances and water heating systems	X	X			•			•		
		On-site Renewable Energy Generation	Solar photovoltaics, wind, hydroelectric, geothermal	X	X		X	•			•		
		Refrigerant Management	HVAC&R equipment: No CFC-based refrigerants, no- or low-impact refrigerants, do not exceed appropriate refrigerant charge	X	X	X		•			•		
		No On-site Combustion	No systems or equipment on site that relies on combustion to conform, no natural gas, heating fuel oil, biomass burning	X	X			•			•		
		Energy Storage	Integrate on-site energy storage capabilities to reduce grid demand and increase resilience	X	X		X	•			•		
		Grid Interactivity	Participate in demand response technologies and programs with local utilities providers or make building ready for when programs are available	X	X		X	•			•		
		Energy Metering	Metering and submetering of major energy-using and energy-generating systems within project boundary (site and building)		X			•			•		
		Green Power and Carbon Offsets	Purchasing of renewable energy certificates (RECs) and/or carbon offsets to create market demand for renewable energy generation and decrease carbon emissions		X		X	•			•		
		Building Envelope Commissioning	Review of design project documents, test and verify the building's thermal envelope		X	X	X	•			•		
		Energy Systems Commissioning	Review of design project documents, energy systems tests, balancing, review reports, site observations, O&M training			X	X	•			•		

X Main Impact
X Smaller Impact

		Topics	Details	Project Phase Impact				Rating System			Impact Level		
				Pre-Design	Design	Construction	Operations	Envision v3	WEDG	Green Marine	Low	Medium	High
INTEGRATIVE DESIGN PROCESS	QUALITY INDOOR ENVIRONMENT	**Air Quality**	Filtration, sensors, ventilation, increased air supply, air treatment, smoking policies.		X		X	•			•		
		Contaminant Containment	Exhausting chemical-use areas, source separation (self-closing doors and hard-lid ceilings), entryway systems / walk-off mats, vestibules, and ongoing maintenance		X		X	•			•		
		Thermal Controls	Thermostats for localized controls, operable windows, desk fans, optimized HVAC setpoints		X		X	•			•		
		Lighting Quality	Indirect / uplight ceiling fixtures, high CRI fixtures, light flicker management strategies, circadian rhythm lighting design		X			•			•		
		Lighting Controls	Switches for localized controls, multi-mode lighting schemes, desk task lamps, dimming and adjustable color temperature		X			•			•		
		Acoustics	Limitation of HVAC background noise and reverberation times, wall design to meet Sound Transmission (STC) ratings, Sound masking or reinforcement strategies		X		X	•			•		
		Daylighting and Glare	Space layout to maximize workstations near windows and minimize artificial lighting, light shelves or tall windows, high VLT (visible light transmittance) windows. Focused or indirect (low glare) artificial lighting, Window solar shades for glare control.	X	X		X	•			•		
		Quality Views	Space layout to optimze workstations near windows, limitation of visual obstructions, window placement to provide diversity of views	X	X			•			•		
		Moisture Management	Germicidal ultraviolet treatment in air handlers, quarterly maintenance and cleaning of cooiling coils. Strategies for protecting the building from moisture intrusion and preventing occupants' exposure to mold spores.		X		X	•			•		
		Ergonomic Furnishings	Ergonomics policy for computer users, ergonomic assessments for occupants, sit-stand desks, ergonomic chairs, adjustable position monitors		X		X						

X Main Impact
x Smaller Impact

		Topics	Details	Project Phase Impact				Rating System			Impact Level		
				Pre-Design	Design	Construction	Operations	Envision v3	WEDG	Green Marine	Low	Medium	High
INTEGRATIVE DESIGN PROCESS	CONSTRUCTION ACTIVITIES	**Contractor Qualifications**	Contractor must have relevant experience, designated sustainability coordinator		x	X		•			•		
		****Activity Containment****	Reduce dust, noise, vibration, light pollution, runoff, dirt tracking, construction vehicle congestion, no idling		x	X		•			•		
		Energy Use Reduction	Plan to minimize emissions, energy demand, control use, automated controls, tracking		x	X		•			•		
		Water Use Reduction	Plan to minimize water demand, control use, tracking, leak detection, grey or rainwater reuse, embodied water use reduction		x	X		•			•		
		****Construction Waste Management****	CWM plan, targeted waste streams for diversion, detailed tracking, on-site reuse		x	X		•			•		
		Careful Storage of Materials	On-site storage that protects materials from moisture, extreme temperatures. Schedule construction procedures to minimize exposure of absorbent materials to VOC emissions.		x	X		•			•		
		Indoor Air Quality	IAQ Plan and tracking (HVAC protection, source control, pathway interruption, housekeeping, flushouts), air testing prior to occupancy, air testing after occupancy. No smoking on site during construction.		x	X		•			•		
		Community Feedback Loop	Communication plan for surrounding community during construction, open feedback process, corrective action plan		x	X		•			•		
		Material Tracking	Detailed purchasing plan and tracking mechanisms; contractor's sustainability coordinator prepares submittal content		x	X		•			•		

X Main Impact
X Smaller Impact

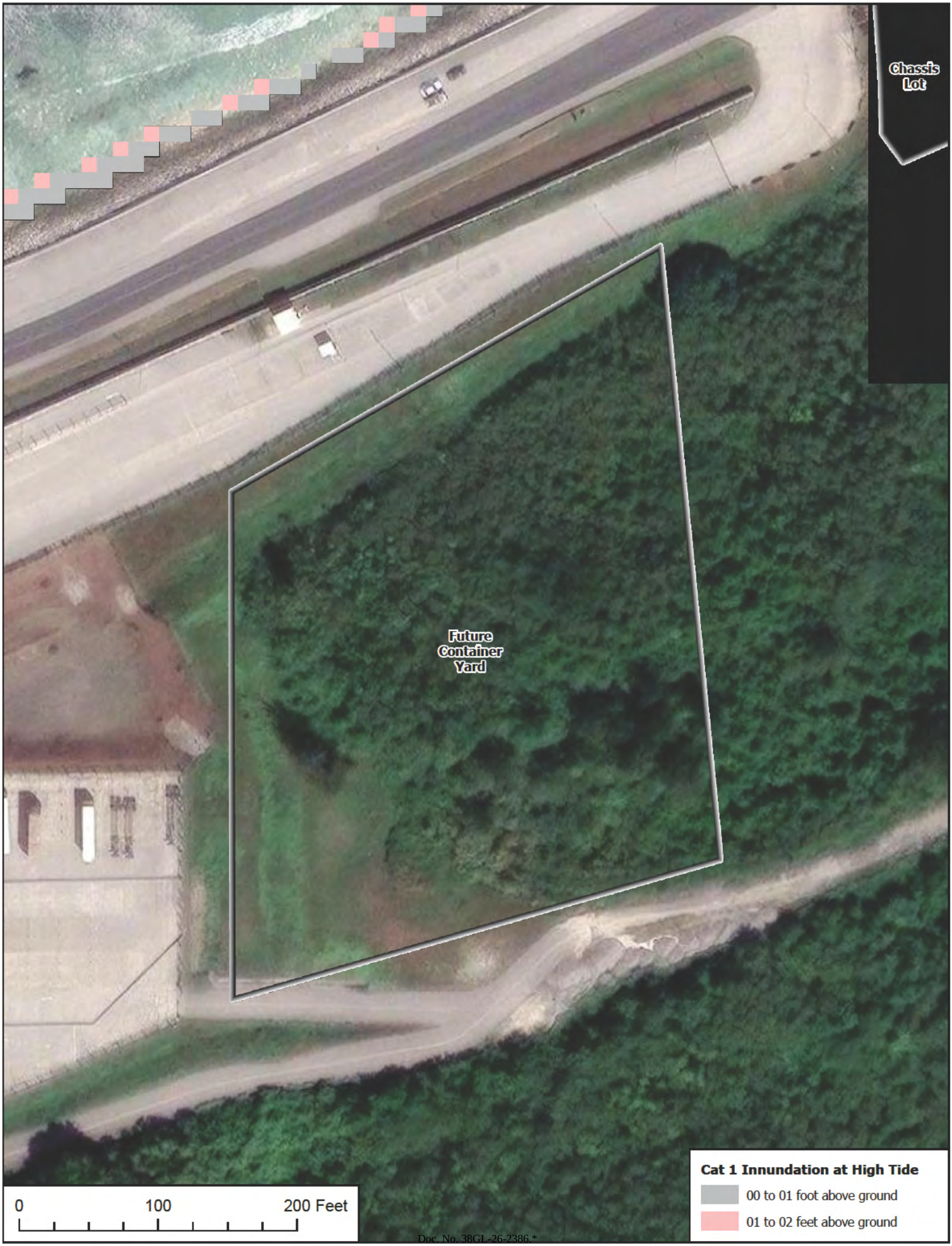
		Topics	Details	Project Phase Impact				Rating System			Impact Level		
				Pre-Design	Design	Construction	Operations	Envision v3	WEDG	Green Marine	Low	Medium	High
INTEGRATIVE DESIGN PROCESS	OPERATIONS	**Building Systems Monitoring**	Energy & water systems: Monitoring-based Cx, measurement & verification, corrective action plans for variances		X	X	X	•			•		
		Emissions Tracking	Track all energy and fuel consumption associated with the site, building, and associated transportation				X	•			•		
		Water and Air Quality Monitoring	Installed monitoring systems and/or regularly scheduled on-site testing		X	X	X	•			•		
		Occupant Feedback Loops	Regular surveys, corrective action plans				X	•			•		
		Transparency	Ongoing sharing of information around energy and water use, maintenance, monitoring results, policies, etc.				X	•			•		
		Green Cleaning	Firm policies, equipment used, chemicals used, process			X	X	•			•		
		Green Procurement	Ongoing consumables: Procurement policies, purchasing specs			X	X	•			•		
		Equitable Procurement	Prioritizes local procurement of consumables				X	•			•		
		Green Maintenance	Site and building policies for maintenance and modifications	X	X	X	X	•			•		
		Operational Waste Management	Operational recycling, e-waste, mercury-containing lamps, batteries, other hazardous wastes, compostables		X		X	•			•		
		Emergency Preparedness	On-site supplies and equipment, personnel training, staff scheduling				X						

Appendix E
NOAA Storm Surge Maps

Heavily Vegetated
PAG Property
Along Route 1
Heavily Vegetated
PAG Property
Along Route 18
Cat 1 Innundation at High Tide
00 to 01 foot above ground
01 to 02 feet above ground
02 to 03 feet above ground
Port of Guam Property Boundary
Ancestral Land
Department of Defense (DoD)
0
400
800 Feet

Heavily Vegetated
PAG Property
Along Route 1
Heavily Vegetated
PAG Property
Along Route 18
Cat 1 Innundation at High Tide
00 to 01 foot above ground
01 to 02 feet above ground
02 to 03 feet above ground
Port of Guam Property Boundary
Ancestral Land
Department of Defense (DoD)
0
400
800 Feet

Doc. No. 38GL-26-2386.*



Doc. No. 38GL-26-2386.*

Old Hawaiian
Rock Site
Chassis Lot
0
100
200 Feet
Cat 1 Innundation at High Tide
00 to 01 foot above ground
01 to 02 feet above ground

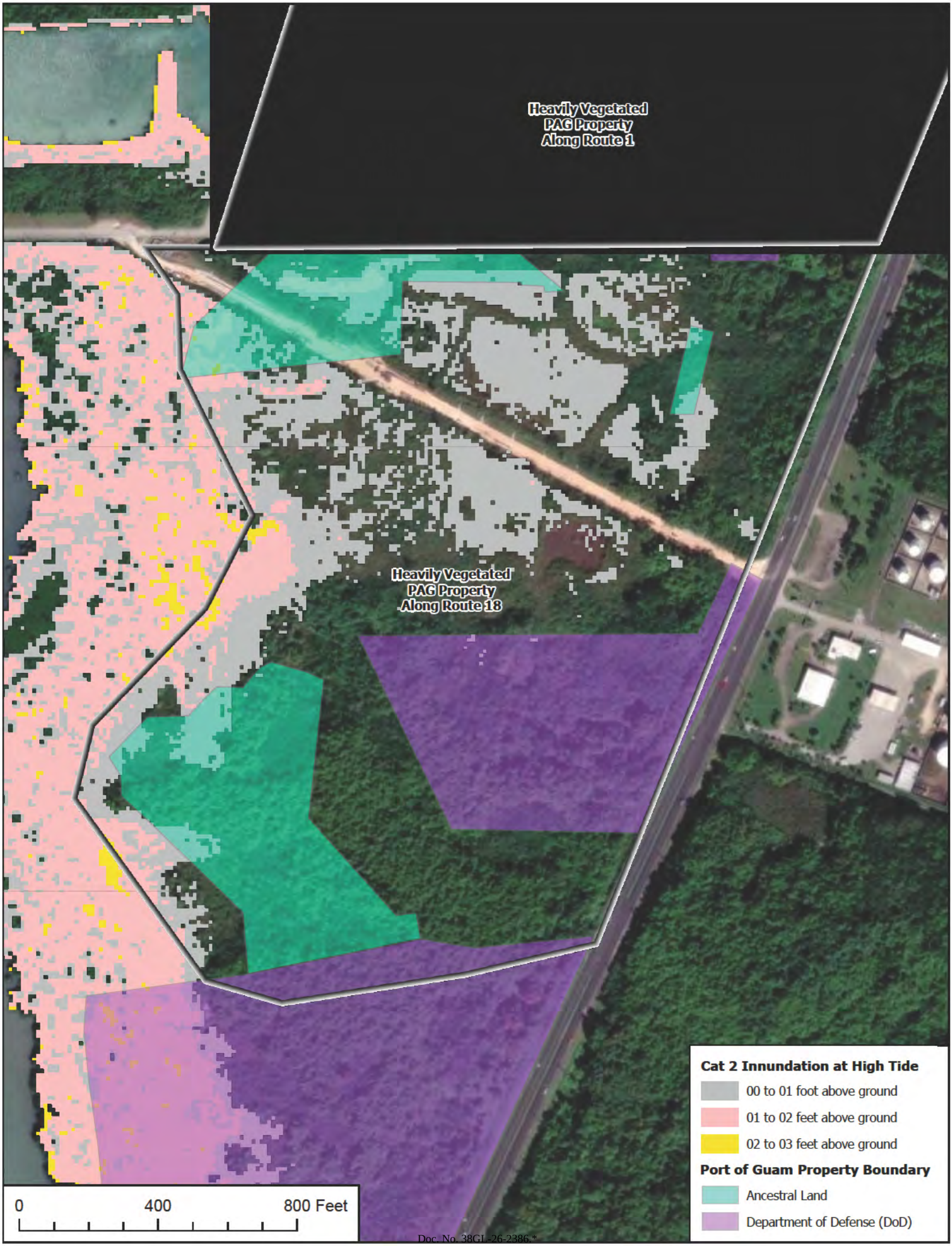
Old Hawaiian Rock Site
PAG Parking Lot
0
100
200 Feet
Cat 1 Innundation at High Tide
00 to 01 foot above ground
01 to 02 feet above ground

Doc. No. 38GL-26-2386.*

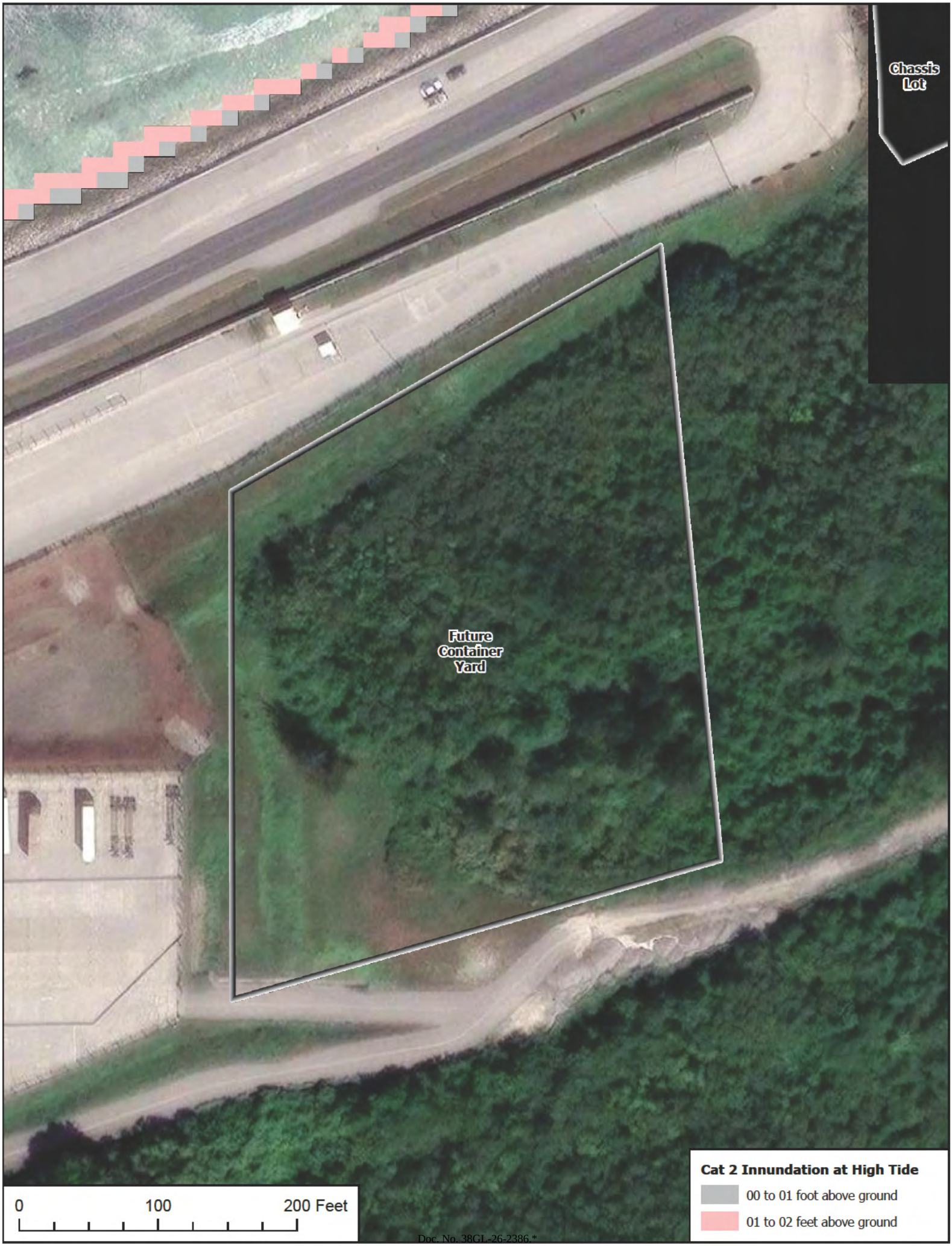
Doc. No. 38GL-26-2386.*

Doc. No. 38GL-26-2386.*

Doc. No. 38GL-26-2386.*


Heavily Vegetated
PAG Property
Along Route 1
Heavily Vegetated
PAG Property
Along Route 18
Cat 2 Innundation at High Tide
00 to 01 foot above ground
01 to 02 feet above ground
02 to 03 feet above ground
Port of Guam Property Boundary
Ancestral Land
Department of Defense (DoD)
0
400
800 Feet

Doc. No. 38GL-26-2386.*



Doc. No. 38GL-26-2386.*

Old Hawaiian
Rock Site
Chassis Lot
0
100
200 Feet
Cat 2 Innundation at High Tide
00 to 01 foot above ground
01 to 02 feet above ground

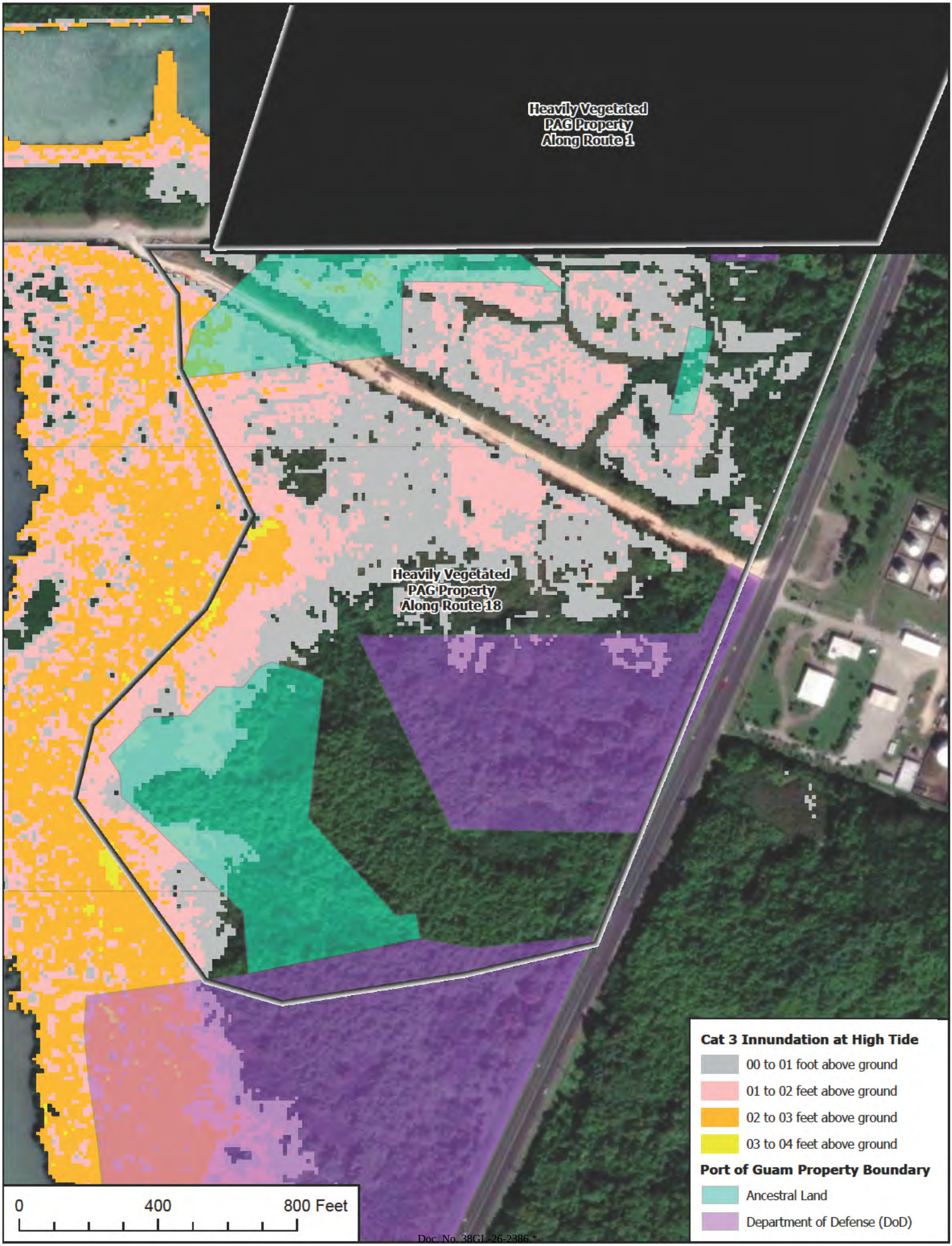
Old Hawaiian Rock Site
PAG Parking Lot
0
100
200 Feet
Cat 2 Innundation at High Tide
00 to 01 foot above ground
01 to 02 feet above ground
02 to 03 feet above ground

Seaplane Ramp
Cat 2 Innundation at High Tide
00 to 01 foot above ground
01 to 02 feet above ground
02 to 03 feet above ground
03 to 04 feet above ground
04 to 05 feet above ground
0
200
400 Feet

Metals
Recycling
Yard
Cat 2 Innundation at High Tide
00 to 01 foot above ground
01 to 02 feet above ground
02 to 03 feet above ground
03 to 04 feet above ground
04 to 05 feet above ground
0
100
200 Feet

Doc. No. 38GL-26-2386.*

Heavily Vegetated
PAG Property
Along Route 1
Heavily Vegetated
PAG Property
Along Route 18
Cat 3 Innundation at High Tide
00 to 01 foot above ground
01 to 02 feet above ground
02 to 03 feet above ground
03 to 04 feet above ground
Port of Guam Property Boundary
Ancestral Land
Department of Defense (DoD)
0
400
800 Feet



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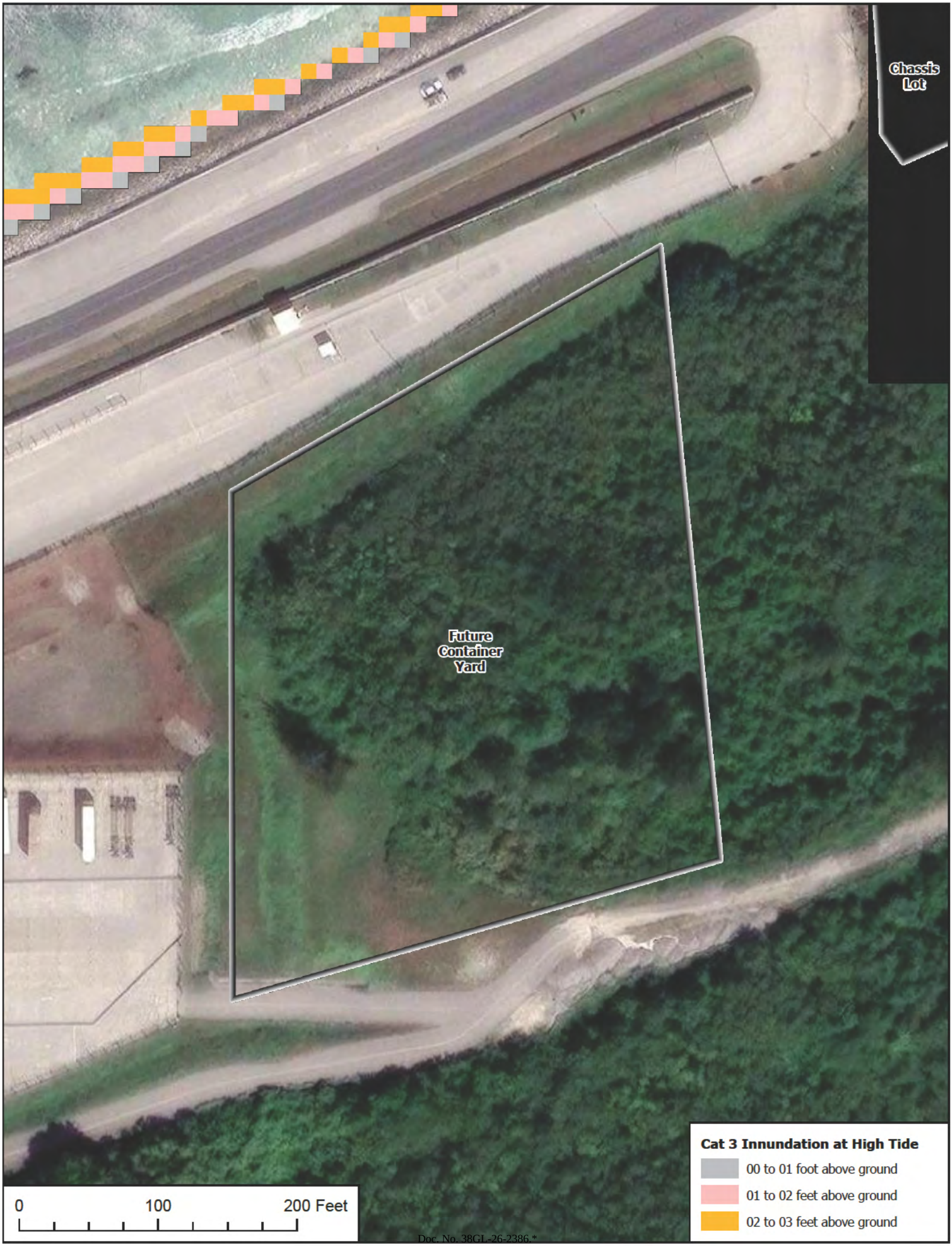


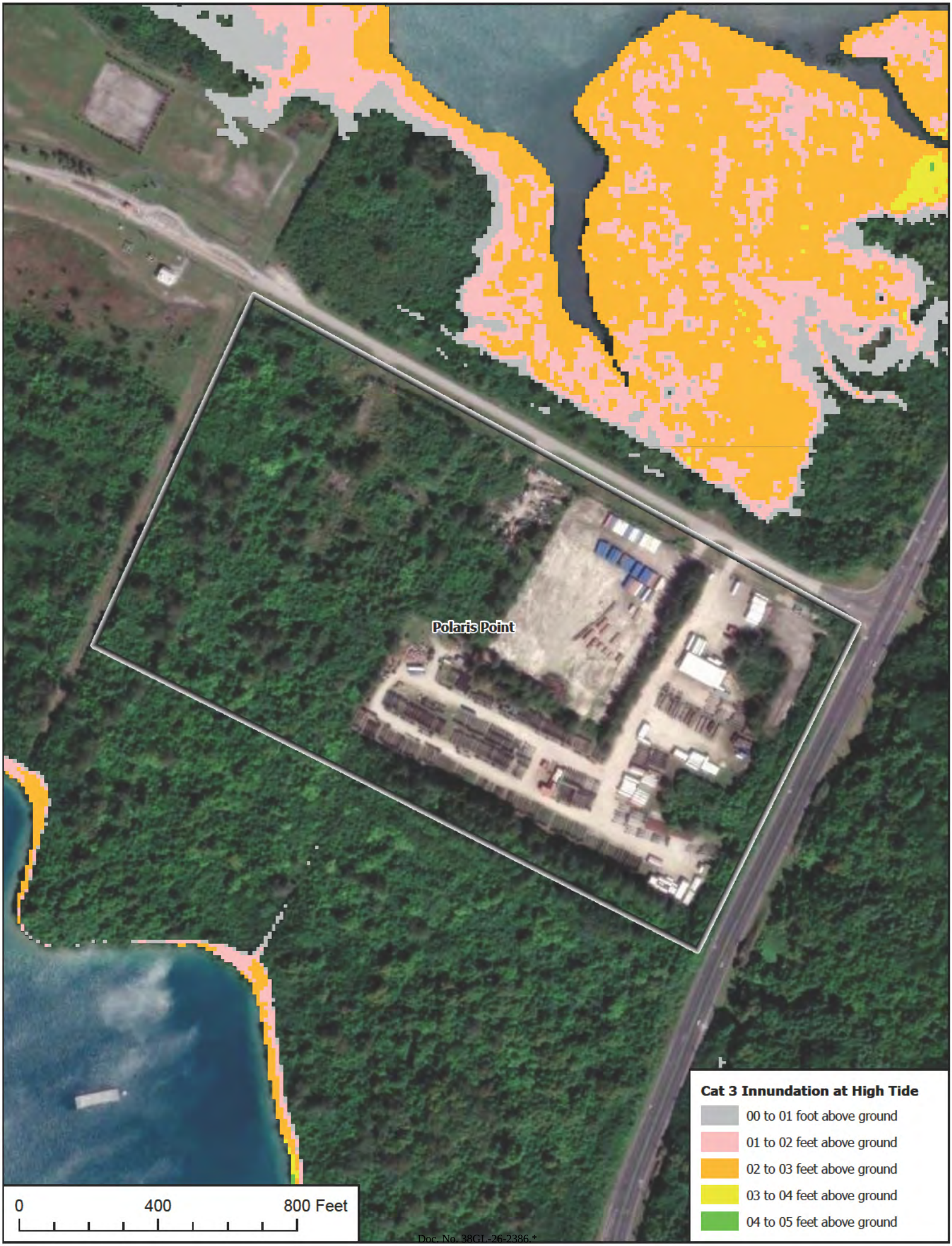
Doc. No. 38GL-26-2386.*

Old Hawaiian
Rock Site
Chassis Lot
0
100
200 Feet
Cat 3 Innundation at High Tide
00 to 01 foot above ground
01 to 02 feet above ground
02 to 03 feet above ground

Old Hawaiian Rock Site
PAG Parking Lot
0
100
200 Feet
Cat 3 Innundation at High Tide
00 to 01 foot above ground
01 to 02 feet above ground
02 to 03 feet above ground

Seaplane Ramp
Cat 3 Innundation at High Tide
00 to 01 foot above ground
01 to 02 feet above ground
02 to 03 feet above ground
03 to 04 feet above ground
04 to 05 feet above ground
05 to 06 feet above ground
0
200
400 Feet

Metals
Recycling
Yard
Cat 3 Innundation at High Tide
00 to 01 foot above ground
01 to 02 feet above ground
02 to 03 feet above ground
03 to 04 feet above ground
04 to 05 feet above ground
0
100
200 Feet



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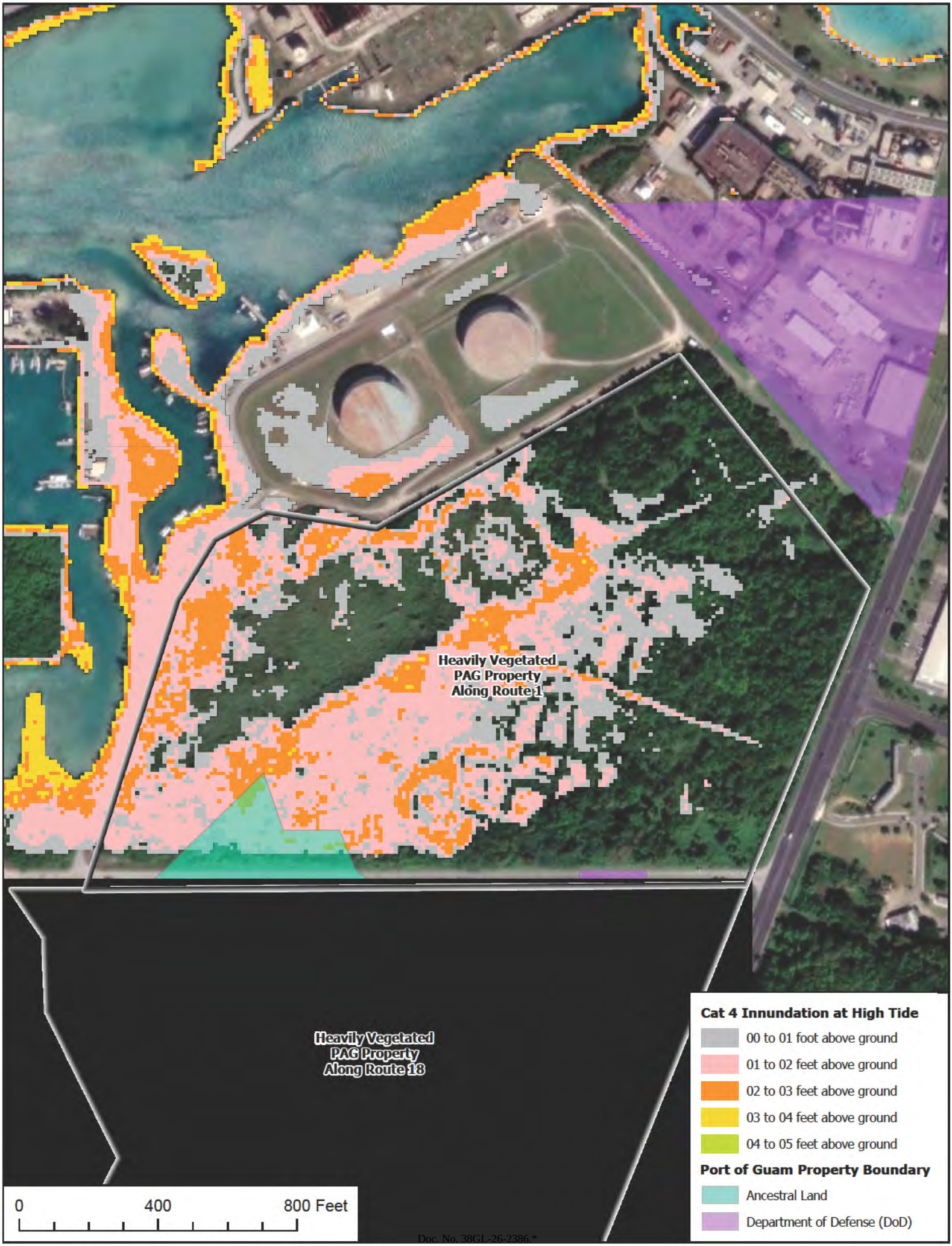
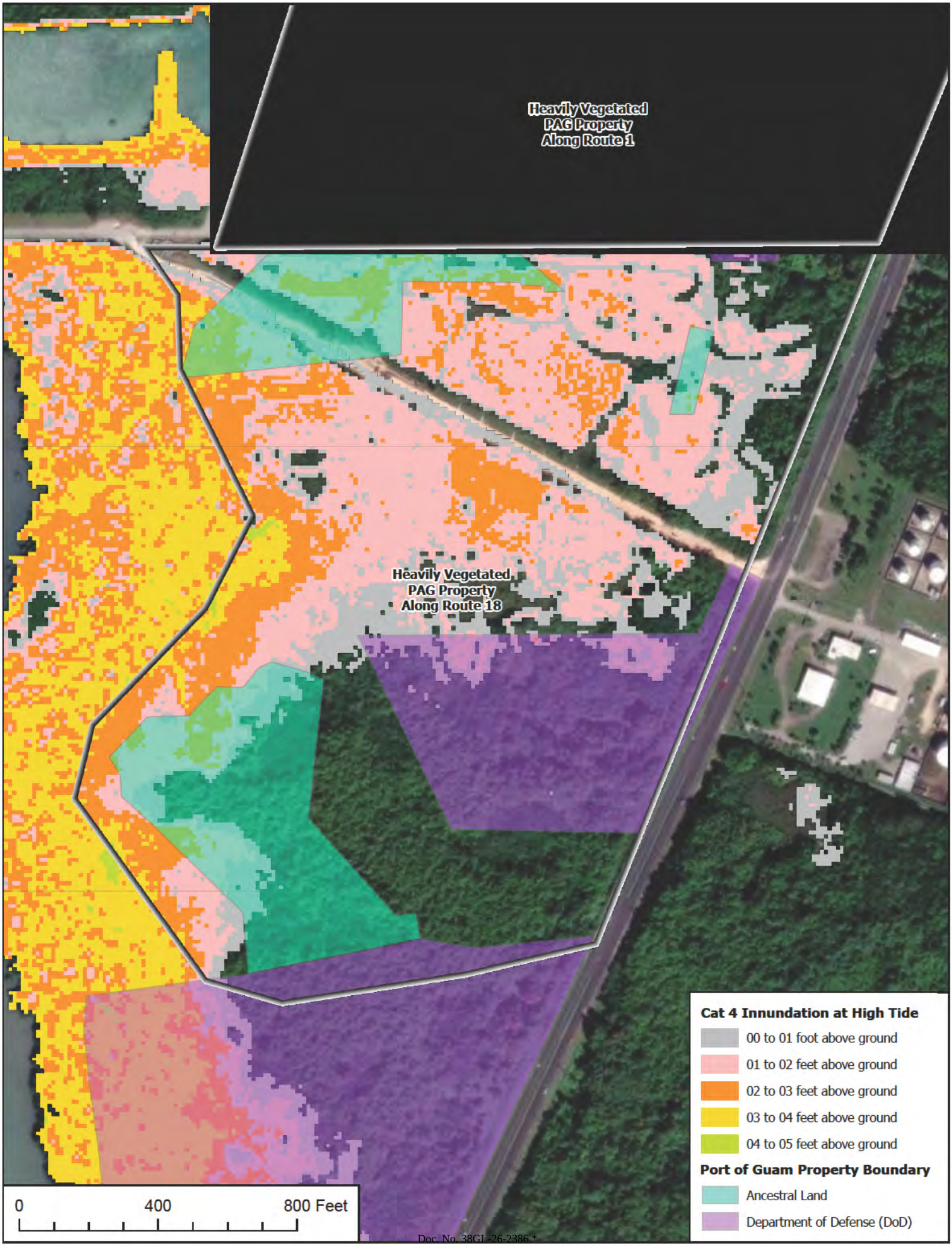

Heavily Vegetated
PAG Property
Along Route 1
Heavily Vegetated
PAG Property
Along Route 18
Cat 4 Innundation at High Tide
00 to 01 foot above ground
01 to 02 feet above ground
02 to 03 feet above ground
03 to 04 feet above ground
04 to 05 feet above ground
Port of Guam Property Boundary
Ancestral Land
Department of Defense (DoD)
0
400
800 Feet



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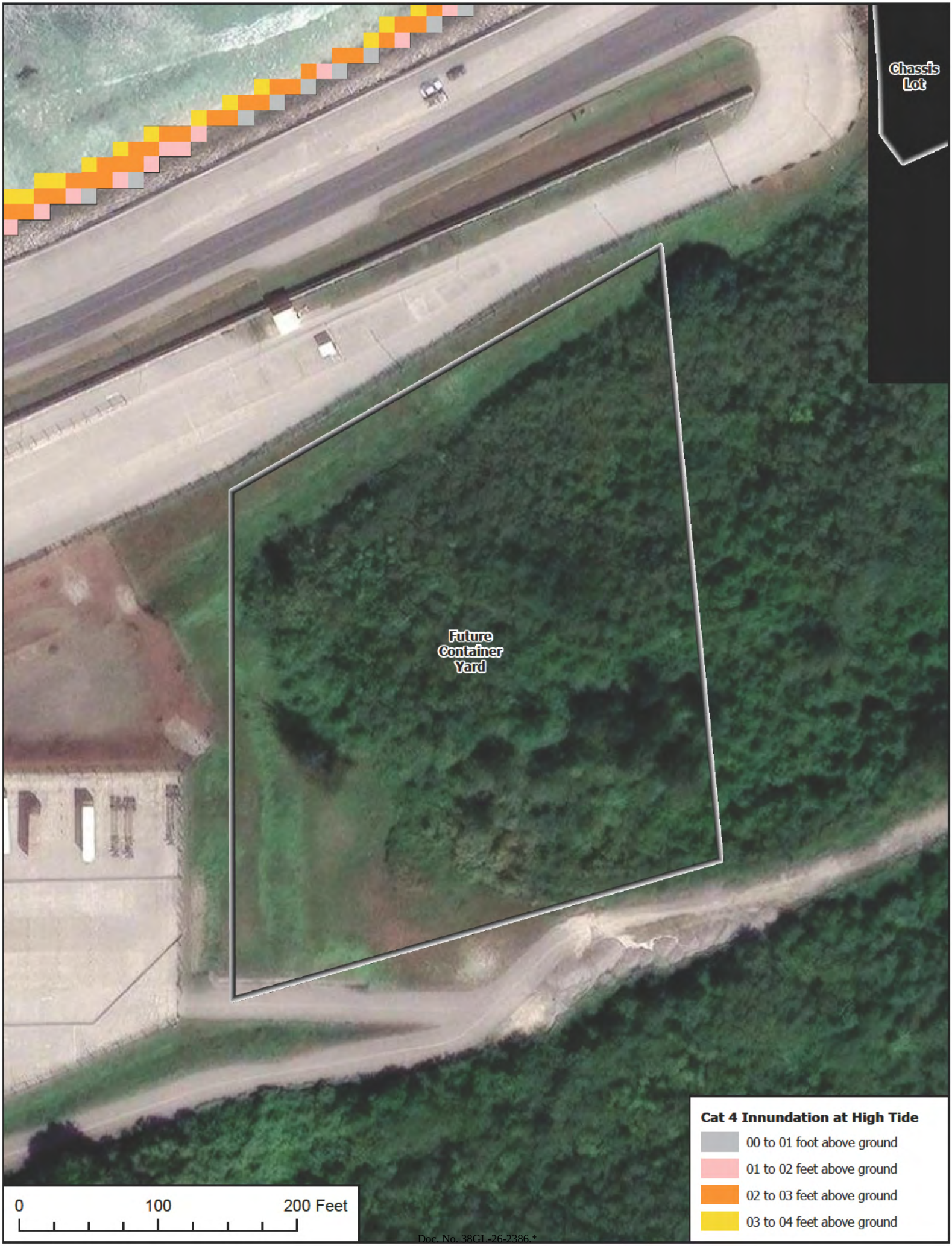
Doc. No. 38GL-26-2386.*



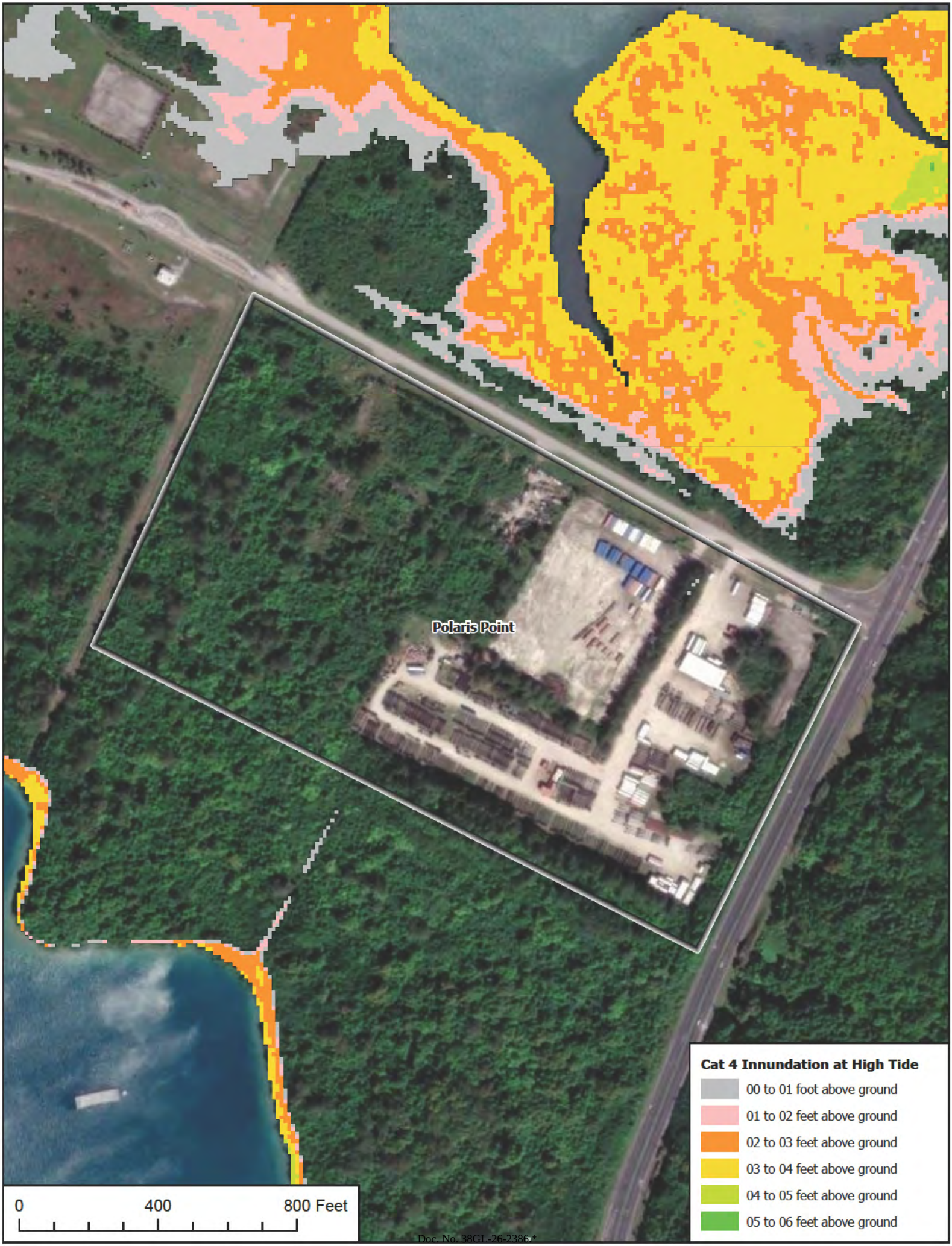
Doc. No. 38GL-26-2386.*

Old Hawaiian
Rock Site
Chassis Lot
0
100
200 Feet
Cat 4 Innundation at High Tide
00 to 01 foot above ground
01 to 02 feet above ground
02 to 03 feet above ground
03 to 04 feet above ground

Old Hawaiian Rock Site
PAG Parking Lot
Cat 4 Innundation at High Tide
00 to 01 foot above ground
01 to 02 feet above ground
02 to 03 feet above ground
03 to 04 feet above ground
0
100
200 Feet

Seaplane Ramp
Cat 4 Innundation at High Tide
00 to 01 foot above ground
01 to 02 feet above ground
02 to 03 feet above ground
03 to 04 feet above ground
04 to 05 feet above ground
05 to 06 feet above ground
06 to 07 feet above ground
0
200
400 Feet

Metals
Recycling
Yard
Cat 4 Innundation at High Tide
00 to 01 foot above ground
01 to 02 feet above ground
02 to 03 feet above ground
03 to 04 feet above ground
04 to 05 feet above ground
05 to 06 feet above ground
0
100
200 Feet



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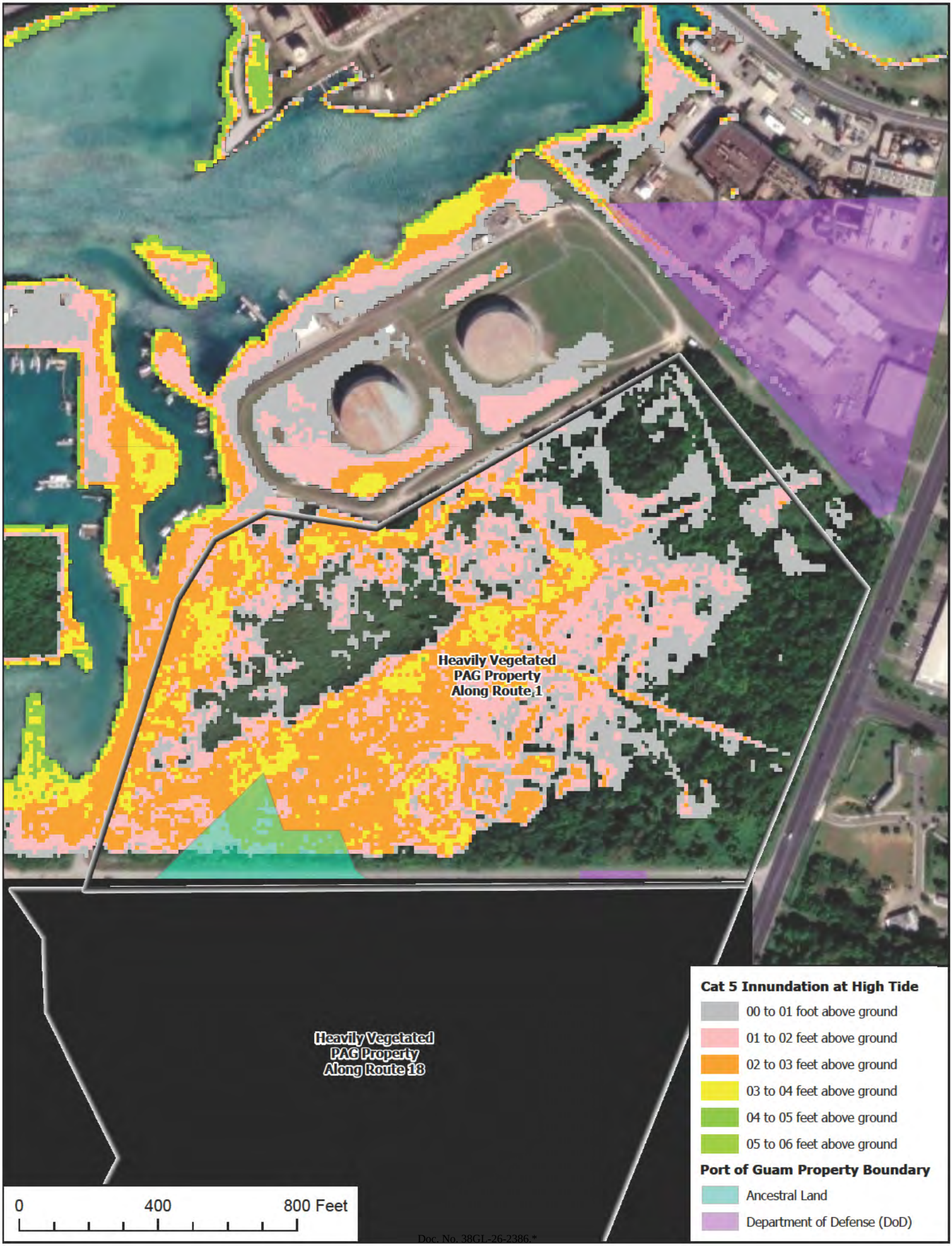

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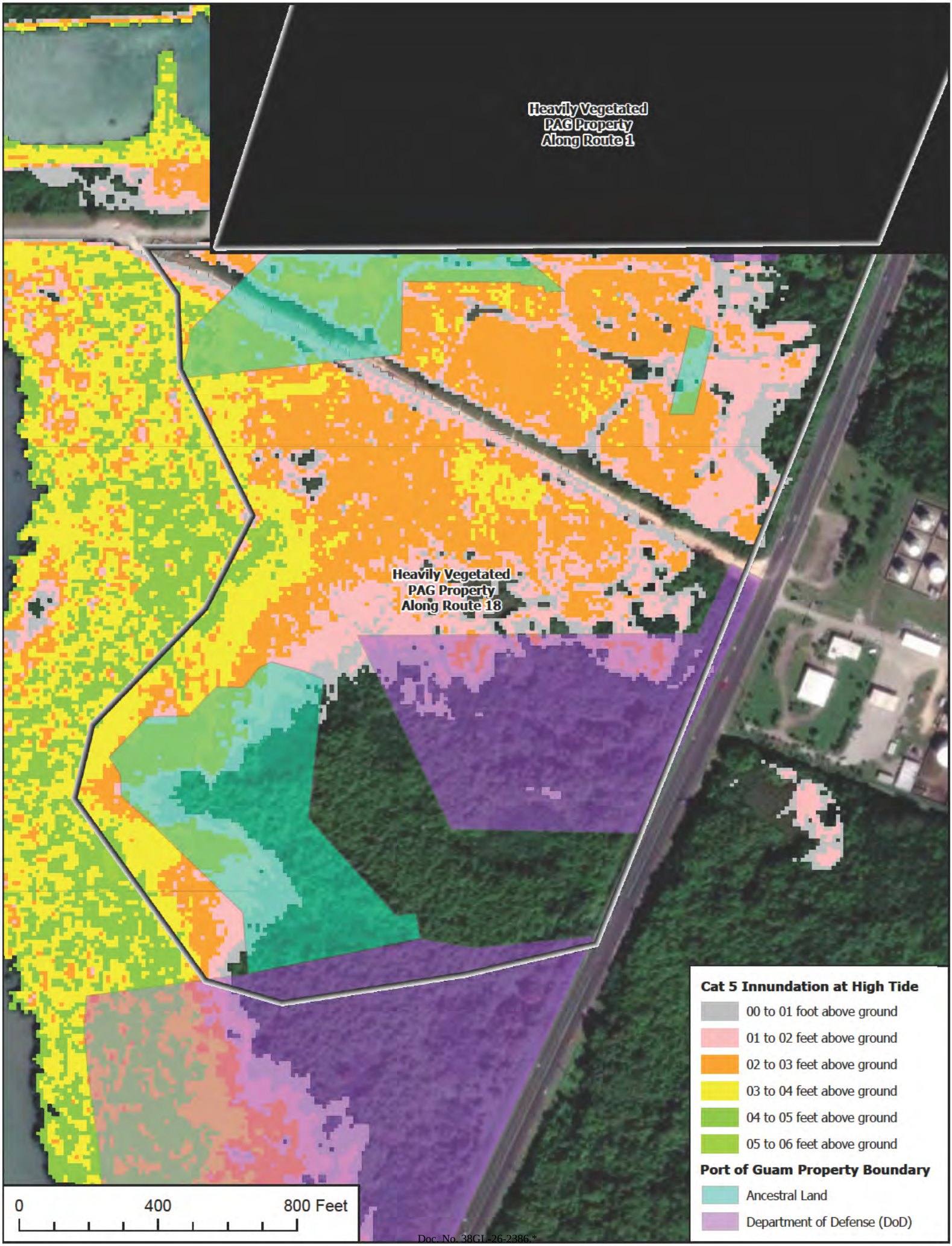
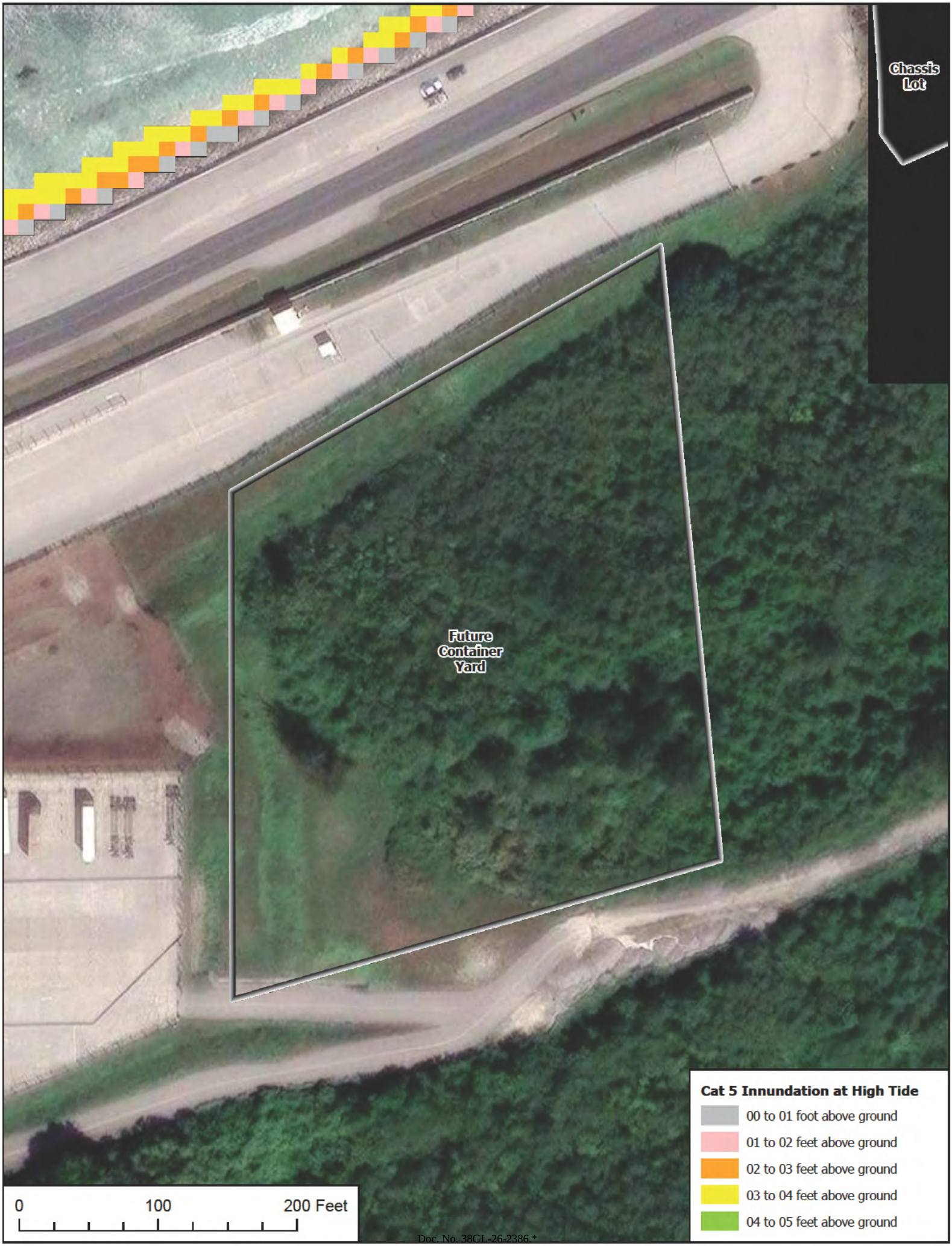

Heavily Vegetated
PAG Property
Along Route 1
Heavily Vegetated
PAG Property
Along Route 18
Cat 5 Innundation at High Tide
00 to 01 foot above ground
01 to 02 feet above ground
02 to 03 feet above ground
03 to 04 feet above ground
04 to 05 feet above ground
05 to 06 feet above ground
Port of Guam Property Boundary
Ancestral Land
Department of Defense (DoD)
0
400
800 Feet

Doc. No. 38GL-26-2386.*



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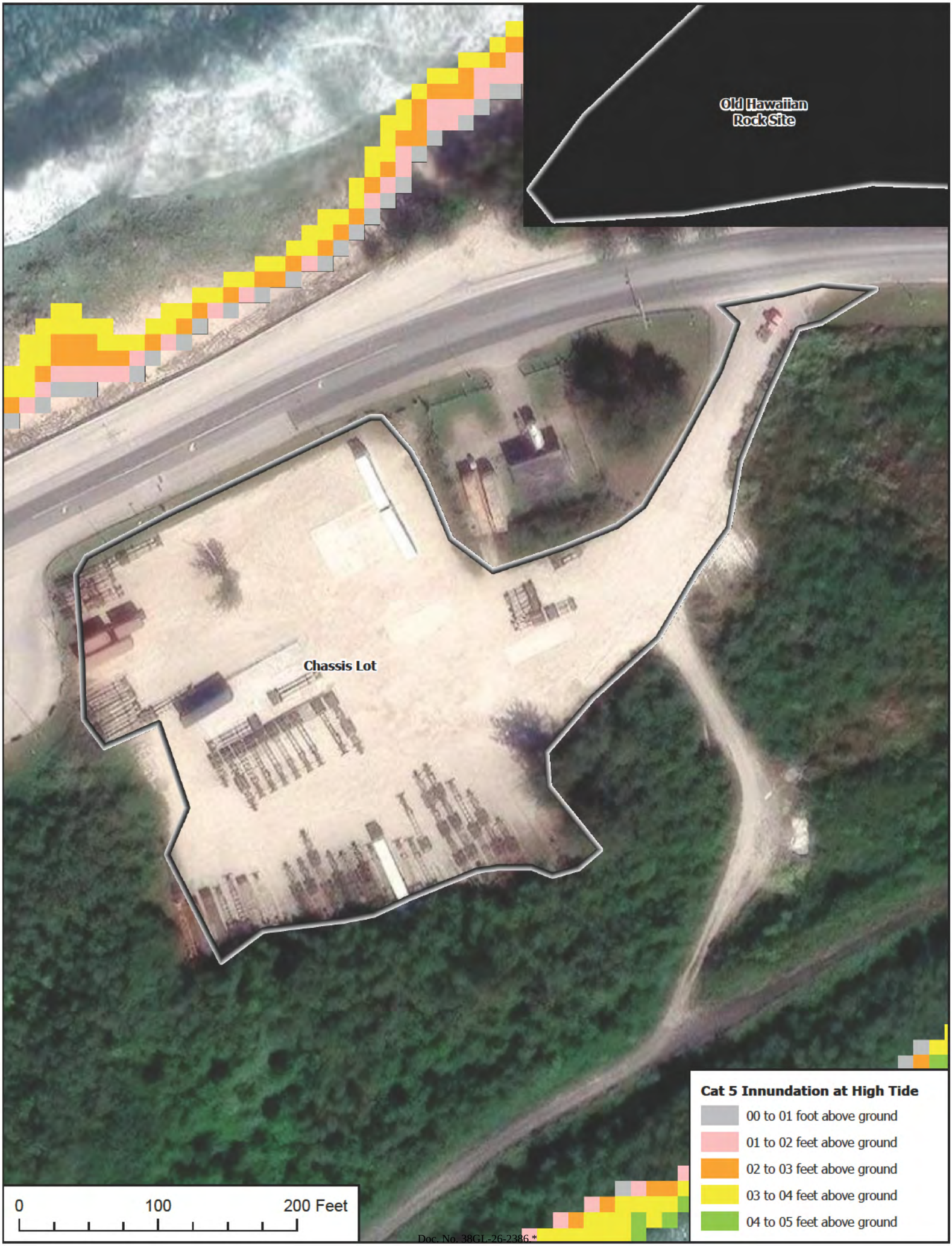
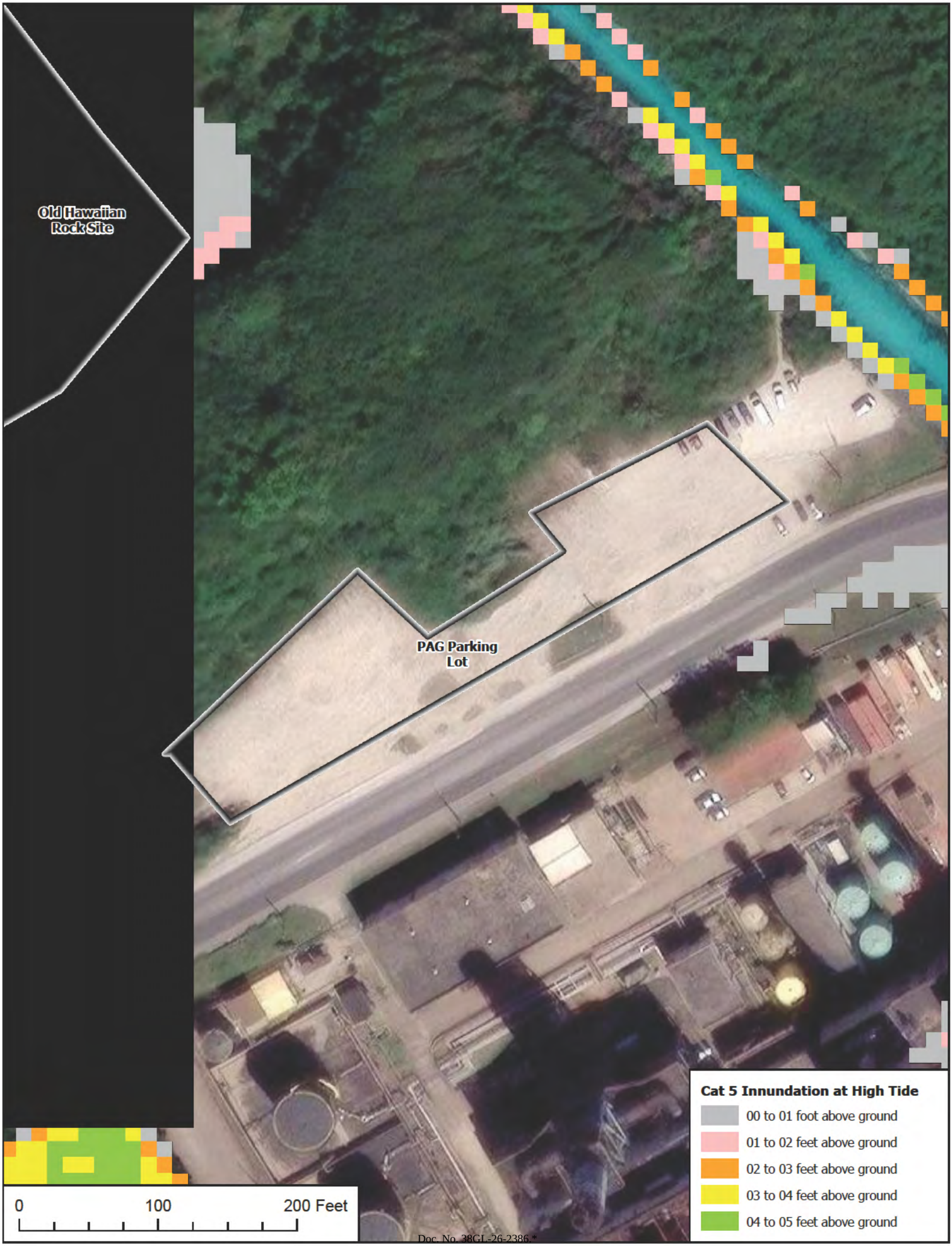
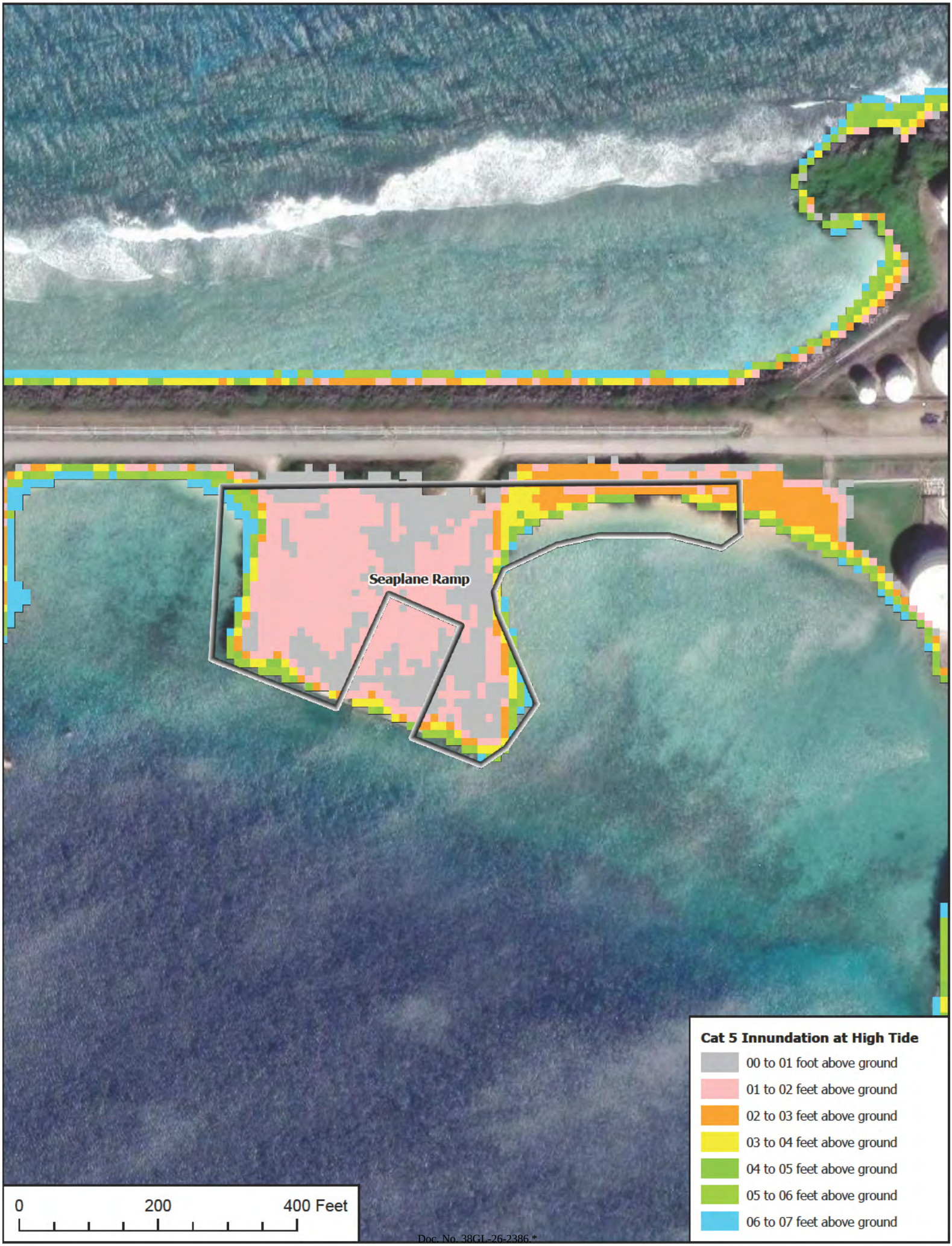
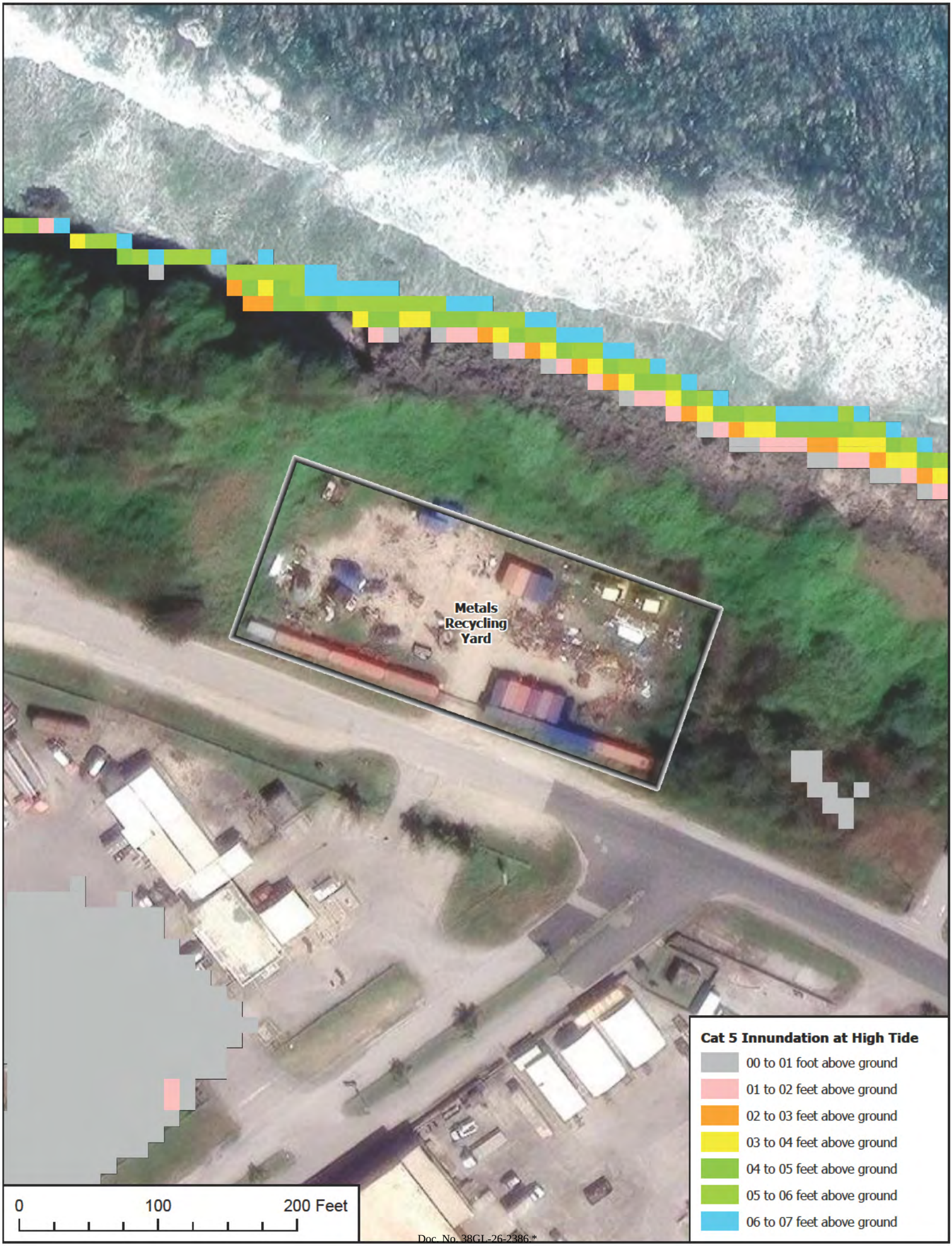

Old Hawaiian
Rock Site
Chassis Lot
Cat 5 Innundation at High Tide
00 to 01 foot above ground
01 to 02 feet above ground
02 to 03 feet above ground
03 to 04 feet above ground
04 to 05 feet above ground
0
100
200 Feet


Old Hawaiian Rock Site
PAG Parking Lot
0
100
200 Feet
Cat 5 Innundation at High Tide
00 to 01 foot above ground
01 to 02 feet above ground
02 to 03 feet above ground
03 to 04 feet above ground
04 to 05 feet above ground


Seaplane Ramp
Cat 5 Innundation at High Tide
00 to 01 foot above ground
01 to 02 feet above ground
02 to 03 feet above ground
03 to 04 feet above ground
04 to 05 feet above ground
05 to 06 feet above ground
06 to 07 feet above ground
0
200
400 Feet



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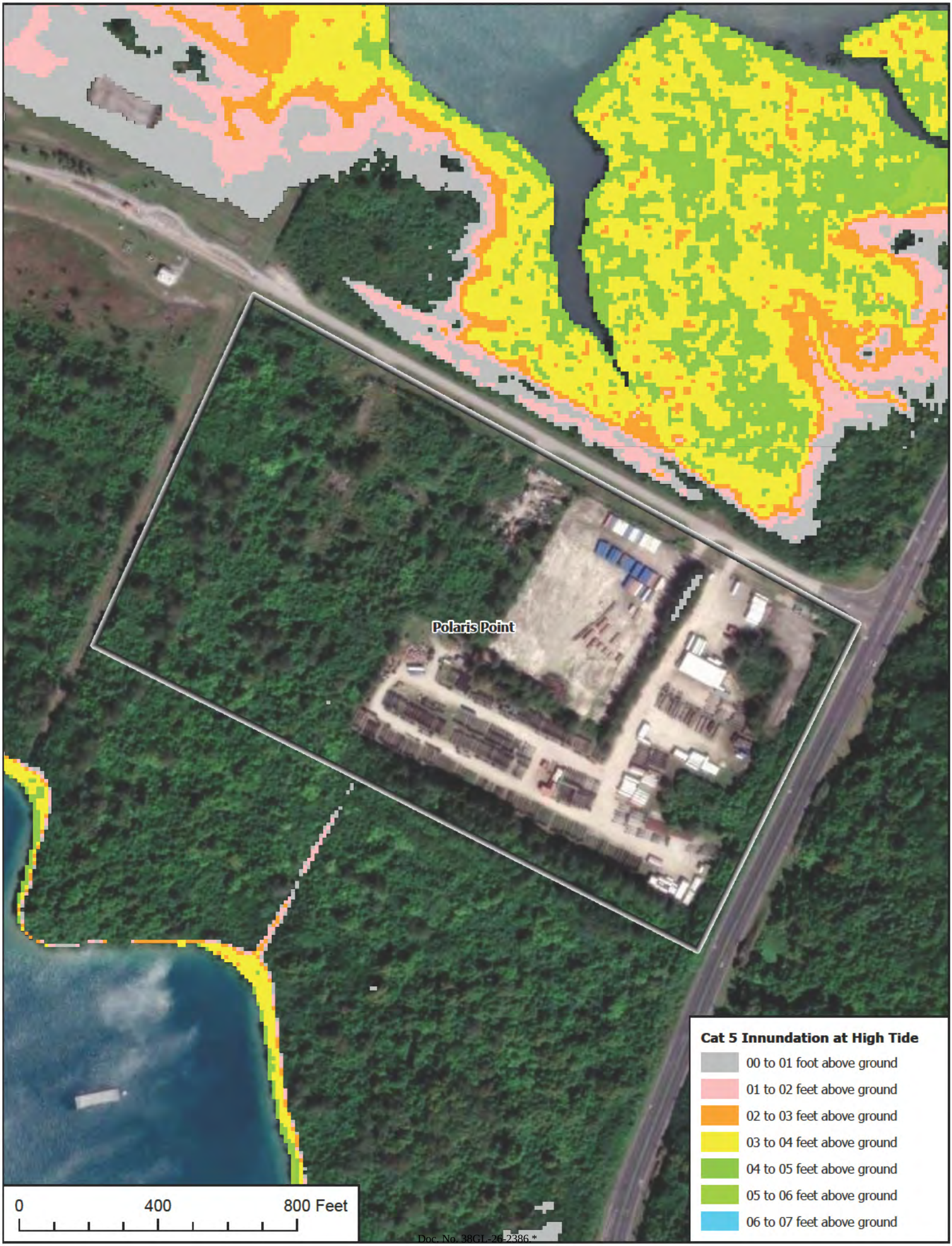
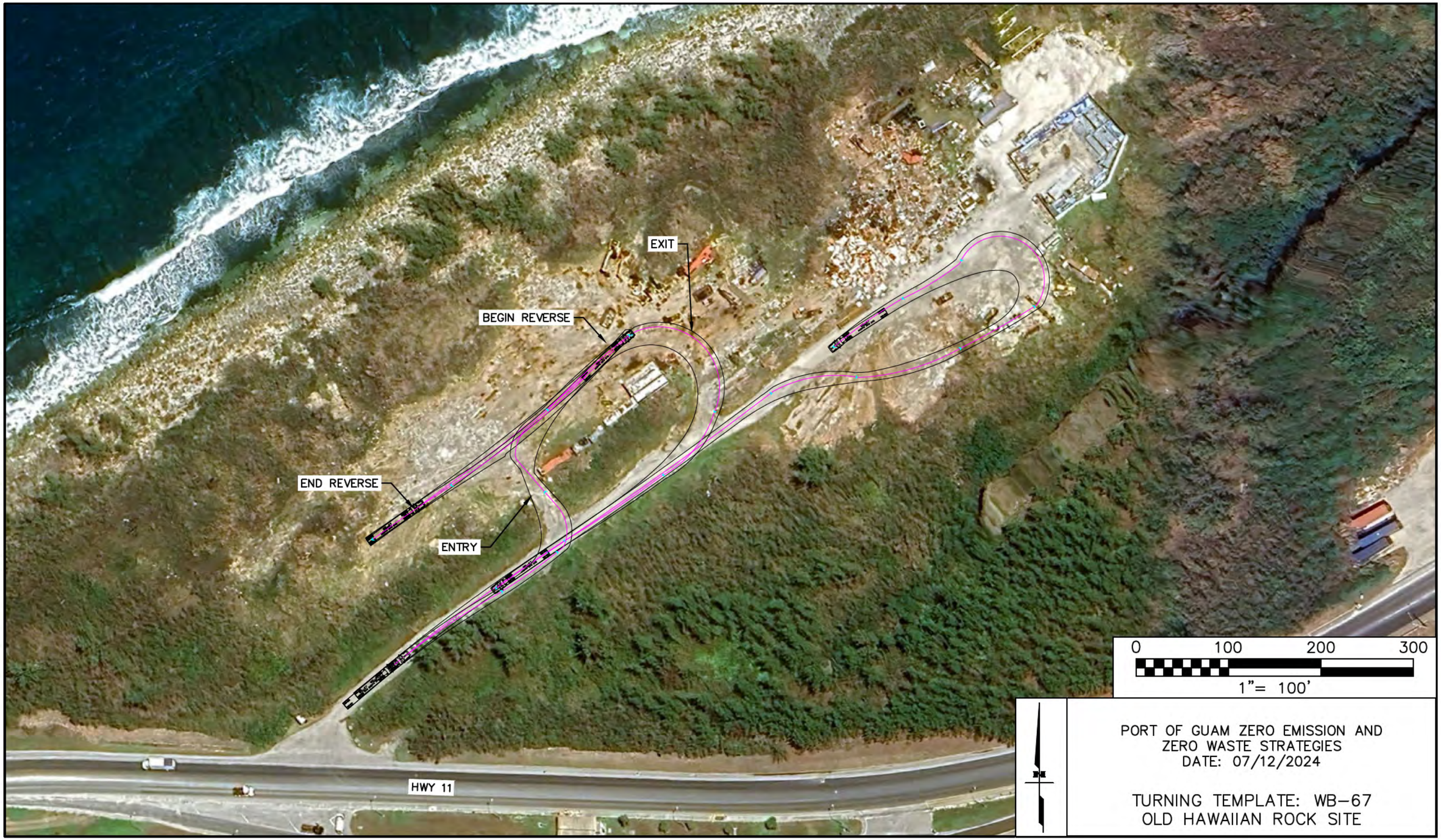

Polaris Point
Cat 5 Innundation at High Tide
00 to 01 foot above ground
01 to 02 feet above ground
02 to 03 feet above ground
03 to 04 feet above ground
04 to 05 feet above ground
05 to 06 feet above ground
06 to 07 feet above ground
0
400
800 Feet

Appendix F
Truck Turn Evaluations


EXIT
BEGIN REVERSE
END REVERSE
ENTRY
HWY 11
0
100
200
300
1"= 100'
PORT OF GUAM ZERO EMISSION AND
ZERO WASTE STRATEGIES
DATE: 07/12/2024
TURNING TEMPLATE: WB-67
OLD HAWAIIAN ROCK SITE

HWY 11
ENTRY
EXIT
END REVERSE
CHASSIS SITE
BEGIN REVERSE
0
100
200
300
1"= 100'
PORT OF GUAM ZERO EMISSION AND ZERO WASTE STRATEGIES
DATE: 07/24/2024
TURNING TEMPLATE: WB-67
CHASSIS SITE

HWY 11
BEGIN REVERSE
ENTRY
SEAPLANE
RAMP
SITE
END REVERSE
0
100
200
300
1"= 100'
PORT OF GUAM ZERO EMISSION AND
ZERO WASTE STRATEGIES
DATE: 09/13/2024
TURNING TEMPLATE: WB-67
SEAPLANE RAMP SITE

HWY 11
ENTRY
BEGIN REVERSE
FUTURE CONTAINER YARD SITE
END REVERSE
PORT AUTHORITY OF GUAM
EXIT
0
100
200
300
1"= 100'
PORT OF GUAM ZERO EMISSION AND ZERO WASTE STRATEGIES
DATE: 11/18/2024
TURNING TEMPLATE: WB-67
FUTURE CONTAINER YARD SITE

BEGIN
REVERSE
METALS
RECYCLING YARD
SITE
EXIT
ENTRY
END
REVERSE
HWY 11
SOUTH
PACIFIC
PETROLEUM
0
50
100
150
1"= 50'
PORT OF GUAM ZERO EMISSION AND
ZERO WASTE STRATEGIES
DATE: 11/18/2024
TURNING TEMPLATE: WB-67
METALS RECYCLING YARD SITE

PORT OF GUAM ZERO EMISSION AND
ZERO WASTE STRATEGIES
DATE: 11/20/2024

TURNING TEMPLATE: WB-67
PAG PARKING LOT SITE

Appendix G
Permit Requirements

STORMWATER POLLUTION PREVENTION PLAN

FOR

PORT AUTHORITY OF GUAM FACILITIES

1026 CABRAS HIGHWAY, SUITE 201
PITI, GUAM 96915

SWPPP CONTACT:

Port Authority of Guam
Rory J. Respicio
1026 Cabras Highway, Suite 201
Piti, Guam 96915
Phone: (671) 477-5931
Fax: (671) 477-2689
Email: rjrespicio@portofguam.com

SWPPP PREPARATION DATE:

April 2023

ACCEPTED AND APPROVED:

X

Rory Respicio
General Manager, Port Authority of Guam

Doc. No. 38GL-26-2386.*

CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information contained therein. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information contained is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

X

Rory Respicio
General Manager

Doc. No. 38GL-26-2386.*

STORMWATER POLLUTION PREVENTION PLAN (SWPPP) REVISIONS

Revision	Date	Details/Comments
Revision 00	February 2011	Newly developed SWPPP
Revision 01	July 2015	Compliance with new General Permit and facility layout and operational changes
Revision 02	May 2022	Compliance with facility layout, operational changes, and expansion yard
Revision 03	February 2023	Compliance with new Multi-Sector General Permit (MSGP)

Note: Updates are required whenever there is a change in design, construction, operation or maintenance which creates a potential for the discharge of pollutants to the waters of the State or if the stormwater pollution prevention plan proves to be ineffective in achieving the general objectives of controlling pollutants in stormwater discharges associated with industrial activity (see Section 1.4).

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LIST OF ACRONYMS AND ABBREVIATIONS

AS	Activity-Specific
AST	Aboveground Storage Tank
BMP	Best Management Practice
CFR	Code of Federal Regulations
CWA	Clean Water Act
DMR	Discharge Monitoring Report
EPA	U.S. Environmental Protection Agency
EQMR	Equipment Maintenance and Repair
Guam EPA	Guam Environmental Protection Agency
IP&E	IP&E Holdings, LLC
mg/L	milligrams per liter
MSGP	Multi-Sector General Permit
NPDES	National Pollutant Discharge Elimination System
OWS	Oil/Water Separator
P2	Pollution Prevention
PAG	Port Authority of Guam
PCBs	polychlorinated biphenyls
SPCC	Spill Prevention, Control, and Countermeasure
SWPPP	Stormwater Pollution Prevention Plan
USCG	U.S. Coast Guard

1.0 FACILITY INFORMATION

1.1 BACKGROUND

This Stormwater Pollution Prevention Plan (SWPPP) has been developed for the Port Authority of Guam (PAG) facility at the commercial port located at 1026 Cabras Highway Piti, Guam 96915 in order to comply with the 1990 amendments to the Clean Water Act (CWA) that established the National Pollutant Discharge Elimination System (NPDES) permitting system. The purpose of the SWPPP is to identify potential sources of pollution which may reasonably be expected to affect the quality of stormwater discharges from the site. It also serves as a framework for pollution prevention activities and as a guidance document for implementing best management practices (BMPs) to minimize stormwater pollution. Facility maps have been drafted and BMP Fact Sheets are provided in Appendix B. Additional SWPPP documentation is maintained in Appendix C.

In accordance with Title 40 Code of Federal Regulations (CFR) 122.26(b)(14)(viii), this SWPPP addresses the areas of the facility that are associated with industrial activities. These operations include an equipment wash rack, outdoor fueling/storage areas, and a Crane Shop in the equipment maintenance and repair (EQMR) area of the facility, gantry crane operation and maintenance area, and the container and cargo storage yard.

This SWPPP has been prepared following U.S. Environmental Protection Agency (EPA) guidelines, *Developing Your Stormwater Pollution Prevention Plan: A Guide for Industrial Operators* (EPA 833-B-09-002, February 2009) and in accordance with the EPA *Multi-Sector General Permit for Stormwater Discharges Associated with Industrial Activity (MSGP)*, issued on September 29, 2021.

1.2 THE NPDES PERMIT AND UPDATED REQUIREMENTS

PAG operates under MSGP GUR050000, NPDES Identification Number GUR053001. A copy of the permit is included in Appendix D. This SWPPP must address potential pollution sources of stormwater and the BMPs to prevent pollution of Apra Harbor and the Philippine Sea. This SWPPP addresses the requirements set forth in the NPDES permit for each of the drainage areas at the site, including industry sector-specific requirements outlined in Part 8, Subpart Q of the MSGP.

1.3 APPLICABILITY AND DISTRIBUTION

The EPA has authority under the CWA to regulate discharges to waters of the United States and its territories, including priority stormwater sources. Federal regulations require these discharges be managed via the NPDES. The EPA remains the permit authority for Guam.

The SWPPP will be distributed to each member of the Stormwater Pollution Prevention (P2) Team, described in Section 2.0. Updates to the SWPPP, as necessary, will be distributed by the P2 Team leader.

1.4 REQUIREMENT TO POST SIGNAGE OF PERMIT COVERAGE

A sign or other notice of the facility's permit coverage will be posted at a safe, publicly accessible location in close proximity to the facility. A font large enough to be readily viewed from a public right-of-way will be used and periodic maintenance of the sign will be performed to

ensure that it remains legible, visible, and factually correct. Requirements for the sign's contents are located in Section 1.3.5 of the MSGP.

1.5 REVISIONS TO THE SWPPP

This SWPPP will be amended whenever there is a significant change in design, construction, maintenance, or operation at the port facility that creates or modifies potential pollutant discharges, or if this SWPPP proves to be ineffective in achieving the general objectives of controlling pollutants in stormwater discharges associated with industrial activity at the port. Conditions that indicate a need for revision of this SWPPP are discussed in Section 8 and will be identified during periodic site inspections, as described in Section 6.

2.0 STORMWATER POLLUTION PREVENTION TEAM

The PAG has designated a Stormwater P2 Team that provides a forum for identifying and addressing stormwater pollution concerns at the commercial port, and to ensure that the SWPPP is appropriately implemented. The PAG P2 Team consists of PAG managers and supervisors who are responsible for activities that have the potential to directly impact stormwater quality at the PAG. The P2 Team is responsible for the following:

- Identifying any changes in operations to determine whether revisions must be made to this SWPPP
- Supporting implementation of NPDES permit and SWPPP requirements, control measures, and BMPs
- Conducting or coordinating SWPPP training
- Conducting or coordinating stormwater sampling and monitoring efforts
- Ensuring timely submittal of Discharge Monitoring Reports (DMRs) and annual stormwater reports to the EPA
- Taking corrective actions when deficiencies or issues are identified
- Maintaining clear lines of communication with tenants and PAG management to ensure a cooperative partnership.

The P2 Team will meet at a minimum of once annually to discuss stormwater-related problems, or concerns. The Team Leader may call additional meetings to address specific events or issues as they arise. Additional attendees, such as consultants, vendors, or stakeholders may be included in the meetings when appropriate. The P2 Team will also ensure that the training described in Section 4.1.8 occurs annually, or more frequently, as deemed necessary by the P2 Team.

PAG P2 Team members and their responsibilities are identified in Table 2-1.

Table 2-1: Port Authority of Guam Pollution Prevention Team

Title	Telephone Number	Roles and Responsibilities
General Manager	671-477-5931 ext. 302/303	Review and approve SWPPP, enforce planning and implementation.
Environmental Specialist	671-477-5931 ext. 430	Pollution Prevention Coordinator, review/revise SWPPP as necessary, administer implementation.
Maintenance Manager	671-477-5931 ext. 401	Support implementation of SWPPP, team leader for corrective actions.
Operations Manager	671-477-5931 ext. 310	Support implementation of SWPPP, identify areas for improvement.
Health & Safety Manager	671-477-5931 ext. 258	Support implementation of SWPPP; assist with corrective actions.

3.0 Site Description

3.1 GENERAL

Facility Information

Name of Facility: Port Authority of Guam
Address: 1026 Cabras Highway, Suite 201
Piti, Guam 96915

Geographic Location (in decimal degrees, using WGS84 datum):
Latitude: 13.462656°N Longitude: 144.667326°E

The PAG Cargo Terminal is located at 1026 Cabras Highway on Apra Harbor in Piti, Guam. The Cargo Terminal compound occupies a total of 61.75 acres and includes an administrative building, EQMR building, Crane Shop and warehouse, cargo warehouse, gantry crane operation and maintenance area, and a large container and cargo storage yard (Figure 1).

As part of the port expansion and modernization program, the PAG has implemented a number of improvements to support stormwater management and minimize potential pollutant discharges. These improvements have included installation of coalescing media oil/water separators (OWSs) on outfalls, use of vegetated swales and infiltration ponds to reduce runoff, and installation of a dedicated equipment wash rack at the EQMR facility.

Industrial activities conducted on the PAG site include EQMR operations, an equipment wash rack, outdoor fueling/storage areas, a Crane Shop, gantry crane operation and maintenance area, and the container and cargo storage yard.

To the west of the PAG facility, is a site operated by IP&E Holdings, LLC (IP&E) that includes a small tank farm behind a concrete wall. A portion of the IP&E site that encompasses the tank farm is included in a drainage area that discharges through an OWS on the PAG site.

3.2 DRAINAGE SYSTEM DESCRIPTIONS

Drainage at the PAG site is split into ten drainage areas: Drainage Areas 1 (DA-1) through 10. Stormwater in each drainage area except DA-4 is collected through a number of storm drain inlets and is conveyed to outfalls (Outfalls 001 through 010) that discharge directly into Apra Harbor.

Drainage at the EQMR facility consists of two drainage areas, DA-1 and DA-2. Stormwater in these drainage areas is collected through a number of storm drain inlets and is conveyed to Outfalls 001 and 002 that discharge directly into Apra Harbor.

The gantry crane operation and maintenance area is comprised of two drainage areas: Drainage Area 3 and Drainage Area 4. Drainage Area 3 includes a staging area for bulk cargo. Stormwater in Drainage Area 3 is collected through a number of storm drain inlets and is conveyed to Outfall 003 that discharges directly into Apra Harbor. Drainage Area 4 runs the length of the gantry crane tracks. Stormwater in Drainage Area 4 generally sheet flows to the south and discharges directly into Apra Harbor.

The remaining six drainage areas, DA-5 through DA-10, consist of the container and cargo

storage yard. Stormwater in these drainage areas is collected through a number of storm drain inlets and is conveyed to Outfalls 005 through 010 that discharge directly into Apra Harbor.

A detailed description of each drainage area is provided below.

3.2.1 Drainage Area 1

Primary Features: *EQMR Building, Crane Shop, IP&E Site*
Drainage Area: *6.13 acres (4.00 acres within PAG boundary and 2.13 acres of IP&E site)*
Imperviousness: *High*

Drainage Area 1 (Figure 2) consists of a portion of the IP&E facility to the west of PAG that includes a small aboveground storage tank (AST) farm and a storage yard, the EQMR building, the western portion of Warehouse 1 that contains the Crane Shop, the western portion of the administration building, and a parking area. A total of ten storm drain inlets are located within Drainage Area 1. Stormwater enters the inlets and is conveyed to an OWS that drains to Outfall 001, located in the western portion of the drainage area, which discharges into Apra Harbor. Paved surfaces in the drainage area are graded to direct stormwater to the inlets. Rooftop areas are not equipped with downspouts but are sloped to direct water to flow off the sides of the roofs and onto the pavement below.

A small diesel fuel tank farm, operated by IP&E, is located within Drainage Area 1. Stormwater that accumulates in the secondary containment of this tank farm is occasionally pumped through a pipe and is discharged to a storm drain inlet within the drainage area. IP&E conducts a visual inspection of the stormwater for any indication of contamination prior to discharge. If there is any evidence of contamination, the stormwater is not discharged, and an alternative means of offsite disposal is used. Inspection and management of the stormwater is conducted in accordance with IP&E's Spill Prevention, Control, and Countermeasure (SPCC) Plan (IP&E, 2018).

3.2.2 Drainage Area 2

Primary Features: *Equipment Washing, Fueling Area, Used Oil Storage Area, Outdoor Storage Area*
Drainage Area: *5.33 acres*
Imperviousness: *High*

Drainage Area 2 (Figure 3) includes the equipment wash rack, a fueling area, a used oil storage area, an outdoor material storage area, the eastern portion of Warehouse 1, the eastern portion of the administration building, and a parking area.

Throughout Drainage Area 2, eleven storm drain inlets capture and convey stormwater to an OWS that drains to Outfall 002, located in the southern corner of the drainage area, which discharges into Apra Harbor. All paved surfaces in the drainage area are graded to direct stormwater to the inlets. Rooftop areas are not equipped with downspouts but are sloped to direct water to flow off the sides of the roof and onto the pavement below.

3.2.3 Drainage Area 3

Primary Features: *Portion of Cargo Building, Bulk Cargo Staging Area*
Drainage Area: *4.34 acres*
Imperviousness: *High*

Drainage Area 3 (Figure 3) includes the western portion of the cargo building and a bulk cargo staging area. Bulk cargo, including rebar, is occasionally staged in this area before it is transported offsite. Throughout Drainage Area 3, eight storm drain inlets capture and convey stormwater to an OWS that drains to Outfall 003, located along the wharf, which discharges into Apra Harbor.

3.2.4 Drainage Area 4

Primary Features: *Gantry Crane Operation and Maintenance Area*
Drainage Area: *11.47 acres (11.28 acres within PAG boundary and 0.19 acres of IP&E site)*
Imperviousness: *High*

Drainage Area 4 (Figure 4) is located along the wharf. The gantry cranes in this area operate along a track system that fronts the wharf. Due to their size and configuration, the gantry cranes cannot be moved to the EQMR facility for repair. Therefore, periodic equipment maintenance and repair is performed in this area. There are no storm drain inlets in the immediate vicinity and stormwater in this area generally sheet flows towards the south where it discharges into Apra Harbor. Because the area does not have a single point source there is no designated outfall.

3.2.5 Drainage Area 5

Primary Features: *Portions of Cargo Building and Storage Yard*
Drainage Area: *4.70 acres*
Imperviousness: *High*

Drainage Area 5 (Figure 5) includes the eastern portion of the cargo building and a portion of the cargo storage yard. Throughout Drainage Area 5, six storm drain inlets capture and convey stormwater to an OWS that drains to Outfall 005, located along the wharf, which discharges into Apra Harbor.

3.2.6 Drainage Area 6

Primary Features: *Portion of Cargo Storage Yard*
Drainage Area: *2.81 acres*
Imperviousness: *High*

Drainage Area 6 (Figure 6) includes a portion of the cargo storage yard. Throughout Drainage Area 6, four storm drain inlets capture and convey stormwater to an OWS that drains to Outfall 006, located along the wharf, which discharges into Apra Harbor.

3.2.7 Drainage Area 7

Primary Features: *Portion of Cargo Storage Yard*
Drainage Area: *12.51 acres*
Imperviousness: *High*

Drainage Area 7 (Figure 6) includes a portion of the cargo storage yard. Throughout Drainage Area 7, trench drains capture and convey stormwater to two OWSs that drain to Outfall 007, located along the wharf, which discharges into Apra Harbor.

3.2.8 Drainage Area 8

Primary Features: *Portion of Cargo Storage Yard*
Drainage Area: *5.98 acres*
Imperviousness: *High*

Drainage Area 8 (Figure 7) includes a portion of the cargo storage yard. Throughout Drainage Area 8, one storm drain inlet and trench drains capture and convey stormwater to an OWS that drains to Outfall 008, located along the wharf, which discharges into Apra Harbor.

3.2.9 Drainage Area 9

Primary Features: *Portion of Cargo Storage Yard*
Drainage Area: *4.80 acres*
Imperviousness: *High*

Drainage Area 9 (Figure 7) includes a portion of the cargo storage yard. Throughout Drainage Area 9, trench drains capture and convey stormwater to an OWS that drains to Outfall 009, located in the storage yard, which discharges into Apra Harbor.

3.2.10 Drainage Area 10

Primary Features: *Portion of Cargo Storage Yard*
Drainage Area: *8.28 acres*
Imperviousness: *High*

Drainage Area 10 (Figure 8) includes a portion of the cargo storage yard. Throughout Drainage Area 10, trench drains capture and convey stormwater to an OWS that drains to Outfall 010, located in the marshy area south of the storage yard, which discharges into Apra Harbor.

3.3 FACILITY ACTIVITIES

Primary activities conducted within the PAG facility include container and cargo storage and preventative care, maintenance, and repair of PAG-owned vehicles and equipment, which includes gantry cranes, forklifts, top lifters, grounds equipment, and official government vehicles. Equipment maintenance includes inspection, painting operations, battery servicing and storage, change-out of equipment fluids (engine oil and hydraulic fluids), fueling, basic welding and fabrication, and equipment washing.

Vehicle and Equipment Maintenance Area (Drainage Area 1)

Vehicle and equipment maintenance and repair activities are performed within the EQMR building and under covered service areas located under the eaves on the south side of the structure. Vehicle and equipment maintenance and repair activities are also performed outside in uncovered areas, to the south of the EQMR building, and to the northeast of Warehouse 1 (Drainage Area 1). Additional metal fabrication occurs in the Welding Shop (Drainage Area 2). Chemicals used in this area include lubricants, solvents, paints, diesel fuel, gasoline, hydraulic fluid, and engine oil. These chemicals are stored inside the EQMR building and are kept within appropriate storage containers such as flammable material storage lockers and containment pallets.

Crane Shop (Drainage Area 1)

Maintenance and repair of PAG gantry crane spreaders is performed within the Crane Shop, which is located in the western portion of Warehouse 1. All maintenance and repair activities associated with the Crane Shop are conducted indoors and are not exposed to precipitation or

stormwater run-on/runoff. Chemicals and products used in this area include lubricants, solvents, paints, diesel fuel, gasoline, hydraulic fluid, and engine oil. These materials are stored inside Warehouse 1 and are kept within appropriate storage containers such as flammable material storage lockers and containment pallets.

Vehicle and Equipment Wash Rack (Drainage Area 2)
Vehicle and equipment washing occurs in the designated wash rack that is located to the east of the Welding Shop. Wash water is contained by the washing pad and directed to a self - contained wash water recycling system that is periodically maintained by a service contractor in accordance with manufacturer specifications.

Diesel Fuel Storage Area (Drainage Area 2)
A secondary containment pad is located approximately 100 feet to the southeast of the EQMR building. The containment pad is used to house one 8,000-gallon diesel fuel AST. Equipment fueling operations take place immediately adjacent to the containment pad.

Used Oil Storage Area (Drainage Area 2)
An outdoor secondary containment area, identified as the Used Oil Storage Area, is located immediately to the south of the Diesel Fuel Storage Area. The Used Oil Storage Area houses two 950-gallon used oil ASTs and is also used to store drums of used oil and spent oily absorbents.

Material Storage Area (Drainage Area 2)
Outdoor storage areas are located to the west and southwest of the Welding Shop that house miscellaneous materials including concrete barriers, metal pipes and beams, crane fittings, and other materials used for welding and fabrication. The storage area to the southwest of the Welding Shop is contained within concrete curbing.

Gantry Crane Operation and Maintenance Area (Drainage Area 4)
Due to their size and configuration, gantry cranes that operate in this area cannot be moved to the EQMR for maintenance and repair. Therefore, periodic maintenance of this equipment is performed in place. Chemicals used in these operations include lubricants, solvents, paints, diesel fuel, gasoline, hydraulic fluid, and engine oil. Chemicals are not stored in this area during normal operations and are only brought to this area to support maintenance activities. These chemicals are stored at the EQMR facility as described above.

Bulk Cargo Staging Area (Drainage Area 3)
Bulk cargo, including rebar, is occasionally staged outside in this area before it is transported offsite. Chemicals are not stored in this area.

Cargo Storage Area (Drainage Areas 3, 5, 6, 7, 8, 9, and 10)
Cargo is stored inside the Cargo Building located in drainage areas 3 and 5 as well as in the container storage yard located in drainage areas 5 through 10. Chemicals are not stored in these areas.

3.4 POTENTIAL POLLUTANT SOURCES

Although the most significant equipment maintenance and repair is performed inside the EQMR building, other operations and materials have the potential to be exposed to stormwater. Table 3-1 provides a summary of industrial activities and the corresponding potential pollutants that may be exposed to stormwater.

Table 3-1: Potential Pollutants Associated with Industrial Activities

Industrial Activity	Potential Pollutants
Vehicle and equipment maintenance	Diesel fuel, gasoline, grease, oil, hydraulic fluid, solvents, lubricants, metals, battery acid, paint
Vehicle and equipment fueling	Diesel fuel
Vehicle and equipment washing	Diesel fuel, gasoline, grease, oil, hydraulic fluid, lubricants, metals, paint
Material storage	Metals, paint, used oil
Welding and fabrication	Metals, cutting compounds, lubricants

3.5 SPILLS AND LEAKS

Due to the nature of equipment fueling and industrial activities conducted at the site, the potential exists for fuel or chemicals to be spilled or for storage containers to leak. EPA has defined "significant spills" to include releases within a 24-hour period of hazardous substances in excess of reportable quantities under Section 311 of the CWA and Section 102 of the Comprehensive Environmental Response, Compensation, and Liability Act.

The following is a summary of where potential spills and leaks could occur at the facility and which outfalls would be likely to be affected:

Vehicle and Equipment Maintenance Area (Drainage Area 1)

Potential spills and leaks may occur during vehicle and equipment maintenance activities either due to unanticipated equipment failure or accidental spillage of materials by maintenance personnel. Materials spilled indoors at the EQMR building would be readily contained and cleaned up without impacting stormwater; however, spills that occur in the outdoor maintenance area on the south side of the EQMR building could potentially flow into storm drain inlets and impact stormwater discharging from Outfall 001.

Crane Shop (Drainage Area 1)

Potential spills and leaks may occur during crane maintenance activities either due to unanticipated equipment failure or accidental spillage of materials. Materials spilled indoors at the Crane Shop would be readily contained and cleaned up without impacting stormwater at the port. Although all operations at the Crane Shop occur indoors, there is a small potential for spills to occur outdoors during transfer of equipment or materials into the shop area. Spills occurring outside of the Crane Shop could potentially flow into a storm drain inlet and impact stormwater discharging from Outfall 001.

Vehicle and Equipment Wash Rack (Drainage Area 2)

Potential spills and leaks from the equipment wash rack could include wash water from vehicle and equipment washing activities as well as any associated soaps and/or detergents. A small potential also exits for equipment leaks during washing activities, which could include oil, grease, fuel, and/or hydraulic oil. Although the wash rack is designed to contain all liquids generated from its use, any spilled material that was not successfully contained could enter storm drain inlets and impact stormwater discharging from Outfall 002.

Diesel Fuel Storage Area (Drainage Area 2)

Potential spills and leaks from the diesel fuel storage area could include diesel fuel from the 8,000-gallon AST or equipment fueling operations that occur in the surrounding area. The

secondary containment pad is meant to prevent leaks from migrating out of the containment area, however, any material spilled outside of the containment area could enter storm drain inlets and impact stormwater discharging from Outfall 002.

Used Oil Storage Area (Drainage Area 2)
Potential spills and leaks within the used oil storage area could occur during transfer to/from the used oil ASTs, or from container failure. Container failure could also cause leaks from new liquid material containers, or from hazardous and non-hazardous waste containers staged in this area. Although the used oil storage area is designed to prevent leaks from migrating out of the containment area, any spilled material that was not successfully contained could enter storm drain inlets and impact stormwater discharging from Outfall 002.

Gantry Crane Operation and Maintenance Area (Drainage Area 4)
Potential spills and leaks may occur in this area as a result of unanticipated equipment failure or from accidental spillage of materials during gantry crane maintenance operations. If left uncontained, spills occurring in this area could impact stormwater discharging from Drainage Area 4

Bulk Cargo Staging Area (Drainage Area 3)
Potential spills and leaks may occur in this area as a result of uncovered material storage and leaks from unused equipment stored in the area. If left uncontained, spills occurring in this area could impact stormwater discharging from Outfall 003.

Cargo Storage Area (Drainage Areas 3, 5, 6, 7, 8, 9, and 10)
Potential spills and leaks may occur in these areas as a result of leakage from cargo containers. If left uncontained, spills occurring in these areas could impact stormwater discharging from Outfalls 003, 005, 006, 007, 008, 009, and 010.

3.5.1 Historic Spills
No significant spills were reported to have occurred onsite during the period of record. An Emergency Spill Log is contained in Appendix C.

3.6 NON-STORMWATER DISCHARGE IDENTIFICATION

3.6.1 Methodology
A comprehensive site inspection was conducted in October 2019. The purpose of this inspection was to identify the presence and potential causes of any unauthorized non-stormwater discharges occurring at the site. All of the drainage areas were inspected, including secondary containment pads, the equipment wash rack, outdoor storage areas, gantry crane operation area, as well as all storm drain inlets and stormwater outfall locations.

3.6.2 Findings
At the time of the inspection there were no sources of non-stormwater discharge identified. All structural BMPs were found to be in good condition with no evidence of structural deterioration or other operational conditions that could lead to an unauthorized non-stormwater discharge. All storm drain inlets were found to be in good condition with no evidence of contaminants or other unauthorized materials entering the system. All of the outfalls were also found to be in good condition with no indication of non-stormwater discharges.

3.7 EXISTING MONITORING

A visual inspection program of the ASTs and related equipment is in place at the PAG facility. Monthly inspections are performed by maintenance staff and documentation of the inspections is kept onsite in the SPCC plan for a minimum of 3 years. Inspection checklists are available in Appendix D.1 of the SPCC plan. A copy of the SPCC plan is maintained onsite in the same location as this SWPPP.

3.8 HISTORICAL STORMWATER MONITORING DATA

The following section provides a summary of quarterly benchmark sampling results obtained under a previous permit. Under the 2015 MSGP, benchmark criteria for total aluminum, total iron, total lead, and total zinc were not hardness dependent values. Grab samples were intermittently collected from Outfall 001 and Outfall 002 between December 2015 to April 2022.

Monitoring Period 1: October – December 2015		
Sample Collection Date: December 28, 2015		
Monitoring Location: Outfall 001		
Parameter	**Result**	**2015 Benchmark Criteria**
Total Aluminum	0.087 J mg/L	0.75 mg/L
Total Iron	0.051 J mg/L	1.0 mg/L
Total Lead	< 0.005 mg/L	0.21 mg/L
Total Zinc	0.270 mg/L	0.09 mg/L
Monitoring Location: Outfall 002		
Parameter	**Result**	**2015 Benchmark Criteria**
Total Aluminum	0.250 mg/L	0.75 mg/L
Total Iron	1.600 mg/L	1.0 mg/L
Total Lead	0.0019 J mg/L	0.21 mg/L
Total Zinc	0.280 mg/L	0.09 mg/L
Monitoring Period 2: July – September 2016		
Sample Collection Date: September 22, 2016		
Monitoring Location: Outfall 001		
Parameter	**Result**	**2015 Benchmark Criteria**
Total Aluminum	0.240 mg/L	0.75 mg/L
Total Iron	0.230 mg/L	1.0 mg/L
Total Lead	0.0011 J mg/L	0.21 mg/L
Total Zinc	0.088 mg/L	0.09 mg/L
Monitoring Location: Outfall 002		
Parameter	**Result**	**2015 Benchmark Criteria**
Total Aluminum	0.140 mg/L	0.75 mg/L
Total Iron	0.260 mg/L	1.0 mg/L
Total Lead	0.0017 J mg/L	0.21 mg/L
Total Zinc	0.150 mg/L	0.09 mg/L

Monitoring Period 3: July – September 2017		
Sample Collection Date: September 20, 2017		
Monitoring Location: Outfall 001		
Parameter	**Result**	**2015 Benchmark Criteria**
Total Aluminum	0.088 J mg/L	0.75 mg/L
Total Iron	0.100 mg/L	1.0 mg/L
Total Lead	0.0018 J mg/L	0.21 mg/L
Total Zinc	0.043 mg/L	0.09 mg/L
Monitoring Location: Outfall 002		
Parameter	**Result**	**2015 Benchmark Criteria**
Total Aluminum	0.085 J mg/L	0.75 mg/L
Total Iron	0.080 J mg/L	1.0 mg/L
Total Lead	<0.005 mg/L	0.21 mg/L
Total Zinc	0.033 mg/L	0.09 mg/L
Monitoring Period 4: October – December 2017		
Sample Collection Date: December 28, 2017		
Monitoring Location: Outfall 001		
Parameter	**Result**	**2015 Benchmark Criteria**
Total Aluminum	0.097 mg/L	0.75 mg/L
Total Iron	1.100 mg/L	1.0 mg/L
Total Lead	<0.005 mg/L	0.21 mg/L
Total Zinc	0.180 mg/L	0.09 mg/L
Monitoring Location: Outfall 002		
Parameter	**Result**	**2015 Benchmark Criteria**
Total Aluminum	0.320 mg/L	0.75 mg/L
Total Iron	0.760 mg/L	1.0 mg/L
Total Lead	<0.005 mg/L	0.21 mg/L
Total Zinc	0.620 mg/L	0.09 mg/L

Monitoring Period 5: April – June 2018		
Sample Collection Date: April 27, 2018		
Monitoring Location: Outfall 001		
Parameter	**Result**	**2015 Benchmark Criteria**
Total Aluminum	0.240 mg/L	0.75 mg/L
Total Iron	0.780 mg/L	1.0 mg/L
Total Lead	0.0069 mg/L	0.21 mg/L
Total Zinc	0.150 mg/L	0.09 mg/L
Monitoring Location: Outfall 002		
Parameter	**Result**	**2015 Benchmark Criteria**
Total Aluminum	<0.100 mg/L	0.75 mg/L
Total Iron	<0.100 mg/L	1.0 mg/L
Total Lead	<0.005 mg/L	0.21 mg/L
Total Zinc	<0.020 mg/L	0.09 mg/L
Monitoring Period 6: July – September 2018		
Sample Collection Date: August 18, 2018		
Monitoring Location: Outfall 001		
Parameter	**Result**	**2015 Benchmark Criteria**
Total Aluminum	0.140 mg/L	0.75 mg/L
Total Iron	0.200 mg/L	1.0 mg/L
Total Lead	0.0024 J mg/L	0.21 mg/L
Total Zinc	0.046 mg/L	0.09 mg/L
Monitoring Location: Outfall 002		
Parameter	**Result**	**2015 Benchmark Criteria**
Total Aluminum	0.084 J mg/L	0.75 mg/L
Total Iron	0.160 mg/L	1.0 mg/L
Total Lead	0.0024 J mg/L	0.21 mg/L
Total Zinc	0.093 mg/L	0.09 mg/L

Monitoring Period 7: April – June 2019		
Sample Collection Date: June 21, 2019		
Monitoring Location: Outfall 001		
Parameter	**Result**	**2015 Benchmark Criteria**
Total Aluminum	0.190 mg/L	0.75 mg/L
Total Iron	0.510 mg/L	1.0 mg/L
Total Lead	0.0032 J mg/L	0.21 mg/L
Total Zinc	0.110 mg/L	0.09 mg/L
Monitoring Location: Outfall 002		
Parameter	**Result**	**2015 Benchmark Criteria**
Total Aluminum	0.100 mg/L	0.75 mg/L
Total Iron	0.042 J mg/L	1.0 mg/L
Total Lead	<0.005 mg/L	0.21 mg/L
Total Zinc	0.110 mg/L	0.09 mg/L
Monitoring Period 8: April – June 2022		
Sample Collection Date: April 12, 2022		
Monitoring Location: Outfall 001		
Parameter	**Result**	**2015 Benchmark Criteria**
Total Aluminum	0.0691 J mg/L	0.75 mg/L
Total Iron	0.0542 J mg/L	1.0 mg/L
Total Lead	0.000443 J mg/L	0.21 mg/L
Total Zinc	0.0593 mg/L	0.09 mg/L
Monitoring Location: Outfall 002		
Parameter	**Result**	**2015 Benchmark Criteria**
Total Aluminum	0.112 mg/L	0.75 mg/L
Total Iron	0.0514 J mg/L	1.0 mg/L
Total Lead	0.000232 J mg/L	0.21 mg/L
Total Zinc	0.0655 mg/L	0.09 mg/L

Monitoring Period 9: July – September 2022		
Sample Collection Date: July 26, 2022		
Monitoring Location: Outfall 001		
Parameter	**Result**	**2015 Benchmark Criteria**
Total Aluminum	0.0618 mg/L	0.75 mg/L
Total Iron	0.0564 mg/L	1.0 mg/L
Total Lead	0.000578 mg/L	0.21 mg/L
Total Zinc	0.0308 mg/L	0.09 mg/L
Monitoring Location: Outfall 002		
Parameter	**Result**	**2015 Benchmark Criteria**
Total Aluminum	0.0631 mg/L	0.75 mg/L
Total Iron	0.0419 mg/L	1.0 mg/L
Total Lead	0.000532 mg/L	0.21 mg/L
Total Zinc	0.0584 mg/L	0.09 mg/L

Average Parameter Concentrations 2014/2015		
Monitoring Location: Outfall 001		
Parameter	**Result**	**2015 Benchmark Criteria**
Total Aluminum	0.135 mg/L	0.75 mg/L
Total Iron	0.342 mg/L	1.0 mg/L
Total Lead	0.0029 mg/L	0.21 mg/L
Total Zinc	**0.108 mg/L**	0.09 mg/L
Monitoring Location: Outfall 002		
Parameter	**Result**	**2015 Benchmark Criteria**
Total Aluminum	0.139 mg/L	0.75 mg/L
Total Iron	0.343 mg/L	1.0 mg/L
Total Lead	0.003 mg/L	0.21 mg/L
Total Zinc	**0.149 mg/L**	0.09 mg/L

Average quarterly benchmark sampling results were below 2015 criteria for all parameters except for concentrations of total zinc detected at Outfall 001 and Outfall 002. The exceedances for total zinc at Outfall 001 and Outfall 002 have potentially been caused by exposed galvanized metal surfaces and tire dust.

In an effort to reduce concentrations of zinc in stormwater runoff, the port has made an effort to move galvanized materials under cover and has increased the frequency of housekeeping and sweeping operations. The port has also implemented a scheduled vehicle and equipment washing program at the equipment wash rack, which helps reduce potential pollutant load on fleet vehicles and equipment. The port is aware that the marine waters benchmark value for zinc under the 2015 MSGP (0.09 mg/L) is significantly lower than the hardness dependent value derived under the previous permit. The port will continue to evaluate additional control options if quarterly benchmark sampling results under the new permit exceed benchmark criteria.

4.0 STORMWATER CONTROL MEASURES

This section of the SWPPP discusses stormwater control measures utilized at the PAG facility. BMPs can minimize potential pollutant sources and effective stormwater management can further reduce pollutants in stormwater discharges. BMPs can be characterized into three groups based on generic activities, specific activities, and site/structural-specific activities. These BMP groups are defined as follows:

- "Baseline" BMPs are practices that are relatively simple, applicable to a wide variety of industries and activities, and are inexpensive. EPA identifies eight baseline BMPs as discussed in Section 4.1 of this SWPPP.

- "Activity-Specific" (AS) BMPs are practices that are applicable to a specific type of activity that occurs at the facility. The activity may occur at more than one location. Examples include equipment washing and maintenance. Activities specific to the facility that potentially contribute to stormwater pollution and their respective BMPs are discussed in Section 4.2.

- "Site-Specific" BMPs are practices that are applicable to specific locations, structures, or items of equipment at the facility. Site-specific BMPs are discussed in Section 4.3.

Fact sheets for the BMPs relevant to the PAG facility are provided in Appendix B.

4.1 BASELINE BEST MANAGEMENT PRACTICES

The maintenance facility NPDES permit requires the SWPPP to provide an implementation schedule for stormwater control measures and BMPs, including the following baseline BMPs:

- Minimize Exposure
- Good Housekeeping
- Preventive Maintenance
- Visual Inspections
- Spill Prevention and Response
- Sediment and Erosion Prevention and Control
- Management of Stormwater Runoff
- Pollution Prevention Training
- Recordkeeping and Internal Reporting Procedures
- Major Storm Events

These eight BMPs are also identified in the EPA Guidance for SWPPPs and are applicable to all types of industrial facilities. Specific measures for implementing these BMPs are described in subsequent sections of this SWPPP. In addition, three of the fact sheets included in Appendix B specifically address the concepts of baseline BMPs. Those fact sheets are:

- BMP Sheet BL1 – Elimination of Non-Stormwater Discharges to Storm Drains
- BMP Sheet BL2 – Emergency Spill Cleanup Plans
- BMP Sheet BL3 – Stormwater Pollution Prevention Education

4.1.1 Minimize Exposure

The following control measures have been implemented to minimize the exposure of potential

pollutants to rain and runoff.

- All maintenance and repair activities are performed indoors at the EQMR building and Crane Shop whenever practicable.
- Use of containment measures (i.e. hanging plastic barriers, tarpaulins, and roofing cover) is in effect for all painting and outdoor maintenance operations.
- Vehicle and equipment washing is performed at the designated wash rack.
- Diesel fuel AST, used oil ASTs, and drums and containers are all maintained on secondary containment pads with impervious ground surfaces and walls.
- Outdoor material storage occurs within a curbed area to prevent run-on and minimize potential pollutant runoff.

4.1.2 Good Housekeeping

Good housekeeping requires the maintenance of a clean, orderly facility. Good housekeeping measures are implemented as part of daily operations and include weekly visual inspections and regular cleaning of work areas to remove garbage, debris, and other potential pollutants, as well as weekly sweeping of all surfaces at PAG with a road sweeper.

Fact sheets for AS BMPs addressing good housekeeping measures as they apply to specific operations or general site/building maintenance activities have been created and are discussed in Section 4.2 and included in Appendix B.

4.1.3 Preventive Maintenance

A preventive maintenance program involves timely inspection and maintenance of stormwater management devices, as well as inspecting and testing facility equipment and systems to uncover conditions that could cause breakdowns or failures. These breakdowns or failures can result in discharges of pollutants to surface waters. Routine facility inspections are conducted quarterly, at minimum, and aid in identifying potential areas requiring maintenance. Specific attention is paid to the EQMR area, vehicle and equipment wash rack, equipment fueling area, used oil storage area, gantry crane operation area, and the outside material storage areas.

4.1.4 Spill Prevention and Response Procedures

The Port Police document spills and leaks of oil or hazardous materials at PAG facilities both on land and in the water. Spills in the water are handled by the Guam EPA and the U.S. Coast Guard (USCG). The USCG responds to spills in the waterways to conduct an evaluation of the spill and predict the movement and effects of the spill.

In the event of a spill, the following agencies must be contacted immediately:

Agency	Telephone Number
Port Police	Direct Line: (671) 472-2703 Main Gate: (671) 477-2864
Guam Fire Department	Piti Station: (671) 472-8139 Tamuning/Tumon Station: (671) 646-8801/8802
National Response Center	(800) 424-8802
USCG	Sector Guam: (671) 355-4824 On-Base Emergency: (671) 333-4357
Guam EPA	(671) 300-4751

The relevant AS BMPs that provide suggestions for handling spills and leaks as they may potentially occur while conducting a specific activity are described in Section 4.2 and fact sheets are located in Appendix B. PAG personnel should also refer to and comply with spill prevention and response procedures outlined in the facility's SPCC plan, which is maintained onsite in the same location as this document.

4.1.5 Erosion and Sediment Control

Erosion concerns can be divided into two broad categories:

(1) Erosion due to active construction projects, and
(2) Chronic or nuisance eroding areas due to inadequate conveyance, steep slopes, erodible fills, etc.

The first category of erosion potential is associated with various development projects being actively constructed or planned on facility property. For each project, an approved sediment and erosion control plan will be developed and approved by the local or state regulatory agencies. These plans will identify the specific control measures that will be in place during construction to minimize erosion and sedimentation. At present there are no sites of construction-related erosion at PAG facility areas covered by this SWPPP.

The second category of erosion or sedimentation problems involves areas that may experience nuisance erosion due to inadequate conveyance, steep slopes, or erodible fills. No significant visible erosion was identified during site inspections.

The MSGP requires that at a minimum, facilities must implement flow velocity dissipation devices at outfall locations to minimize the potential for erosion. However, the stormwater outfalls at the PAG facility discharge directly into Apra Harbor from storm drainage pipes embedded in the retaining seawall or directed underground into the harbor. In addition, sheet flow from pavement directly discharges to the surface waters of Apra Harbor from the sea wall. Stormwater discharging from the outfalls does not come into contact with any natural or manmade feature with potential to erode prior to entering the harbor. Furthermore, water depths at the point of discharge from the sea wall are upwards of 30 feet, thereby posing no risk for erosion of the harbor floor.

Due to the unique configuration of the stormwater outfalls at the site, flow velocity dissipation devices do not serve a practical function. Therefore, flow velocity dissipation devices have not been installed.

In an effort to minimize discharge of sediment mobilized by stormwater runoff at the site, the port has incorporated grit traps into the design of the coalescing media OWSs located on the stormwater drainage lines in each drainage area other that DA-4 which is sheet flow. The stormwater in each of these drainage areas passes through the OWSs, effectively capturing sediment in the grit traps prior to stormwater discharge. The port will continue to evaluate sedimentation through the periodic inspection program and will identify and implement additional BMPs, if necessary. Further information regarding the OWSs is presented in Section 4.1.6.

4.1.6 Management of Stormwater Runoff

A typical system of devices and facilities to manage stormwater runoff includes catch basins, underground chambers, detention basins, wet ponds, OWSs, and oil/grit chambers. The various facilities and devices provide different types of stormwater quality and quantity management.

For example, a typical stormwater basin may be designed to provide quantity management for attenuating peak discharges and targeting pollutants like sediment and phosphorus from paved areas, whereas an OWS is utilized to remove petroleum from lower flows through the drainage systems in maintenance areas.

Structural BMPs in place at the PAG facility include an equipment wash rack, stormwater diversion measures, ¼" mesh wire installed on the administrative parking lot storm drains, and OWSs.

As part of the port modernization program, an equipment wash rack was installed in the northeast corner of the EQMR facility to support vehicle and equipment washing while minimizing the potential for pollutants from these activities to impact stormwater discharge (Figure 2). The wash rack is designed to contain all associated wash water and prevent stormwater run-on/runoff. The system uses a self-contained wash water recycling system that is periodically inspected and maintained by a service contractor.

Stormwater diversion measures are currently used to reduce exposure of stormwater to potential pollutants. Diversion measures at the site include impervious walls, curbing, and grading around secondary containment and material storage areas. The facility also uses storm drain inlets and an underground conveyance system to direct stormwater flow.

Coalescing OWSs have been integrated into the stormwater drainage lines in all drainage areas except DA-4 which is sheet flow to remove potential petroleum contamination prior to stormwater discharge from the outfalls. The OWSs are periodically inspected and maintained by a service contractor in accordance with the manufacturer's specifications.

4.1.7 MSGP Sector-Specific Non-Numeric Effluent Limits

Sector-specific technology-based effluent limits are defined for the PAG facility industrial sector (Subsector Q1). The additional Subsector Q1 requirements that apply to the site have been incorporated into facility operations, and although generally discussed throughout this document, these specifically include the following:

Good Housekeeping Measures

- *Painting Area.* Containment measures (plastic barriers/tarpaulins) have been implemented to minimize overspray and potential runoff from painting operations. At least once per month stormwater conveyances and inlets are cleaned of deposits of debris and paint chips.

- *Material Storage Areas.* All containerized materials (e.g., fuels, paints, solvents, waste oil, antifreeze, batteries) are labeled and stored in protected, secure locations away from drains. Outdoor storage areas are managed appropriately to minimize the potential for contamination of precipitation or surface runoff from storage areas. Inventory control measures are used to limit the quantity of potentially hazardous materials kept onsite.

- *Equipment Maintenance and Repair Areas.* To minimize the contamination of precipitation or surface runoff from equipment maintenance and repair to the extent practical, all maintenance activities are indoors. Stormwater runoff from all areas but DA-4 is treated through the use of oil water separators.

4.1.8 Major Storm Events

The following enhanced control measures will be implemented to minimize the exposure of

potential pollutants to rain and runoff from storm surges and flood events (when possible).

- Reinforce materials storage structures to withstand flooding and additional exertion of force;
- Prevent floating of semi-stationary structures by elevating to the Base Flood Elevation (BFE) level or securing with a non-corrosive device;
- When a delivery of exposed materials is expected, and a storm is anticipated within 48 hours, delay delivery (if possible) until after the storm or store materials as appropriate;
- Temporarily store materials and waste above the BFE level;
- Temporarily reduce or eliminate outdoor storage;
- Temporarily relocate any mobile vehicles and equipment to higher ground;
- Develop scenario-based emergency procedures for major storms that are complementary to regular stormwater pollution prevention planning and identify emergency contacts for staff and contractors; and
- Conduct staff training for implementing your emergency procedures at regular intervals.

Material Handling Area. To minimize contamination of precipitation or surface runoff from material handling operations and areas, spill and overflow protection is implemented whenever possible during fueling activities. Paint and solvent mixing is performed in designated areas and under cover whenever possible.

Employee Training. The following additional sector-specific employee training topics are included in the Pollution Prevention Training discussed in Section 4.1.8: used oil management, spent solvent management, spill prevention and control, fueling procedures, general good housekeeping practices, painting procedures, and used battery management.

Preventative Maintenance. The preventive maintenance program includes testing facility equipment and systems to uncover conditions that could cause breakdowns or failures resulting in discharges of pollutants to surface waters, and also includes timely inspection and maintenance of stormwater management devices (secondary containment areas, storm drain inlets, oil/water separators, and the equipment wash rack).

4.1.8 Pollution Prevention Training

Training is necessary to ensure that PAG employees are aware of their impact to stormwater, their responsibilities to prevent pollution, and methods to control such pollution release. Training sessions are held annually for PAG maintenance staff. Topics covered during training include, but are not limited to:

- Purpose of SWPPP, requirements, and contents
- Spill prevention and response procedures
- Good housekeeping practices
- Preventative maintenance
- Material management practices
- Equipment washing procedures
- Recordkeeping and reporting
- Additional training topics identified in Section 4.1.7

All training is organized and coordinated through the P2 Team annually. Staff is alerted by the

P2 Team in advance of the training session to ensure full participation. A copy of the attendance sheet and topics covered is maintained onsite.

Other training sessions are held as needed for members of the P2 Team or others to address specific topics of interest. Topics for such training sessions may include basic concepts of pollution prevention and baseline BMPs (for new P2 Team members); site- specific BMPs; and proper use and maintenance of stormwater management systems and structures. Training on these topics is scheduled on an as-needed basis by the P2 Team Leader in coordination with the P2 Team.

4.1.9 Non-Stormwater Discharges

Inspection and elimination of unauthorized non-stormwater discharges is discussed in Section 3.6. To ensure continued prevention and elimination of non-stormwater discharges from the site, a BMP factsheet has been created for this baseline BMP and is located in Appendix B (BL-1).

4.1.10 Waste, Garbage, and Floatable Debris

As part of daily operations and general good housekeeping practices, all employees routinely inspect and sweep their work areas to ensure waste materials, garbage, or other floatable debris are not permitted to accumulate. Garbage receptacles are located throughout the site and are kept with their lid closed to minimize contamination of runoff. Garbage bins are maintained and regularly emptied by a service contactor.

4.1.11 Recordkeeping and Internal Reporting Procedures

Recordkeeping is an important aspect of determining the long-term history and practices at a facility. It is also necessary to prove a facility is in compliance with local, state, and federal laws and programs. A template for additional documentation requirements is provided in Appendix C.

In addition to items listed in Appendix C, records will be maintained for the following:

- Current inventory of materials used onsite
- Records of routine site inspections
- Reports of spills
- Records of annual and additional stormwater training sessions

4.2 ACTIVITY-SPECIFIC BMPS

In addition to the baseline BMPs, the P2 Team and staff will consider their individual activities and the techniques that are available to aid in reducing stormwater pollution. The following AS BMPs are provided in a series of fact sheets in Appendix B:

- BMP Sheet AS1 – Vehicle and Equipment Maintenance
- BMP Sheet AS2 – Vehicle and Equipment Fueling
- BMP Sheet AS3 – Vehicle and Equipment Washing, Cleaning, and Degreasing
- BMP Sheet AS4 – Outdoor Storage of Waste and Materials
- BMP Sheet AS5 – Waste/Garbage Handling and Disposal
- BMP Sheet AS6 – Building and Grounds Maintenance
- BMP Sheet AS7 – Aboveground Storage Tank Management

All AS BMPs listed above apply to the PAG facility.

4.3 SITE-SPECIFIC AND STRUCTURAL BMPS

In some situations, special practices may be necessary to prevent pollution based on the specific stormwater management structure or a unique site design or practice. In general, the manufacturer of physical structures, such as sand traps and storm filters, can provide documentation for proper maintenance and recommended practices to prevent the release of pollutants to stormwater.

P2 Team members should continue to assess individual areas and processes to determine the need for different or additional BMPs.

The EPA Guidance specifically identifies Site-Specific BMPs for the following items:

- **Flow Diversion Practices**

Stormwater Conveyances
Diversion Dikes
Graded Areas and Pavements

- **Exposure Minimization Practices**

Containment Dikes
Curbing
Drip Pans
Collection Basins
Sumps
Covering
Vehicle Positioning
Loading/Unloading by Air Pressure/Vacuum

- **Mitigative Practices**

Sweeping
Shoveling
Excavation Practices
Vacuum/Pump Systems
Sorbents
Gelling Agents

- **Other Preventive Practices**

Preventive Monitoring
Dust Control
Signs and Labels
Security
Area Control Procedures
Equipment Washing

- **Sediment and Erosion Prevention**

Vegetative Practices
Structural Erosion Prevention and Sediment Control Practices

- **Infiltration Practices**

Vegetated Filter Strips
Grassed Swales
Level Spreaders
Infiltration Trenches
Porous Pavements/Concrete Grids and Modular Pavement

Ensuring that maintenance and operations personnel are aware of maintenance and use requirements prior to installation is essential for the successful operation of stormwater management structures. As needed, training on the correct use and maintenance of stormwater management structures is included in the annual P2 training or is separately scheduled (See Section 4.1.8).

4.4 BMP IMPLEMENTATION PROGRAM

4.4.1 Scheduling of Implementation

The P2 Team is responsible for implementing the schedule for the goals, reports, activities, and BMPs described above. BMPs will be distributed to the relevant maintenance staff and PAG offices as needed. The P2 Team will meet periodically to identify the need for new BMPs and schedules for their implementation. Annual P2 training is scheduled as described in Section 4.1.8.

5.0 STORMWATER MONITORING AND REPORTING

This section of the SWPPP describes the stormwater monitoring requirements for the PAG facility.

5.1 SUBSTANTIALLY IDENTICAL OUTFALLS

Outfalls 005, 006, 007, 008, 009, and 010 are considered substantially identical due to the types of activities conducted within the drainage areas for these outfalls (i.e., storage of cargo containers on a paved surface); therefore, monitoring one of these outfalls will provide data for all 6 drainage areas. PAG has chosen to monitor Outfall 005.

5.2 BENCHMARK AND INDICATOR MONITORING

5.2.1 Benchmark Monitoring

In accordance with section 4.2.2 of the MSGP benchmark monitoring must be conducted quarterly for the first and fourth years of permit coverage. Monitoring periods for the first year are summarized as follows:

- Monitoring Period 1 – April 1 through June 30, 2023
- Monitoring Period 2 – July 1 through September 31, 2023
- Monitoring Period 3 – October 1 through December 31, 2023
- Monitoring Period 4 – January 1 through March 31, 2024

One sample will be collected from each monitored outfall (Outfalls 001, 002, 003, and 005), and will be analyzed for the following parameters:

Table 5-1: Quarterly Benchmark Monitoring Criteria

Parameter	Benchmark Monitoring Concentration
Total Aluminum	1.1 mg/L
Total Lead	0.21 mg/L
Total Zinc	0.09 mg/L

DA-4 is sheet flow and cannot be monitored.

5.2.2 Indicator Monitoring

Because PAG has paved surfaces that will be sealed or re-sealed with coal-tar sealcoat in areas of the port covered under the MSGP, in accordance with section 4.2.1.1b of the MSGP, indicator monitoring for polycyclic aromatic hydrocarbons (PAHs) must be conducted biannually for the first and fourth year of permit coverage. Monitoring periods for the first year are summarized as follows:

- Monitoring Period 1 – April 1 through June 30, 2023
- Monitoring Period 2 – October 1 through December 31, 2023

One sample will be collected from each monitored outfall (Outfalls 001, 002, 003, and 005), and will be analyzed for the following parameters:

Table 5-2: Biannual Indicator Monitoring Criteria

Parameter	Benchmark Monitoring Concentration
PAHs	Report only/ No thresholds or baseline values

5.2.3 Benchmark and Indicator Monitoring Reports

Monitoring data must be reported to the EPA in accordance with Section 7.3 of the MSGP. Data must be submitted to EPA using the EPA's Net-DMR system (available at https://npdes-ereporting.epa.gov/net-netdmr) no later than 30 days after receiving analytical results for all outfalls monitored during the reporting period.

Refer to Section 4.2.2.3 of the MSGP for additional guidance regarding the benchmark monitoring program and to determine if continued monitoring is required.

5.2.4 Benchmark and Indicator Monitoring Procedure

Benchmark monitoring samples will be collected by the sampling team, which shall at minimum consist of one member of the P2 Team and/or a qualified contracted professional. Stormwater sampling should occur during measurable storm events, which are defined as a storm event that results in an actual discharge from the site and occurs at least 72 hours after the previous measurable storm event. The 72-hour storm interval does not apply if you can document that less than a 72-hour interval is representative for local storm events during the monitoring period. National Weather Service forecasts can be used as a planning tool for gauging storm events.

Sampling will be performed using the following equipment:

- Sample bottles, sample cooler with ice
- Rope and bucket to lower and collect discharge water from the outfall
- Measuring glass and a watch to calculate the flow rate
- Disposable gloves
- Field notebook, marking pen, and chain of custody form

Once a rainfall has been determined to result in a discharge and there has not been a measurable storm event in the last 72 hours, the sampling team should conduct sampling activities.

Personnel shall collect one grab sample for analysis during the first 30 minutes of the discharge. If it is not possible to collect the sample within the first 30 minutes of a measurable storm event, the sample must be collected as soon as practicable, and documentation must be kept with the SWPPP explaining why it was not possible to take samples within the first 30 minutes. Samples can be collected directly in the sample bottles. Alternatively, a food grade high density

polyethylene bucket or other suitable container can be lowered down to the outfall and filled with discharge water and then used to fill the sample bottles. This bucket must be decontaminated between each sampling event. Sample bottles will be labeled and placed in a cooler with ice. The team members will record the time that the rain ceased in the field notebook and take the samples to the laboratory for analysis.

All sample containers will have a label that is placed on the side of the container. Sample container caps should not be labeled. The labels will include the following information:

- Date
- Time
- Collector
- Sample Number (this should correspond to the Outfall; i.e. SW-001, SW-002)
- Sampling Site (PAG Facility)
- Sample Type (i.e. grab)
- Preservative used (i.e. ice)
- Tests Required (indicated on chain of custody)

A chain of custody form shall be properly filled out and signed by the sampling personnel to ensure sample integrity.

5.3 IMPAIRED WATERS MONITORING

Apra Harbor is currently listed as an impaired water body due to the presence of polychlorinated biphenyls (PCBs) in fish tissue. In accordance with Section 4.2.5 of the MSGP, monitoring of impaired waters must be conducted once annually at each of the four monitored outfalls. The annual monitoring period begins in the first full quarter of permit coverage.

One sample will be collected from each monitored outfall (Outfall 001, Outfall 002, Outfall 003, and Outfall 005), and will be analyzed for the following:

- Total PCBs

Currently, there are no EPA-approved or established Total Maximum Daily Load Waste Load Allocation values for Apra Harbor, and PCBs are not expected to be present in stormwater discharges covered under this SWPPP. In accordance with Section 4.2.5.1 of the MSGP, monitoring for total PCBs can be discontinued for the next two years if the contaminant is not detected in the stormwater discharge monitoring results. The facility must resume monitoring for PCBs in year four of permit coverage.

Refer to Section 6.2.4 of the MSGP to determine if continued monitoring is required. Section 6.2.4 of the MSGP also provides additional guidance regarding documentation and records necessary to support this determination.

5.3.1 Impaired Waters Monitoring Reports

Impaired waters monitoring data must be reported to the EPA in accordance with Section 7.3 of the MSGP. DMRs must be submitted to EPA using the EPA's NetDMR system (available at https://npdes-ereporting.epa.gov/net-netdmr) no later than 30 days after receiving analytical results for all outfalls monitored during the reporting period.

5.3.2 Impaired Waters Monitoring Procedure

Collection of stormwater samples for impaired waters monitoring shall be conducted in

accordance with the procedures outlined in Section 5.1.2 of this document. To minimize the burden of sample collection, the impaired waters monitoring samples can be collected at the same time as one of the quarterly benchmark monitoring samples.

5.4 ANNUAL REPORT

An annual report containing information from the previous calendar year must be submitted to the EPA by 30 January for each year of permit coverage. Annual reports must be submitted via EPA's eReporting tool, which can be accessed at:

https://npdes-ereporting.epa.gov/net-msgp/

Refer to Section 7.4 of the MSGP for additional information and guidance regarding preparation and submittal of the annual report.

6.0 INSPECTIONS

6.1 ROUTINE FACILITY INSPECTIONS

Regular visual inspections are the most effective way to ensure that all the elements of the SWPPP are in place and are effective at preventing stormwater pollution. Routine facility inspections occur at least quarterly and include all areas of the facility, but specifically focus on the equipment washing area, equipment maintenance and repair areas, painting areas, material storage areas (indoor and outside), material handing/fueling areas, and storm drain inlets and conveyances. Due to the higher risk for pollutant discharge associated with equipment washing activities, the equipment wash rack are inspected at least monthly to ensure potential issues are identified and corrected in a timely manner.

Routine inspections are conducted by qualified personnel and include one member of the P2 Team. Routine inspections are tentatively scheduled to occur during the months of February, May, August, and November. Inspections of the wash rack area occur monthly. At least one such inspection per year occurs during stormwater discharge.

Although not reported to the EPA, documentation of routine inspections is maintained onsite and made available upon request. Documentation includes the following:

- The inspection date and time;
- The name(s) and signature(s) of the inspector(s);
- Weather information and a description of any discharges occurring at the time of the inspection;
- Any previously unidentified discharges of pollutants from the facility;
- Any evidence of, or the potential for, pollutants entering the drainage system;
- Observations regarding the physical condition of the outfalls and the surrounding area, including any evidence of pollutants in the discharge and/or the receiving water;
- Any control measures needing maintenance or repairs;
- Any failed control measures that need replacement;
- Any incidents of noncompliance observed; and
- Any additional control measures needed to comply with the permit requirements.

Sample routine facility inspection forms are located in Appendix C.

6.2 QUARTERLY VISUAL STORMWATER ASSESSMENTS

One stormwater sample from each outfall is collected quarterly for visual assessment. These samples are representative of the stormwater discharge and are made:

- Of a sample in a clean, clear glass, or plastic container, and examined in a well-lit area;
- Of samples collected within the first 30 minutes of an actual discharge from a storm event. If it is not possible to collect the sample within the first 30 minutes of discharge, the sample must be collected as soon as practicable after the first 30 minutes and documentation must be made noting why it was not possible to take samples within the first 30 minutes; and
- Of samples collected from discharges that occur at least 72 hours (3 days) from the previous discharge.

The sample is visually inspected for the following characteristics:

- Color;
- Odor;
- Clarity;
- Floating solids;
- Settled solids;
- Suspended solids;
- Foam;
- Oil sheen; and
- Other obvious indicators of stormwater pollution.

Documentation of the visual sample assessments is maintained onsite with the SWPPP. Documentation includes the following:

- Sample location(s);
- Sample collection date and time, and visual assessment date and time for each sample;
- Personnel collecting the sample and performing visual assessment, and their signatures;
- Nature of the discharge (i.e., runoff)
- Results of observations of the stormwater discharge;
- Probable sources of any observed stormwater contamination;
- If applicable, why it was not possible to take samples within the first 30 minutes.

If the results of the visual assessment identify signs of stormwater pollution, corrective action must be implemented in accordance with Part 4 of the MSGP. Sample visual assessment forms are located in Appendix C.

6.2.1 Visual Assessment of Substantially Identical Outfalls

Outfalls 005, 006, 007, 008, 009, and 010 are considered substantially identical due to the types of activities conducted within the drainage areas for these outfalls (i.e., storage of cargo containers on a paved surface); therefore, visually assessing one of these outfalls will provide data for all six drainage areas. PAG has chosen to visually assess Outfall 005.

7.0 DOCUMENTATION TO SUPPORT ELIGIBILITY CONSIDERATIONS UNDER OTHER FEDERAL LAWS

7.1 DOCUMENTATION REGARDING ENDANGERED SPECIES

Consultation of the United States Fish and Wildlife Service and National Marine Fisheries Service was performed in 2012 as part of the Environmental Assessment conducted to support PAG facility expansion activities. Potential impacts to endangered species as a result of pollutant discharges were evaluated during the consultation and determined to be insignificant. Additionally, no critical habitat was identified in the vicinity of the site. Supporting documentation is provided in Appendix E.

7.2 DOCUMENTATION REGARDING HISTORIC PROPERTIES

From 2010 to 2015, PAG expanded their facility and worked closely with the State Historic Property Office to establish the absence of historic structures. Stormwater discharges and stormwater control measures at the facility will therefore not impact historic properties. Supporting documentation is provided in Appendix F.

8.0 CORRECTIVE ACTIONS AND ADDITIONAL IMPLEMENTATION MEASURES

Corrective actions and additional implementation measures (AIM) must be implemented in accordance with Part 5 of the 2021 MSGP. The following provides a summary of conditions requiring corrective action and procedures for response. Refer to Part 5 of the MSGP for additional guidance.

8.1 CONDITIONS REQUIRING SWPPP REVISIONS

If the following events occur, PAG will revise this SWPPP to meet effluent limits:

- Unauthorized release or discharge of non-stormwater
- Discharge violates numeric effluent limits depicted in this SWPPP
- Non-numeric effluent limits depicted in this SWPPP are not met
- A required control measure was not installed, was incorrectly installed, or not properly operated or maintained
- Visual assessment yields evidence of stormwater pollution such as color, odor, floating solids, settled solids, suspended soils, etc.

8.2 CONDITIONS REQUIRING SWPPP REVIEW

If the following events occur, PAG will review the SWPPP to determine if modifications are necessary:

- Construction, changes in operation, or maintenance at the facility.
- Average of four quarterly sampling results exceeds an applicable benchmark.

8.3 ADDITIONAL IMPLEMENTATION MEASURES (AIM)

If any of the AIM triggering events described in Parts 5.2.3, 5.2.4, or 5.2.5 of the MSGP occur, PAG will follow the response procedures described in those parts, called “additional implementation measures” or “AIM.” There are three AIM levels: AIM Level 1, Level 2, and Level 3. PAG will respond as required to different AIM levels which prescribe sequential and increasingly robust responses when a benchmark exceedance occurs. PAG will follow the corresponding AIM level responses and deadlines described in Parts 5.2.3, 5.2.4, and 5.2.5 unless the port qualifies for an exception under Part 5.2.6.

8.4 CORRECTIVE ACTION AND AIM DOCUMENTATION AND DEADLINES

If corrective action is required, PAG shall take immediate action to prevent events described in Section 8.1.

Subsequent actions must be implemented within 14 calendar days of discovery of the event. If this is not feasible, then PAG must document why it is infeasible and provide a revised schedule within the allocated 14 calendar days. The revised schedule can be no longer than 45 days. The corrective action must be documented as follows:

- Description of event
- Date of event
- Description of immediate actions
- Statement, signed and certified that actions are complete per schedule requirements

Documentation of any of the conditions listed in Sections 8.1 or 8.2 must be made within 24 hours of becoming aware of the condition. Such documentation must be made available to the EPA upon request and will also be summarized in the annual stormwater report. Refer to Section 5.3 of the MSGP for additional guidance regarding corrective action documentation.

9.0 REFERENCES AND INFORMATION SOURCES

IP&E Holdings, LLC (IP&E). 2018. *Spill Prevention, Control, and Countermeasure Plan, IP&E F-3 Dock Facility*. October.

U.S. Environmental Protection Agency (EPA). 2009. *Developing Your Stormwater Pollution Prevention Plan: A Guide for Industrial Operators*. EPA 833-B-09-002.

U.S. Environmental Protection Agency (EPA). 2021. *Multi-Sector General Permit for Stormwater Discharges Associated with Industrial Activity (MSGP)*

APPENDICES

A. FIGURES (NOT INCLUDED)

B. BMP FACT SHEETS

Port Authority of Guam Equipment Maintenance and Repair Facility SWPPP	
BL BMP 1	ELIMINATION OF NON-STORMWATER DISCHARGE TO STORM DRAIN
PURPOSE	**Existing discharges**: Eliminate non-stormwater discharges to the stormwater collection system. Non-storm water discharges can be classified as follows: 1) Activity-based (subtle), and 2) Overt (hard pipe connection). Activity-based non-stormwater discharges may include: wash water, and spillage. Overt non-storm water discharges may include: building floor drains and sanitary wastewater. **Prevention of illicit connections:** Prevent improper physical connections to the storm drain system from sanitary sewers, floor drains, and washbays through education, developing project approvals conditions, and performing both construction phase and post-construction inspections.

APPROACH TO FUTURE FACILITIES AND UPGRADES

Design of New Facilities and Existing Facility upgrades

- Perform inspections during the design review and project construction phases to ensure drainage, wastewater, and water supply connections are correct (no cross connections or illicit hookups).
- Develop a set of as-built prints for all projects. Keep a set of prints at the facility.
- Design projects to include adequate waste repositories at locations near waste origin points.
- Provide adequate and appropriately designed facilities for functions such as steam cleaning, degreasing, painting, mechanical maintenance, chemical/fuel storage and delivery, material handling, waste handling and storage, and lavatory service that may produce non-stormwater discharges.

APPROACH TO EXISTING FACILITY ACTIVITIES

Operational Considerations

Contingency Response:

- Develop and implement a Spill Prevention Control and Countermeasure (SPCC) plan under guidelines set forth in 40 CFR, Section 112.3(a), (b).
- Notify the Team Leader in the event of a spill (any size).
- Maintain adequate supplies of spill response equipment and materials in accessible locations near areas where spills may be likely to occur (i.e. near the scale house, entrances/exits, compaction area and areas where large quantities of hazardous materials are stored).

Inspection and Training:

- Inspect waste containers and storage tanks, including any piping and appurtenances, on a routine basis for leaks, drip marks, and discoloration and proper closure seal.
- Develop employee training programs which emphasize the proper disposal procedures for operations-derived wastes.
- Provide annual employee training in the following areas: spill prevention and response, storm waste pollution prevention.

REQUIREMENTS

- Capital and operation and maintenance (O&M) funding may be required to eliminate non-storm water discharges.

LIMITATIONS

- Activity-based (subtle) non-storm water discharges from a particulate facility are typically sporadic, transient, and often require frequent inspections to detect.

RECOMMENDATIONS

Use dry cleaning procedures.
Implement regular training of staff in materials disposal, and spill response.

Port Authority of Guam Equipment Maintenance and Repair Facility SWPPP	
BL BMP 2	EMERGENCY SPILL CLEANUP PLANS
PURPOSE	Prevent or reduce the discharge of pollutants to storm water resulting from spills of petroleum products or other materials.

General Approach

Owners and operators of facilities that store, process, or refine oil or oil products may be required by federal law (40CFR 112) to develop and implement a Spill Prevention, Control, and Countermeasure (SPCC) Plan. Emergency spill cleanup plans should include the following information:

- A description of the facility including the nature of the facility activity and the general types and quantities of chemicals stored at the facility.
- A site plan showing the location of chemical storage areas, fire hydrant location, and the location and description of any devices used to contain spills such as positive shut-off control valves.
- Notification procedures to be implemented in the event of a spill, such as keep company personnel and local, state, and federal agencies.
- Instructions regarding cleanup procedures.
- Designated personnel with overall spill response cleanup responsibility.

APPROACH TO EXISTING FACILITY ACTIVITIES
Operational Considerations

Operational Considerations:

- Maintain an inventory of appropriate cleanup materials on-site (absorbent material, solvent/cleaning material) and store spill kits near the Maintenance Building, materials transfer points, material storage areas, and other areas where spills are likely.

Contingency Response:

- If the spilled material is of a reportable quantity, the EC should call:
  - National Response Center at 1-800-424-8802
  - U.S. Coast Guard Guam Chapter Prevention Department at 671-355-4937 (if spill reaches Apra Harbor/Philippine Sea)
  - Guam EPA (GEPA) Emergency Response pager number is 671-635-9500 and their main line is 671-475-1658 (if spill reaches State Water).
- A written notification must also be submitted to the GEPA Clean Water contact (671-475-1628) no later than five (5) days following the violation and a written notification must be submitted to the Guam Department of Health Director's Office at 671-735-7173 no later than thirty (30) days following the discovery of the release. Containment and cleanup of spills shall begin immediately.

REQUIREMENTS

- Capital and operations and maintenance (O&M) costs should be small to moderate (locate spill kits containing absorbent material and cleaning solvent at facility).
- Maintenance costs include periodic training and equipment replacement.

LIMITATIONS

- Spills occurring after work hours may go undetected until impacting off-site areas.

RECOMMENDATIONS

- Train staff in spill response.
- Locate spill kits near the Maintenance Shop, Fueling Area, material storage areas, and other area where spill are likely.

Port Authority of Guam Equipment Maintenance and Repair Facility SWPPP	
BL BMP 3	STORM WATER POLLUTION PREVENTION EDUCATION
PURPOSE	Prevent or reduce the discharge of pollutants to stormwater through implementing an education program.

APPROACH TO FUTURE FACILITIES AND UPGRADES
Design of New Facilities and Existing Facility upgrades

- Incorporate proactive stormwater management features into projects such as, decreased impervious areas, infiltration Best Management Practices (BMPs) biofilters, oil/water separators, etc.

APPROACH TO EXISTING FACILITY ACTIVITIES
Operational Considerations

Contingency Response:

- Train employees in the use of spill response equipment and materials.

Inspection and training:

- Perform and document in a log book, inspections of work areas, waste storage facilities, maintenance areas, and contractor projects to examine compliance with BMPs. Follow up with additional training or enforcement as required. Incorporate inspection findings into subsequent training efforts.
- Implement regular stormwater pollution prevention education programs:
  - Promote the proper storage and use of all materials, chemicals, and equipment inside a building, garage, or covered area. Dispose of materials in a proper and timely fashion.
  - Promote the use of environmentally safe products.
  - Perform all vehicle and equipment washing in contained washing area.
  - Encourage good housekeeping practices on site.
  - Increase awareness of the detrimental environmental impacts that result when fuel antifreeze, pesticides, lubricants, detergent, paints and other wastes are dumped onto the ground or into storm drains.
  - Promote source reduction and recycling of waste materials.
  - Increase awareness of what is and what is not allowed to enter storm drains.

REQUIREMENTS

- Capital and operation and maintenance (O&M) costs are minimal for educational programs.
- Educational programs need to be ongoing. Information and training must be disseminated at regular intervals.

LIMITATIONS

- The success of educational programs is difficult to measure. Acceptance and awareness are critical factors.

RECOMMENDATIONS

- Conduct annual training of staff in proper materials handling and disposal.

Port Authority of Guam Equipment Maintenance and Repair Facility SWPPP	
AS BMP 1	**VEHICLE AND EQUIPMENT MAINTENANCE**
PURPOSE	Prevent or reduce the discharge of pollutants to storm water drains from vehicles and equipment maintenance and repair.

APPROACH TO FUTURE FACILITIES AND UPGRADES
Design of New Facilities and Existing Facility upgrades

- Provide covered maintenance areas when designing new facilities or upgrading existing facilities. Utilize indoor areas, overhangs, or portable covers.
- Locate maintenance areas so minimal quantities of runoff cross the site.
- Include appropriate storm water quality structures (oil/water separators, sumps, first flush diversion basins, etc.) in the design of outdoor maintenance and storage areas.

APPROACH TO EXISTING FACILITY ACTIVITIES
Operational Considerations

Implement the following to the maximum extent practicable:

Good Housekeeping

- Use drip pans to collect fluid leaks.
- Use absorbent materials at potential problem areas.
- Adequately collect/remove absorbent materials from area after use and dispose of them in an appropriate manner.
- Perform all vehicle maintenance within the Maintenance Shop. All byproducts from that maintenance (i.e. oil filters, batteries, etc.) should be stored in a covered storage area and disposed of in a proper fashion.
- Drain and crush oil filters (and oil containers) before recycling or disposal. Store crushed oil filters and empty lubricant containers in a leak-proof container.
- Label storm drain inlets (“Don’t Dump” or “Drains to Bay”) to indicate they are to receive no waste.
- Employ only dry cleaning in the buildings and work areas (i.e. sweeping). Do not hose down work areas.
- Drain and properly dispose of all fluids and remove batteries salvaged from vehicles and equipment.
- Drain parts and equipment of all fluids. Store in secondary containment within covered storage area.
- Recycle or properly dispose of the following: grease, oil, antifreeze, brake fluid, cleaning solutions, hydraulic fluid, batteries, transmission fluid, and filters. If materials are stored on-site prior to disposal, keep in labeled containers appropriately.
- Use biodegradable products and substitute materials with less hazardous properties where feasible.
- Maintain and organized inventory of materials used in maintenance areas.

Physical Site Usage

- Store mechanical parts and equipment that may yield even small amounts of contaminants (e.g., oil or grease) under cover and away from drains.
- Store vehicles and equipment awaiting maintenance in designated areas only. Vehicles awaiting maintenance should be stored under cover if possible.

REQUIREMENTS

- Capital investment may be required depending on the facility layout.

• Operation and maintenance (O&M) investment is not expected to be significant.
LIMITATIONS
• Size, space and time limitations may preclude work from being performed indoors.
RECOMMENDATIONS
• Perform all vehicle maintenance indoors. Keep all vehicles awaiting maintenance under cover as much as possible • All byproducts of vehicle and equipment maintenance will be labeled, stored under cover, and disposed of in a proper and timely manner. • Use biodegradable and eco-friendly materials as much as possible. Do not use materials containing phosphorus and minimize chlorine use. • Train staff regularly in materials handling, pollution prevention, and spill response.

Port Authority of Guam Equipment Maintenance and Repair Facility SWPPP	
AS BMP 2	VEHICLE AND EQUIPMENT FUELING
PURPOSE	Prevent fuel spills and leaks, and reduce their impacts to stormwater.

APPROACH TO FUTURE FACILITIES AND UPGRADES
Design of New Facilities and Existing Facility upgrades

- Design fueling areas to prevent the run-on of storm water and the runoff of spills by employing the following approaches:
  - Cover the fueling area if possible
  - Use a perimeter drain or slope the fueling area to a dead-end sump or oil/water separator.
- If stormwater runoff from fueling areas is not collected, install an appropriately-sized oil/water separator.
- Design facilities to include secondary containment where required and/or appropriate.

APPROACH TO EXISTING FACILITY ACTIVITIES
Operational Considerations

Implement the following to the maximum extent practicable:

Good Housekeeping

- Perform all vehicle fueling on secondary containment pad or under cover whenever possible to minimize the discharge of fuel to the surrounding environment.
- Use spill and overflow protection whenever possible
- Fuel pumps intended for vehicular use should be posted with signs stating “No topping off” to prevent overflow.

RECOMMENDATIONS

- Monitor fueling area and fueling truck to ensure that no leaking is occurring.
- Locate spill kits near the fueling station.
- Train staff in spill response.

Port Authority of Guam Equipment Maintenance and Repair Facility SWPPP	
AS BMP 3	VEHICLE AND EQUIPMNET WASHING, CLEANING, AND DEGREASING
PURPOSE	Prevent or reduce the discharge of pollutants to storm water drains from vehicles and equipment washing, and cleaning and degreasing activities.

APPROACH TO FUTURE FACILITIES AND UPGRADES

Design of New Facilities and Existing Facility upgrades

- Outdoor washing operations should not occur without the following design characteristics:
  - Paved area (Portland cement concrete pavement resists degradation from petroleum products)
  - Bermed and/or covered to prevent contact with storm water.
  - Sloped to facilitate wash water collection.
  - Wash water should be collected in a dead-end sump for removal to off-site treatment or discharged to the sanitary sewer through a permitted connection.
  - Drainage piping serving uncovered was areas should be equipped with control valves that are easy to operate from the surface and can direct discharges wither to the storm drain system or sanitary sewer as appropriate.
  - Wash areas should be clearly identified with appropriate signage.
  - Equip with an oil/water separator designed to operate under storm water runoff conditions to treat storm water volumes and flow rates.

APPROACH TO EXISTING FACILITY ACTIVITIES

Operational Considerations

Implement the following to the maximum extent practicable:

Good Housekeeping

- Provide secondary containment, and cover if possible, for containers of washing and steam cleaning additives.
- Use inlet covers over catch basins, spill berms or spill mats to control the discharge of wash water.
- Use biodegradable phosphate-free detergents.
- Keep wash area clean and free of waste.
- Include proper signage to prohibit the discharge of waste oils into the drains.
- Collect and discharge wash water to an approved treatment facility.

REQUIREMENTS

- Capital costs vary depending on measures implemented.
- Operation and maintenance (O&M) costs increase with capital investment.

LIMITATIONS

- Steam cleaning and de-greasing operations can generate significant pollutant concentrations that may require permitting, monitoring, pretreatment, and inspections.

RECOMMENDATIONS

- Perform all vehicle washing within the designated washing area.
- Do not use phosphate or chlorine based detergents.

Port Authority of Guam Equipment Maintenance and Repair Facility SWPPP	
AS BMP 4	OUTDOOR STORAGE OF WASTE AND MATERIALS
PURPOSE	Prevent or reduce the discharge of pollutants to stormwater from outdoor storage areas for waste or materials (i.e. fuel, chemicals, bagged solids, contaminated soil, bulk storage, etc.). Outdoor material storage is discouraged. Storage of materials in designated areas indoors is preferred.

APPROACH TO FUTURE FACILITIES AND UPGRADES

Design of New Facilities and Existing Facility upgrades

- Require the appropriate use of water quality control structures for fuel, waste, and chemical storage areas such as berms, detention/retention basins, and sumps. Develop appropriate minimum performance standards for these water quality control structures and implement a reporting program to monitor the performance and maintenance of these structures.
- Chemical, fuel, oil dispensing sites, and waste collection areas should be covered, if possible.
- Develop standard guidelines for the management of stormwater which collect in secondary containment areas.

APPROACH TO EXISTING FACILITY ACTIVITIES

Operational Considerations

Implement the following to the maximum extent practicable:

Good Housekeeping

- Avoid dispensing from drums positioned horizontally in cradles. Dispensing materials from upright drums equipped with hand pumps is preferred. Always use secondary containment and self closing spigots if dispensing from horizontally positioned drums.
- Store drums and containers on spill containment pallets or other structures to keep the container out of contact with stormwater.
- Use drum lids and drum-top absorbent pads to prevent rainfall from washing materials and drips from the top of containers to the storm drain system.
- Discharge collected stormwater from secondary containment areas according to guidelines developed by the federal government and applicable state and local regulations.
- Store all materials in their original containers or containers approved for that use. Ensure that all containers are appropriately sealed. Store empty containers in fully enclosed area, under cover, or move them off-site.
- Properly label all containers with information, including their contents, hazards, spill response and first aid procedures, manufacturer's name and address, and storage requirements.
- Maintain copies of MSDS on file for any material stored and/or handled by the applicator
- Maintain a spill response plan near the material or waste storage area.

REQUIREMENTS

- Capital and operation and maintenance (O&M) costs will vary widely depending on the size of the facility and the necessary controls.
- Store materials under cover as much as possible
- If materials have to be stored outdoors, locate the materials to minimize the contact with stormwater (i.e. under a cover, on a raised platform, inside secondary containment).
- Locate spill kits near the Maintenance Shop, Fueling area, material storage location and other areas where spills are likely.
- Regularly inspect outdoor waste storage areas to ensure that the containers are not leaking.

Port Authority of Guam Equipment Maintenance and Repair Facility SWPPP	
AS BMP 5	WASTE HANDLING AND DISPOSAL
PURPOSE	Prevent or reduce the discharge of pollutants to storm water from proper waste storage, handling and disposal; reducing waste generation and disposal through source reduction, reuse, and recycling; and preventing run-on and runoff from waste management areas.

APPROACH TO FUTURE FACILITIES AND UPGRADES
Design of New Facilities and Existing Facility upgrades

- Avoid the following characteristics when examining candidate sites for storing wastes:
  - Excessive slope
  - High water table
  - Locations near storm drain inlets
  - Locations near public access area
- Waste handling and storage areas should be covered.
- Develop standard guidelines for the management of stormwater that collects in secondary containment areas.
- Provide contained and covered area for hazardous waste collection sites.

APPROACH TO EXISTING FACILITY ACTIVITIES
Operational Considerations

Implement the following to the maximum extent practicable:
Good Housekeeping

- Perform regular housekeeping to maintain waste storage areas in a clean and orderly condition.
- Recycle materials whenever possible.
- Inspect waste management areas for spills and waste management containers for leaks.
- Ensure that sediments and waste are prevented from being washed, leached, or otherwise carried off-site.
- Completely drain containers (e.g. quart oil cans) prior to disposal.
- Regularly service waste storage areas to avoid overloaded/ overfilled disposal containers.
- Minimize spills and fugitive losses such as dust or mist from loading areas.
- Maintain a minimal inventory of required chemicals to reduce the magnitude of potential spills and limit waste generation.
- Find substitutes for harmful chemicals.
- Properly dispose of unusable chemical inventory.

REQUIREMENTS

- Capital and operation and maintenance (O&M) costs for these programs will vary substantially depending on the size of the facility and the types of waste handled.

LIMITATIONS

- Hazardous waste that cannot be re-used or recycled; must be disposed of at a permitted facility by a licensed hazardous waste hauler.

RECOMMENDATIONS

- Regularly service waste storage areas to prevent a build-up of accumulated waste.
- Keep all garbage dumpsters covered.

Port Authority of Guam Equipment Maintenance and Repair Facility SWPPP	
AS BMP 6	BUILDING AND GROUNDS MAINTENANCE
PURPOSE	Prevent or reduce the discharge of pollutants to stormwater from building and grounds maintenance by washing and cleaning up with as little water as possible, preventing and cleaning up spills immediately, keeping debris from entering storm drains, and maintaining the storm water collection system.

APPROACH TO FUTURE FACILITIES AND UPGRADES
Design of New Facilities and Existing Facility upgrades

- Specify low-maintenance structures/features for capital improvements.
- Incorporate storm water detention/retention to reduce peak runoff flows and for water quality control.
- Incorporate design considerations such as leaving vegetation or planting native vegetation to reduce irrigation, fertilizer, and pesticide/herbicide needs.

APPROACH TO EXISTING FACILITY ACTIVITIES
Operational Considerations

Implement the following to the maximum extent practicable:

Good Housekeeping

- Do not employ any wet cleaning procedures.
- Clean any accumulated trash/debris from stormwater management features.
- Regularly inspect and service oil/water separators.
- Seek less harmful/toxic products to replace ones currently used for building or grounds maintenance.
- Properly dispose of landscape waste, sweepings, and sediments.
- Regularly clean paved surfaces that are exposed to industrial activity. Use “dry” cleaning techniques.

REQUIREMENTS

- Costs will vary depending on the type and size of the facility. Costs of on-site stormwater detention/retention facility could be high.

RECOMMENDATIONS

- Regularly clean site surfaces using dry techniques.

Port Authority of Guam Equipment Maintenance and Repair Facility SWPPP	
AS BMP 7	ABOVEGROUND STORAGE TANK MANAGEMENT
PURPOSE	Prevent or reduce the discharge of pollutants to storm water from aboveground storage tanks (ASTs).

APPROACH TO FUTURE FACILITIES AND UPGRADES
Design of New Facilities and Existing Facility upgrades

- Use appropriate and adequate secondary containment and water quality control structures for ASTs such as berms, detention/retention basins, and sumps. Minimum requirements for performance structures and reporting program to monitor the performance and maintenance of these structures are set forth under guidelines in 40 CFR, section 112.7 9c)
- Provide adequate supplies of spill response equipment and materials in a readily accessible location in close proximity to ASTs/dispensers.
- Manage storm water that collects in secondary containment areas as set forth in 40 CFR, section 112.8 (1).
- New storage thanks must be properly labeled and permitted in accordance with applicable regulations.
- Obtain the necessary permits when handling hazardous or flammable materials, as applicable.
- Provide sufficient protection for tanks from vehicles, etc. by providing structural barriers or adequate buffer from high traffic areas. A higher degree of protection may be appropriate for non-metallic ASTs.

APPROACH TO EXISTING FACILITY ACTIVITIES
Operational Considerations

- Properly label all ASTs with their contents and capacity. Retain information regarding potential hazard, spill response and first air procedures, tank/piping manufacturer's name and address, and storage requirements.
- Maintain copies of MSDS on file for any materials stored and/or handled by the operator.
- Maintain a spill response plan and specifications book near the material or waste storage area.
- Maintain all necessary permits and keep up-to-date.
- Require adequate supplies of spill response equipment and materials in a readily accessible location in close proximity to ASTs/dispensers.
- Require the use of appropriately trained personnel during AST filing or transferring of material.
- Maintain records of any testing, repairs and/or problems that have occurred with ASTs.

RECOMMENDATIONS

- Regularly inspect AST's and document.
- Locate spill kits near Maintenance building, Fueling area, material storage locations, and other areas where spill are likely.
- Train staff in spill response.

C. ADDITIONAL DOCUMENTATION

Additional MSGP Documentation

for:

Port Authority of Guam
1026 Cabra Highway, Suite 201
Piti, Guam, 96915
(671) 477-5931
GUR053001

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Instructions:

- Keep the following inspection, corrective action, monitoring, and certification records in the same location that you keep your SWPPP:
  - A copy of the NOI submitted to EPA along with any correspondence exchanged between you and EPA specific to coverage under this permit (you should already have this);
  - A copy of the authorization email you receive from the EPA assigning your NPDES ID (you should already have this);
  - A copy of the 2021 MSGP (either a hard copy or an electronic copy easily available to SWPPP personnel);
  - Documentation of maintenance and repairs of stormwater control measures and industrial equipment and systems, including the date(s) of regular maintenance, date(s) of discovery of areas in need of repair/replacement, and for repairs, date(s) that the control measure(s)/industrial equipment/system(s) returned to full function, and the justification for any extended maintenance/repair schedules (see Part 2.1.2.3);
  - All inspection reports, including the Routine Facility Inspection Reports (see Part 3.1.6) and Visual Assessment Documentation (see Part 3.2.3);
  - Description of any deviations from the schedule for visual assessments and/or monitoring, and the reason for the deviations (e.g., adverse weather or it was impracticable to collect samples within the first 30 minutes of a measurable storm event) (see Parts 3.2.4 and 4.1.5);
  - Corrective action documentation required per Part 5.1;
  - Documentation of any benchmark threshold exceedances, which AIM Level triggering event the exceedance caused, and AIM response employed per Part 5.2, including:
    - The AIM triggering event;
    - The AIM response taken;
    - Any rationale that SWPPP/SCM changes were unnecessary; or
    - Any documentation required to meet any AIM exception per Part 5.2.6;
  - Documentation to support any determination that pollutants of concern are not expected to be present above natural background levels if you discharge directly to impaired waters, and that such pollutants were not detected in your discharge after three years or were solely attributable to natural background sources (see Part 4.2.5.1); and
  - Documentation to support your claim that your facility has changed its status from active to inactive and unstaffed with respect to the requirements to conduct routine facility inspections (see Part 3.1.5), quarterly visual assessments (see Part 3.2.4.4), benchmark monitoring (see Part 4.2.2.4), and/or impaired waters monitoring (see Part 4.2.5.2).
  - With the exception of the first three items, these are records that you will be updating throughout the permit term. Follow the instructions in Sections A through L of this template to keep your records complete.

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A. EMPLOYEE TRAINING

Instructions:

- Keep records of employee training, including the date of the training (see Parts 2.1.2.8 and 6.2.5.1.e of the 2021 MSGP).
- For in-person training, consider using the tables below to document your employee trainings. For computer-based or other types of training, keep similar records on who was trained, the training date, and the type of training conducted.

Training Date: Insert Date of Training	
Training Description: Insert Description of Training	
Trainer(s): Insert Trainer Name(s)	
Employee(s) Trained:	**Employee Signature**
Insert Name	

Training Date: Insert Date of Training	
Training Description: Insert Description of Training	
Trainer(s): Insert Trainer Name(s)	
Employee(s) Trained:	**Employee Signature**
Insert Name	

Training Date: Insert Date of Training	
Training Description: Insert Description of Training	
Trainer(s): Insert Trainer Name(s)	
Employee(s) Trained:	**Employee Signature**
Insert Name	

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B. MAINTENANCE

Instructions:

- Include in your records documentation of maintenance and repairs of stormwater control measures and industrial equipment and systems (see Part 2.1.2.3 and 6.5), including:
  - the control measure(s)/equipment/system(s) maintained,
  - date(s) of regular maintenance,
  - date(s) of discovery of areas in need of repair/replacement, and for repairs, date(s) that the control measure(s)/equipment/system(s) returned to full function, and
  - the justification for any extended maintenance/repair schedules and the notification to your EPA Region that you need an extension past 45 days to complete repairs/maintenance.
- As a reminder:
  - you are required to immediately take all reasonable steps to prevent or minimize the discharge of pollutants until the final repair or replacement is implemented.
  - final repair/replacements of stormwater controls should be completed as soon as feasible but no later than 14 days, or if that is infeasible within 45 days.
  - if the completion of stormwater control measure/equipment/system repairs/replacement will exceed the 45 day timeframe, you may take the minimum additional time necessary to complete the maintenance, provided that you notify the EPA Regional Office of your intention to exceed 45 days and document your rationale for your modified maintenance timeframe in your SWPPP.
- Provide information, as shown below, to document your maintenance activities for each stormwater control measure and industrial equipment/system. Repeat as necessary by copying and pasting the information below for additional stormwater control measures and industrial equipment/systems.

Note that maintenance documentation in this section is separate from corrective action and AIM documentation required in Part 5.3 of the 2021 MSGP. For any condition or event triggering the need for corrective action review and/or AIM response you must include documentation in section G of this Template.

Stormwater Control Measure Maintenance Records (copy information below for each stormwater control measure)

Stormwater Control Measure: Insert Name of Stormwater Control Measure
Regular Maintenance Activities: Describe Maintenance Activities
Regular Maintenance Schedule: Insert Maintenance Schedule

Date of Maintenance Action: Insert Date of Action
Reason for Action: ☐ **Regular Maintenance** ☐ **Discovery of Problem**
If Problem,
- **Description of Action Required**: Describe Actions Taken in Response to Problem
- **Date Control Measure Returned to Full Function**: Insert Date
- **Justification for Extended Schedule, if applicable**: Insert Justification (if applicable)

Notes: Insert Notes (if applicable)

Date of Maintenance Action: Insert Date of Action
Reason for Action: ☐ **Regular Maintenance** ☐ **Discovery of Problem**

If Problem,
- Description of Action Required: Describe Actions Taken in Response to Problem
- Date Industrial Equipment Returned to Full Function: Insert Date
- Justification for Extended Schedule, if applicable: Insert Justification (if applicable)

Notes: Insert Notes (if applicable)

Date of Maintenance Action: Insert Date of Action
Reason for Action: ☐ Regular Maintenance ☐ Discovery of Problem
If Problem,
- Description of Action Required: Describe Actions Taken in Response to Problem
- Date Industrial Equipment Returned to Full Function: Insert Date
- Justification for Extended Schedule, if applicable: Insert Justification (if applicable)

Notes: Insert Notes (if applicable)

Industrial Equipment and Systems Maintenance Records (copy information below for each industrial equipment/system)

Industrial Equipment/System: Insert Name of Industrial Equipment/System
Regular Maintenance Activities: Describe Maintenance Activities
Regular Maintenance Schedule: Insert Maintenance Schedule

Date of Maintenance Action: Insert Date of Action
Reason for Action: ☐ Regular Maintenance ☐ Discovery of Problem
If Problem,
- Description of Action Required: Describe Actions Taken in Response to Problem
- Date Industrial Equipment Returned to Full Function: Insert Date
- Justification for Extended Schedule, if applicable: Insert Justification (if applicable)

Notes: Insert Notes (if applicable)

Date of Maintenance Action: Insert Date of Action
Reason for Action: ☐ Regular Maintenance ☐ Discovery of Problem
If Problem,
- Description of Action Required: Describe Actions Taken in Response to Problem
- Date Industrial Equipment Returned to Full Function: Insert Date
- Justification for Extended Schedule, if applicable: Insert Justification (if applicable)

Notes: Insert Notes (if applicable)

Date of Maintenance Action: Insert Date of Action
Reason for Action: ☐ Regular Maintenance ☐ Discovery of Problem
If Problem,
- Description of Action Required: Describe Actions Taken in Response to Problem
- Date Industrial Equipment Returned to Full Function: Insert Date
- Justification for Extended Schedule, if applicable: Insert Justification (if applicable)

Notes: Insert Notes (if applicable)

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Date of Maintenance Action: Insert Date of Action

Reason for Action: ☐ Regular Maintenance ☐ Discovery of Problem

If Problem,

- Description of Action Required: Describe Actions Taken in Response to Problem
- Date Industrial Equipment Returned to Full Function: Insert Date
- Justification for Extended Schedule, if applicable: Insert Justification (if applicable)

Notes: Insert Notes (if applicable)

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C. ROUTINE FACILITY INSPECTION REPORTS

Instructions:

- Include in your records copies of all routine facility inspection reports completed for the facility.
- The sample inspection report is consistent with the requirements in Part 3.1.6 of the 2021 MSGP relating to routine facility inspections. Facilities subject to state industrial stormwater permits may also find this form useful. **If your permitting authority provides you with an inspection report, use that form.**

Using the Sample Routine Facility Inspection Report

- This inspection report is designed to be customized according to the specific control measures and activities at your facility. For ease of use, you should take a copy of your site plan and number all of the stormwater control measures and areas of industrial activity that will be inspected. A brief description of the stormwater control measures and areas that were inspected should then be listed in the site-specific section of the inspection report.
- You can complete the items in the "General Information" section that will remain constant, such as the facility name, NPDES ID, and inspector (if you only use one inspector). Print out multiple copies of this customized inspection report to use during your inspections.
- When conducting the inspection, walk the site by following your site map and numbered control measures/areas of industrial activity to be inspected. Also note whether the "Areas of Industrial Materials or Activities exposed to stormwater" have been addressed (customize this list according to the conditions at your facility). Note any required corrective actions and the date and responsible person for the correction.

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Stormwater Industrial Routine Facility Inspection Report

General Information			
Facility Name	Port Authority of Guam		
NPDES ID.	GUR053001		
Date of Inspection	Insert Date	**Start/End Time**	Insert Start/End Time
Inspector Name(s)	Insert Name(s)		
Inspector Title(s)	Insert Title(s)		
Inspector Contact Information	Insert Contact Information		
Inspector Qualifications	Insert Qualifications or Add Reference to the SWPPP		

Weather Information

Weather at time of this inspection?
☐ Clear ☐ Cloudy ☐ Rain ☐ Sleet ☐ Fog ☐ Snow ☐ High Winds
☐ Other: Temperature:

Observations

Have any previously unidentified discharges of pollutants occurred since the last inspection? ☐ Yes ☐ No
If yes, describe: Describe

Are there any discharges occurring at the time of inspection? ❑Yes ❑No
If yes, describe: Describe

Stormwater Control Measures

- Number the structural stormwater control measures identified in your SWPPP on your site map and list them below (add as many control measures as are implemented on-site). Carry a copy of the numbered site map with you during your inspections. This list will ensure that you are inspecting all required control measures at your facility.
- Identify if maintenance or corrective action is needed.
  - If maintenance is needed, fill out section B of this template
  - If corrective action is needed, fill out section G of this template

	Structural Control Measure	Control Measure is Operating Effectively?	If No, In Need of Maintenance, Repair, or Replacement?	Maintenance or Corrective Action Needed and Notes
1	Insert Control Measure Name	☐ Yes ☐ No	☐ Maintenance ☐ Repair ☐ Replacement	Describe Maintenance and/or Corrective Actions Needed
2	Insert Control Measure Name	☐ Yes ☐ No	☐ Maintenance ☐ Repair ☐ Replacement	Describe Maintenance and/or Corrective Actions Needed
3	Insert Control Measure Name	☐ Yes ☐ No	☐ Maintenance ☐ Repair ☐ Replacement	Describe Maintenance and/or Corrective Actions Needed
4	Insert Control Measure Name	☐ Yes ☐ No	☐ Maintenance ☐ Repair ☐ Replacement	Describe Maintenance and/or Corrective Actions Needed

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	Structural Control Measure	Control Measure is Operating Effectively?	If No, In Need of Maintenance, Repair, or Replacement?	Maintenance or Corrective Action Needed and Notes
5	Insert Control Measure Name	☐ Yes ☐ No	☐ Maintenance ☐ Repair ☐ Replacement	Describe Maintenance and/or Corrective Actions Needed
6	Insert Control Measure Name	☐ Yes ☐ No	☐ Maintenance ☐ Repair ☐ Replacement	Describe Maintenance and/or Corrective Actions Needed
7	Insert Control Measure Name	☐ Yes ☐ No	☐ Maintenance ☐ Repair ☐ Replacement	Describe Maintenance and/or Corrective Actions Needed
8	Insert Control Measure Name	☐ Yes ☐ No	☐ Maintenance ☐ Repair ☐ Replacement	Describe Maintenance and/or Corrective Actions Needed
9	Insert Control Measure Name	☐ Yes ☐ No	☐ Maintenance ☐ Repair ☐ Replacement	Describe Maintenance and/or Corrective Actions Needed
10	Insert Control Measure Name	☐ Yes ☐ No	☐ Maintenance ☐ Repair ☐ Replacement	Describe Maintenance and/or Corrective Actions Needed

Areas of Industrial Materials or Activities Exposed to Stormwater

Below are some general areas that should be assessed during routine inspections. Customize this list as needed for the specific types of industrial materials or activities at your facility that are potential pollutant sources. Identify if maintenance or corrective action is needed. If maintenance is needed, fill out section B of this template. If corrective action is needed, fill out section G of this template.

	Area/Activity	Inspected?	Controls Adequate (appropriate, effective and operating)?	Maintenance or Corrective Action Needed and Notes
1	**Material loading/unloading and storage areas**	☐ Yes ☐ No ☐ N/A	☐ Yes ☐ No	Describe Maintenance and/or Corrective Actions Needed
2	**Equipment operations and maintenance areas**	☐ Yes ☐ No ☐ N/A	☐ Yes ☐ No	Describe Maintenance and/or Corrective Actions Needed
3	**Fueling areas**	☐ Yes ☐ No ☐ N/A	☐ Yes ☐ No	Describe Maintenance and/or Corrective Actions Needed
4	**Outdoor vehicle and equipment washing areas**	☐ Yes ☐ No ☐ N/A	☐ Yes ☐ No	Describe Maintenance and/or Corrective Actions Needed
5	**Waste handling and disposal areas**	☐ Yes ☐ No ☐ N/A	☐ Yes ☐ No	Describe Maintenance and/or Corrective Actions Needed
6	**Erodible areas/construction**	☐ Yes ☐ No ☐ N/A	☐ Yes ☐ No	Describe Maintenance and/or Corrective Actions Needed
7	**Non-stormwater/illicit connections**	☐ Yes ☐ No ☐ N/A	☐ Yes ☐ No	Describe Maintenance and/or Corrective Actions Needed

	Area/Activity	Inspected?	Controls Adequate (appropriate, effective and operating)?	Maintenance or Corrective Action Needed and Notes
8	**Salt storage piles or pile containing salt**	☐ Yes ☐ No ☐ N/A	☐ Yes ☐ No	Describe Maintenance and/or Corrective Actions Needed
9	**Dust generation and vehicle tracking**	☐ Yes ☐ No ☐ N/A	☐ Yes ☐ No	Describe Maintenance and/or Corrective Actions Needed
10	**Processing areas**	☐ Yes ☐ No ☐ N/A	☐ Yes ☐ No	Describe Maintenance and/or Corrective Actions Needed
11	**Areas where industrial activity has taken place in the past and significant materials remain and are exposed to storm water**	☐ Yes ☐ No ☐ N/A	☐ Yes ☐ No	Describe Maintenance and/or Corrective Actions Needed
12	**Immediate access roads and rail lines used or traveled by carriers of raw materials, manufactured products, waste material, or by-products used or created by the facility**	☐ Yes ☐ No ☐ N/A	☐ Yes ☐ No	Describe Maintenance and/or Corrective Actions Needed
13	**(Other)**	☐ Yes ☐ No ☐ N/A	☐ Yes ☐ No	Describe Maintenance and/or Corrective Actions Needed
14	**(Other)**	☐ Yes ☐ No ☐ N/A	☐ Yes ☐ No	Describe Maintenance and/or Corrective Actions Needed

Discharge Points

At discharge points, describe any evidence of, or the potential for, pollutants entering the stormwater drainage system. Also describe observations regarding the physical condition of and around all stormwater discharge points, including any flow dissipation devices, and evidence of pollutants in discharges and/or the receiving water. Identify if any corrective action is needed.

Describe Discharge Point Observations

Discharges/Pollutants

Describe any previously unidentified stormwater discharges from and/or pollutants:
Describe Discharges and/or Pollutants

Non-Compliance

Describe any incidents of non-compliance observed and not described above:
Describe Non-compliance

Additional Control Measures

Describe any additional control measures needed to comply with the permit requirements:
Describe Additional Controls Needed

Notes

Use this space for any additional notes or observations from the inspection:
Additional Notes

CERTIFICATION STATEMENT

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information contained therein. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information contained is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Print Name and Title: _____

Signature: _____Date Signed:_____

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D. VISUAL ASSESSMENT DOCUMENTATION

Instructions:

- Include in your records all visual assessment documentation completed for the facility (Part 3.2.3). An example visual assessment form can be found on the following page.

MSGP Visual Assessment Form

(Complete a separate form for each discharge point you assess)

Name of Facility: Enter Name of Facility

NPDES ID. Insert NPDES ID

Sample Location: Enter Discharge Point ID

"Substantially Identical Discharge Point" (SIDP)? ☐ Yes (identify SIDPs): ☐ No

Person(s)/Title(s) Collecting Sample: Enter Name(s)/Title(s)

Signature(s) of Person(s) Collecting Sample:

Person(s)/Title(s) Examining Sample: Enter Name(s)/Title(s)

Signature(s) of Person(s) Examining Sample:

Date & Time Discharge Began: Enter Date and Time

Date & Time Sample Collected: Enter Date and Time. If sample not taken within first 30 minutes, explain why.

Date & Time Sample Examined: Enter Date and Time

Substitute Sample? ☐ No ☐ Yes* (identify quarter/year when sample was originally scheduled to be collected): _____

Is this a substitute sample for quarterly visual assessments distributed during seasons when precipitation more regularly occurs? ☐ No ☐ Yes* (identify the quarter/year when the sample was originally scheduled to be collected): _____

Nature of Discharge: ☐ Rainfall ☐ Snowmelt

If Rainfall: Rainfall Amount: Number of inches

Previous Storm Ended > 72 hours (three days) Before Start of This Storm? ☐ Yes ☐ No**

(describe): _____

Pollutants Observed

Color ☐ None ☐ Other (describe): _____

Odor ☐ None ☐ Musty ☐ Sewage ☐ Sulfur ☐ Sour ☐ Petroleum/Gas ☐ Solvents ☐ Other (describe): _____

Clarity ☐ Clear ☐ Slightly Cloudy ☐ Cloudy ☐ Opaque ☐ Other

Floating Solids ☐ No ☐ Yes (describe): _____

Settled Solids*** ☐ No ☐ Yes (describe): _____

Suspended Solids ☐ No ☐ Yes (describe): _____

Foam (gently shake sample) ☐ No ☐ Yes (describe): _____

Oil Sheen ☐ None ☐ Flecks ☐ Globs ☐ Sheen ☐ Slick ☐ Other (describe): _____

Other Obvious Indicators of Stormwater Pollution ☐ No ☐ Yes (describe): _____

* Your facility must be located in an area where limited rainfall occurs during many parts of the year (e.g., arid or semi-arid climate) or in an area where freezing conditions exist that prevent discharges from occurring for extended periods. Identify the quarter/year when the sample was originally scheduled to be collected.

** The 72-hour (three day) interval can be waived when the previous storm did not yield a measurable discharge or if you are able to document (attach applicable documentation) that less than a 72-hour (three day) interval is representative of local storm events during the sampling period.

*** Observe for settled solids after allowing the sample to sit for approximately one-half hour.

Sampling not performed due to adverse conditions: ☐ No ☐ Yes (explain): _____

Sampling not performed due to no measurable storm event occurring that resulted in a discharge during the monitoring quarter:
☐ No ☐ Yes (explain): _____

Identify probable sources of any observed stormwater contamination. Also, include any additional comments, descriptions of pictures taken, and any corrective actions necessary below (attach additional sheets as necessary). Insert details

Certification Statement (Refer to MSGP Appendix B, Part B.11 for Signatory Requirements)

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information contained therein. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information contained is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

A. Name: _____ B. Title: _____

C. Signature: _____ D. Date Signed: _____

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E. MONITORING RESULTS

Instructions:

- Include in your records copies of all monitoring results (including analytical laboratory data, indicator monitoring, benchmark monitoring, annual effluent limitations guidelines monitoring, state- or tribal-specific monitoring, impaired waters monitoring, and any other monitoring required or conducted) for the facility. Also include copies of monitoring data submitted to EPA's Net-DMR reporting system or paper DMRs if EPA has granted your facility a waiver from electronic reporting (Part 4.1.9).

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F. DEVIATIONS FROM VISUAL ASSESSMENT AND/OR MONITORING SCHEDULE

Instructions:

Include in your records:

- A description of any deviations from the schedule you provided in your SWPPP for visual assessments and/or monitoring (Part 6.5), and
- The reason for the deviations (e.g., it was impracticable to collect samples within the first 30 minutes of a measurable storm event or adverse weather) (Parts 3.2.4 and 4.1.5 of the 2021 MSGP).

Use the fields below to document the deviations. Repeat as necessary for any deviations.

Date:
☐ **Visual Assessments** ☐ **Monitoring**
Describe Deviation from Schedule: Describe Deviation
Reason for deviation: Describe Reason

Date: Insert Date
☐ **Visual Assessments** ☐ **Monitoring**
Describe Deviation from Schedule: Describe Deviation
Reason for Deviation: Describe Reason

Date: Insert Date
☐ **Visual Assessments** ☐ **Monitoring**
Describe Deviation from Schedule: Describe Deviation
Reason for Deviation: Describe Reason

Date: Insert Date
☐ **Visual Assessments** ☐ **Monitoring**
Describe Deviation from Schedule: Describe Deviation
Reason for Deviation: Describe Reason

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G. CORRECTIVE ACTION AND AIM DOCUMENTATION

Instructions:

Within 24 hours of becoming aware of a condition identified in Parts 5.1.1, 5.2.3, 5.2.4, or 5.2.5 of the 2021 MSGP, document the existence of the condition and subsequent actions. Note that this information must be summarized in the annual report (as required in Part 7.4 of the 2021 MSGP).

Description of Condition: Insert Description of Condition or Event Trigering Need for Corrective Action Review and/or AIM Response

For Spills and Leaks:

Description of Incident: Insert Description
Material: Insert Description of Material
Date/Time: Insert Date/Time
Amount: Insert Amount of Spill/Leak
Location: Insert Location of Spill/Leak
Reason for Spill: Insert Reason for Spill/Leak
Discharge to Waters of U.S.: Insert Whether Spill/Leak/Other Release Discharged to a Water of the U.S.

Date: Insert Date Condition/Triggering Event was Identified
Immediate Actions: Insert Description of Immediate Actions Taken
Actions Taken within 14 Days: Insert Description of Corrective Actions and/or AIM Responses Taken Within 14 days of Discovery of Condition/Triggering Event
14 Day Infeasibility: If Applicable, Document Why It Is Infeasible to Complete Necessary Corrective Actions and/or AIM Responses Within 14 Day Timeframe and Describe Schedule
45 Day Extension: If Applicable, Document Rationale Provided to EPA for Extension of 45 Day Timeframe

Description of Condition: Insert Description of Condition or Event Trigering Need for Corrective Action Review and/or AIM Response

For Spills and Leaks:

Description of Incident: Insert Description
Material: Insert Description of Material
Date/Time: Insert Date/Time
Amount: Insert Amount of Spill/Leak
Location: Insert Location of Spill/Leak
Reason for Spill: Insert Reason for Spill/Leak
Discharge to Waters of U.S.: Insert Whether Spill/Leak/Other Release Discharged to a Water of the U.S.

Date: Insert Date Condition/Triggering Event was Identified
Immediate Actions: Insert Description of Immediate Actions Taken
Actions Taken within 14 Days: Insert Description of Corrective Actions and/or AIM Responses Taken Within 14 days of Discovery of Condition/Triggering Event
14 Day Infeasibility: If Applicable, Document Why It Is Infeasible to Complete Necessary Corrective Actions and/or AIM Responses Within 14 Day Timeframe and Describe Schedule
45 Day Extension: If Applicable, Document Rationale Provided to EPA for Extension of 45 Day Timeframe

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H. BENCHMARK THRESHOLD EXCEEDANCES

Instructions:

Include in your records documentation of any annual average benchmark threshold exceedances, which AIM Level triggering event the exceedances caused, and AIM response employed per Part 5.2,including:

- The AIM triggering event;
- The AIM response taken;
- Any rationale that SWPPP/SCM changes were unnecessary; or
- Any documentation required to meet any AIM exception per Part 5.2.6.

Note: an annual average exceedance for a parameter can occur if the four-quarterly annual average for a parameter exceeds the benchmark threshold, or fewer than four quarterly samples are collected, but a single sample, or the sum of any sample results withing the sampling year exceeds the benchmark threshold by more than four times for a parameter (Part 5.2.2).

Date: Insert Date
Pollutant Exceeded and Results: Insert Pollutant Name
Sample 1 (Sample date: Insert Sample Date**) Result**: Insert Sample Result
Sample 2 (Sample date: Insert Sample Date**) Result**: Insert Sample Result
Sample 3 (Sample date: Insert Sample Date**) Result**: Insert Sample Result
Sample 4 (Sample date: Insert Sample Date**) Result**: Insert Sample Result
Average Result: Insert Value
Benchmark Value: Insert Benchmark Value from 2021 MSGP

AIM Level Triggered (select one)

☐ AIM Level 1 (quarterly benchmark monitoring results indicate that an AIM triggering event per Part 5.2.2 has occurred)

☐ AIM Level 2 (continued quarterly benchmark monitoring results indicate that an AIM triggering event per Part 5.2.2 has occurred)

☐ AIM Level 3 (continued quarterly benchmark monitoring results indicate that an AIM triggering event per Part 5.2.2 has occurred)

AIM Response Taken: Document AIM response taken in section G of this Template

Do You Qualify for an Exception from AIM Requirements and Continued Benchmark Monitoring?

☐ **Yes (indicate the exception below)** ☐ **No**

Exception(s): (if applicable)

☐ **Solely Attributable to Natural Background Pollutant Levels**

Pollutant(s): Insert Pollutant
Maintain supporting rationale and applicable data as required in Part 5.2.6.1

☐ **Due to Run-On**

Pollutant(s): Insert Pollutant

Attach documentation and concurrence from EPA Regional Office required in Part 5.2.6.2

☐ Due to An Abnormal Event

Pollutant(s): Insert Pollutant

Attach documentation required in Part 5.2.6.3

☐ Demonstrated to Not Result in An Exceedance of Facility-Specific Value Using National Recommended Water Quality Criteria in Lieu of Applicable MSGP Benchmark Threshold (For Aluminum and Copper Benchmark Parameters Only)

Pollutant(s): Insert Pollutant

Attach documentation and concurrence from EPA Regional Office required in Part 5.2.6.4

☐ Demonstrated Not to Result in Any Exceedance of Water Quality Standards

Pollutant(s): Insert Pollutant

Attach documentation and concurrence from EPA Regional Office required in Part 5.2.6.5

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I. IMPAIRED WATERS MONITORING: DOCUMENTATION OF NATURAL BACKGROUND SOURCES OR NON-PRESENCE/ACCEPTABLE RANGE OF IMPAIRMENT POLLUTANT

Instructions:

This section applies only if your facility:

- Discharges directly to an impaired water without an EPA-approved or established total maximum daily load (TMDL); and
- Your first or fourth year annual impaired waters monitoring results indicate that the pollutant(s) for which the water is impaired is (1) not detected in your discharge, or is within the acceptable range for a given parameter for the waterbody to meet its designated use (e.g., pH or temperature) or (2) is detected in your discharge, but you have determined that its presence is caused solely by natural background sources. See Part 4.2.5.1 of the 2021 MSGP.

Date: Insert Date

Check one of the boxes below and complete the additional documentation:

☐ **1 – Pollutant(s) for which the water is impaired is not present in your discharge or is within the acceptable range for a given parameter for the waterbody to meet its designated use.**

Attach documentation that the impairment pollutant(s) was not detected in your discharge sample(s) or was detected within an acceptable range.

☐ **2 – Pollutant(s) for which the water is impaired is present, but you have determined its presence is caused solely by natural background sources.**

Attach the following documentation:

- An explanation of why you believe that the presence of the pollutant(s) causing the impairment in your discharge is not related to the activities at your facility; and
  Data and/or studies that tie the presence of the pollutant(s) causing the impairment in your discharge to natural background sources in the watershed.

J. ACTIVE/INACTIVE STATUS CHANGE

Instructions:

If your facility changes its status from active to inactive and unstaffed (or from inactive/unstaffed to active), include documentation in this section to support your claim.

Date: Insert Date of Change in Status
New Facility Status: ☐ **Inactive and Unstaffed** ☐ **Active**
Reason for Change in Status: Describe Reason

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K. SWPPP AMENDMENT LOG

Instructions:

Include in your records:

- A log of the date and description of any amendments to your SWPPP.

Fill in the appropriate columns of this table for each amendment to your SWPPP. Copy and paste additional rows into the table as necessary.

Amend. No.	Description of the Amendment	Date of Amendment	Amendment Prepared by [Name(s) and Title(s)]
1	Insert Description of Amendment	Insert Date	Insert Name(s)/Title(s)
2			
3			
4			
5			
6			
7			
8			
9			
10			

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L. MISCELLANEOUS DOCUMENTATION

Instructions:

Use this section to keep records of any additional documentation that relates to your compliance with the 2021 MSGP.

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D. NOTICE OF INTENT AND 2021 MULTI-SECTOR GENERAL PERMIT

The NOI and submission receipt are available from the Port upon request.

E. ENDANGERED SPECIES DOCUMENTATION

Endangered Species Eligibility Determination

Appendix E - Procedures Relating to Endangered Species Protection

E.1 Assessing the Effects of Your Discharges and Discharge-Related Activities

In accordance with Part 1.1.4, you must follow the procedures in this appendix to determine which of the eligibility criteria (i.e., criterion A - E) you qualify under, if any, with respect to the protection of threatened or endangered species listed, and "critical habitat" designated, under the federal Endangered Species Act (ESA). If you do not meet one of these criteria, you are not eligible for coverage under this permit.

The procedures in this appendix will help you assess the potential effects of applicable stormwater discharges, discharge-related activities, and authorized non-stormwater discharges on federally listed threatened and endangered species and their designated critical habitat. In accordance with Part 6.2.6.1 of this permit, you must keep any documentation that supports your eligibility criteria determination, including the completed *Criterion Selection Worksheet* in Part E.4 of this appendix, with your Stormwater Pollution Prevention Plan (SWPPP).

You must complete your eligibility determination outlined in the Endangered Species Protection section of the Notice of Intent (NOI) in the NPDES eReporting Tool (NeT-MSGP) and provide all information as required on your NOI that supports the Part 1.1.4 eligibility criterion you qualify under. Note that if you have determined that you may be eligible under Criterion C3 or Criterion F, you must complete additional questions in the Endangered Species Protection section of the NOI in NeT-MSGP, unless the EPA Regional Office grants you a waiver from electronic reporting, in which case you must submit a completed *Criterion C3 Eligibility Form* to EPA a minimum of 30 days prior to submitting your NOI for permit coverage.

While coordination between you and the U.S. Fish and Wildlife Service (USFWS) and/or the National Marine Fisheries Service (NMFS)(together, the "Services") is not necessarily required in all cases, EPA encourages you to coordinate with the Services, to document that coordination, and to do so early in the planning process prior to submitting your NOI.

When evaluating the potential effects of your activities, you must consider effects to listed species or critical habitats within the "action area" of your industrial activity, as identified by the USFWS IPaC and/or the NOAA Species Directory (see Part E.4 of this appendix). Action area is defined in Appendix A of the MSGP and below:

> **Action Area** – all areas to be affected directly or indirectly by the federal action and not merely the immediate area involved in the action. See 50 CFR 402. For the purposes of this permit and for application of Endangered Species Act requirements, the following areas are included in the definition of action area:
>
> • The areas where stormwater discharges originate and flow from the industrial facility to the point of discharge into receiving waters. (Example: Where stormwater flows into a ditch, swale, or gully that leads to receiving waters and where listed species (such as listed amphibians) are found in the ditch, swale, or gully.)
>
> • The areas where stormwater from industrial activities discharge into receiving waters and the areas in the immediate vicinity of the point of discharge. (Example: Where stormwater from industrial activities discharges into a stream segment that is known to harbor listed aquatic species.)

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• The areas where stormwater controls will be constructed and operated, including any areas where stormwater flows to and from the stormwater controls. (Example: Where a stormwater retention pond would be built.)

• The areas upstream and/or downstream from the stormwater discharge into a stream segment that may be affected by these discharges. (Example: Where sediment discharged to a receiving stream settles downstream and impacts a breeding area of a listed aquatic species.)

E.2 Eligibility Criterion

As required by Part 1.1.4, you must certify in your NOI that you meet one of the following criteria (A - E) to be eligible for coverage under the permit. Once you determine the applicable eligibility criterion, you must:

- Specify the basis for your selection of the applicable eligibility criterion, and if required, provide documentation that is the basis for your determination with the NOI form; and
- Provide documentation in your SWPPP that is sufficient to support your determination that you satisfy the requirements of the applicable criterion.

NOTE: You must use the information from the USFWS IPaC and NOAA Species Directory (see Step 2 and Step 3 of this appendix) when determining the presence of ESA listed species and critical habitat. Attaching aerial image(s) of the site to this NOI is helpful to EPA, USFWS, and NMFS in confirming eligibility under this criterion. Please Note: NMFS' jurisdiction includes ESA-listed marine and estuarine species that spawn in inland rivers.

Criterion A. **No ESA-listed species and/or critical habitat present in action area.** No ESA-listed species and designated critical habitat(s) are likely to occur in your facility's "action area" as defined in Appendix A. You must provide a description below of the basis for selecting this criterion and provide documentation supporting your eligibility determination in your SWPPP.

Basis statement content: A basis statement supporting the selection of this criterion must identify the USFWS and NMFS information sources used. State resources are not acceptable. Attaching aerial image(s) of the site to this NOI is helpful to EPA, USFWS, and NMFS in confirming eligibility under this criterion. Note that NMFS' jurisdiction includes ESA-listed marine and estuarine species that spawn in inland rivers.

Criterion B. **Eligibility requirements met by another operator under the 2021 MSGP.** Your industrial activity's discharges and discharge-related activities were already addressed in another operator's valid certification of eligibility for your "action area" under eligibility criteria A, C, D, or E of the 2021 MSGP and you have confirmed that no additional ESA-listed species and designated critical habitat not considered in that certification may be present or located in the "action area" (e.g., due to a new species listing or critical habitat designation). To certify your eligibility under this criterion, there must be no lapse of NPDES permit coverage in the other 2021 MSGP operator's certification. By certifying eligibility under this criterion, you must comply with any conditions upon which the other operator's certification was based. You must include in your NOI the NPDES ID assigned to the other 2021 MSGP operator's authorization under this permit. If your certification is based on another 2021 MSGP operator's certification under

criterion C, you must provide EPA with the relevant supporting information required (i.e., permit tracking number, industrial activity SWPPP, a description of the basis for the criterion selected) in your NOI form.

Basis statement content: A basis statement supporting the selection of this criterion must identify the eligibility criterion of the other MSGP NOI, the authorization date, and confirmation that the authorization is effective.

Criterion C1. **Facility eligible for Criterion C in the 2015 MSGP with NO CHANGE to listed species, critical habitat, or action area.** Your facility was eligible for Criterion C in the 2015 MSGP and there has been no change in your facility's action area and you have confirmed that there are no additional threatened or endangered species or designated critical habitat listed by USFWS and/or NMFS in your action area since your certification under Criterion C in the 2015 MSGP. You must provide a description of the basis of this criterion selected on your NOI form and provide documentation supporting your eligibility determination in your SWPPP.

Basis statement content: A basis statement supporting the selection of this criterion must provide the USFWS and/or NMFS resources consulted that helped you determine that there are no additional and/or critical habitat listed by under the jurisdiction of the Services in your action area.

Criterion C2. **Facility eligible for Criterion C in the 2015 MSGP with CHANGES to listed species, critical habitat, or action area.** Your facility was eligible for Criterion C in the 2015 MSGP, but there have been changes in your facility's action area, and/or additional threatened or endangered species and/or designated critical habitat have been listed by USFWS and/or NMFS in your action area since your certification under Criterion C under the 2015 MSGP. You must provide a description of the basis of this criterion selected on your NOI form and provide documentation supporting your eligibility determination in your SWPPP. You must submit your completed Criterion C2 Eligibility information at the same time that you submit your NOI, which will be held for 30 additional days prior to the standard 30-day review for all NOIs.

Basis statement content: A basis statement supporting the selection of this criterion must identify the following:

1. A description of the changes in the facility's action area (if applicable).
2. The USFWS and/or NMFS resources consulted that helped you determine that additional species and/or critical habitat have been listed/designated by either of the Services in your action area.
3. What ESA-listed species and/or designated critical habitat are located in your "action area".
4. Distance in miles between your site and the ESA-listed species and/or designated critical habitat within the action area (in miles, or state "on site" if the ESA-listed species and/or designated critical habitat is within the area to be disturbed).
5. A description of EPA approved measures you will implement or will continue to implement, including additional measures previously

suggested by the services and required by the EPA under the 2015 MSGP, to ensure no likely adverse effects on ESA-listed species and/or critical habitat.

Criterion C3. **ESA-listed species and/or designated critical habitat likely to occur, but discharges not likely to adversely affect them.** ESA-listed threatened or endangered species or their designated critical habitat(s) under the jurisdiction of USFWS and/or NMFS are likely to occur in or near your facility's "action area," and you certify to EPA that your industrial activity's discharges and discharge-related activities are not likely to adversely affect ESA-listed and/or critical habitat. To certify your eligibility under this criterion, you must complete the Criterion C3 Eligibility Form, which you must complete additional questions in the Endangered Species Protection section of the NOI in NeT-MSGP, unless the EPA Regional Office grants you a waiver from electronic reporting, in which case you must submit to EPA at least 30 days prior to filing your NOI for permit coverage. After evaluation of your Criterion C3 Eligibility Form, EPA may require additional measures that you must implement to avoid or eliminate likely adverse effects on ESA-listed species and/or critical habitat from discharges and discharge-related activities. You must submit your completed Criterion C3 Eligibility information at the same time that you submit your NOI, which will be held for 30 additional days prior to the standard 30-day review for all NOIs. You must also provide a description of the basis for the criterion you selected on your NOI form and provide documentation supporting your eligibility determination in your SWPPP.

Basis statement content: A basis statement supporting the selection of this criterion must identify the following:

1. The USFWS and NMFS information resources and expertise (e.g., state or federal biologists) used to arrive at this conclusion. Any supporting documentation should explicitly state that both ESA-listed species and designated critical habitat under the jurisdiction of the USFWS and/or NMFS were considered in the evaluation.

2. What ESA-listed species and/or designated critical habitat are located in your "action area".

3. Distance in miles between your site and the ESA-listed species and/or designated critical habitat within the action area (in miles, or state "on site" if the ESA-listed species and/or designated critical habitat is within the area to be disturbed).

4. A description of EPA approved measures you will implement to ensure no likely adverse effects on ESA-listed species and/or critical habitat.

5. A statement affirming that "I agree to implement any additional measures that were determined by EPA to be necessary to ensure that my discharges and/or discharge-related activities will not have likely adverse effects on listed species and critical habitat."

6. If the EPA Regional Office granted you a waiver from electronic reporting, date you sent completed Criterion C3 Eligibility form to EPA.

Criterion D. **ESA Section 7 consultation has successfully concluded**. Consultation between a Federal Agency and the U.S. Fish and Wildlife Service and/or the National Marine Fisheries Service under section 7 of the Endangered Species Act has concluded. The consultation must have addressed the effects of the facility's discharges and discharge-related activities on ESA-listed species and/or designated critical habitat under the jurisdiction of USFWS and/or NMFS. To certify eligibility under this criterion, indicate the result of the consultation:

i. A biological opinion and/or conference opinion that concludes that the action in question (taking into account the effects of your facility's discharges and discharge-related activities) is not likely to jeopardize the continued existence of ESA-listed species, or result in the destruction or adverse modification of designated critical habitat; or

ii. Written concurrence from the applicable Service(s) with a finding that your facility's discharges and discharge-related activities are not likely to adversely affect ESA-listed species or designated critical habitat.

You must verify that the consultation does not warrant reinitiation under 50 CFR §402.16. If reinitiation of consultation is required, in order to be eligible under this criterion you must ensure consultation is reinitiated and the result of the consultation must be consistent with Criterion D (i), or (ii) above.

If eligible under Criterion D, you must also provide supporting documentation for your determination in your NOI and SWPPP, including the Biological Opinion (or ECO tracking number) or concurrence letter. You must include copies of the correspondence between yourself and the USFWS and/or NMFS in your SWPPP and your NOI.

Basis statement content: A basis statement supporting the selection of this criterion should identify the federal action agency(ies) involved, the field office/regional office(s) providing that consultation, any tracking numbers of identifiers associated with that consultation (e.g., IPaC number, ECO number), and the date the consultation was completed.

Criterion E. **Issuance of section 10 permit.** Potential take is authorized through the issuance of a permit under section 10 of the ESA by the USFWS and/or NMFS, and this authorization addresses the effects of the facility's discharges and discharge-related activities on ESA-listed species and designated critical habitat. You must include copies of the correspondence between yourself and the participating agencies in your SWPPP and your NOI.

Basis statement content: A basis statement supporting the selection of this criterion should identify whether USFWS or NMFS or both agencies provided a section 10 permit, the field office/regional office(s) providing permit(s), any tracking numbers of identifiers associated with that consultation (e.g., IPaC number, ECO number), and the date the permit was granted.

E.3 Eligibility Compliance

You must comply with any measures that formed the basis of your eligibility determination in Part 1.1.4 for the duration of your coverage under the MSGP in order to maintain your eligibility for coverage under the permit. These measures become permit requirements per Part 2.3. Documentation of these measures must be kept as part of your SWPPP (see Part 6.2.6.1).

E.4 Criterion Selection Worksheet

Instructions:

You must follow the step-by-step instructions in this worksheet in order to determine your eligibility under Part 1.1.4. Alternatively, if you prefer to use a Biological Evaluation (or its equivalent) in making a determination of your eligibility, you should ensure all of the information requested below for the criterion you are selecting is fully addressed in the document and provided. You must attach this completed document or Biological Evaluation (or equivalent) to your SWPPP to support your Part 1.1.4 eligibility determination.

You may need the following information in order to determine your eligibility:

1) Your facility's draft Stormwater Pollution Prevention Plan (SWPPP), including information on receiving waters.

2) Any additional site-specific information related to your facility's discharges and discharge-related activities, such as the geographic location.

3) The list(s) of threatened and endangered species and/or any designated critical habitat in your action area, as acquired from the Fish and Wildlife Service and/or the National Marine Fisheries Service. Directions on how to acquire species lists is described in a subsequent section below.

Note that much of the information needed to complete this worksheet is also needed in order to prepare your NOI for permit coverage and is information that is part of your SWPPP. You may copy and paste any information that is already required and completed in your SWPPP into this worksheet. (*You may also decide to make minor changes or additions to your SWPPP while filling out the worksheet for clarification purposes or to address any concerns that are identified below.)*

STEP 1: DETERMINE IF YOU MEET THE ELIGIBILITY REQUIREMENTS OF CRITERION B, D, or E.

I. You should first determine whether you are eligible under criterion B (because another operator has accounted for your action area in their valid certification of eligibility under the 2021 MSGP), criterion D (because of a previously completed ESA section 7 consultation), or criterion E (because of a previously issued ESA section 10 permit).

II. If you determine that your facility does not meet criterion B, D, or E (e.g., due to difference in action area described, lack of analysis of appropriate effects, new listings or designation of critical habitat), proceed to **Step 2** below.

Criterion B Eligibility Requirements

If your industrial activities were already addressed in another operator's valid certification of eligibility under the current 2021 MSGP, you may be eligible for coverage under criterion B. In order to be eligible for coverage under criterion B, you must confirm that **all** three of the following are true:

- ☐ You have confirmed that the other operator's certification of eligibility accounted for your action area and that the eligibility determination was valid.
- ☐ There has been no lapse of NPDES permit coverage in the other operator's certification.

☐ You will comply with all measures that formed the basis of the other operator's valid certification of eligibility. Provide the operator's NPDES permit number and list any measures that you must comply with in the box below (or enter "N/A" if none exist):

- **If all three of the above are true, you may select criterion B on your NOI.** You must include in your NOI the NPDES ID assigned to the other operator's authorization under this permit, and a description of the basis for the criterion selected on your NOI form, including the eligibility criterion selected in the other operator's NOI. You must include this completed Worksheet in your SWPPP.
- **If any of the above are <u>not</u> true, you may <u>not</u> select criterion B and must proceed to <u>Step 2</u>.** For example, if there are any listed species in your action area that were not addressed in the other operator's certification, you are not eligible under criterion B.

<u>Criterion D Eligibility Requirements</u>

If consultation under section 7 of the ESA has concluded, you may be eligible for coverage under criterion D. In order to be eligible for coverage under criterion D, you must confirm that **all** two of the following are true:

■ A consultation between a federal agency and the U.S. Fish and Wildlife Service and/or the National Marine Fisheries Service under section 7 of the ESA has concluded. Consultations can be either formal or informal, and would have occurred only as a result of a separate federal action (e.g., during application for an individual wastewater discharge permit or the issuance of a wetlands dredge and fill permit), <u>and</u> the consultation must have addressed the effects of your industrial activity's discharges and discharge-related activities on all ESA-listed threatened or endangered species and all designated critical habitat in your action area. The result of this consultation must be either:

i. A biological opinion currently in effect that concludes that the action in question (taking into account the effects of your facility's discharges and discharge-related activities) is not likely to jeopardize the continued existence of listed species or result in the destruction or adverse modification of critical habitat. The biological opinion must have included the effects of your facility's discharges[1] and discharge-related activities on all the listed species and designated critical habitat in your action area. To be eligible under (i), any

[1] Effects of discharge includes, but is not limited to, the analysis of the hydrological, chemical, and biological effects of the discharge on listed species, their prey, and their habitat, as well as critical habitat, where designated. For example, the effects analysis would have evaluated whether the various pollutants in the discharge (e.g., TSS, metals) would adversely affect listed species through exposure to the pollutants, or to their prey or habitat. Effects that look only at short-term effects unrelated to the stormwater discharge effects to listed species are not sufficient for these purposes.

reasonable and prudent measures specified in the incidental take statement must be implemented;

ii. Written concurrence (e.g., letter of concurrence) from the applicable Service(s) with a finding that your facility's discharges and discharge-related activities are not likely to adversely affect ESA-listed species and/or designated critical habitat. The concurrence letter must have included the effects of your facility's discharges and discharge-related activities on all the ESA-listed species and/or designated critical habitat on your species list(s) acquired from the U.S. Fish and Wildlife Service and/or the National Marine Fisheries Service as part of this worksheet.

☒ The consultation does not warrant reinitiation under 50 CFR §402.16; or, if reinitiation of consultation is required (e.g., due to a new species listing or critical habitat designation; new information), you have reinitiated the consultation and the result of the consultation is consistent with the statements above. Attach a copy of any reinitiation documentation from the Services or other consulting federal agency.

- **If both of the above are true, you may select criterion D on your NOI.** You must also provide a description of the basis for the criterion selected on your NOI form and you must include this completed worksheet in your SWPPP. In both your SWPPP and NOI you must also provide the Biological Opinion (or ECO tracking number) or concurrence letter and any other documentation supporting your eligibility determination.
- **If any of the above are not true, you may not select criterion D and must proceed to Step 2.** For example, if the biological opinion or written concurrence did not include the effects of the discharge or discharge-related activities as described above (e.g., the previous consultation covered some but not all of the species or critical habitat in your action area as shown on your species list), or if the consultation is no longer valid (e.g., due to new species listings), you are not eligible under criterion D.

Criterion E Eligibility Requirements

If your industrial activities are the subject of a permit under section 10 of the ESA, and this authorization addresses the effects of your facility's discharges and discharge-related activities on ESA-listed species and designated critical habitat in your action area, you may be eligible for coverage under criterion E. In order to be eligible or coverage under criterion E, you must confirm that the following is true:

☒ A permit has been issued under section 10 of the ESA. The permit authorization specifically addresses the effects of your facility's discharges and discharge-related activities (if applicable) on all federally-listed species and designated critical habitat in your action area.

- **If the above is true, you may select criterion E on your NOI.** You must also provide a description of the basis for the criterion selected on your NOI form and must include this completed worksheet in your SWPPP. In both your SWPPP and your NOI you must provide a copy of the section 10 permit issued by the Services.
- **If the above is not true, you may not select criterion E and must proceed to Step 2.** For example, if a permit has been issued under section 10 of the ESA, but the permit authorization did not address the effects of your facility's discharges and/or discharge-related activities on all federally-listed species and designated critical

habitat in your action area, you are not eligible under criterion E, but you should attach a copy of the permit to the SWPPP for reference.

STEP 2: DETERMINE THE EXTENT OF YOUR ACTION AREA

You must determine whether species listed as either threatened or endangered, or their critical habitat(s) are located in your facility's action area (i.e., all areas to be affected directly or indirectly by the federal action and not merely the immediate area involved in the action, including areas beyond the footprint of the facility that are likely to be affected by stormwater discharges, discharge-related activities, and authorized non-stormwater discharges). Consider the following in determining the action area for your facility:

- Discharges of pollutants into downstream areas can expand the action area well beyond the footprint of your facility and the discharge point(s). Take into account the controls you will be implementing to minimize pollutants and the receiving waterbody characteristics (e.g., perennial, intermittent, ephemeral) in determining the extent of physical, chemical, and/or biotic effects of the discharges. All receiving waterbodies that could receive pollutants from your facility must be included in your action area.
- Discharge-related activities must also be accounted for in determining your action area. Discharge-related activities are any activities that cause, contribute to, or result in stormwater and authorized non-stormwater point source discharges, and measures such as the siting, construction, and operation of stormwater controls to control, reduce, or prevent pollutants from being discharged. For example, any new or modified stormwater controls that will have noise or other similar effects, and any disturbances associated with construction of controls, are part of your action area.

If you have any questions about determining the extent of your action area, you may contact EPA or the Services for assistance. https://www.epa.gov/npdes/contact-us-stormwater#regional

You must include a **map and a written description of** the action area of your facility in Attachment 1 of this appendix. You may choose to include the map that is generated from the FWS' on-line mapping tool IPaC (the *Information, Planning, and Consultation System*) located at http://ecos.fws.gov/ipac/ (see Step 3 for information about using this tool).

You must proceed to **Step 3** below.

STEP 3: DETERMINE IF LISTED THREATENED OR ENDANGERED SPECIES AND/OR CRITICAL HABITAT ARE PRESENT IN YOUR ACTION AREA.

You must determine whether species listed as either threatened or endangered under the Endangered Species Act, and/or their designated critical habitat(s) (as defined in Appendix A), are located in your facility's action area. ESA listed species and designated critical habitat are under the purview of the National Marine Fisheries Service (NMFS) and the U.S. Fish and Wildlife Service (USFWS), and in many cases, you will need to acquire species and critical habitat lists from both Services.

- For NMFS species and critical habitat information, use the following webpages, which provide up-to-date information on listed species
    - For the Northeastern U.S.: NOAA Fisheries Greater Atlantic Region ESA Section 7 Mapper: https://noaa.maps.arcgis.com/apps/webappviewer/index.html?id=1bc332edc5204e03b250ac11f9914a27;

- For Puerto Rico:
  - *Acropora* critical habitat map: https://www.fisheries.noaa.gov/resource/map/acropora-elkhorn-and-staghorn-coral-critical-habitat-map-and-gis-data;
  - Green turtle critical habitat map: https://www.fisheries.noaa.gov/resource/map/green-turtle-critical-habitat-map-and-gis-data;
  - Hawksbill Turtle critical habitat map: https://www.fisheries.noaa.gov/resource/map/hawksbill-turtle-critical-habitat-map-and-gis-data;
- Western U.S.: West Coast Region Protected Resources App: https://www.webapps.nwfsc.noaa.gov/portal/apps/webappviewer/index.html?id=7514c715b8594944a6e468dd25aaacc9; and
- Pacific Islands: Contact the Pacific Islands Regional Office at (808) 725-5000 or pirohonolulu@noaa.gov.

If you need more information, go to https://www.fisheries.noaa.gov/regions. Choose the Region where the project is based from the left-hand column and the office from the About Us on the right-hand column.

If the action area includes coastal waters or waters used by species that migrate between fresh and salt waters (e.g., salmon, sturgeon), you must obtain a species list from NMFS field office.

- For FWS species information, use the on-line mapping tool IPaC (the *Information, Planning, and Consultation System*) located at http://ecos.fws.gov/ipac/, and follow these steps:
  - *Select Get Started*.
  - **Search or zoom to find your location:** Use an address, city name or other location to find your facility then use the zoom in/out feature to see the entire extent of your action area on the screen.
  - **Define you action area:** Use one of the mapping features (e.g., sketch, polygon or line drawing tool) to draw your entire action area.
    - For the aquatic portion of your action area, trace the waterbody(ies) with the tool to characterize your action area.
    - If your proposal will include any upland activities (i.e., discharge-related activities), or if there is some aspect of your discharge that would potentially result in effects to terrestrial species, include the corresponding upland areas within your action area.
    - When you are done, go to confirm and press *Continue.*
  - Select *Define Project* to request an Official Species List.
  - Complete the fields on the Official Species List Request page and include "(MSGP)" at the end of the project description.
    - For Classification, select "Water Quality Modification".
    - Select the appropriate requesting agency/organization type (for most operators, this should be "Other").

- Submit the request to acquire an Official Species List, which should show both listed species as well as any designated critical habitat that are present in the action area in the previous step.
- Note: *If a link to an Official Species List is not available on the page, follow the web link of the office(s) indicated, or contact the office directly by mail or phone if a web link is not shown.*

The principle authority for critical habitat designations and associated requirements is found at 50 CFR Parts 17 and 226.

Attach a copy of the species and critical habitat list(s) from the Service(s) to Attachment 2 of this appendix and use the list(s) to complete the rest of this worksheet. For FWS species, include the full printout from your IPaC query/Official Species List in Attachment 2. You can include the map from your IPaC query in Attachment 1. For NMFS species, include the full printout from the Species Directory with the correct Region selected.

If after following the steps you have determined that there are no listed species and/or designated critical habitat in your action area, you may be eligible for coverage under criterion A.

If you have determined that there are or may be listed species and/or designated critical habitat in your action area, you are not eligible under criterion A and must proceed to **Step 4** below.

Criterion A Eligibility Requirements

In order to be eligible for coverage under criterion A, you must confirm that the following is true:

☒ I have confirmed there to be no ESA-listed species and no critical habitat in my action area.

- **If the above is true, you may select criterion A on your NOI form.** You must also provide a description of the basis for the criterion selected on your NOI form. You must include this completed worksheet in your SWPPP. *Note: If your Official Species List from the USFWS indicated no species or critical habitat were present in your action area, include the full consultation tracking code at the top of your Official Species List in your NOI in the basis statement for Criterion A. If an Official Species List was not available on IPaC, list the contact date and name of the Service staff with whom you corresponded to verify no USFWS species or critical habitat were present in your action area.*

Note: For existing dischargers that have previously obtained coverage under criterion A, you must verify whether ESA-protected species and/or critical habitat are expected to exist in your action area, as described above. Please note that if you now find that your action area overlaps with ESA-protected species or critical habitat, you must proceed to Step 4.

- If the above is not true, you may not select criterion A and must proceed to **Step 4** to determine if you can become eligible under criterion C.

STEP 4: DETERMINE IF YOUR INDUSTRIAL FACILITY'S DISCHARGES OR DISCHARGE-RELATED ACTIVITIES ARE LIKELY TO ADVERSELY AFFECT LISTED THREATENED OR ENDANGERED SPECIES OR DESIGNATED CRITICAL HABITAT AND ANY MEASURES THAT MUST BE IMPLEMENTED TO AVOID ADVERSE EFFECTS.

If in Step 3 you determined that listed species and/or designated critical habitat could exist in your action area, you must next assess whether your discharges and discharge-related activities are likely to adversely affect ESA-listed threatened or endangered species or designated critical habitat, and whether any additional measures are necessary to ensure no likely adverse effects. In order to make a determination of your facility's likelihood of adverse effects, you must complete additional questions in the Endangered Species Protection section of the NOI in NeT-MSGP, unless the EPA Regional Office grants you a waiver from electronic reporting, in which case you must complete the attached *Criterion C3 Eligibility Form* and must submit this form to EPA a minimum of 30 days prior to filing your NOI for permit coverage. After you submit your NOI containing Criterion C3 information or your *Criterion C3 Eligibility Form*, you may be contacted by EPA with additional measures that you must implement in order to ensure your eligibility under criterion C3.

Criterion C3 Eligibility Form

Instructions:

In order to be eligible for coverage under criterion C3, **you must complete the Endangered Species Protection section of the Notice of Intent in the NPDES eReporting Tool (NeT-MSGP).** Per Part 7.1, you must submit your NOI electronically via NeT-MSGP, unless the EPA Regional Office grants you a waiver from electronic reporting, in which case you may use this paper Criterion C3 form. If using the paper form, you must complete the following form and you must submit it to EPA following the instructions in Section VII a **minimum of 30 days prior to filing your NOI for permit coverage.** After you submit your form, you may be contacted by EPA with additional measures (e.g., additional stormwater controls or modifications to your discharge- related activities) that you must implement in order to ensure your eligibility under criterion C3.

If after completing this worksheet you cannot make a determination that your discharges and discharge-related activities are not likely to adversely affect ESA listed threatened or endangered species or designated critical habitat, you must submit this completed worksheet to EPA, and you may not file your NOI for permit coverage until you receive a determination from EPA that your discharges and/or discharge-related activities are not likely to adversely affect ESA-protected species and critical habitat.

Note: Much of the information needed for this form can be obtained from your draft SWPPP which will be needed when you file your NOI.

SECTION I. OPERATOR, FACILITY, AND SITE LOCATION INFORMATION.

1) **Operator Information**

   a) **Operator Name:** _____

   b) **Point of Contact**

   First Name:_____ **Last Name:** _____

   Phone Number: _____

   E-mail: _____

2) **Facility Information**

   a) **Facility Name:** _____

   b) **Check which of the following applies:**

☐ I am seeking coverage under the MSGP as a new discharger or as a new source.

☐ I am seeking coverage under the MSGP as an existing discharger and my facility has modifications to its discharge characteristics (e.g., changes in discharge flow or area drained, different pollutants) and/or discharge-related activities (e.g., stormwater controls).

Indicate the number of years the facility has been in operation:_____years

Provide your NPDES ID (i.e., permit tracking number) from your previous MSGP coverage: _____

☐ I am seeking coverage under the MSGP as an existing discharger and there are no modifications to my facility.

Indicate the number of year(s) the facility has been in operation: _____ year(s)

Provide your NPDES ID (i.e., permit tracking number) from your previous MSGP coverage: _____

c) Facility Address:

Address 1: _____

Address 2: _____

City: _____ **State:** _____ **Zip Code:** _____

d) Identify the primary industrial sector to be covered under the 2021 MSGP:

SIC Code _____ or Primary Activity Code _____

Sector _____ and Subsector _____

e) Identify the sectors of any co-located activities to be covered under the 2021 MSGP:

Sector _____ Subsector _____

Sector _____ Subsector _____

Sector _____ Subsector _____

Sector _____ Subsector _____

Sector _____ Subsector _____

Sector _____ Subsector _____

f) Estimated area of industrial activity exposed to stormwater: ___acres

g) Provide a general description of the industrial activities that are taking place at this facility:

3) Receiving Waters Information

List all the stormwater outfalls from your facility.				For each outfall, provide the following receiving water information:	
Discharge Point ID	**Design Capacity (if known)**	**Latitude (decimal degrees)**	**Longitude (decimal degrees)**	**Name of the receiving water that receives stormwater from the discharge point and/or from the MS4 that the discharge point discharges to**	**Type of Waterbody (e.g., lake, pond, river/stream/creek, estuarine/marine water)**
		___.____	___.____		
		___.____	___.____		
		___.____	___.____		
		___.____	___.____		
		___.____	___.____		

SECTION II. ACTION AREA

As required in Step 2, you must include a map and a written description of the action area of your facility in Attachment 1 of this appendix.

SECTION III. LISTED SPECIES AND CRITICAL HABITAT LIST

As required in Step 3, attach a copy of the species and critical habitat list(s) from the Service(s) to Attachment 2 of this appendix and use the list(s) to complete the rest of this worksheet. For FWS species, include the full printout from your IPaC query/Official Species List in Attachment 2. You can include the map from your IPaC query in Attachment 1.

Review your species list in Attachment 2, choose one of the following three statements, and follow the corresponding instructions:

> ***Note:*** For the purposes of this permit, "terrestrial species" would not include animal or plant species that 1) spends any portion of its life cycle in a waterbody or wetland, or 2) if an animal, depends on prey or habitat that occurs in a waterbody or wetland. For example, shorebirds, wading birds, amphibians, and certain reptiles would not be considered terrestrial species under this definition. Please also be aware that some terrestrial animals (e.g., certain insects, amphibians) may have an aquatic egg or larval/juvenile phase.

☐ The species list includes only terrestrial species and/or their designated critical habitat. No aquatic or aquatic-dependent species or their critical habitat are present in the action area. **You may skip to Section IV of this form. You are not required to fill out Section V.**

☐ The species list includes only aquatic and/or aquatic-dependent species and/or their designated critical habitat. No terrestrial species or their critical habitat are present in the action area. **You may skip to Section V of this form and are not required to fill out Section IV.**

☐ The species list includes both terrestrial and aquatic or aquatic-dependent species and/or their designated critical habitat. **You must fill out both Sections IV and V of this form.**

SECTION IV. EVALUATION OF DISCHARGE-RELATED ACTIVITIES EFFECTS

Note: You are only required to fill out this section if your facility's action area contains terrestrial species and/or their designated critical habitat. If your action area only contains aquatic and/or aquatic-dependent species and/or their designated critical habitat, you can skip directly to Section V.

Most of the potential effects related to coverage under the MSGP are assumed to occur to aquatic and/or aquatic-dependent species. However, in some cases, potential effects to terrestrial species and/or their critical habitat should be considered as well from any discharge-related activities that occur during coverage under the MSGP. Examples of discharge-related activities that could have potential effects on listed terrestrial species or their critical habitat include the storage of materials and land disturbances associated with stormwater management-related activities (e.g., the installation or placement of stormwater control measures).

A. Select the applicable statement(s) below and follow the corresponding instructions:

☐ There are no discharge-related activities that are planned to occur during my coverage under the 2021 MSGP. You can conclude that your discharge-related activities will have no likely adverse effects, and:

- If there are any aquatic or aquatic-dependent species and/or their critical habitat in your action area, you must skip to Section V, *Evaluation of Discharge Effects*, below.
- If there are no aquatic or aquatic-dependent species, you may skip to Section VI and verify that your activities will have no likely adverse effects. You must submit this form to EPA as specified in Section VII of this form. You may select criterion C on your NOI form and may submit your NOI for permit coverage 30 days after you have submitted this *Criterion C Eligibility Form*. You must also provide a description of the basis for the criterion you selected on your NOI form, **including the species and critical habitat list(s) in your action area**, as well as any other documentation supporting your eligibility. You must also include this completed *Criterion C Eligibility Form* in your SWPPP.

☐ There are discharge-related activities planned as part of the proposal. Describe your discharge- related activities in the following box and continue to (B) below.

B. In order to ensure any discharge-related activities will have no likely adverse effects on ESA-listed threatened and endangered species and/or their designated critical habitat, you must certify that all the following are true:

☐ Discharge-related activities will occur:

- on previously cleared/developed areas of the site where maintenance and operation of the facility are currently occurring or where existing conditions of the area(s) in which the discharge-related activities will occur precludes its use by listed species (e.g., work on existing impervious surfaces, work occurring inside buildings, area is not used by species), and
- if discharge-related activities will include the establishment of structures (including, but not limited to, infiltration ponds and other controls) or any related disturbances, these structures and/or disturbances will be sited in areas that will not result in isolation or degradation of nesting, breeding, or foraging habitat or other habitat functions for listed animal species (or their designated critical habitat), and will avoid the destruction of native vegetation (including listed plant species).

☐ If vegetation removal (e.g., brush clearing) or other similar activities will occur, no terrestrial listed species that use these areas for habitat would be expected to be present during vegetation removal and these activities will not occur within critical habitat.

If all the above are true, you can conclude that your discharge-related activities will have no likely adverse effects, and:

- If there are any aquatic or aquatic-dependent species and/or critical habitat in your action area, you must skip to Section V, *Evaluation of Discharge Effects,* below.
- If there are no aquatic or aquatic-dependent species, you may skip to Section VI and verify that your activities will have no likely adverse effects. You must submit this form to EPA as specified in Section VII of this form. You may select criterion C on your NOI and may submit your NOI for permit coverage 30 days after you have submitted this completed form. You must also provide a description of the basis for the criterion you selected on your NOI form, **including the species and critical habitat list(s)**, and any other documentation supporting your eligibility. You must also include this completed *Criterion C Eligibility Form* in your SWPPP.
- **If any of the above are not true**, you cannot conclude that your discharge-related activities will have no likely adverse effects. You must complete the rest of this form (if applicable) and must submit the form to EPA for assistance in determining your eligibility for coverage.

SECTION V. EVALUATION OF DISCHARGE EFFECTS

Note: You are only required to fill out this section if your facility's action area includes aquatic and/or aquatic-dependent species and/or their critical habitat.

In this section, you will evaluate the likelihood of adverse effects from your facility's discharges. The scope of effects to consider will vary with each facility and species/critical habitat characteristics. The following are examples of discharge affects you should consider:

- *Hydrological Effects.* Stormwater discharges may adversely affect receiving waters by causing changes in water quality parameters such as turbidity, temperature, salinity, or pH. Stormwater discharges may adversely affect the immediate vicinity of the discharge point through streambank erosion and scour. These effects will vary with the amount of stormwater discharged and the volume and condition of the receiving water. Where a stormwater

discharge constitutes a minute portion of the total volume of the receiving water, adverse hydrological effects are less likely.

- *Toxicity of Pollutants.* Pollutants in stormwater may have toxic effects on listed species and may adversely affect critical habitat. Exceedances of benchmarks, effluent limitation guidelines, or state or tribal water quality requirements may be indicative of potential adverse effects on listed species or critical habitat. However, some listed species may be adversely affected at pollutant concentrations below benchmarks, effluent limitation guidelines, and state or tribal water quality standards due to exposures to multiple stressors at the same time. In addition, stormwater pollutants identified in Part 6.2.3.2 of your SWPPP, but not monitored as benchmarks or effluent limitation guidelines, may also adversely affect listed species and criticalhabitat.

As these effects are difficult to analyze for listed species, their prey, habitat, and designated critical habitat, this form helps you to analyze your discharges to make a determination of whether your discharges will likely have adverse effects and whether there are any additional controls you can implement to ensure no likely adverse effects.

A. Evaluation of Pollutants and Controls to Avoid Adverse Effects. In this section, you must document **all** of your pollutant sources and pollutants expected to be discharged in stormwater (see Part 8). You must also document the controls you will implement to avoid adverse effects on listed aquatic and aquatic-dependent species and critical habitat. You must include specific details about the expected effectiveness of the controls in avoiding adverse effects to the listed aquatic-and aquatic-dependent species and critical habitat. Attach additional pages if needed.

Potential Pollutant Source	Potential Pollutants	**Controls to Avoid Adverse Effects on Listed Aquatic and Aquatic-Dependent Species and Critical Habitat.** Include information supporting why the control(s) will ensure no adverse effects, including any data you have about the effectiveness of the control(s) in reducing pollutant concentrations. You may also attach photos of your controls to this form.
e.g., • **vehicle and equipment fueling**	*e.g.,* • **Oil & grease** • **Diesel** • **Gasoline** • **TSS** • **Antifreeze**	*e.g.,* • **Fueling operators (including the transfer of fuel from tank trucks) will be conducted on an impervious or contained pad or under cover** • **Drip pans will be used where leaks or spills of fuel can occur and where making and breaking hose connections** • **Spill kit will be kept on-site in close proximity to potential spill areas** • **Any spills will be cleaned-up immediately using dry clean-up methods** • **Stormwater runoff will be diverted around fueling areas using diversion dikes and curbing**

Potential Pollutant Source	Potential Pollutants	Controls to Avoid Adverse Effects on Listed Aquatic and Aquatic-Dependent Species and Critical Habitat.

Potential Pollutant Source	Potential Pollutants	Controls to Avoid Adverse Effects on Listed Aquatic and Aquatic-Dependent Species and Critical Habitat.

☐ Check if you are not able to make a preliminary determination that any of your pollutants will be controlled to a level necessary to avoid adverse effects on aquatic and/or aquatic-dependent listed species and their designated critical habitat. You must check in Section VI that you are unable to make a determination of no likely adverse effects and must complete the rest of the form. You must submit your completed form to EPA for assistance in determining your eligibility for coverage.

B. Analysis of Effects Based on Past Monitoring Data. Select which of the following applies to your facility:

☐ I have no previous monitoring data for my facility because there are no applicable monitoring requirements for my facility's sector(s).

☐ I have no previous monitoring data for my facility because I am a new discharger or a new source, but I am subject to monitoring under the 2021 MSGP. You must provide information to support a conclusion that your facility's discharges are not expected to result in benchmark or numeric effluent limit exceedances that will adversely affect listed species or their critical habitat:

☐ My facility has not had any exceedances under the 2015 MSGP of any required benchmark(s) or numeric effluent limits. I comply with the applicable monitoring requirements and have not had any exceedances.

☐ My facility has had exceedances of one or more benchmark(s) or numeric effluent limits under the 2015 MSGP, but I have addressed them during my coverage under the 2015 MSGP, or in my evaluation of controls to avoid adverse effects in (A) above. Describe all actions (including specific controls) that you will implement to ensure that the pollutants in your discharge(s) will not result in likely adverse effects from future exceedances.

☐ Check if your facility has had exceedances of one or more benchmarks or numeric effluent limits under the 2015 MSGP and you have not been able to address them to avoid adverse effects from future exceedances, or if you are a new discharger or a new source but you are not sure if you can avoid adverse effects from possible exceedances. You must check in Section VI that you are unable to make a determination of no likely adverse effects. You must submit your completed form to EPA for assistance in determining your eligibility for coverage. You may not file your NOI for permit coverage until you are able to make a determination that your discharges will avoid adverse effects on listed species and designated critical habitat.

SECTION VI. VERIFICATION OF PRELIMINARY EFFECTS DETERMINATION

Based on Steps I – V of this form, you must verify your preliminary determination of effects on listed species and designated critical habitat from your discharges and/or discharge-related activities:

- ☐ Following the applicable Steps in I – V above, I have provided information supporting a preliminary determination that my discharges and/or discharge-related activities are not likely to adversely affect listed species and designated critical habitats.
- ☐ Following the applicable Steps in I – V above, I am **not** able to provide information supporting a preliminary determination that my discharges and/or discharge-related activities are not likely to adversely affect listed species and designated critical habitats.

Certification Information

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete.

I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

First Name, Middle initial, Last Name

Title

Signature:_____ Date:

E-mail:

SECTION VII CRITERION C ELIGIBILITY FORM SUBMISSION INSTRUCTIONS

Only if the applicable EPA Regional Office has granted you a waiver from electronic reporting, you must submit this completed form to EPA at msgpesa@epa.gov, including any attachments and any additional information that demonstrates how you will avoid or eliminate adverse effects to listed threatened and endangered species or designated critical habitat (e.g., specific controls you will implement to avoid or eliminate adverse effects). **Any missing or incomplete information may result in a delay of your coverage under the permit**.

If you have made a preliminary determination that your discharges and/or discharge-related activities are not likely to adversely affect listed species and critical habitat, this form must be submitted a minimum of 30 days prior to submitting your NOI for permit coverage under criterion C. Please note that during either the 30-day *Criterion C Eligibility Form* review period prior to your NOI submission, or within 30 days after your NOI submission and before you have been

authorized for permit coverage, EPA may advise you that additional information is needed, or that there are additional measures you must implement to avoid likely adverse effects.

If you are unable to make a preliminary determination that your discharges and/or discharge-related activities are not likely to adversely affect listed species and critical habitat, this worksheet must be submitted to EPA, but you may not file your NOI for permit coverage until you have received a determination from EPA that your discharges and/or discharge-related activities are not likely to adversely affect listed species and critical habitat.

Attachment 1

Include a **map and a written description** of the action area of your facility, as required in Step 2. You may choose to include the map that is generated from the FWS' on-line mapping tool IPaC (the *Information, Planning, and Consultation System*) located at http://ecos.fws.gov/ipac/.

The written description of your action area that accompanies your action area map must explain your rationale for the extent of the action area drawn on your map. For example, your action area written description may look something like this:

> *The action area for the (name of your facility)'s stormwater discharges extends downstream from the outfall(s) in (name of receiving waterbody) (# of meters/feet/kilometers/miles). The downstream limit of the action area reflects the approximate distance at which the discharge waters and any pollutants would be expected to cause potential adverse effects to listed species and/or critical habitat because (insert rationale). The action area does/does not extend to the (name of receiving waterbody)'s confluence with (name of confluence waterbody) because (insert rationale).*

Note: If your action area written description will be highly site-specific, depending on the expected effects of your facility's discharges and discharge-related activities, receiving waterbody characteristics, etc.

Attachment 2

List or attach the list(s) of species and critical habitat in your action area on this sheet, as required in Step 3. You must include a list for applicable listed NMFS and USFWS species and critical habitat. If there are listed species and/or critical habitat for only one Service, you must include a statement confirming there are no listed species and/or critical habitat for the other Service. For USFWS species, include the USFWS Official Species List full printout from your IPaC query (including the consultation code and event code at the top of the FWS printout).

Note: If your Official Species List from the USFWS indicated no species or critical habitat were present in your action area, include the consultation code and event code that can be found at the top of your Official Species List in your NOI basis statement. If an Official Species List was not available on IPaC, list the contact date, the ecological services field office and the name of the Service staff with whom you corresponded to identify the existence of any USFWS species or critical habitat present in your action area.

Doc. No. 38GL-26-2386.*

Agency Consultation Letters

U.S. Department
of Transportation
**MARITIME
ADMINISTRATION**

1200 New Jersey Avenue, S.E.
Washington, D.C. 20590

Michael Tosatto
Regional Administrator
Pacific Islands Regional Office
NOAA/NMFS
1601 Kapiolani Boulevard, Suite 1110
Honolulu, HI 96814

August 22, 2012

SUBJECT Port Authority of Guam Port Modernization Project Federal Threatened and Endangered Species Determination

Mr. Tosatto:

The United States Department of Transportation, Maritime Administration (MARAD) is in the process of preparing an Environmental Assessment (EA) in accordance with the National Environmental Policy Act (NEPA) of 1969, as amended; Council on Environmental Quality Regulations (40 Code of Federal Regulations [CFR] 1500–1508); DOT Order 5610.1c; and MARAD MAO 600-1 to identify and assess the potential impacts associated with the proposed Port Authority of Guam Port Modernization Project (Project). MARAD seeks National Marine Fisheries Service (NMFS) concurrence with the determination that although Federal Threatened and Endangered Species may be affected by the subject action, it is not likely to be adversely affected.

The proposed action for the Project is to modernize, improve, and reconfigure the Port's existing 52-acre Terminal Yard and develop a 19-acre Expansion Area immediately east of the Terminal Yard with new cargo storage facilities in order to increase cargo-handling capacity and operating efficiency (Attachment 1, Figures 1-1, 1-2). The overall purpose of the Project is to update facilities and reconfigure operations in order to create sufficient capacity to support projected cargo handling demand, while maintaining ongoing Port operations.

All proposed work would be done above and out of the water. The only project component with any direct impact on marine waters would be the replacement of one existing storm water outfall, and the installation of two additional stormwater outfalls. The outfalls would be constructed to include treatment systems (oil-water separators). The current outfall is untreated. The new outfalls would require permitting by the U. S. Environmental Protection Agency under the National Pollutant Discharge Elimination System (NPDES).

Based on the agencies' responses to the letters of inquiry regarding federally threatened and endangered species, as well as follow-up communication, the federally threatened and endangered species under NMFS jurisdiction that are expected to occur in the action area are: the green turtle (*Chelonia mydas*) – a federally threatened species, and the hawksbill turtle (*Eretmochelys imbricata*) – a federally endangered species. The anticipated prevalence of these species on and near the site is summarized below.

Sea Turtles (green turtle and hawksbill turtle) – Guam's Division of Aquatic Wildlife Resources (DAWR) has maintained a bimonthly aerial survey program that confirms the year-round presence of a resident population of green sea turtles in Guam's nearshore waters. Sightings include low numbers of turtles observed throughout Apra Harbor (DAWR unpublished data). Grimm and Farley (2008) report that hawksbills are frequently sighted in the nearshore waters surrounding Guam. However, they are less common than green sea turtles. According to Wiles *et al.* (1995), hawksbills represent about 13% of turtles sighted around Guam. Aerial turtle survey information obtained from 1992 to 2009 by DAWR indicated that the nearest record of nesting is at the Sea Plane Ramp located approximately 4,000 feet west of the site, and known nesting by both species occurs at Spanish Steps at the west end of Orote Peninsula (DAWR 2004; Grimm and Farley 2008). Although neither turtle nests at the project site, both inhabit Apra Harbor in low numbers, and as such either species may utilize marine waters in the project area to forage, shelter, or they may swim through the area to reach other nearby habitats.

Proposed Action

The Proposed Action would not be expected to result in significant direct or indirect impacts to federally threatened and endangered species during construction or operation of the proposed Project.

Construction Effects

Based on the planned above- and near-water work, with the absence of any in-water work, the stressors expected by the proposed action on in-water sea turtles is limited to: Disturbance from human activity and equipment operation, and exposure to wastes and discharges.

Disturbance from human activity and equipment operation: Sea turtles that are exposed to project-related activity may experience a startle reaction. The reaction could range from one extreme where an animal calmly approaches and investigates the activity, to an opposite reaction of panicked flight, where an animal injures itself in an attempt to flee. However, sea turtles typically avoid human activity in Apra Harbor. Thus, the most likely effect of this interaction would be a moderate to high energy avoidance behavior leading to the animal rapidly leaving project areas without injury. The project best management practices (BMP) require contractors to reduce the likelihood of this interaction by watching for and avoiding sea turtles. Based on that expectation, we have determined that disturbances related to the proposed action would be infrequent and non-injurious, resulting in insignificant effects on the ESA-listed sea turtles.

Exposure to wastes and discharges: Construction wastes may include plastic trash and bags that may be ingested and cause digestive blockage or suffocation, or if large enough, along with discarded sections of ropes and lines, may entangle marine life. Equipment spills and discharges likely consist of hydrocarbon-based chemicals such fuel oils, gasoline, lubricants, hydraulic

fluids and other toxicants, which could expose protected species to toxic chemicals. Depending on the chemicals and their concentration, exposure could result in a range of effects, from avoidance of an area to death. Local and Federal regulations prohibit the intentional discharge of toxic wastes and plastics into the marine environment. Additionally, the project BMPs includes measures intended to prevent the introduction of wastes and toxicants into the marine environment. Based on this, we expect that discharges and spills are unlikely to occur, but will be infrequent, small, and quickly cleaned if they do occur. Therefore, we have determined that exposure to construction wastes and discharges that may result from this action will result in insignificant effects on ESA-listed sea turtles.

Operational Effects

Significant impacts to federally threatened and endangered species would not be expected during operation of the Project, as none of these species are expected to seasonally or permanently inhabit the site.

With operation of the Port facilities under the Proposed Action, there would be a long-term increase in activity levels (related to increases in vessel and vehicular traffic), noise, and light at the Port relative to existing conditions. The increase in activity levels, noise, and light could impact federally threatened and endangered species (if any) on and in the vicinity of the site. However, the site currently is an active commercial port and activity levels, noise, and light onsite are already relatively high. Therefore, the incremental increase in these levels with the Proposed Action would not be expected to result in significant impacts on federally threatened and endangered species.

Mitigation Measures

The following mitigation measures are proposed by the Proponent to address potential impacts to federally threatened and endangered species during construction of the Proposed Action:

<u>During Construction</u>

- The site would be surveyed for Marianas common moorhen prior to vegetation clearing associated with construction of the storm water outfalls, to determine the status of Marianas common moorhen. If nests are located, clearing would not be completed until birds and nestlings leave on their own volition.
- Engineering controls (i.e. light focusing reflectors, deflective shrouds, and fence screens) would be installed to minimize stray light from construction activities from reaching adjacent habitat areas.

In conclusion, based on the effects analyses provided above, the MARAD has concluded that the potential stressors posed by the proposed action would result in insignificant impacts, or the likelihood of impacts would be discountable, for ESA-listed sea turtles. As such, MARAD has determined that the proposed action may affect, but is not likely to adversely affect any ESA listed marine species under NMFS jurisdiction, and we request your written concurrence with that determination under Section 7 of the ESA.

Thank you for your consideration of this request. If you have any questions, please call Mr. Daniel Yuska of my staff at 202-366-0714.

Sincerely,

for Michael C. Carter
Director, Office of Environment

U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Pacific Islands Regional Office
1601 Kapiolani Blvd., Suite 1110
Honolulu, Hawaii 96814-4700
(808) 944-2200 • Fax: (808) 973-2941

SEP 1 2 2012

Mr. Michael C. Carter
Director, Office of Environment
U.S. Department of Transportation
Maritime Administration
1200 New Jersey Avenue, S.E.
Washinton, D. C. 20590

Dear Mr. Carter:

This letter responds to your August 22, 2012 letter regarding the proposal by the U.S. Department of Transportation, Maritime Administration (MARAD) and the Port Authority of Guam to modernize the commercial port, on the island of Guam. In the letter, MARAD determined that the proposed action is not likely to adversely affect endangered or threatened species under National Marine Fisheries Service (NMFS) jurisdiction, and requested our concurrence under section 7 of the Endangered Species Act of 1973 (ESA), as amended (16 U.S.C. §1531 et seq.), with that determination.

Proposed Action/Action Area: The action is described in your letter with its attachments (MARAD 2012). In summary, the proposed action consists of MARAD funding the Port Authority of Guam to perform above water work to modernize, improve, and reconfigure the existing 52-acre Terminal Yard and to develop a new 19-acre Expansion Area with new cargo storage facilities. The only project component with direct impacts on the marine environment would be the replacement of the single existing storm water outfall, and the installation of two new additional storm water outfalls. All three outfalls would be equipped with oil-water separators. The outfalls would require permitting under the U. S. Environmental Protection Agency's National Pollutant Discharge Elimination System (NPDES). All work would occur above water, and the project includes comprehensive BMP that include requirements to minimize and control erosion, sedimentation, and discharges. The action area for this project is estimated to be the in-water area within 50-yards around project-related activities, and the in-water extent of any plumes that may result from mobilized sediments or discharges of wastes or toxic chemicals such as fuels and/or lubricants associated with the machinery used for this activity.

Listed Species/Critical Habitat: MARAD determined that green sea turtles (*Chelonia mydas*) and hawksbill sea turtles (*Eretmochelys imbricata*) are the only ESA-listed species under NMFS

jurisdiction that occur within the action area for the proposed action. Detailed information to describe the biology, habitat, and conservation status for sea turtles can be found in the recovery plans and other sources at http://www.nmfs.noaa.gov/pr/species/turtles/.

Critical Habitat: There is no designated critical habitat for any listed marine species within or adjacent to the action area. Therefore, this action would have no effect on designated critical habitat.

Analysis of Effects: In order to determine that a proposed action is not likely to adversely affect listed species, NMFS must find that the effects of the proposed action are expected to be insignificant, discountable, or beneficial as defined in the joint USFWS-NMFS Endangered Species Consultation Handbook: (1) insignificant effects relate to the size of the impact and should never reach the scale where take occurs; (2) discountable effects are those that are extremely unlikely to occur; and (3) beneficial effects are positive effects without any adverse effects (USFWS & NMFS 1998). This standard, as well as consideration of the probable duration, frequency, and severity of potential interactions, was applied during the analysis of effects of the proposed action on ESA-listed marine species, as is described in the MARAD consultation request. MARAD determined that disturbance from human activity and equipment operation and exposure to wastes and discharges would result in insignificant effects on ESA-listed sea turtles. Based on consideration of the record, NMFS agrees with MARAD that the proposed action would have insignificant impacts on the sea turtles considered in this consultation.

Conclusion: NMFS concurs with your determination that funding the Port Authority of Guam to perform the proposed Port Modernization Project at the Guam Commercial Port is not likely to adversely affect ESA-listed marine species or their designated critical habitat. Our concurrence is based on the finding that the effects of the proposed action are expected to be insignificant, discountable, or beneficial as defined in the joint USFWS-NMFS Endangered Species Consultation Handbook (USFWS-NMFS 1998) and summarized at the beginning of the Analysis of Effects section above. This concludes your consultation responsibilities under the ESA for species under NMFS's jurisdiction. However, this consultation focused solely on compliance with the ESA. Any additional compliance review that may be required of NMFS for this action (such as assessing impacts on Essential Fish Habitat) would be completed by NMFS Habitat Conservation Division in separate communication, if applicable.

ESA Consultation must be reinitiated if: 1) a take occurs; 2) new information reveals effects of the action that may affect listed species or designated critical habitat in a manner or to an extent not previously considered; 3) the identified action is subsequently modified in a manner causing effects to listed species or designated critical habitat not previously considered; or 4) a new species is listed or critical habitat designated that may be affected by the identified action.

If you have further questions please contact Donald Hubner on my staff at (808) 944-2233. Thank you for working with NMFS to protect our nation's living marine resources.

Sincerely,

Michael D. Tosatto
Regional Administrator

cc: Patrice Ashfield, ESA Section 7 Program Coordinator, USFWS, Honolulu
Tony Montgomery, Coastal Conservation, USFWS, Honolulu

NMFS File No. (PCTS): I/PIR/2012/03725
PIRO Reference No.: I-PI-12-1026-LVA

Doc. No. 38GL-26-2386.*

Literature Cited

U.S. Dept of Transportation, Maritime Administration (MARAD). 2012. Letter to request informal consultation under Section 7 of the Endangered Species Act for the Port Authority of Guam Port Modernization Project. August 22, 2012.

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http://www.nmfs.noaa.gov/pr/pdfs/laws/esa_section7_handbook.pdf

U.S. Department
of Transportation
**MARITIME
ADMINISTRATION**

1200 New Jersey Avenue, S.E.
Washington, D.C. 20590

Dan Polhemus
Administrator
U.S. Fish and Wildlife Service
Pacific Islands Ecoregion
300 Ala Moana Boulevard
Room 3-122, Box 50088
Honolulu, HI 96850

August 22, 2012

SUBJECT: Port Authority of Guam Port Modernization Project Federal Threatened and Endangered Species Determination

Mr. Polhemus:

The United States Department of Transportation, Maritime Administration (MARAD) is in the process of preparing an Environmental Assessment (EA) in accordance with the National Environmental Policy Act (NEPA) of 1969, as amended; Council on Environmental Quality Regulations (40 Code of Federal Regulations [CFR] 1500–1508); DOT Order 5610.1c; and MARAD MAO 600-1 to identify and assess the potential impacts associated with the proposed Port Authority of Guam Port Modernization Project (Project). MARAD seeks United States Fish and Wildlife Service (USFWS) concurrence with the determination that although Federal Threatened and Endangered Species may be affected by the subject action, it is not likely to be adversely affected.

The proposed action for the Project is to modernize, improve, and reconfigure the Port's existing 52-acre Terminal Yard and develop a 19-acre Expansion Area immediately east of the Terminal Yard with new cargo storage facilities in order to increase cargo-handling capacity and operating efficiency (Attachment 1, Figures 1-1, 1-2). The overall purpose of the Project is to update facilities and reconfigure operations in order to create sufficient capacity to support projected cargo handling demand, while maintaining ongoing Port operations.

Based on the agencies' responses to the letters of inquiry regarding federally threatened and endangered species, as well as follow-up communication, the federally threatened and endangered species on and in the vicinity of the site are: the green turtle (*Chelonia mydas*) – a

federally threatened species; hawksbill turtle (*Eretmochelys imbricata*) – a federally endangered species; and Marianas common moorhen *(Gallinula chloropus guami)* – a federally endangered species. The anticipated prevalence of these species on and near the site is summarized below.

- *Sea Turtles* (green turtle and hawksbill turtle) – Due to lack of habitat, there is a low likelihood of either of the sea turtles *(C. mydas* and *E. imbricata)* nesting or foraging onsite, particularly in the location of the two new proposed outfalls in the Expansion Area. Aerial turtle survey information obtained from 1992 to 2009 by DAWR indicated that the nearest record of nesting is at the Sea Plane Ramp located approximately 4,000 feet west of the site. Neither turtle species is likely to nest onsite, because of the lack of sandy beaches along the shoreline. No sea turtles were observed in the vicinity of the site during either the June 2010 biological survey or the December 2010 and January 2011 marine surveys for this EA.
- *Marianas common moorhen* – The Marianas common moorhen *(G. chloropus guami)* is unlikely to forage or nest onsite due to the lack of appropriate habitat and protected nesting areas. The Marianas common moorhen was not observed during the June 2010 field survey.

Proposed Action

The Proposed Action would not be expected to result in significant direct or indirect impacts to federally threatened and endangered species during construction or operation of the proposed Project.

Construction Effects

Significant impacts to federally threatened and endangered species (i.e. the hawksbill turtle- *E. imbricata*, green turtle - *C. mydas*, and Marianas common moorhen - *G. chloropus guami)* would not be expected during construction activities for the proposed Project, as there is little likelihood that these species seasonally or permanently inhabit the site.

However, to minimize the potential to impact federally threatened and endangered species (if any), construction activities would be conducted in compliance with Guam EPA (GEPA) and DAWR requirements to minimize potential disturbance from construction during bird migration periods, and direct impacts (i.e. for installation of the proposed storm water outfalls) would be avoided during active bird nesting. Engineering controls would be installed to minimize stray construction lighting from reaching adjacent habitat areas. Therefore, construction activities would not be expected to result in significant adverse effects on federally threatened and endangered species.

Operational Effects

Significant impacts to federally threatened and endangered species would not be expected during operation of the Project, as none of these species are expected to seasonally or permanently inhabit the site.

With operation of the Port facilities under the Proposed Action, there would be a long-term increase in activity levels (related to increases in vessel and vehicular traffic), noise, and light at the Port relative to existing conditions. The increase in activity levels, noise, and light could impact federally threatened and endangered species (if any) on and in the vicinity of the site.

However, the site currently is an active commercial port and activity levels, noise, and light onsite are already relatively high. Therefore, the incremental increase in these levels with the Proposed Action would not be expected to result in significant impacts on federally threatened and endangered species.

Mitigation Measures

The following mitigation measures are proposed by the Proponent to address potential impacts to federally threatened and endangered species during construction of the Proposed Action:

<u>During Construction</u>

- The site would be surveyed for Marianas common moorhen prior to vegetation clearing associated with construction of the storm water outfalls, to determine the status of Marianas common moorhen. If nests are located, clearing would not be completed until birds and nestlings leave on their own volition.
- Engineering controls (i.e. light focusing reflectors, deflective shrouds, and fence screens) would be installed to minimize stray light from construction activities from reaching adjacent habitat areas.

In conclusion, The Maritime Administration has determined that while the Proposed Action may temporarily affect Federal Threatened and Endangered Species, the effects would not result in significant impacts. MARAD seeks USFWS written concurrence with this determination.

Thank you for your consideration of this request. If you have any questions, please call Mr. Daniel Yuska of my staff at 202-366-0714.

Sincerely,

for Michael C. Carter
Director, Office of Environment

Savercool, Dan

To: PAG EA Admin Record
Subject: FW: 2012-I-0422 Port of Guam Modernization Project Section 7 Consultation

From: Jodi_Charrier@fws.gov [mailto:Jodi_Charrier@fws.gov]
Sent: Friday, September 14, 2012 6:01 PM
To: Yuska, Daniel (MARAD)
Subject: RE: 2012-I-0422 Port of Guam Modernization Project Section 7 Consultation

Hello Daniel,

Thank you for providing the survey.

We can agree to the modification of #2. Although the area is highly industrialized, we like to recommend adding as little to current ambient light as possible. Also, though no turtles nest in the immediate vicinity, they are definitely found in waters nearby and the brighter our shores and night-time horizons, the more potential for disorientation. It is my understanding that shielding lights or installing shielded lights is not cost prohibitive when compared to standard lighting. However, I will not slow down the consultation process for this detail.

I will edit the measure and draft the letter today. You should receive it within 30 days. No additional or official correspondence is needed.

Aloha,
Jodi Charrier
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
Fish & Wildlife Biologist
Pacific Islands Fish and Wildlife Service
300 Ala Moana Boulevard
Room 3-122, Box 50088
Honolulu, Hawaii 96850-5000
Ph: 808-792-9400
Fax: 808-792-9580

<Daniel.Yuska@dot.gov>

09/14/2012 08:39 AM

To <Jodi_Charrier@fws.gov>
cc <[redacted]>, <[redacted]>, <dsavercool@eaest.com>
Subject RE: 2012-I-0422 Port of Guam Modernization Project Section 7 Consultation

Jodi,

Thank you for the email. We can agree and comply with the conditions below, however we would like to propose one modification. Regarding condition #2, sea turtle-friendly lighting, we propose that we use engineering controls (i.e. light focusing reflectors, deflective shrouds, or fence screens) to minimize stray light from construction activities that may reach adjacent habitat areas. Our reasoning is that results from biological surveys conducted as part of this project show there are no beaches in the project area, no turtle nesting areas, and no foraging habitat. Essentially, the area is highly industrialized and has served as an active port for over 60 years. Please let me know if our proposal is acceptable.

As a matter of procedure, would you prefer we edit our initial consultation letter to reflect the conditions and re-submit or will an email confirmation suffice?
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

As discussed yesterday, I have attached the biological survey of the project site and surrounding area. Please let me know if there is anything else you need. Because of our time difference, feel free to reach me on work cell at 202-281-5474. I have cc'ed our environmental consultant on this email so we can get you any additional information expeditiously.

Thanks for your assistance,
Dan

From: Jodi_Charrier@fws.gov [Jodi_Charrier@fws.gov]
Sent: Thursday, September 13, 2012 4:26 PM
To:
Cc: [redacted];
Subj[redacted]of[redacted]ject Section 7 Consultation

Aloha Mr. Yuska,

Nice to finally catch up with you via phone this morning. As mentioned, we received your request for concurrence with your NLAA determination for the Port of Guam Modernization Project in our office on August 27. As mentioned this morning, we have 30 days from the day that we receive all of the data necessary to complete our analysis to complete the consultation. I will do my best to expedite.

The following are our standard recommendations to avoid and minimize impacts to sea turtles and Mariana moorhen. If it is amenable with your agency to include these as nondiscretionary conservation measures in your Section 7 consultation, we can send a concurrence letter and finish the Section 7 process.

1. Pre-construction surveys will be completed one week prior to the onset of work by a biologist experienced in the identification of the moorhen by sight and vocalization and experienced with implementation of the Service protocol survey methodology to ensure no nesting moorhen are present. If nesting moorhen are present within 984 ft (300 m), clearing and construction will be postponed until chicks have fledged and the moorhen has left voluntarily. If work stops for more than one week, pre-construction surveys will be repeated to ensure that no moorhen have begun nesting. Guam Division of Aquatic and Wildlife Resources (DAWR) personnel will be contacted at 671 735-3955 if moorhen are detected at any time prior to or during construction.

2. Sea turtle-friendly lighting will be installed for any replaced or proposed lighting. This will reduce the direct and ambient lighting of the beach and will reduce disorientation of nesting or hatchling sea turtles. This lighting will follow guidelines found in the technical report by The Florida Fish and Wildlife Conservation Commission found on-line here:
http://www.sescolighting.com/turtlelighting/Sea%20Turtle%20Booklet.pdf

3. Any construction-related debris that may pose an entanglement hazard to marine protected species must be removed from the project site when it is not actively being used and at the conclusion of the construction work.

4. NMFS's standard best management practices regarding sediment control, pollution and erosion will be followed.

5. All best management practices and conservation measures will be reviewed with all workers and made available on the project site. This includes species and habitat specific measures, the erosion control plan, spill prevention and control plan and the Hazard Analysis and Critical Control Points plan.

6. A litter control program shall be instituted at the entire project site. All workers ensure their food scraps, paper wrappers, food containers, cans, bottles, and other trash from the project area are deposited in covered or closed trash containers. The trash containers shall be removed from the project area at the end of each working

day.

Thank you,
Jodi Charrier
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
Fish & Wildlife Biologist
Pacific Islands Fish and Wildlife Service
300 Ala Moana Boulevard
Room 3-122, Box 50088
Honolulu, Hawaii 96850-5000
Ph: 808-792-9432
Fax: 808-792-9580
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United States Department of the Interior

FISH AND WILDLIFE SERVICE

Pacific Islands Fish and Wildlife Office
300 Ala Moana Boulevard, Room 3-122, Box 50088
Honolulu, Hawaii 96850

JUN 1 3 2013

In Reply Refer To:
2012-I-0422

Mr. Michael C. Carter
U.S. Department of Transportation
Maritime Administration
1200 New Jersey Avenue, S.E.
Washington, D.C. 20590

Subject: Informal Section 7 Consultation on the Proposed Guam Port Modernization Project, Guam

Dear Mr. Carter:

We received your letter dated August 22, 2012, requesting our concurrence with your determination that the proposed Guam Port Modernization Project may affect, but is not likely to adversely affect the federally endangered Mariana common moorhen (*Gallinula chloropus guami*; moorhen) and hawksbill turtle (*Eretmochelys imbricata*), and the threatened green turtle (*Chelonia mydas*). This letter also addresses biosecurity concerns regarding the brown treesnake (*Boiga irregularis*). In early October 2012, Service staff notified MARAD that a brown treesnake biosecurity plan needed to be developed, approved and incorporated into the project description as part of the section 7 consultation. Since that time, MARAD has worked with the Service (both invasive species and section 7 staff), Port of Guam Authority (PAG), and the U.S. Department of Agriculture Animal and Plant Inspection Service, Wildlife Services (USDA) to develop a sound brown treesnake biosecurity plan. MARAD submitted a draft version of the plan in early December, 2012. The final version was accepted in May, 2012

The findings and recommendations in this consultation are based on: (1) your August, 22 2012, consultation request; (2) a meeting held in our office on June 4, 2012, (3) phone call and email exchanges between Jodi Charrier, Dawn Greenlee, Kevin Foster, Domingo Cravalho, and Earl Campbell, (U.S. Fish and Wildlife Service (Service)) and Daniel Yuska (The United States Department of Transportation, Maritime Administration (MARAD)) and other information available to us. A complete administrative record is on file in our office. This response is in accordance with section 7 of the Endangered Species Act of 1973 (Act), as amended (16 U.S.C. 1531 *et seq.*)

TAKE PRIDE® IN AMERICA

Project Description
MARAD is proposing to reconfigure and expand the Jose D. Leon Guerrero Commercial Cargo Port (Port) at Piti, Guam. The Port is planning to update facilities and reconfigure operations to support projected increased cargo handling demand and to maintain ongoing Port operations. Expansion of the existing 52-acre terminal will include the development of a 19-acre area immediately east of the terminal yard. Elements of the Guam Port Modernization Project include construction of a new break-bulk terminal area and new entrance and exit gates, demolition and refurbishment of buildings, and installation of oil and water separators in the eight existing storm water outfalls, and construction of two new outfalls.

Invasive Species
The brown treesnake was accidentally introduced to the island of Guam shortly after World War II. It has colonized the island at densities reaching 32 individuals per acre and is directly responsible for the extinction of 10 of 12 native forest birds historically found on Guam (USDA 2011). The brown treesnake poses a risk to biodiversity, natural resources, food security, economic development, human health, and ecosystem services on Guam as well as other Pacific islands. The cryptic nature and extreme abundance on Guam creates a significant risk of dispersal via civilian and Department of Defense (DoD) cargo transferred from the island to other ports.

The increased cargo traffic due to the Guam Port Modernization Project will increase the likelihood that the brown treesnake may be transported from Guam to other locations. The introduction of this highly invasive snake to other islands would be devastating to native fauna, particularly listed species. As part of the proposed action, PAG has committed to developing a HACCP plan, assuring all incoming and outbound cargo is inspected, and securing the funding to do so.

During Construction: A Hazard Analysis and Critical Control Point Plan (HACCP) or similar plan will be created for vegetation removal, construction activities, and increased maritime traffic resulting from the proposed Port Modernization Project. A HACCP plan is a tool designed to prevent the accidental spread of non-native invasive species by eliminating or reducing risk through pathway analysis and critical control point planning. The HACCP plan will incorporate measures to ensure there is no inadvertent transport of invasive species into and out of Guam.

During Port Operation: Most outbound freight arrives at the Port in the form of sealed shipping containers and comes from privately owned freight forwarding companies. Currently, USDA inspects containers at the freight-forwarding company properties. However, there is concern that uninspected containers are transported to the Port and co-mingled with previously inspected containers. PAG will actively work with all cooperating freight forwarding companies in the brown treesnake inspection program to ensure inspections are complete. Prior to entry, all containers arriving to the Port via roads must be cleared at the security gate. Containers without proof of inspection documentation will be refused at the gate and not allowed to enter the Port.

Existing levels of brown treesnake interdiction efforts conducted by USDA will be increased to address increases in commercial cargo exports to U.S. states and territories, and other locations resulting from the Port Modernization Project. PAG, in consultation with the Guam Customs and Quarantine Agency, DAWR, DoD, and other pertinent agencies, agrees to develop a

mechanism to ensure necessary funding is provided for increased brown treesnake interdiction efforts by USDA. The mechanism will be developed no later than 12 months after the start of the Port Modernization Project. The amount of funding necessary will be determined by comparing the amount of commercial cargo handled by the Port over the 60-month period immediately before the Port Modernization Project begins in relation to the current level of interdiction effort required by USDA (number of traps, number of inspections, etc.). This amount will represent the baseline condition for future brown treesnake interdiction efforts to be compared against. If commercial cargo handled by the Port decreases below the baseline level, then additional funding will not be required for that year. PAG will re-evaluate funding needs every 5 years. During this 5-year period, a working group consisting of members from PAG, USDA, the Service, and other Guam agencies, will meet annually to discuss the status of commercial cargo movement and interdiction efforts.

In addition to agreeing to fund that portion of the increase in brown treesnake interdiction measures required due to construction and increased maritime traffic related to the Port Modernization Project, PAG will employ an iterative adaptive management process, consistent with the brown treesnake interdiction commitment made by DoD (Service 2010). The adaptive management process will establish a system of reporting, monitoring, and threshold metrics that can be used to guide the appropriate level of brown treesnake interdiction.

Avoidance and Minimization Measures
The following measures identified in your letter will be implemented at the project site to avoid and minimize effects to the species listed above. These conservation measures are considered part of the project description. Any changes to, modifications of, or failure to implement these conservation measures may result in the need to reinitiate this consultation.

1. Pre-construction surveys will be completed one week prior to the onset of work to ensure no nesting moorhen are present. These surveys will be conducted by a biologist experienced in the identification of the moorhen by sight and vocalizations and experienced with implementation of the Service survey protocol methodology. If nesting moorhen are present within 300 meters (m) (984 feet [ft]) of the project, clearing and construction will be postponed until chicks have fledged and the moorhen have left voluntarily. If work stops for more than one week, surveys will be repeated to ensure no moorhen have initiated nesting. Guam Division of Aquatic and Wildlife Resources (DAWR) personnel will be contacted at (671) 735-3955 if moorhen are detected at any time prior to or during construction.

2. Engineering controls (i.e. light focusing reflectors, deflective shrouds, or fence screens) will be used to minimize stray light from construction activities that may reach adjacent turtle habitat.

3. Construction work will follow the Environmental Protection Plan (EPP) developed for the project and tailored to the specific construction methods. Although no in-water work is involved, the EPP measures will control discharges and manage spills from heavy equipment operating at the site near fresh and marine waters. Containment booms and absorbent pads will be readily available onsite for cleaning up lubricant or petroleum spills. To minimize erosion, sedimentation, and other adverse impacts to aquatic resources and nearby coral reef ecosystems, environmental protection measures will be

installed prior to construction or demolition activities. These will include Standard Best Management Practices (BMPs) as identified in the enclosed list.

4. All tools, gear, and construction scrap generated from this project will be removed upon completion of work to prevent the attraction of invasive pests.

5. No project-related materials will be stockpiled in the intertidal zone, reef flats, or stream channels.

Affected Species

The Mariana Common Moorhen

The Mariana common moorhen occurred historically on the islands of Guam, Tinian, Saipan, and Pagan (Baker 1951; Service 1991; Stinson et al. 1991). Archaeological evidence also indicates they were present on Rota between 1,500 to 2,000 years ago (Butler 1988). The most recent survey information indicates there are approximately 90 moorhen on Guam, 154 on Saipan, 41 on Tinian, and only 2 individuals on Rota (Takano and Haig 2004). Currently, the two main threats to the moorhen are: (1) loss and degradation of wetland habitat, including filling, alteration of hydrology, invasion of habitat by non-native plants, and unrestricted grazing of domestic and feral ungulates; and 2) predation by introduced species (Service 1991; Service 1996).

Moorhen are opportunistic breeders and may be attracted to ephemeral water bodies. The 19-acre expansion area consists of scrub forest and wet areas that may contain suitable habitat for moorhen. No moorhen were detected during a June 2010, survey. Due to the implementation of pre-construction monitoring for moorhen, lack of moorhen presence in recent years, and curtailing project activities if a moorhen is nesting within 300 m (984 ft), we concur the proposed action may affect, but is not likely to adversely affect the moorhen.

Green and Hawkbill Turtles

Green turtle - The biology and ecology of this species is summarized in the *Recovery Plan for U.S. Pacific Populations of the Green Turtle* (*Chelonia mydas*) (NMFS and Service 1998a) and the five-year Status Review (2007a) that indicate nesting may occur on the island of Guam, but not in high numbers. In addition to nesting, green turtles may also use beaches to haul out and bask, although this behavior has never been documented in Guam (Kelly 2009; Wusstig 2009). Nesting activity on Guam occurs throughout the entire year and peaks between April and July (Grimm and Farley 2008).

Hawksbill turtle - The biology and ecology of this species is summarized in the *Recovery Plan for U.S. Pacific Populations of the Hawksbill Turtle* (*Eretmochelys imbricata*) (NMFS and Service 1998b) and five-year Status Review (2007b). Hawksbill turtles are frequently sighted in the near-shore waters surrounding Guam (Grimm and Farley 2008), though the population is thought to be declining, with only 5 to 10 females estimated to nest annually (NMFS and Service 2007b). Hawksbill turtles were reported nesting in June and July at Tarague Beach, Guam; however, this is based on only one year of data (Wusstig, 2008a). Between 1991 and 1994, hawksbill turtles nested in Sumay Marina, Apra Harbor, Guam, in October, December, February, and March (Wusstig, 2008b). In 2008, four nesting attempts at Adotgan Dikiki, Guam were attributed to the hawksbill turtle (Grimm and Farley 2008).

According to aerial surveys conducted by DAWR from 1992 to 2009, the nearest record of nesting turtles is at the Sea Plane Ramp, located approximately 4,000 feet west of the project site. There are no suitable nesting beaches and there have been no reported sea turtle nesting activities in the immediate vicinity of the project. Therefore, we concur with your determination the proposed project may affect, but is not likely to adversely affect green or hawksbill turtles.

Summary

Based on the project description, including the implementation of the conservation measures you provided, we concur with your determination that the project may affect, but is not likely to adversely affect the Mariana moorhen, and hawksbill or green turtles. In addition, your agreement to develop a HACCP Plan and implement increased BTS interdiction adequately addresses our concerns regarding invasive species, and therefore, we conclude your project is not likely to adversely affect other listed species. Unless the project description changes, or new information reveals that the effects of the proposed action may affect listed species in a manner or to an extent not considered, or a new species or critical habitat is designated that may be affected by the proposed action, no further action pursuant to the Act is necessary.

If you have any questions or concerns regarding this consultation, please contact Jodi Charrier, Fish and Wildlife Biologist (phone: 808-792-9423, email: jodi_charrier@fws.gov) or regarding invasive species, please contact Domingo Cravalho, Invasive Species Biologist (phone: 808-872-9445, e-mail: domingo_cravalho@fws.gov).

Sincerely,

for Loyal Mehrhoff
Field Supervisor

Enclosure(s): Brown treesnake Control Plan
Standard Best Management Practices

cc
Mr. Daniel Vice, U.S. Department of Agriculture, Guam
Mr. Celestino Aguon, Guam Department of Agriculture

Literature cited

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USDA 2011.Brown Treesnake Containment Plan for Guam.

Wusstig, S. 2009. Electronic mail dated May 6, 2009, through May 13, 2009, regarding nesting and movement of green sea turtles detected on or near Guam.

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U.S. Fish and Wildlife Service
Recommended Standard Best Management Practices

The U.S. Fish and Wildlife Service recommends that the measures below be incorporated into projects to minimize the degradation of water quality and minimize the impacts to fish and wildlife resources.

1. Turbidity and siltation from project-related work shall be minimized and contained within the vicinity of the site through the appropriate use of effective silt containment devices and the curtailment of work during adverse tidal and weather conditions.

2. Dredging/filling in the marine environment shall be scheduled to avoid coral spawning and recruitment periods and sea turtle nesting and hatching periods.

3. Dredging and filling in the marine/aquatic environment shall be designed to avoid or minimize the loss special aquatic site habitat (beaches, coral reefs, wetlands, etc.) and the function of such habitat shall be replaced.

4. All project-related materials and equipment (dredges, barges, backhoes, etc.) to be placed in the water shall be cleaned of pollutants prior to use.

5. No project-related materials (fill, revetment rock, pipe, etc.) should be stockpiled in the water (intertidal zones, reef flats, stream channels, wetlands, etc.) or on beach habitats.

6. All debris removed from the marine/aquatic environment shall be disposed of at an approved upland or ocean dumping site.

7. No contamination (trash or debris disposal, non-native species introductions, attraction of non-native pests, etc.) of adjacent habitats (reef flats, channels, open ocean, stream channels, wetlands, beaches, forests, etc.) shall result from project-related activities. This shall be accomplished by implementing a litter-control plan and developing a Hazard Analysis and Critical Control Point Plan (HACCP – see http://www.haccp-nrm.org/Wizard/default.asp) to prevent attraction and introduction of non-native species.

8. Fueling of project-related vehicles and equipment should take place away from the water and a contingency plan to control petroleum products accidentally spilled during the project shall be developed. Absorbent pads and containment booms shall be stored on-site, if appropriate, to facilitate the clean-up of accidental petroleum releases.

9. Any under-layer fills used in the project shall be protected from erosion with stones (or core-loc units) as soon after placement as practicable.

10. Any soil exposed near water as part of the project shall be protected from erosion (with plastic sheeting, filter fabric etc.) after exposure and stabilized as soon as practicable (with native or non-invasive vegetation matting, hydroseeding, etc.).

F. HISTORIC PROPERTIES DOCUMENTATION

Historic Properties Eligibility Determination

PORT AUTHORITY OF GUAM
ATURIDAT I PUETTON GUAHAN
Jose D. Leon Guerrero Commercial Port
GOVERNMENT OF GUAM
1026 Cabras Highway, Suite 201
Piti, Guam 96925

FELIX P. CAMACHO
Governor of Guam

MICHAEL W. CRUZ
Lieutenant Governor

Telephone: (671) 477-5931/35
(671) 477-2683/85
Facsimile: (671) 477-2689/4445
Webpage: www.portofguam.com

December 15, 2010

Mr. Joe Duenas
State Historic Preservation Office
Guam Historic Resources Division
490 Chalan Palasyo
Agana Heights, Guam 96910

Subject: Port Authority of Guam Terminal Yard Reconfiguration Maintenance and Repair Project Section 106 Concurrence

Happy Holidays Mr. Duenas:

The Port Authority of Guam (PAG) is undertaking the above-referenced project to address much needed improvements to its facilities and is preparing a NEPA Environmental Assessment (EA) to address potential project-related impacts. The Maritime Administration (MARAD) is the lead agency for the NEPA process. As a federal undertaking, the project will comply with Section 106 of the National Historic Preservation Act (NHPA). PAG is considering potential impacts to historic resources (defined as cultural resources deemed eligible for nomination to the National or Guam Register of Historic Places (NRHP/GRHP) which may be affected by the project. Please review this letter and if in concurrence with the determinations provided, sign and date the letter as provided on page 2.

Project Description

This project will reconfigure and expand the Port terminal yard to enhance its cargo handling capacity. To help achieve efficient use of the site, the project will include demolition, expansion or refurbishment of buildings and construction of new buildings; installation of utilities (water, sewer, stormwater and fire protection systems and high-mast lights); and installation of one new 36-inch stormwater outfall and one new 30-inch stormwater outfall into Apra Harbor. Other project elements include paving of currently unpaved portions of the terminal yard; upgrades to existing terminal yard pavement; installation of security infrastructure; new gates and parking areas; and new cargo handling and equipment systems. The proposed terminal plan layout and details of the breakbulk yard and proposed terminal buildings are shown in Figures 1 and 2, respectively.

The terminal yard will be redesigned to accommodate separate break-bulk and container operations and will allow for wheeled and grounded container storage. Gate and Terminal Operating Systems will be installed to control the movement and tracking of increased cargo volumes and will add to overall port operating efficiency. A new break bulk terminal will be constructed on ten acres of the West Terminal Yard, using the Berth F-4 frontage for waterside

access. Most of the demolition, reconfiguration and expansion changes to the buildings will occur on the west side of the site and are adjacent to the expanded break-bulk terminal (see Figure 2).

As shown in Figures 3, 4 and 5, two new stormwater outfalls will originate at the southeastern portion of the site and terminate atop riprap before discharge into Apra Harbor (approximately 100 cubic yards (CY) of rip-rap will be placed at each outfall (for a total of 200 CY) and will cover a total of approximately 1530 square feet (0.035 acres) in regulated wetland areas. The maximum water depth at the location of the rip-rap is approximately 1.5 feet below Mean Higher High Water (MHHW). At low tide, the rip-rap will be aerially exposed.

Approximately 40 acres of unpaved area will be re-graded in constructing the expanded terminal yard areas. Concurrent with this re-grading, several thousand feet of utilities (water, electric, sanitary sewer, storm sewer, communications) infrastructure will be installed. The depth of re-grading will range between 0 feet and 20 feet. Following re-grading, utility trench depths will range from 3 feet to 10 feet. The location and details of the proposed high mast lights are shown in Figures 6 through 9. Footings for the high-mast lights will be installed at a depth of 17 feet.

The Area of Potential Effect
the Area of Potential Effect (APE) for this project is within the proposed construction footprint. This APE accommodates the anticipated proposed staging areas and other temporary impacts necessary during construction.

Historic Properties
Identification of historic properties included consulting a number of sources. These sources include:

- Consultation with the Guam Historic Preservation Office,
- GIS files of historic site locations on Guam,
- *Soil Survey of Territory of Guam* of 1988 by the U.S. Department of Agriculture,
- *Jose D. Leon Guerrero Commercial Port of Guam Master Plan Update 2007 Report,* and
- *Cultural Resources Reconnaissance, Cabras Island, Apra Harbor, Territory of Guam* - April 1977

The Port of Guam was constructed starting in 1966, with a peak of construction activity between 1967 and 1969. The Port started providing service in 1969. As construction is slated to be complete by 2013, a fifty-year period would include properties built before 1963. Buildings constructed after 1963 are considered out of period. Notable, relatively unmodified buildings, such as the Port Administration Building (1967-1968), Control Tower (1968-1969), and the Port Police Station (post-1970) were built after this date. There have been several expansion projects since construction, which have impacted the historic integrity of any resources in the Port. Since Port buildings were constructed in or after 1966, they are considered out-of-period , and not historic properties as defined in 36 CFR 800.

No archaeological sites are documented within the APE for this project. Further, it is unlikely that the APE holds undocumented sites, as most of the area has been subject to recent commercial and military development. Much of the area is underlain with coral and rock at shallow depth, and does not hold potential for significant subsurface deposits.

Findings of Effect
Since there are no known historic properties within the APE, we believe that a finding of No Historic Properties Affected is appropriate, pursuant to 36 CFR 800.4(d)(1). It also is unlikely that any undocumented historic properties will be encountered. If any properties are identified during construction, PAG will consult with the Guam SHPO.

If you have any questions or concerns, please contact me by phone at 671-477-5931 or via email at rjagustin@portguam.com.

Si Yu'os Ma'ase,

ENRIQUE J.S. AGUSTIN
General Manager

I, the undersigned, concur with the APE and findings of effect stated above for the Port Authority of Guam Terminal Yard Reconfiguration Maintenance and Repair Project

Joe Duenas, State Historic Preservation Officer _____ Date _____

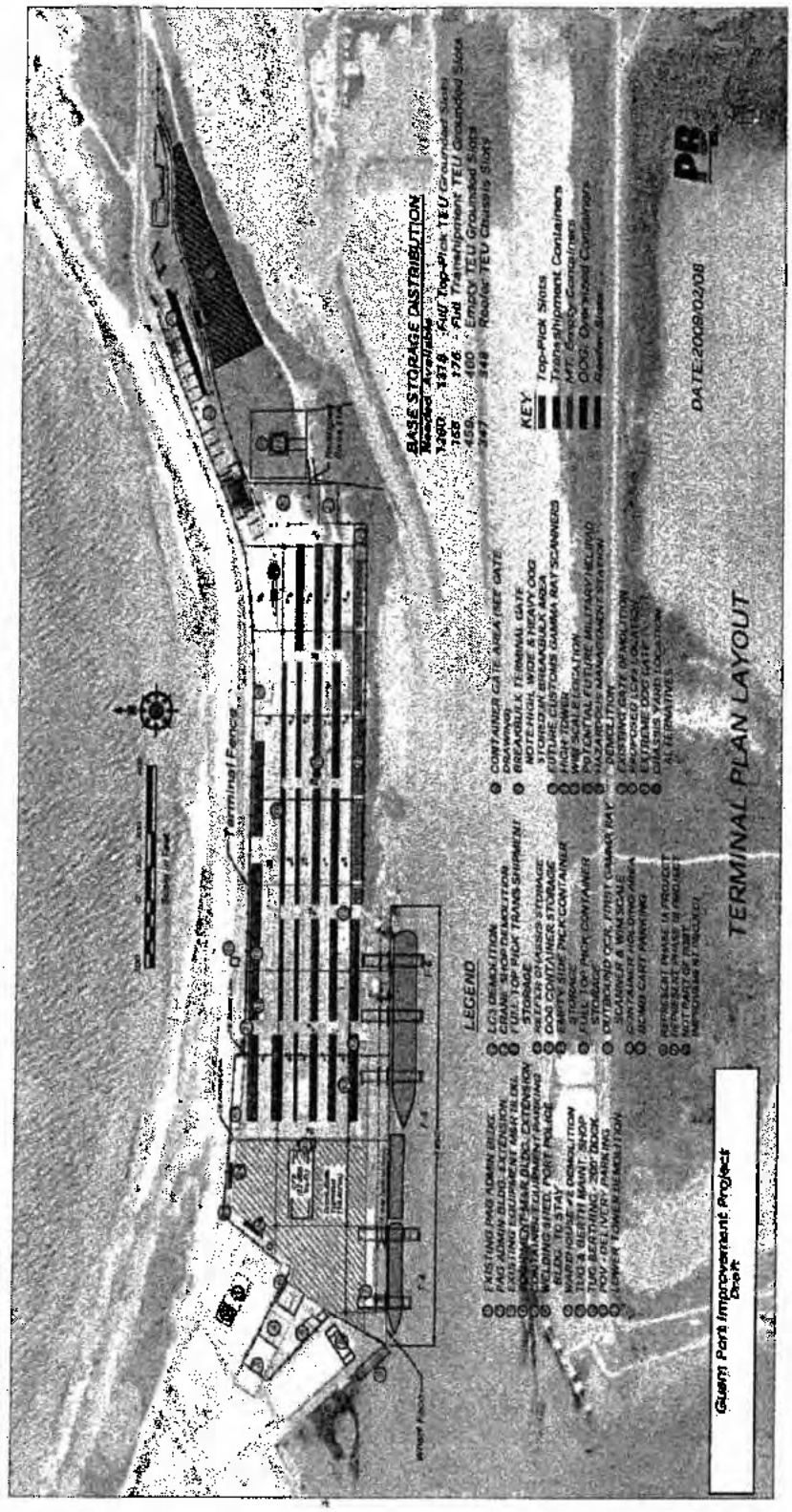

Figure 1. Terminal Plan Layout

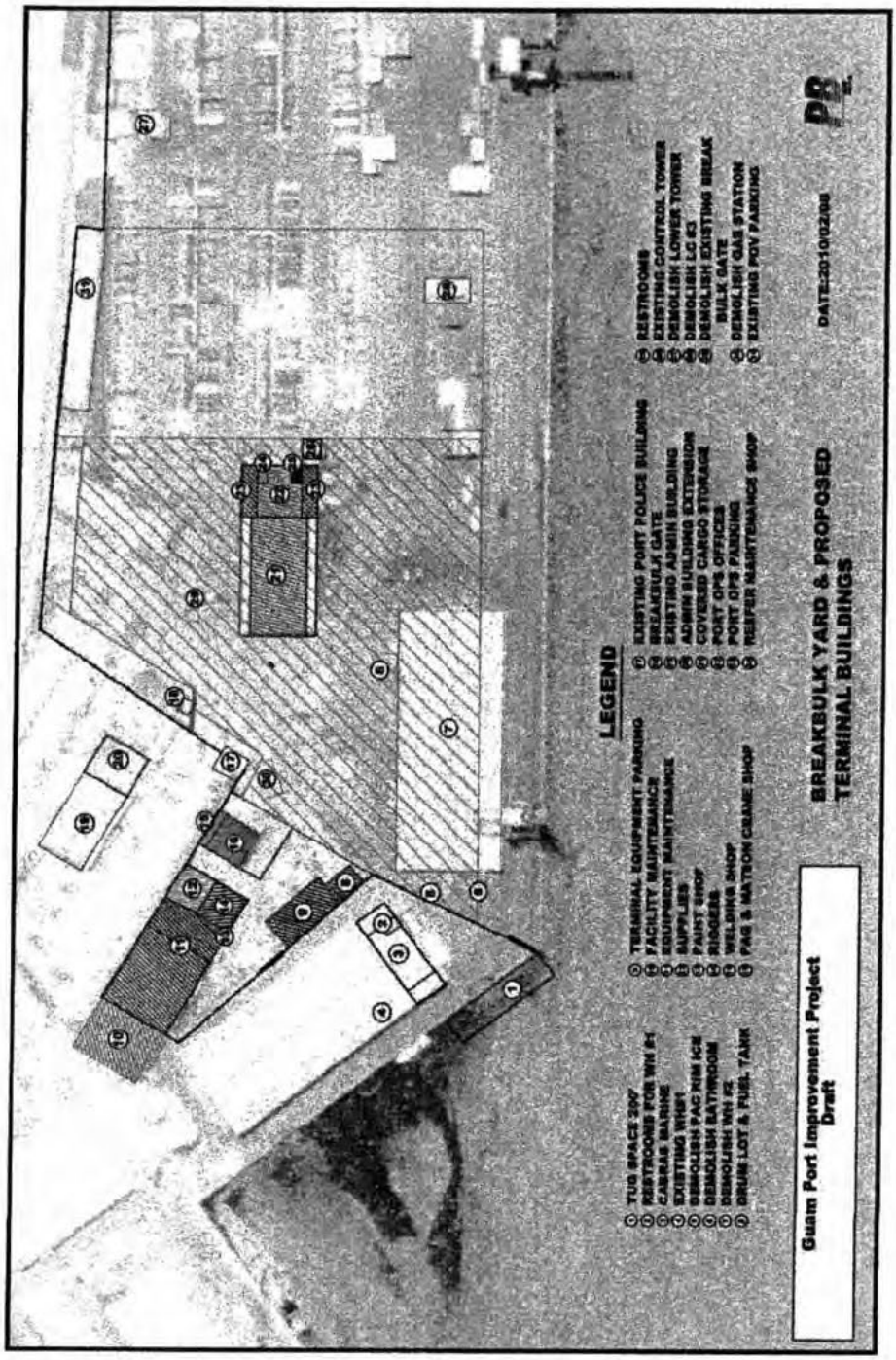

Figure 2. Breakbulk Yard and Proposed Terminal Buildings

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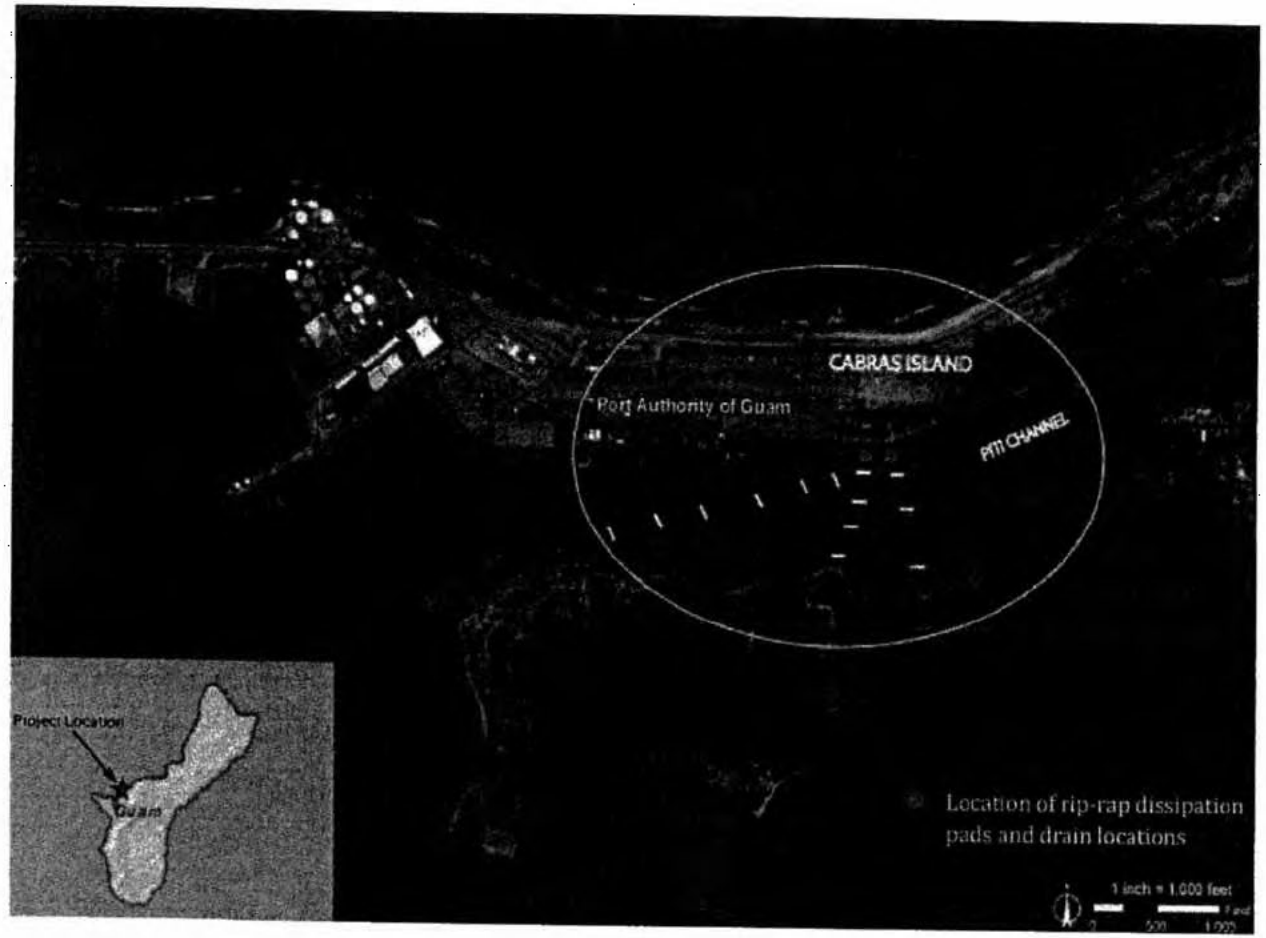

Figure 3. Aerial photograph of Port Authority of Guam with annotated outfall drain locations

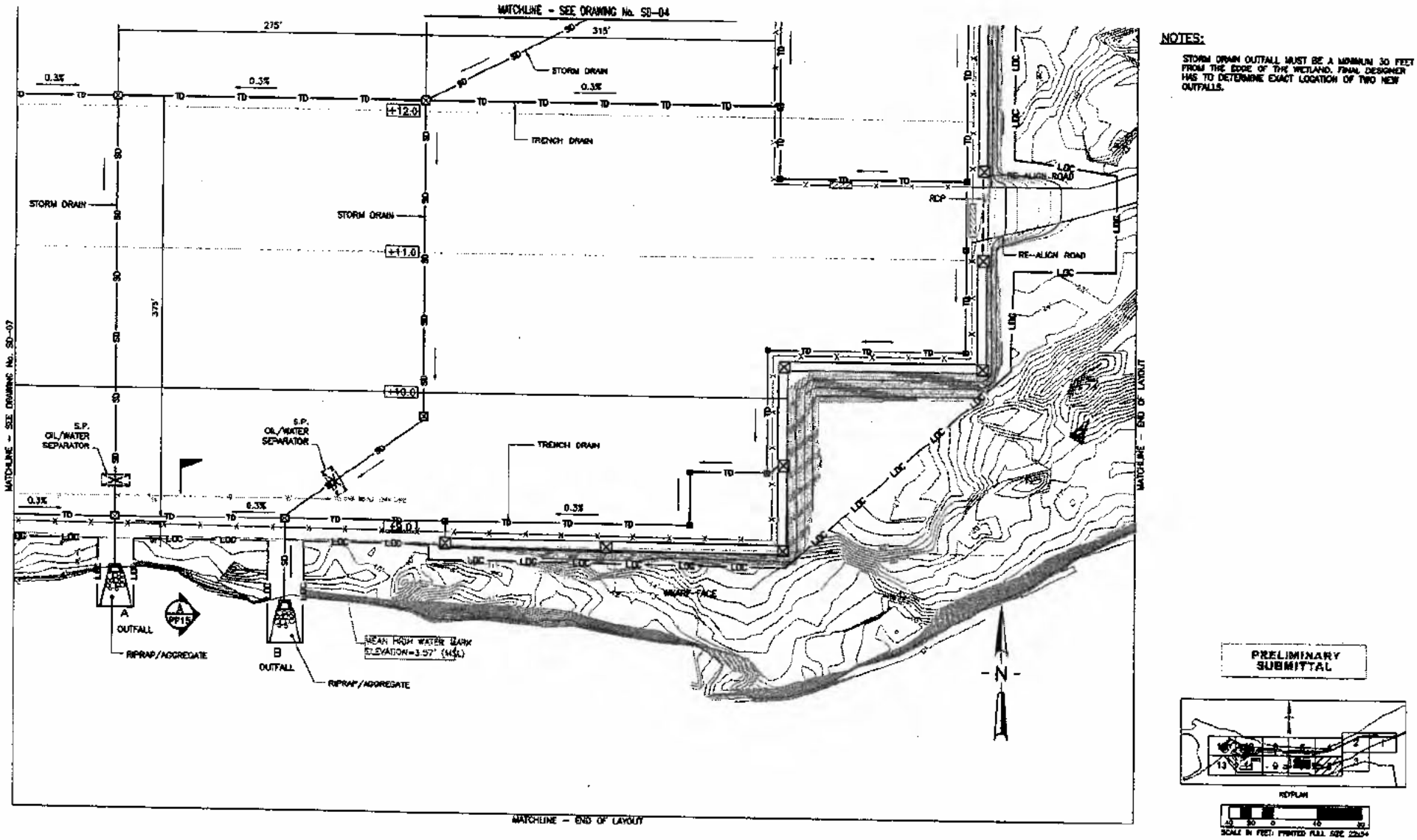

Figure 4. Outfall Location Plan

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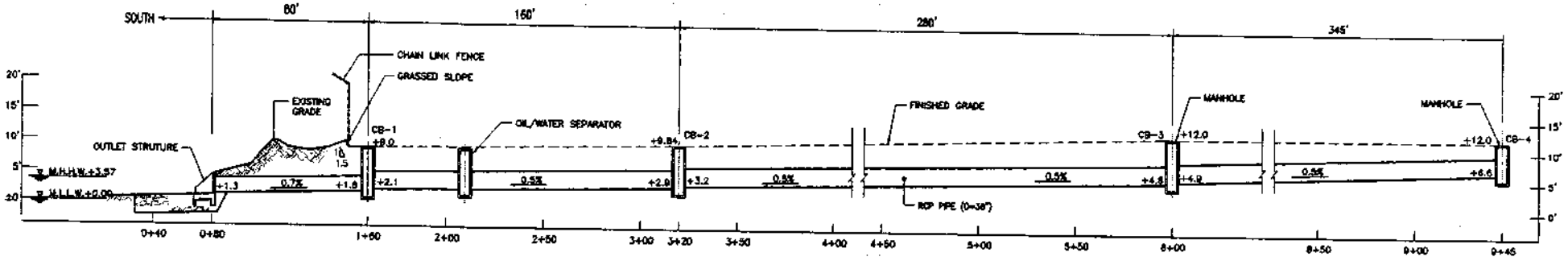
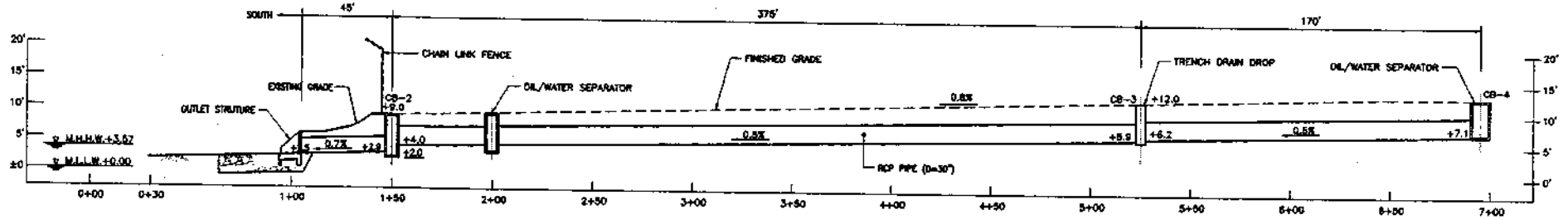


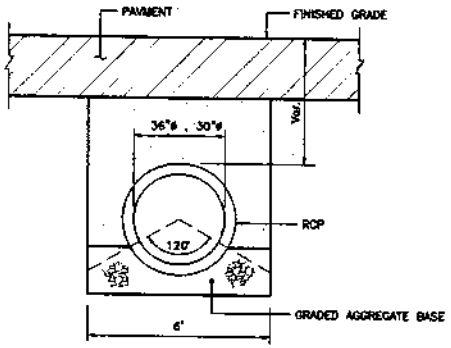
STORM DRAINAGE B PROFILE

VERT SCALE: 1"= 8'-0"
HOR SCALE: 1"=25'-0"



STORM DRAINAGE A PROFILE

VERT SCALE: 1"= 8'-0"
HOR SCALE: 1"=25'-0"



36"ø , 30"ø RCP PIPE

1/2" = 1'-0"

Figure 5. Storm Drain and Outfall Profile

Doc. No. 38GL-26-2386.*

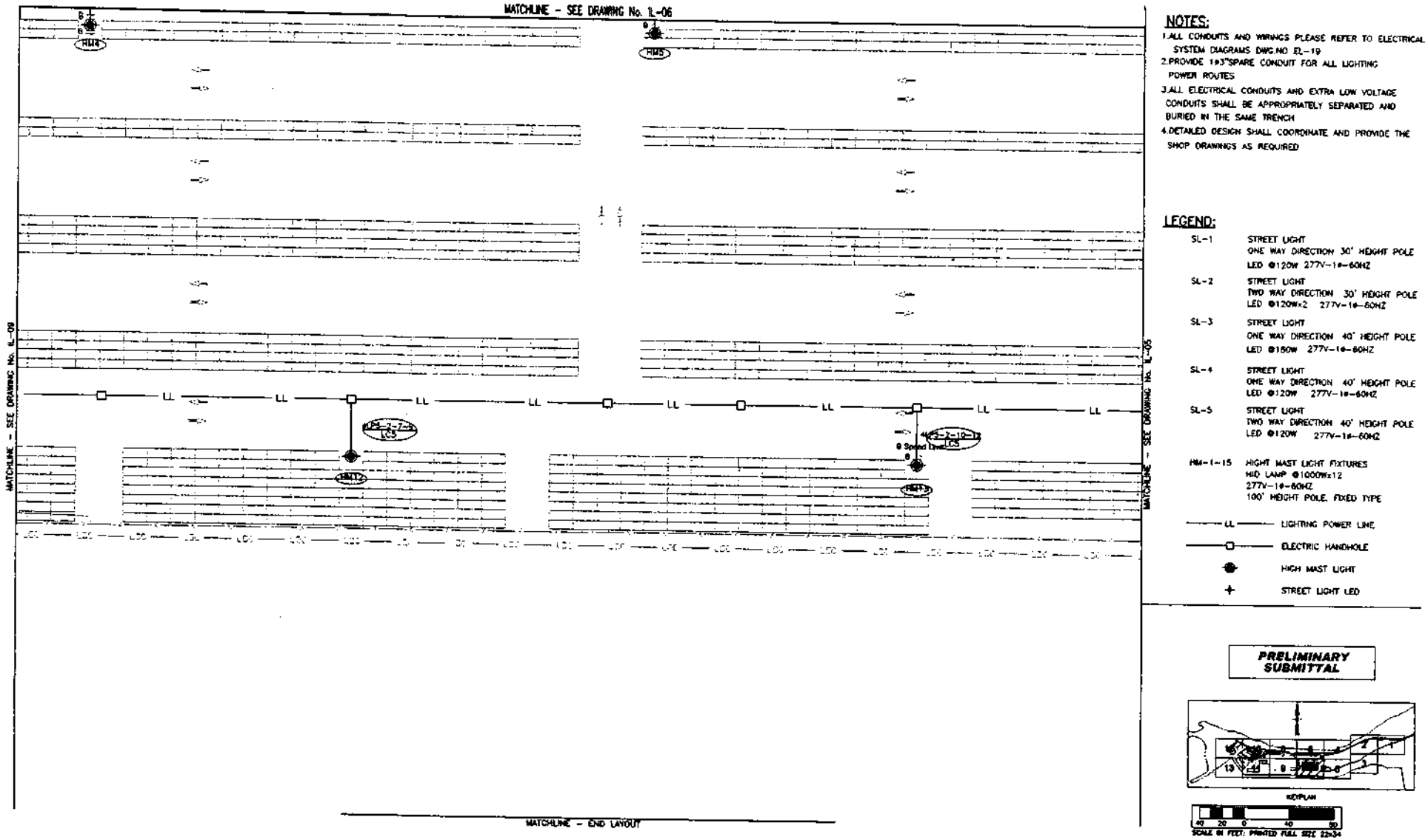
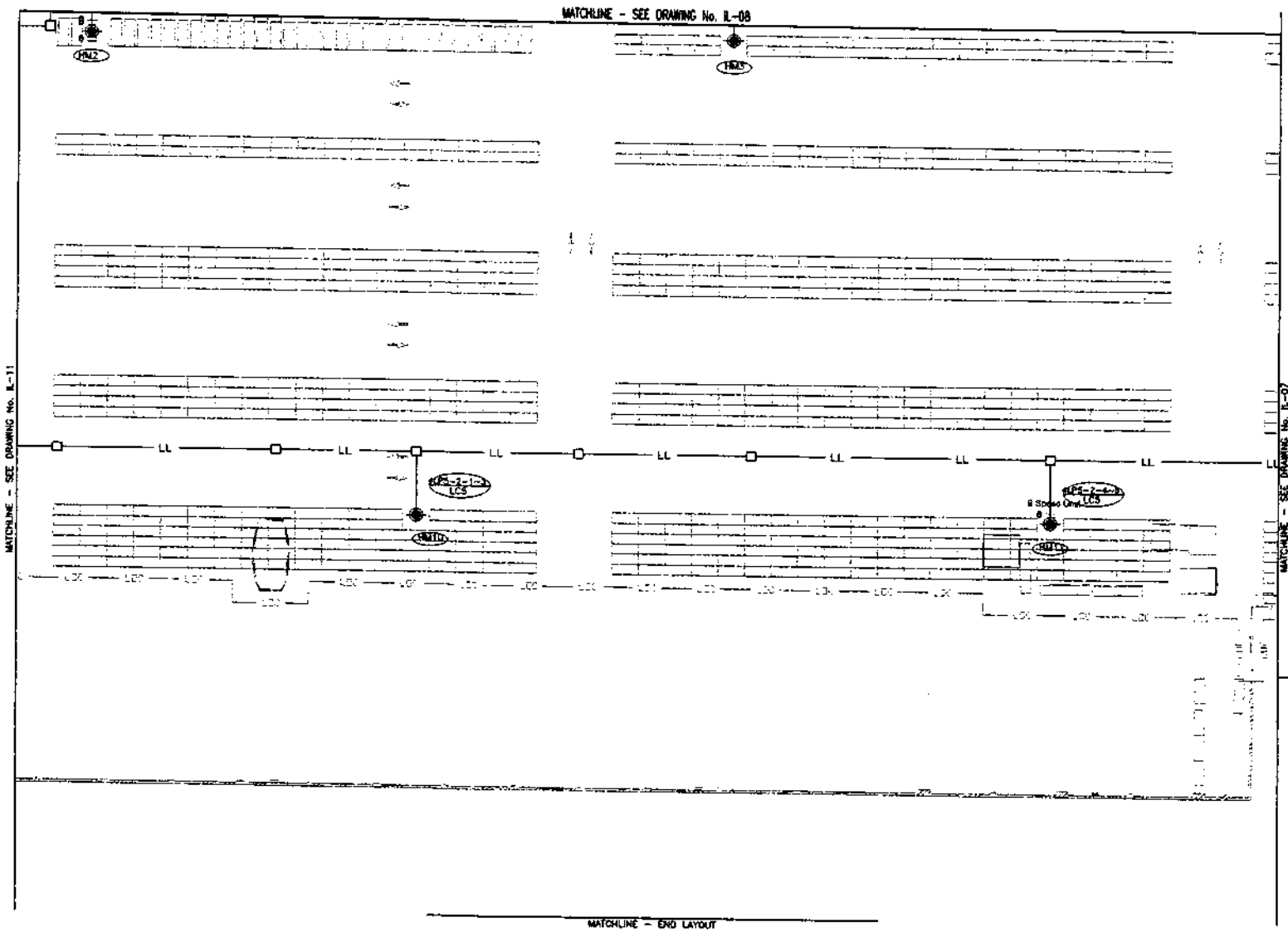


Figure 6. Location of High Mast Lighting

Doc. No. 38GL-26-2386.*


MATCHLINE - SEE DRAWING No. IL-08
MATCHLINE - SEE DRAWING No. IL-11
MATCHLINE - SEE DRAWING No. IL-07
MATCHLINE - END LAYOUT
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HM5
HM10
HM15
LL
LC5
LC6
LC7
LC8
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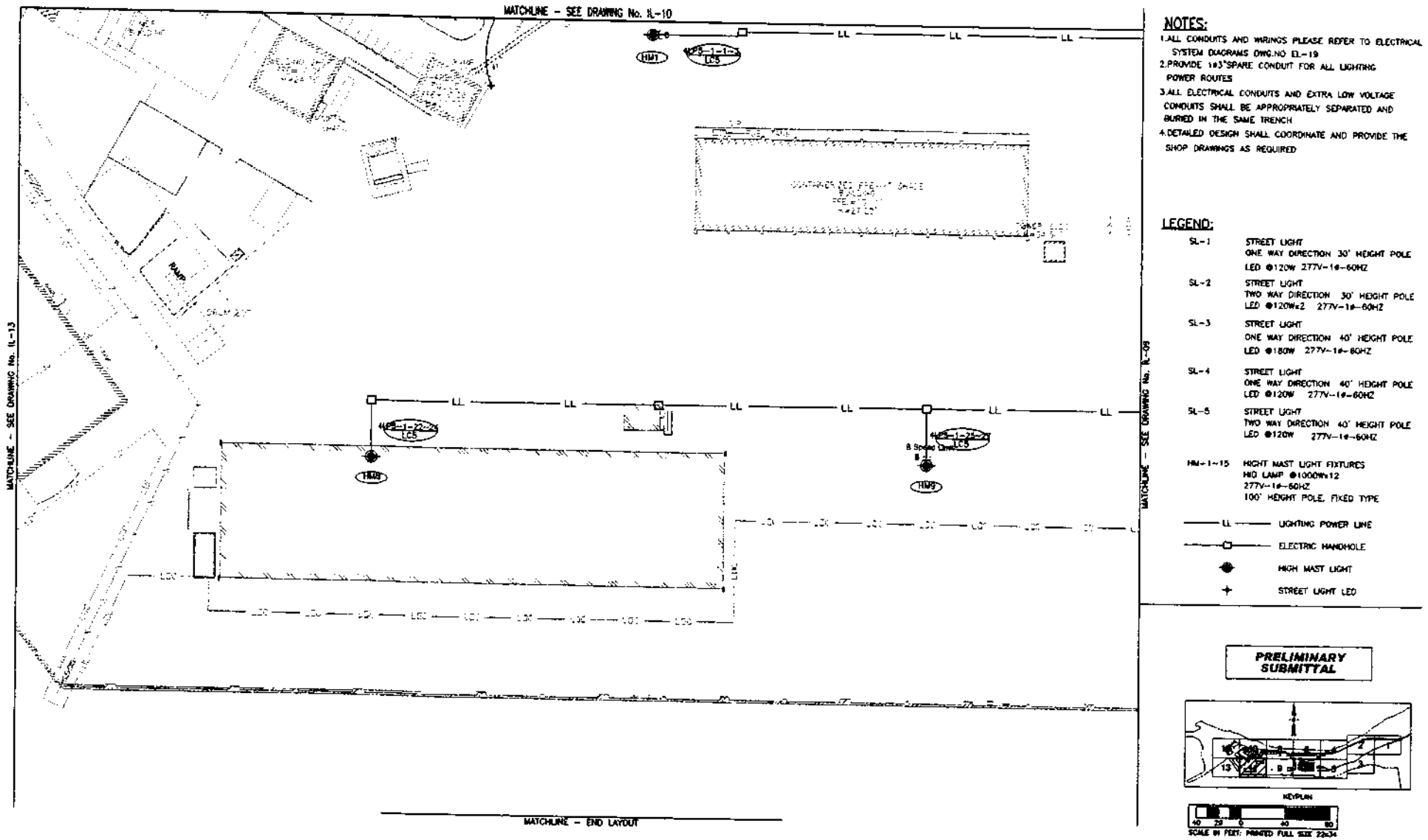
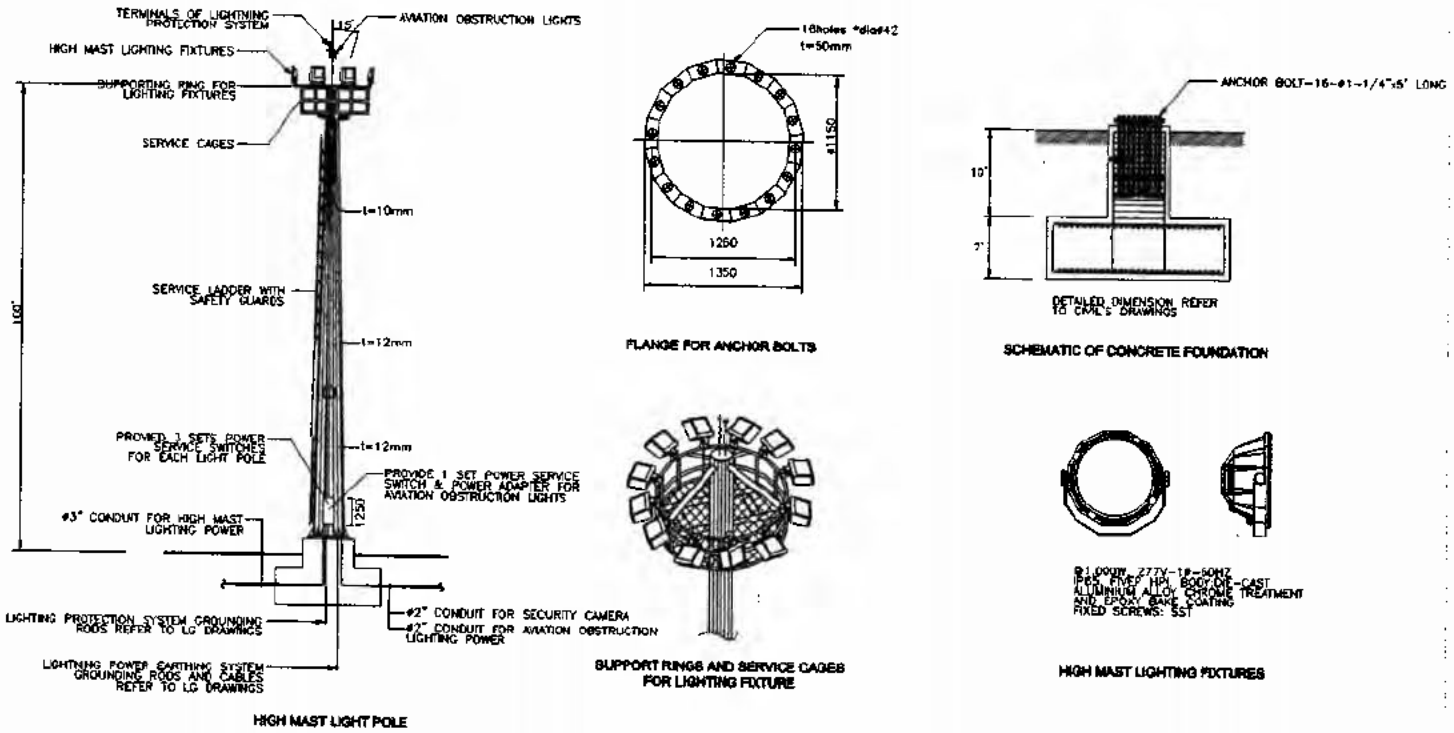


Figure 8. Location of High Mast Lighting

Doc. No. 38GL-26-2386.*



HIGH MAST LIGHT

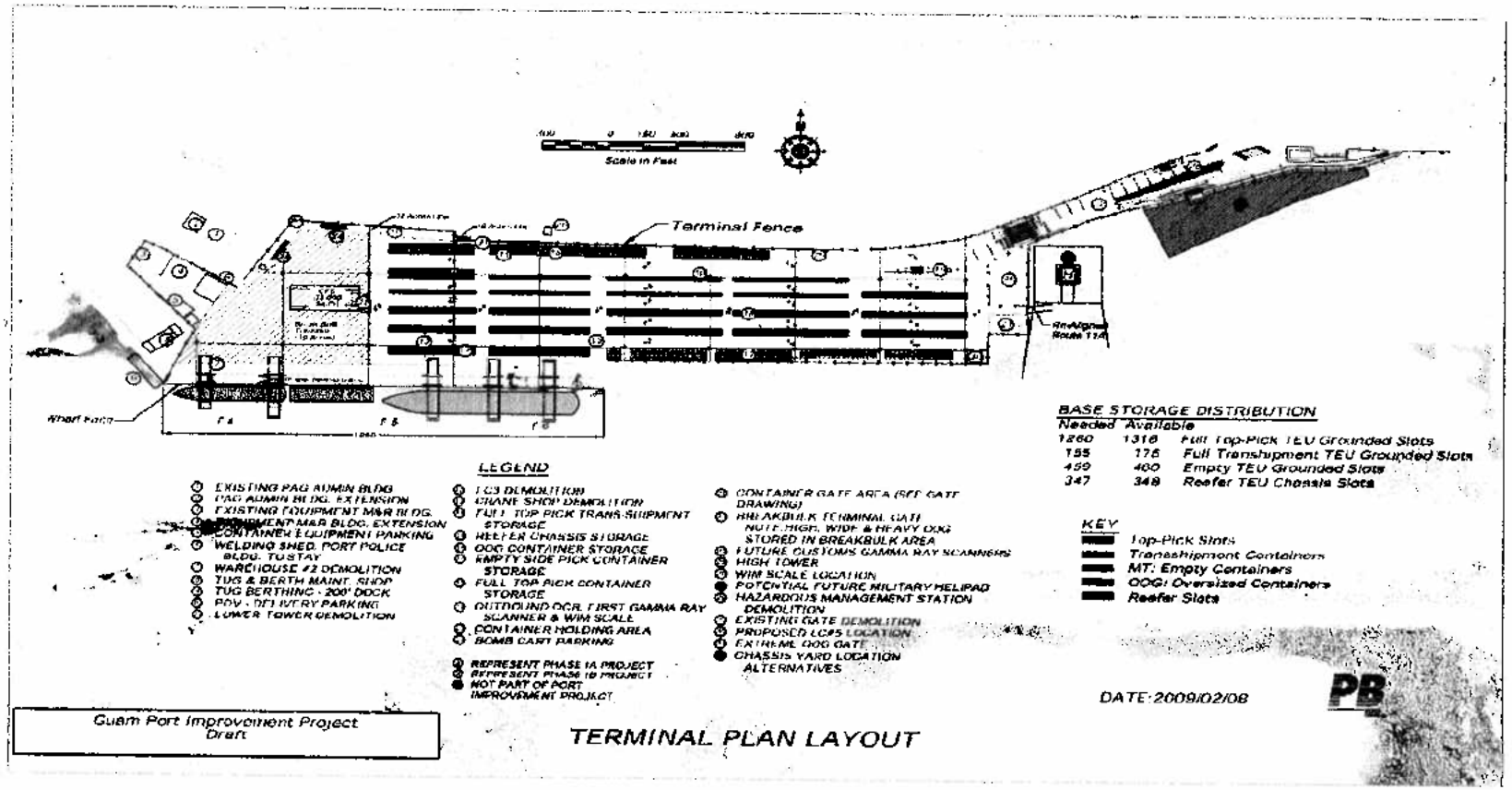
NOTES:

1. HM-1-15 HIGHT MAST LIGHT FIXTURES
   HID LAMP @1000wx12, 277V-1ø-60HZ
   100' HEIGHT POLE, FIXED TYPE
2. LIGHT POLES SHALL BE CARBON STEEL CONSTRUCTION WITH HOT DIPPED GALVANIZED AND WEATHER SHIELD COATING,RUST-GRIP,FOR CORROSIVE RESISTED
3. ANCHOR BOLTS SHALL BE CARBON STEEL WITH HOT DIPPED GALVANIZED AND WEATHER SHIELD COATING,RUST-GRIP,FOR CORROSIVE RESISTED
4. TERMINALS OF THE LIGHTNING PROTECTION SYSTEM, AVIATION OBSTRUCTION LIGHTS AND CCTV CAMERAS SHALL BE INSTALLED AND MOUNTED AT TOP OF LIGHT POLE. THE DETAILED DESIGN HAVE TO COORDINATE, AS REQUIRED
5. PROVIDE 3 SETS OF LIGHTING POWER SERVICE SWITCHES FOR EACH LIGHT POLE.
6. DURING CONSTRUCTION OF CONCRETE FOUNDATION, THE CONTRACTOR'S SHALL INSTALL NECESSARY EMBEDDED CONDUITS AND GROUNDING RODS AS REQUIRED BY OTHER SYSTEM
7. PROVIDE 1 SETS POWER SERVICE SWITCH & POWER ADAPTER FOR AVIATION OBSTRUCTION LIGHTS.
8. AVIATION OBSTRUCTION LIGHT:
   *TYPE: LED,RED
   *NO. LEDS: 300 MIN
   *INTENSITY OF EACH LED: 250-300mCD
   *NO. OF CIRCUITS: 5 IN PARALLEL
   *TOTAL MACP: 60-90 CANDELA
   *TOTAL POWER CONSUMPTION: 15W AT 277V
   *POWER ADAPTER: 277V-1ø-50HZ/24V/48VDC
   *PROTECTION: IP55
   *MATERIAL OF CONSTRUCTION: CAST ALUMINIUM
   *TRANSPARENT PART: CLEAR GLASS DOME
   *GASKET: NEOPRENE

PRELIMINARY SUBMITTAL

Doc. No. 38GL-26-2386.*

Figure 9. High Mast Lighting Detail



Doc. No. 38GL-26-2386.*

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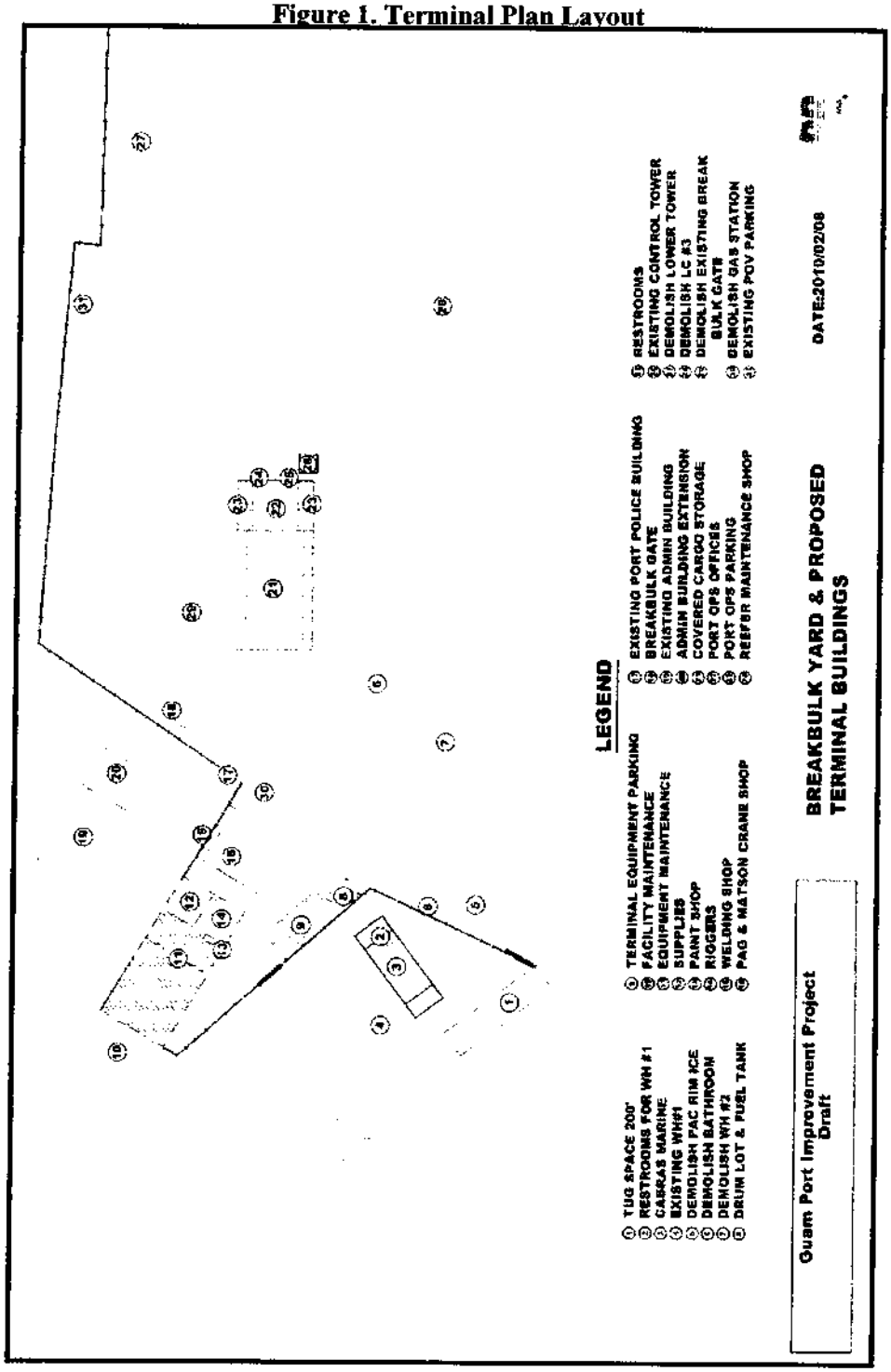

Figure 2. Breakbulk Yard and Proposed Terminal Buildings

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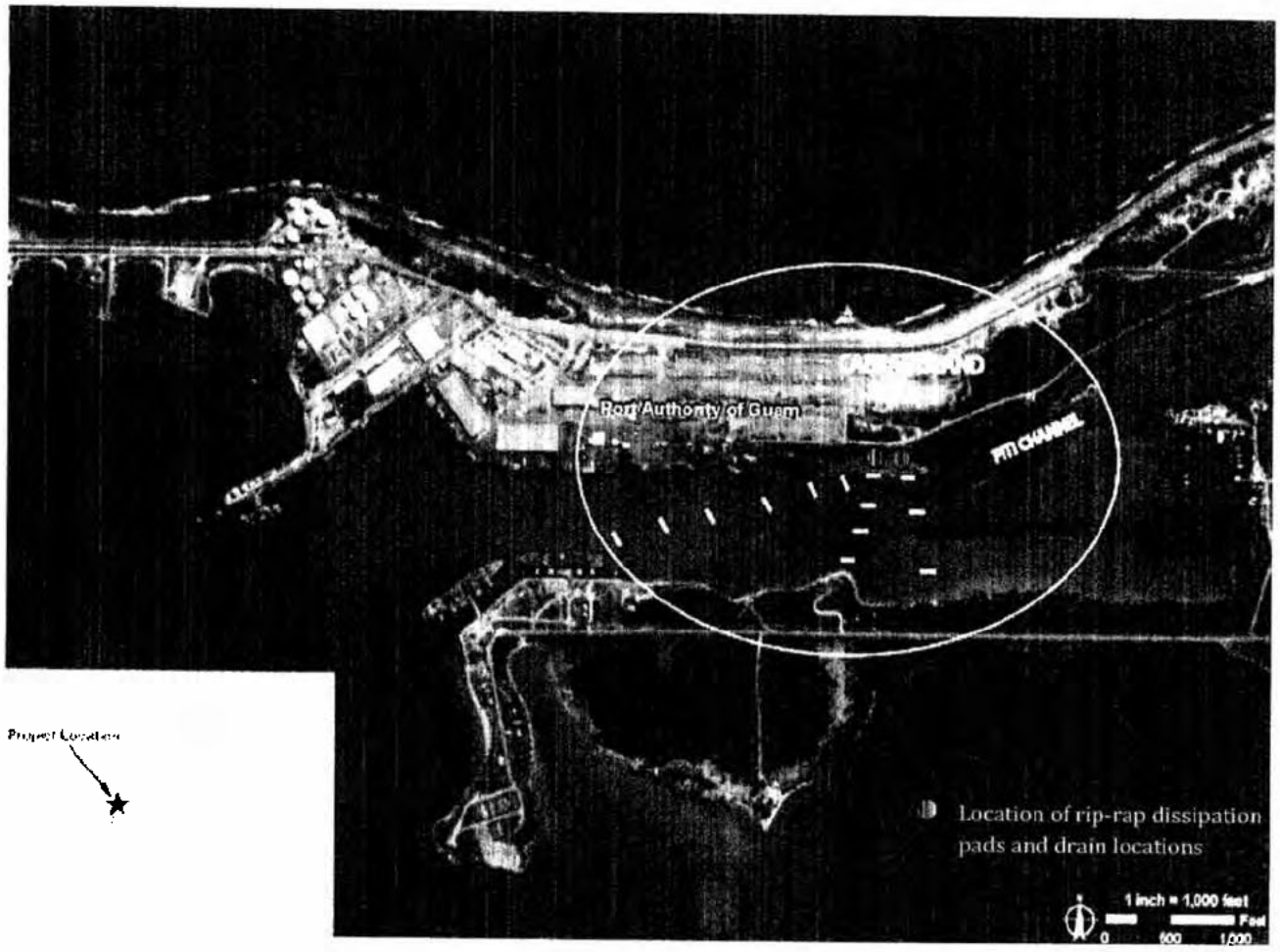


Figure 3. Aerial photograph of Port Authority of Guam with annotated outfall drain locations

Department of Parks and Recreation
Government of Guam
490 Chalan Palasyo
Agana Heights, Guam 96910
Director's Office: (671) 475-6296/7
Facsimile: (671) 477-0997
Parks Division: (671) 475-6288/9
Guam Historic Resources Division: (671) 475-6294/5
Facsimile: (671) 477-2822

Edward J.B. Calvo
Governor

Raymond S. Tenorio
Lt. Governor

Peter S. Calvo
Acting Director

Dot

In reply refer to:
RC09-5225

1/28/11
Port Authority of Guam
General Manager's Office
RECEIVED

January 19, 2011

Mr. Enrique J.S. San Agustin
General Manager
Port Authority of Guam
Jose D. Leon Guerrero Commercial Port
Government of Guam
1026 Cabras Highway, Suite 201
Piti, Guam 96915

Subject: Section 106 Project Review: Port Authority of Guam Terminal Yard Reconfiguration Maintenance and Repair Project, Piti, Guam

We reviewed for the above project and have the following comments:

We concur with your determination of "No Historic Property Affected," however, you will need the services of an archaeologist if there is an inadvertent discovery of historic properties during the project undertaking. Additionally, during the permitting process, we will issue a Certificate of Approval with stipulations that the Port Authority of Guam document photo structures within the project area that are 25 years or older and submitted to the Guam Historic Resources Division to assist in this effort you may contact William Hernandez, HP Specialist at 475-6349.

If you have any questions, please contact our office at 475-6294/6295 or fax us at 477-2822.

Sincerely,

Peter S. Calvo
Acting Director

Co-Signature:

Lynda Bordallo Aguon
Guam (State) Historic Preservation Officer

cc: BSP

Appendix H
Recommended Additions to the PAG Standard Lease Agreement

Doc. No. 38GL-26-2386.*

Recommended Additional Terms for Recycling Enterprise Zone Lease Agreement

Purpose and Eligibility Criteria

- Clearly state the purpose of the enterprise zone, emphasizing Public Law 28-92 goals and requirements.
- Define the scope of activities allowed within the zone, such as processing, storage, and transshipment. Emphasize activities that are prohibited, such as storage, handling and spillage of any solid wastes or liquids wastes.
- Specify the criteria for businesses or organizations eligible to operate within the zone.

Reporting and Monitoring

- Require compliance with all applicable local permits and environmental regulations, including terms in the Stormwater Pollution Prevention Plan (SWPPP) permit. Consider adding the following requirements:
  - Include easement to access portions of the property for routine facility inspections, BMP inspections, and outfall discharge monitoring.
  - Require adherence to baseline, activity-specific, and site-specific best-management practices (BMPs) described in the SWPPP.
  - Port Authority of Guam (PAG) has reported historic exceedances for total zinc at two outfalls, which potentially were caused by exposure of stormwater runoff to galvanized metal surfaces and tire dust. Tenants should ensure that they implement the appropriate BMPs to help PAG prevent total zinc exceedances, such as covering automobile, material, and waste storage areas.
  - Require tenants to prevent unauthorized non-stormwater discharges.
  - Require tenants to notify the PAG if their activities, or change in activities, introduce potential pollutant sources that are not covered by PAG's existing SWPPP.
- Specify requirements for submitting reports and metrics on materials collected and shipped off-island for recycling.

Appendix I
IFB Options and Partnership Opportunities

Doc. No. 38GL-26-2386.*

Invitation for Bid Options and Partnership Opportunities

Introduction

Thousands of pounds of recyclable materials[1] are illegally dumped or abandoned throughout villages on Guam, including junk vehicles, tires, and white goods. The Integrated Solid Waste Management Plan (Public Law [PL] 25-175) recognizes the responsibility of the government of Guam to protect the environment and communities through the responsible management of solid waste.

The government of Guam enacted PL 28-92 to establish a Recycling Enterprise Zone (REZ) at the Jose D. Leon Guerrero Commercial Port to process, containerize, and stage materials for transshipment off-island for recycling, with a specific emphasis on junk vehicles. Hundreds of new vehicles are imported and sold on Guam every year by local dealers, but the removal of junk vehicles remains a problem. A movement to initiate an advanced disposal fee on imported cars did not pass the legislature. Instead, the Recycling Revolving Fund (RRF) was developed to manage the recycling of illegally dumped priority wastes, including junk vehicles, tires, and white goods. The RRF is funded by annual fees on vehicle registrations, but use of this fund has not been successful at managing the removal of illegally dumped materials.

Current RRF payments are distributed to village mayors for uses that include removal of illegally dumped vehicles and other priority wastes. Some village mayors sign contracts with haulers to move junk vehicles from villages to centralized junk vehicle lots. However, contracts in place are insufficient to process the annual generation of abandoned wastes for shipment off island.

Invitation for Bid Options

The Port Authority of Guam (PAG) could be a part of the solution using the authority of the REZ under PL 28-92 to contract the processing and recycling of recyclable materials. First, the PAG will use grant funding or RRF funding to prepare an invitation for bid (IFB). The scope of work in the IFB will include the following:

- Securing the recyclable materials staging lots to prevent theft and arson
- Removal and proper disposal of wastes and fluids under a current Guam Environmental Protection Agency (EPA) Storage and Processing Facility permit
- Volume reduction (disassembly, crushing, and/or baling)
- Transfer, staging, and shipping
- Furnishing receipts to document receipt at the ultimate recycling facility
- Comply with all applicable permits and regulations to conduct work

Means and methods for executing these requirements are to be determined by the successful bidders. Funding for this program should come from the RRF. Competitive selection process may include the following options:

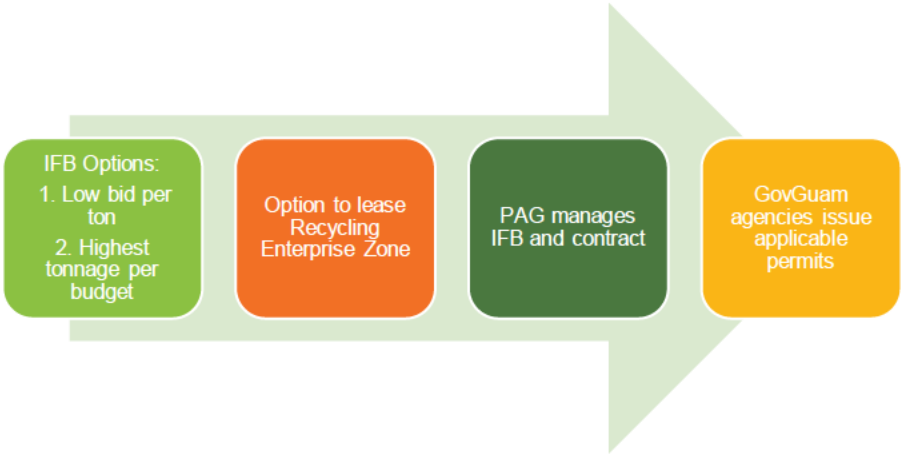
- Low bid per ton: Selection could be based on low bid per ton for a guaranteed tonnage recycled for a short time period (to minimize risk of fluctuation in scrap prices). Total annual budget would be provided. Payment will be based on tonnage of recyclable materials received at the ultimate recycling facility.

[1] PL 28-92 defines “recyclable materials” as materials that retain useful physical or chemical properties after use.

- Highest minimum tonnage for set annual budget: Contractors would guarantee a minimum tonnage recycled over a given time period. Total annual budget would be provided. Payment will be based on tonnage of recyclable materials received at the ultimate recycling facility.

The IFB will include the option for contractors to lease an operational area at the REZ for staging or processing. The PAG would manage the IFB and contract for priority materials recycling and GovGuam agencies would issue with applicable licenses, permits, etc. Figure 1 below illustrates the IFB and contract management process for recycling of priority wastes.

Figure 1. IFB and Contract Management Process



Partnership Opportunities

The following presents two potential partnership opportunities to accelerate the recycling of priority wastes off-island.

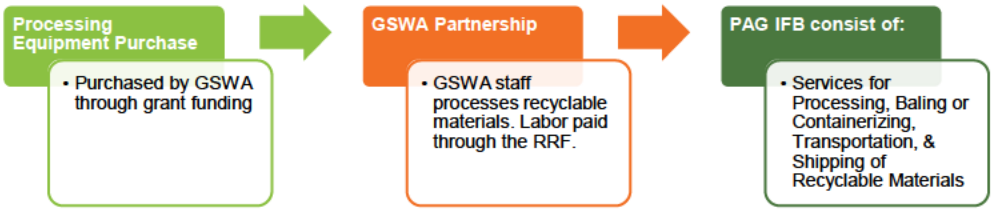
Opportunity 1: Partnership with GovGuam Agency. Junk vehicles, white goods, and other recyclable materials should be processed prior to transshipment by removing hazardous materials, compressing, and containerizing. Recyclable materials processing equipment may include a junk vehicle crusher and/or dismantling systems to remove refrigerants, compressor oils, and electrical units from white goods. Personnel should be trained on proper handling of hazardous materials and fluids.

One example of Opportunity 1 could be the processing of junk vehicles; the Guam Solid Waste Authority (GSWA) recently had a IFB for purchase of a junk vehicle crusher (self-contained) and collects fluids during the crushing process. It is our understanding that GSWA intends to own and maintain this equipment. Fluids drained from the junk vehicles would be handled through GSWA's waste contractor. There is an opportunity to have GSWA staff operate this crusher (and drain and manage fluids during the same process), with labor paid through the RRF. GSWA has stated that they would need to be compensated for their labor. If feasible, this is a possible solution for the first step in the junk vehicle recycling process; crushing/processing done by the entity owning and maintaining the equipment. This option is likely to be lower cost than the private sector conducting processing due to several factors:

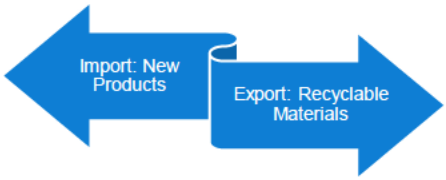
- the vehicle crusher is being purchased using grant funding;
- fluids would be managed by existing competitive contract; and
- GSWA labor rates are likely lower than private sector.

In this scenario, the scope of the PAG's IFB would be reduced to baling, then transportation and shipping off-island to the ultimate recycling company. Figure 2 illustrates the example partnership with GSWA.

Figure 2. Opportunity 1: Partnership Process with GSWA



Opportunity 2: Partnership with Shipping Companies. Evaluate the feasibility of partnering with shipping companies to provide reduced cost for shipping containers with recyclable materials off-island after unloading of new product shipments to Guam. This would include review of routes to target vessels that move containers to the markets where the recyclable materials are destined. It would also include approaching importers for support to find the shipping companies they use for importing tires, vehicles, white goods, and other relevant products.



Policy Decisions to Consider

The legislature has decided that vehicle end-of-life management should be covered by fees on vehicle registration, which accrue to the RRF. The RRF is intended to support the recycling of priority wastes generated on Guam, including junk vehicles, tires, batteries, and white goods. Therefore, it may be appropriate that the PAG use its commercial staff labor to manage the proposed recyclable materials recycling contract. It is recommended that PAG further discuss the possibility of PAG commercial staff labor to be reimbursed via funding from other agency programs, including the RRF.

Appendix J
Updates to the PAG Board Recycling Policy

Doc. No. 38GL-26-2386.*

PORT OF GUAM
ATURIDAT I PUETTON GUAHAN
Jose D. Leon Guerrero Commercial Port
1026 Cabras Highway, Suite 201, Piti, Guam 96925
Telephone: 671-477-5931/35 Facsimile: 671-477-2689/4445
Website: *www.portguam.com*

Eddie Baza Calvo
Governor of Guam
Ray Tenorio
Lieutenant Governor

BOARD POLICY MEMORANDUM NO. 2015-01

To: Division Heads	Subject: **Recycling Program**
Approved by the Board of Directors: **April 15, 2015**	Revision Date:
Approved by: FRANCISCO G. SANTOS, Chairman, Board of Directors	
All revisions are marked with an asterisk (*)	

I. **PURPOSE:** To implement a recycling program and establish process and procedures in the disposal of solid waste for a safer and healthier environment.

II. **DEFINITIONS:**

Fixed Assets are tangible, non-consumable property, which is capitalized. A fixed asset has an acquisition cost of at least $1,000.00, has a useful life of a least one year and is used to conduct Port business. The cost of a fixed asset includes the purchase price plus all costs to acquire (shipping & handling), install, and prepare equipment for its intended use.

Lease Agreements means any binding agreement by and between the Port Authority of Guam.

Recycle or Recycling means a method by which recovered resources are converted for use as raw materials or feedstock to make new products.

Recycling Company means any business licensed by the Department of Revenue and Taxation, and has been issued a permit, as required in Section 51104 of Chapter 51 of Title 10, Guam Code Annotated from the Guam Environmental Protection Agency (GEPA) to conduct business on Guam.

Recyclable Materials means materials which still have useful physical or chemical properties after serving a specific purpose for the same or other purpose. Recyclable materials are as follows:

1. batteries (lead-acid, portable computer batteries, nickel-cadmium, sealed types for power backup);
2. automobiles, buses, and trucks or any form of motorized vehicle;
3. tires (passenger/commercial);
4. enameled white goods (refrigerators, water heaters, air conditioners, washers, dryers and stoves);
5. home appliances (other small appliances that are not considered enameled white goods);
6. glass and plastic bottles;

7. foam padding;
8. lead;
9. metals (ferrous/non-ferrous);
10. organic material (i.e., tree trimmings, palm fronds, grass, food waste, soiled cardboard);
11. paper products;
12. wood pallets and scrap wood;
13. construction and demolition debris;
14. x-ray film;
15. automobile oil and fluids;
16. Freon and other refrigerant gases;
17. electronic waste (computers, circuit boards, televisions, and portable phones);
18. heavy equipment; and
19. other recyclable materials deemed recyclable by GEPA pursuant to the Rules and Regulations.

III. **SCOPE:**

A. This recycling program is prepared specifically for the Port Authority of Guam properties to include Harbor of Refuge, Agat Marina, Gregorio D. Perez Marina, Hotel Wharf, Seaplane Ramp, Port Beach and Family Beach.

B. ***Exempted*** from this recycling program are Fixed Assets of the Port Authority of Guam.

C. As to leases, the recycling program may be applied towards personal properties that are unclaimed or abandoned, unless manner of disposition is otherwise provided in the subject agreements.

Abandoned or unclaimed personal properties arising from lease agreements, the Port Authority shall make concerted effort to contact the lessee and provide reasonable notice on their final opportunity to retrieve such personal properties. Failure to do so will result in the Port Authority taking whatever action it deems necessary to remove such personal items.

IV. **AUTHORITY:** The Port Authority General Manager is possessed with the authority to dispose of recyclable materials in accordance with this Policy.

V. **PROCEDURES AND RESPONSIBILITIES:**

1. Operations Department or as otherwise designated by the General Manager:

a. To administer and facilitate the recycling program.

b. Shall make the determination if items are of recyclable materials as defined herein.

c. Generate an inventory list of items to be recycled and transmit to Property Control Officer (PCO) for inspection and clearance. This form is identified as the **'Inventory List of Recyclable Materials'**, as attached.

d. For purposes of record detention, copies of recycling documents shall be maintained and kept for a period of one year; thereafter said documents are to be transmitted to the Records Transfer and Receipt custodian for further disposition.

2. Finance Division:

a. Property Control Officer (PCO) shall:

i. Inspect and perform quality assurance of recyclable materials to validate that all recyclable materials are not of Fixed Assets of the Port Authority of Guam.

ii. Clear inventory list of items being processed for recycling by affixing his/her initials in the appropriate box affirming action of either *'Cleared'* or *'Not Cleared'* as contained in the **'Inventory List of Recyclable Materials'** form.

iii. Route inventory list of items ensuring completeness of documents for final approval of the General Manager with cover memo.

3. Division Heads: Any recyclable materials falling under this program should be coordinated with the administrator of this Policy for further processing.

VI. **DISPOSAL OF RECYCLABLE MATERIALS:** The recyclable materials shall be donated to a duly recognized non-profit organization identified by the General Manager that will be charged with furthering the disposal process.

VII. **REQUIREMENTS OF A NON-PROFIT ORGANIZATION:**

1. Responsible for the removal of recyclable materials in coordination with a Recycling Company that is licensed to conduct business on Guam and has been issued a permit as described herein.

2. Obtain an itemized official receipt from the Recycling Company to validate that items on the **'Inventory List of Recyclable Materials'** are true and correct, and are of the same items as identified therein for removal from Port properties.

3. Provide a copy of the official receipt received from the Recycling Company to the Port Authority of Guam Operations Department and Procurement Division.

4. Failure to comply with this Policy shall render cessation of the non-profit organization from future donations.

VIII. **SEVERABILITY:** If any provision of this Policy or its application or circumstance(s) is held invalid, the invalidity *shall not* affect other provisions or applications of this Policy which can be given effect without the invalid provision or application and to this end the provisions of this Policy are severable.

Port Authority of Guam
Inventory List of Recyclable Materials

Department: _____ **Name:** _____ **Date:** _____

Property Control Officer

No.	Description	Location	Unit	Qty	Cleared	Not Cleared
1						
2						
3						
4						
5						

(Additional space provided on separate sheet.)

_____
John Santos
Operations Manager

_____
George Pecina
Property Control Officer

/ / Approved / / Disapproved

_____
Joanne M.S. Brown
General Manager

To be completed by Recycling Company:

(Name of Company): _____,
hereby certify receipt of ***'Cleared'*** recyclable materials listed.

Authorized Representative:

Print: _____

Signature: _____

Date: _____

Recyclable materials donated to a duly recognized Non-Profit Organization:

_____

Authorized Representative: *(Print/Sign)*

_____

_____

Port Authority of Guam
Inventory List of Recyclable Materials

Department: _____ **Name:** _____ **Date:** _____

Property Control Officer

No.	Description	Location	Unit	Qty	Cleared	Not Cleared
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						

Appendix K
Implementation Roadmap

Doc. No. 38GL-26-2386.*

Implementation Roadmap

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Acronyms and Abbreviations

A	amp (s)
AC	air conditioning
ASHRAE	American Society of Heating, Refrigerating and Air-Conditioning Engineers
BAS	building automation system
BMS	building energy management system
CNG	compressed natural gas
DDC	direct digital control
DX	direct expansion
ECM	Energy Conservation Measures
EER	energy efficiency ratio
ESCO	energy service company
ESPC	Energy Savings Performance Contracts
EV	electric vehicle
G3	Guam Green Growth
GDOE	Guam Department of Education
GEDA	Guam Economic Development Authority
GEO	Guam Energy Office
GHG	greenhouse gas
GPA	Guam Power Authority
GRTA	Guam Regional Transit Authority
GSWA	Guam Solid Waste Authority
Guam EPA	Guam Environmental Protection Agency
GWA	Guam Waterworks Authority
HVAC	heating, ventilation, and air-conditioning
ICE	internal combustion engine
IPMVP	International Performance Measurement & Verification Protocol
IRA	Inflation Reduction Act
kW	kilowatt(s)
kWh	kilowatt-hour(s)
LC	load center
LEAC	Levelized Energy Adjustment Clause
LED	light-emitting diode
LSEV	low speed electric vehicle
MT CO2e	metric ton(s) of carbon dioxide equivalent
MW	megawatt(s)
O&M	operations and management
PAG	Port Authority of Guam

Port	Port of Guam
PPA	Power Purchase Agreement
PV	photovoltaic
RACI	responsible, accountable, consulted, informed
REC	renewable energy certificate
RLF	Revolving Loan Fund
SEER	seasonal energy efficiency ratio
SHGC	solar heat gain coefficient
USEPA	U.S. Environmental Protection Agency
V	volt(s)
VAV	variable air volume

1.0 Introduction

This appendix will provide a deeper dive into the five key solutions identified in the Zero Emissions Strategy presented in Section 4.3, Table 6, of the *Sustainability and Resilience Plan*, following the order of the three action categories:

- Direct Action (Section 2)
- Collaborative Action (Section 3)
- Nature-based Solutions (Section 4)

A Zero Emission Workshop was held with key personnel across the Port Authority of Guam (PAG) and supporting stakeholders to discuss the potential solutions and agree upon a timeline for implementation. Information from the solutions identified by the project team and discussed in the workshop is presented for each category in the following sections. Each of these sections will present the following to address the key solutions:

- **Description**: Outline of the key solutions and strategies within the category
- **Greenhouse Gas (GHG) Emissions**: Quantification of the GHG emissions associated with the solution
- **The Wedge Diagram**: Quantification of the carbon reduction solutions
- **Cost Analysis** (where appropriate): High-level assessment of the costs and financial levers available for implementing solutions
- **Implementation Roadmap**: Key activities and next steps

2.0 Direct Actions

2.1 Electrification of the Passenger Fleet

2.1.1 Description

During the Zero Emissions Workshop, the following challenges related to decarbonization of cargo handling equipment and fleet vehicles were identified and discussed:

- Lack of required electric vehicle (EV) charging stations and electrical infrastructure
- Potential disruption to Port of Guam (Port) operations
- Existing cargo handling equipment with service life remaining
- Current electricity mix on Guam is carbon intensive

It was decided that by decarbonizing the passenger fleet before any cargo handling equipment, the lessons learned from electrifying these assets could be applied as the Port continues its decarbonization journey.

Electrification of the passenger fleet, rather than alternative clean fuel options, was identified as the most suitable solution for decarbonization of this emission source (Scope 1 on-road GHG emissions). This is primarily driven by lower emissions of EVs relative to alternative fuels such as compressed natural gas (CNG) or propane. EVs are increasingly becoming more cost competitive because of advances in battery technologies, and now garner a larger market share in the United States (IEA 2024) versus alternatively fueled passenger vehicles. The EV market in the United States is expected to show an annual growth rate of 10.49 percent, reaching $156.3 billion[1] as a projected market volume by 2029 (statista 2024). Furthermore, multiple initiatives across Guam are supporting the transition to electric vehicles, including the following:

1. The Guam Green Growth (G3) Renewable Energy Project (Transportation Measure #1) will see the installation of ten Level 2 EV charging stations, five at the Chamorro Village of Hagatna and five at the University of Guam campus in the village of Mangilao.

2. The replacement of the Guam Waterworks Authority (GWA) passenger fleet (20 vehicles in total) with EVs will include the installation of EV charging stations for agency use.

3. The replacement of Guam Regional Transit Authority (GRTA) transit vehicles (10 vehicles in total) with EVs will include the installation of EV charging stations, batteries, contracts for installation, maintenance, and training for agency use.

4. The replacement of the Guam Department of Public Works passenger fleet (10 vehicles in total) with EVs will include the installation of EV charging stations, batteries, contracts for installation, maintenance, and training for agency use.

There are multiple categories of EVs that the PAG will want to consider as options for decarbonization. Smaller EVs such as golf carts and small utility vehicles (referred to as low speed electric vehicles, or LSEVs) can be charged via standard 120-volt (V) 20-amp (A) outlets and require no additional charging infrastructure. Light duty battery electric work trucks and vans will require 240V-fed charging infrastructure to supply the necessary power outputs, varying from 7 to 19 kilowatts (kW).

[1] Note that money amounts in this appendix are presented in U.S. dollars.

2.1.2 Greenhouse Gas Emissions

GHG emissions for the passenger fleet are captured in Scope 1 on-road emissions. Table 1 summarizes the results for the GHG baseline. On-road vehicles were categorized per U.S. Environmental Protection Agency (USEPA) Emission Standards guidance (USEPA 2024c). When compared against the total GHG emission baseline of 4,743 metric tons of CO2 equivalent (MT CO2e) per year, the passenger fleet emissions comprise 4 percent of GHG emissions.

Table 1. Scope 1 GHG Emissions for On-road Vehicle Types

Vehicle Type	2021 Emissions (kilograms of CO2e)	2022 Emissions (kilograms of CO2e)	Yearly Fuel Consumption (gallons) [a]	No. of Units[a]	Yearly Baseline (MT CO2e)
Passenger Vehicle	1,495	2,141	207	2	2
Other Light Duty Trucks	15,317	15,433	1,747	32	15
Pickup Truck	76,310	102,837	10,178	32	90
SUV	110,837	44,630	8,833	9	78
Van	7,758.29	21,542	1,665	9	15
Total	**211,717**	**186,583**	**22,629**	83	**199**

[a] Averaged across both years (2021 and 2022)

SUV = sport-utility vehicle

2.1.3 Decarbonization Solutions

The electrification of the passenger fleet will increase the electrical consumption of the Port, leading to a potential increase in Scope 2 emissions. To quantify the net carbon savings, the energy demand for the passenger fleet was estimated using the following equation:

$$Gal\ x\ Fge\ x\ Te\ =\ ED$$

Where:

- Gal = yearly fuel consumption in gallons
- Fge = Fuel gallon energy in kilowatt-hour (kWh) per gallon. Estimated to be 33.7 kWh/gallon (energy content for gasoline [USEPA 2024b])
- Te = Thermal efficiency in percent. Estimated to be 30%
- ED = Energy demand in kWh/year (ref)

The carbon intensity factor of the grid could then be applied to the energy demand value to estimate the carbon emissions associated with the conversion of the passenger fleet. Guam's Priority Action Plan indicated their current generation mix results in power at 0.77 kilograms of CO2e per kWh (University of Guam 2024).

Table 2 provides the values quantified, where positive values for the Total Savings column indicate that EV's have a lower GHG footprint when operating than standard internal combustion engine (ICE) vehicles. Values are rounded up to the nearest whole value for brevity.

Table 2. Estimated GHG Emissions in MT CO2e per year when converting Internal Combustion Engine vehicles to Electric Vehicle equivalents.

Vehicle Type	Average Fuel Use (gallons/ year)	Fuel Emissions (MT CO2e/year)	Energy Demand (kWh/year)	Electric Emissions (MT CO2e/year)	Total Savings (MT CO2e/year)
Passenger Vehicle	206	2	2,088	2	0
Other Light Duty Trucks	1,747	15	17,661	14	2
Pickup Truck	10,178	90	102,897	79	10
SUV	8,833	78	89,300	69	9
Van	1,665	15	16,835	13	2
Total	**22,629**	**199**	**228,781**	**176**	**23**

It is important to note that this provides the most conservative carbon emission values for electrification. LSEVs are a potential solution for passenger fleet electrification as they generally tend to have lower energy consumption than standard EVs, which would provide greater savings in carbon emissions. It is suggested that the PAG facilitate a workshop to understand the transportation requirements of the different teams, as there may be opportunities to convert certain passenger vehicles and other light duty trucks to LSEVs based on the operational requirements.

2.1.4 Cost Analysis

A preliminary high-level financial analysis was conducted for the purchase of 86 EVs. For the purposes of this report, it is assumed that the category of other light duty trucks can be converted to LSEVs.

To conduct this analysis, certain assumptions based on the provided passenger fleet data were made (Table 3). These values may be an overestimation of true annual mileage as it is difficult to account for idling time.

Table 3. Assumptions of Average Annual Mileage per Vehicle Based on Yearly Fuel Consumption

Vehicle Type	Yearly Fuel consumption (gallons) [a]	No. of Units [a]	Assumed Efficiency (miles per gallon)	Average Annual Miles per Vehicle
Passenger Vehicle	207	2	23	2,375
Other Light Duty Trucks	1,747	32	19	1,747
Pickup Truck	10,178	32	16	5,088
SUV	8,833	9	21	20,607
Van	1,665	9	16	2,960
			Average per vehicle	**6,555**

[a] Averaged across both years (2021 and 2022)

Desk-based research for the most appropriate comparison models was conducted for ICE vehicle costs versus EV costs. Table 4 provides a breakdown of these costs as well as net savings after 6 years per vehicle, as well as total savings for entire fleet. Although certain categories suggest a net loss in costs (as indicated by numbers in parentheses), overall, there is a net savings of $219,029 over 6 years for the entire fleet conversion. It is important to note that this analysis does not account for the maintenance cost difference between ICE vehicles and EVs. However, research suggests that EVs are cheaper to maintain than ICE vehicles, with estimations suggesting EV maintenance totals of 6.1 cents per mile versus ICE vehicle maintenance total of 10.1 cents per mile (U.S. Department of Energy 2021). It is important to note that the costs indicated in this table do not include the requirements for infrastructure upgrades and the installation of charging stations.

The specific needs of the Port may vary, necessitating a series of engagements with subject matter experts to develop a clear path forward. The PAG should consider the operational requirements of each vehicle type to determine the most suitable EV conversions. Identifying the appropriate EV conversion will influence the overall financial results, with further work required to understand the appropriate vehicles. As highlighted in Table 3, converting certain vehicles to LSEVs, such as the Pickman, can result in significant savings in both capital and operating costs. However, these LSEVs have a limited mileage range and will likely need to be charged every night. In contrast, larger vehicles offer a greater mileage range, allowing for longer intervals between charges. This extended range can provide a crucial safety buffer for Port operations in the event of any energy supply disruptions. A successful fleet conversion will hinge on detailed engagement with transportation teams to develop a tailored action plan.

The estimations provided in Table 3 do not include the cost estimations for construction of electrical charging stations. Therefore, the indicated total cost savings for EV conversion may be lower than these estimates suggest.

Table 4. Cost Estimations for Conversion of the ICE Passenger Fleet to EVs

Vehicle Type	ICE Equivalent	ICE Base Price	ICE Annual Fuel Cost[a]	EV Equivalent	EV Overall Price[b]	EV Annual Costs[c]	6-year Net Savings per Vehicle	Total Cost Savings
Passenger Vehicle	2023 Toyota Corolla	$26,000.00	$393.36	2024 Tesla Model 3	$46,422	$176	$(19,685)	$(39,370)
Other Light Duty Trucks	2024 Toyota Tacoma SR	$40,599.00	$462.96	Pickman 4XR	$30,050	$129	$12,551	$401,619
Pickup	2024 Ford F-150 XLT 2WD	$52,500.00	$1,419.28	F-150 Lightning	$59,288	$923	$(3,807)	$(121,808)
SUV	Toyota Rav-4	$32,299.00	$4,045.08	2024 Chevrolet Blazer EV	$52,133	$2,364	$(9,745)	$(87,703)
Van	2024 Ford Transit 350 XL	$55,000.00	$1,045.87	Ford E-Transit 350	$50,953	$493	$7,366	$66,291
Total								**$219,030**

[a] Using a gas price per gallon as of June 2024 of $5.30.

[b] This price is based on U.S. automakers' manufacturer's suggested retail price (MSRP) pricing and includes $3,792.48 cost per vehicle for shipping and $7,500 tax rebate for EV purchase. Note that LSEVs do not qualify for rebate.

[c] Cost per kW on Guam estimated to be $0.37 per kWh.

2.1.5 Roadmap for Implementation

To maintain the course to achieve Net Zero by 2050, the PAG should aim to have completed their ICE passenger vehicle conversion to EVs by 2035. This aligns to the trajectory as described in the Wedge Diagram and allows for lessons learned from passenger fleet conversion prior to the decarbonization of yard equipment.

A successful upgrade will require key steps for implementation. Consideration is needed of which types of EVs are required, their daily operational times and how transportation might need to adapt, and the location, cost, and quantity of additional charging infrastructure.

A RACI matrix has been developed to implement this transition and identify key next steps for success. The matrix is a tool for defining key tasks and associated roles and responsibilities, with the acronym, RACI, representing the following:

- Responsible (R): The person/people who do the work to complete task.
- Accountable (A): The person/people who is ultimately answerable for the correct and thorough completion of the task. There should only be one accountable person per task.
- Consulted (C): Those whose opinions are sought or required for task completion, typically subject matter experts.
- Informed (I): Those who are kept up to date on progress, often only a one-way communication.

Table 5. RACI Matrix for the Conversion of ICE Passenger Fleet to EVs

Task	Strategic Planning Team	O&M Teams	Port Leadership	Transportation Teams	External Consultants
Assess Fleet Requirements and Select EV Models. Evaluate types of EVs needed based on daily operational times, range requirements and passenger capacity.	R	C	A	R	R
Plan Charging Infrastructure. Determine the location, quantity and type of charging stations required based on output of previous task.	R	C	A	I	R
Conduct Feasibility Study and Cost Analysis. Analyze financial implications, including initial investment, operations and maintenance (O&M) costs, and potential savings based on outputs of previous two tasks.	C	I	A	C	R
Procure and Install Charging Stations. Upgrade Electrical infrastructure where necessary.	C	R	A	I	C
Deploy EVs and Monitor Fleet Operations. Purchase EVs in batches so that shifts in operations can be captured in implemented with minimal disruption.	C	C	A	R	C

2.2 Energy Management and Efficiency Strategies

2.2.1 Description

As the Port's Scope 2 emissions (those associated with electricity consumption) are higher than Scope 1, decarbonization solutions should prioritize energy efficiency to deliver meaningful GHG reduction. This includes reducing total consumption and providing the ability to control and manage how energy is used.

A series of eight Energy Conservation Measures (ECMs) were identified for implementation. These recommended measures include best practices applicable to the Port, as well as more site-specific opportunities such as lighting upgrades based on discussions with facilities management personnel. Existing conditions of buildings and systems were also taken into consideration when forming the ECM recommendations. These measures include the following:

- Convert existing non- light-emitting diode (LED) lighting fixtures to LED system
- Retrofit or replace air-conditioning (AC) and ventilation units with higher efficiency models
- Retrofit refrigeration systems with energy-saving controls
- Retrofit or replace AC controls
- Reduce energy use by plug loads
- Add solar energy with battery energy storage system
- Retrofit windows with solar film to reduce AC energy
- Enhance AC O&M with condenser coil cleaning and coatings

Many of these measures can be implemented early in the decarbonization journey with little to no capital investment, and/or rapid financial payback. However, they may require additional detailed analysis, calculation, and/or modeling to estimate capital cost, energy savings, and payback period. Other complex energy efficiency measures, with integrated or cascading utility system impacts, might not be individually identified as part of this initial energy reduction strategy and might require a special engineering study to confirm feasibility and approach. An important next step for the PAG is to perform a detailed onsite energy efficiency audit of all facility buildings and mechanical and electrical systems, build a comprehensive picture of energy reduction potential, and further estimate cost savings and required capital cost. Table 6 shows a list of potential ECMs identified for each building or facility area in scope.

Table 6. Potential ECMs Identified for each Building or Facility Area in Scope

Building	ECM 1	ECM 2	ECM 3	ECM 4	ECM 5	ECM 6	ECM 7	ECM 8	ECM 9	ECM 10	ECM 11	ECM 12	ECM 13	Emission Savings Potential
Building	Air-Conditioning Upgrade	Lighting Upgrade	Appliances	Refrigeration Retrofit	Controls Upgrade	Envelope Retrofit	Plug Load Retrofit	Ventilation Upgrade	O&M Upgrade	Cargo Handling	Solar PV Array	Waste-to-Energy	Energy Storage	Emission Savings Potential
Admin	X	X			X	X	X	X	X					Medium
Annex A		X	X		X	X	X	X	X					Low
CFS Container Freight Station	X	X		X	X	X	X	X	X					Medium
Collapsible Container														TBD
Container Yard		X												High
EQMR	X	X	X		X	X	X	X	X					Medium
Fire Pump Bldg		X			X	X	X	X	X					Low
Gantry Crane office		X			X	X	X	X	X					Medium
Gatehouse		X			X	X	X	X	X					Low
GDP Marina office		X			X	X	X	X	X					Medium
High Tower	X	X			X	X	X	X	X					Low
Horizon (Admin Annex, Port Police)	X	X			X	X	X	X	X					Medium
LC-1														
LC-2														
LC-3														
LC-4														
LC-5														
Lower Tower	X	X	X	X	X	X	X	X	X					Low
New Operations (former Port Police bldg)	X	X			X	X	X	X	X					Low
PCC Port Command Center		X	X	X	X	X	X	X	X					Medium
Port Police Shacks		X			X	X	X	X	X					Low
Street/ Ext Lights														Low
Terminal Gates Booths		X			X	X	X	X	X					Low
Warehouse 1		X	X		X	X	X	X	X					Medium
Welding Shop	X	X	X		X	X	X	X	X					Medium
zPAG Portwide											X	X	X	Medium

2.2.1.1 Energy-efficient Lighting Upgrades (LED)

Interior lighting throughout the existing facilities includes LED and fluorescent lighting, as well as incandescent and high-intensity discharge lighting. Exterior lights include high-intensity discharge technology and LED. Along with being one of the most energy-efficient lighting choices, LED has the highest life expectancy with one of the lowest maintenance costs over the lifetime of the fixture. LED lighting also has minimal heat waste, which reduces building internal heat gains and the need for space cooling. Replacing fixtures with LED alternatives is a quick-win strategy that will result in decreased overall facility energy consumption.

PAG facilities teams have been upgrading interior lighting with LED tubes on an as-needed replacement basis. In addition, new construction and newly renovated spaces are being fitted with LED lighting systems**.** Table 7 summarizes the progress of the lighting upgrades to date, based on discussions with facilities, and is reflected in the energy baseline. Light green highlighted sections indicate completed LED upgrades. Estimated energy savings from the recommended remaining upgrades are incorporated into the energy reduction calculations and roadmap based on expected timeline of completion.

In addition, lighting controls upgrades can be implemented to further realize the benefits:

- Add occupancy and vacancy sensors in spaces that have only manual controls. Photosensors can be added in addition to the occupancy sensor controls where exterior glazing can provide adequate lighting levels. Exterior glazing can be in the form of exterior windows, skylights, and translucent panels. The proposed sensors should be capable of delayed reaction control, so the lights are not frequently turned on and off.
- Add photosensors in areas that could benefit from daylighting. Dimmable LED drivers are recommended in areas with dense lighting load, which will reduce lighting from existing fixtures without turning them off. This type of upgrade is recommended in areas where sunlight is available but may not allow lighting to be completely switched off. This reduces the overall energy consumption during daylighting hours for rooms with adequate sunlight from exterior glazing.
- There is currently no scheduled changeout of the remaining non-LED lighting inventory. Port facility maintenance staff has been evaluating container yard lighting concerns. The container yard has large number of metal halide fixtures, as noted in Table 7. The current lighting upgrade at the Port has been largely ad-hoc, involving as-needed replacement of non-LED bulbs. This may contribute to inconsistency in visual appearance, illumination, and color temperatures. Most often, replacement of commercial non-LED lamps with LED bulbs without addressing existing ballasts, fixture condition, rewiring, and illumination strategies results in lower efficiency gains. In many cases, a full replacement of the lighting fixture will achieve maximum power reduction per fixture with improved illumination performance.

Table 7. PAG Lighting Systems: Existing Conditions and Future Projects

Port Authority of Guam Lighting FY2024 Cabras, Piti; STS Carnes, Outer Areas																		
Location	**1500W MH**	**1000W MH**	**400WMH**	**250W MH**	**150W HPS**	**70W HPS**	**450W LED**	**215W LED**	**140W LED**	**104W LED**	**80W LED**	**40W LED**	**15W LED**	**F32T8 (4)**	**F32T8 (2)**	**32W CFL**	**31W Fluor**	**60W Incnd**
Admin Bldg			3									48		171	28			6
Port Cmnd Ctr															41		42	3
Horizon Bldg.														23	45			
Ops Bldg.							3							40	18			
Welders Shop			6												7			
EQMR Bldg			23					6				14		22	38	2		
WH1			41				12			4		9		11	24			4
CFS Building		22	10											29	37			
High Tower														6	6			1
Lower Tower														13	6			
Gatehouse															15			
Term Booths										8		6						
Fire Pump Bldg															9			
LC1															11			
LC2															10			
LC3															6			
LC4												9						
LC5															18			
Guard Shacks			3		6	3									8			
Container Yard	123	139					28											
Parklot/Street									40									
Annex A														37	4	1		
Agat Marina			8						14						34	11		
GDP Marina			4								11				3			
Gantry Cranes		42					2						36					
Totals	**123**	**203**	**98**	**0**	**6**	**3**	**45**	**6**	**54**	**12**	**11**	**86**	**36**	**352**	**368**	**14**	**42**	**14**

2.2.1.2 Energy-efficient Air Conditioning and Ventilation Upgrades

Per discussions with facilities engineering and operations personnel, there have been some equipment repairs and replacements as equipment reaches end of life, and there are several other ongoing and planned projects to maintain operations and improve facility performance. It is recommended that these projects continue and include a review of the current capital improvements plan to identify opportunities and ensure compatibility with established decarbonization goals.

In addition to these projects, there are other opportunities for upgrades to the existing systems that can be completed in the near term that not only address basic maintenance requirements but can also improve efficiency and performance. Typically, projects have been done on an as-needed basis and not specific to addressing energy reduction or sustainability goals. To maximize the benefits of these capital improvement projects, it is important to evaluate the systems and interactive effects on facility performance more holistically and implement strategic projects that not only improve operations and system reliability but also support the Port's sustainability vision.

2.2.1.3 Replace and Retrofit Appliances and Refrigeration Systems

Cooling load reduction: American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) Climate Zones 1 and 2 applicable to the Port are prone to significant night heat and moisture build up. Adding roof or wall exhaust fans or retrofitting existing exhausts with controls for night purge will reduce daytime cooling load and cooling energy if infiltration through doors and windows are kept to a minimum.

Premium efficiency motor upgrades: Replace existing standard fan and pump motors with higher-efficiency motor models. Reduced energy consumption, higher service factor, longer component lifetimes, and less heat output are some benefits of upgrading motors.

Appliances ECM: The PAG currently operates electric dryers and washing machines at six locations. It is recommended to replace washers and dryers more than 10 years old with EnergyStar-rated high-efficiency units. Alternatively, to achieve higher savings, it is recommended to centralize all washing and drying in a single laundry facility that can use commercially advanced energy and water saving technologies such as ozone water savings and energy reuse.

Refrigeration ECM: The PAG currently operates ice machines at three locations. Retrofitting these ice machines with a heat exchange system (HX) can significantly reduce kWh consumption by lowering incoming water temperatures that reduces ice-making cycle times.

Strategic replacement of existing split systems: Upgrade to higher seasonal energy efficiency ratio (SEER) units with a minimum rating of SEER 14 with ventilation. Prioritize older units with greater than 10 percent coil damages due to corrosion.

2.2.1.4 Air Conditioning Control Upgrades

Controls ECM: The PAG can achieve significant savings by optimizing and upgrading building ventilation and air-conditioning control systems with energy-saving features. In the short term, quick results can be seen by replacing existing fixed thermostats to programmable thermostats with remote override as well as by interlocking AC units to lighting occupancy sensors. Several other controls-related measures should be investigated.

Implement demand control ventilation (where appropriate): In occupied spaces (without prescribed pressurization or ventilation requirements), ventilation systems are typically set to provide a constant amount of outside air based on anticipated space occupancy. As an alternative, outside air flow can be adjusted based on the actual dynamic occupancy demand of the space. Carbon dioxide sensors provide a means of implementing demand control ventilation for minimum safe occupancy requirements, reducing fan energy and energy required to condition outside air. It is recommended that the feasibility of implementing demand control ventilation be investigated for applicable conditioned spaces with fluctuating occupancy density, such as dedicated office spaces.

Replace existing heating, ventilation, and air-conditioning (HVAC) distribution with variable air volume (VAV) systems if applicable: Replace or convert constant air perimeter induction systems with VAV systems, which reduce fan horsepower, eliminate simultaneous heating and cooling, and decrease the amount of energy needed for conditioning the spaces. These shifts in HVAC operation can significantly reduce energy consumption, as well as improve air circulation in the conditioned space(s).

Update facility pressurization plan and rebalance facility airflow: Workshop and laboratory type facilities have strict ventilation requirements, ensuring adequate air exchange rates and air filtration for the health and safety of building occupants. For this reason, the conditioning of makeup air is a top energy consumer in such facilities. In many cases, makeup air rates are set according to the original system design and never revisited. It is recommended that the pressurization and ventilation plan be updated for each facility, to identify potential for makeup air reductions and significant energy savings. The facility airflow can then be rebalanced, and the controls updated as needed.

Building automation system (BAS) and controls upgrades and strategies: Information is not available whether the PAG is implementing BAS upgrades at its facilities that replace existing pneumatic or electric relay control systems with direct digital controls (DDCs). Pneumatically actuated controls systems have a significantly lower overall system efficiency as compared to DDC because of the amount of energy necessary to produce the required compressed air, as well as their limited capabilities for system optimization and modulation that electronic systems offer. DDC systems provide expanded controls optimization capability such as scheduling, temperature setpoints and setbacks, temperature resets, variable speed operations, and ventilation controls. DDC systems also offer a centralized platform that can be expanded on as an energy management system is installed. DDC systems also require comparatively minimal O&M costs.

Retro-commissioning and controls optimization: Significant energy savings can be realized through optimization of existing facility systems performance. Retro-commissioning of a building considers the original design and operational strategy of the building, facility systems, equipment, and energy management system and identifies opportunities for incorporating more modern operational improvements. Retro-commissioning is especially beneficial in buildings that have been in operation for many years, as over time, the building's operations become out of sync with today's operating conditions, building documentation and historical data is lost, and equipment is replaced but not properly integrated. A detailed onsite energy audit using a whole-building approach followed by retro-commissioning can address these potential concerns. At a minimum, an ASHRAE Level 2 building energy audit will establish a plan for correcting deficiencies and moving forward with an updated facility energy and asset management strategy.

In addition to or in conjunction with building retro-commissioning, the facility systems control strategies and current setpoints will be assessed for potential to optimize energy efficiency. Major facility systems, such as ventilation, heating and cooling, and lighting, operate based on control strategies that may be linked to environmental feedback or static setpoints. Often these control strategies have not been reviewed for relevancy since initial building commissioning. The existing control strategies will be reviewed, and recommendations will be made for eliminating irrelevant control sequences, changing control setpoints, automating control sequences, installing sensors for tighter controls, and shifting operational loads relative to building occupancy schedules.

2.2.1.5 Reduce Energy Use by Plug Loads

Plug load ECM: Internal loads in a building can contribute significantly to energy consumption, both from direct usage (that is, plug loads) as well as increased cooling requirements from added heat rejection loads. For the PAG, there are several internal load sources, including typical office equipment such as computers and printers, and refrigeration, kitchen, or small lab equipment. When combined, these loads can account for a large portion of total building electric energy consumption, not including impacts to cooling requirements. Small appliances experience standby power usage. It is recommended to retrofit computers/uninterruptible power supplies, printers, coffee machines, TVs, and other plug loads using a centralized WiFi-based plug load control software to reduce standby power loss.

2.2.1.6 Add Solar Energy with Battery Energy Storage System

Solar PV with energy storage: A pre-feasibility level assessment for onsite solar photovoltaic (PV) opportunities was conducted for the PAG's existing portfolio. The most feasible solution, and largest potential for onsite solar PV, is parking lot solar shading canopies. Some facilities also have potential for standard ground-mounted solar arrays. However, these are considered tentatively feasible as the suitability of solar PV installation on parking garages is highly dependent on the type of construction and structural integrity of the parking structure and requires an additional comprehensive study. Based on the current net metering incentive available from the Guam Power Authority (GPA) and on physical site location considerations, it is recommended to conduct a detailed feasibility study to install a 100kW pilot array (optimum size) at Load Center 1 (LC-1).

Incorporating a battery energy storage in conjunction with a PV installation could allow the PAG more flexibility with the 100kW net metering incentive limit as excess production can be stored for other uses. Under such a scenario, it is recommended to consider installing a 250kW battery energy storage system at LC-1 powered by 200kW solar PV capacity to charge the EV fleet and electric fork lifts and reduce peak demand charges.

2.2.1.7 Retrofit Windows with Solar Films to Reduce AC Energy

Envelope ECM: Window films are an energy-saving strategy for months when mechanical cooling is used. The PAG's windows are exposed to direct solar radiation during the hottest parts of the days. Even with interior blinds or curtains, the heat gain from solar radiation would be quite noticeable. Adding window films with a lower solar heat gain coefficient (SHGC) would reduce load on the AC systems. It is recommended to retrofit the existing glazed windows and glass doors with an interior-applied film. Solar films are a lower cost interim strategy compared to full window replacements, in addition more holistic envelope improvements are discussed in the following paragraphs.

A building's envelope is responsible for a significant portion of the total energy consumption, because of thermal load impacts (that is, solar gains and heat loss) and infiltration. For example, the building envelope in a typical office building can account for almost 30 percent of the total cooling loads in a cooling dominant climate. When designing a new building, it is much easier to incorporate strategies such as insulation values, window quantity and location, glazing requirements, and building orientation to optimize the cost/benefit of building envelope design and performance. When working with existing buildings, this becomes much more challenging, as significant changes to the envelope are cost prohibitive and sometimes not feasible because of disruption to occupants. The facilities included in this study range in age from original construction to newer additions and renovations within the last few years. Older facilities typically offer more savings potential, as minimum design requirements as well as available materials did not support energy performance as much as current day standards. However, a significant amount of investment is required to fully upgrade a building. Best practice strategies typically employed on existing buildings include the following:

- Weatherstripping on doors and windows (include as regular maintenance activity to check and repair)
- Window glazing upgrades such as energy-efficient window film or interior shading systems on existing windows
- Window replacements, including tinted/low-e glazing (also can significantly reduce infiltration)
- High-albedo roof coating addition or repair (incorporated with roofing replacement projects)
- Increased roof insulation (incorporated with roofing replacement projects)
- Exterior shading over windows (dependent on structural impacts)

2.2.1.8 Enhance AC Operations and Maintenance with Condenser Coil Cleaning and Coatings

O&M practices ECM: Upgrade O&M with condenser coil cleaning and coatings. The outdoor environment can be harsh on heat transfer surfaces. Weather and age can cause degradation to condensing unit coils and fins. This is especially the case at the PAG. Direct expansion (DX) condensing unit efficiency is determined by the ability of the unit to reject heat to the environment. This heat transfer

occurs most efficiently when the condenser coils and fins are in good condition and have access to free-flowing outside air. Degradation of the coils and fins in the form of oxidation on the surface can create an insulating layer that degrades the ability of the unit to transfer heat to the outside air. This degradation causes a decrease in efficiency, performance, and the overall life of the system. Cleaning condensing unit coils and applying a protective corrosion inhibiting coating can improve energy efficiency of existing units.

Applying a protective corrosion inhibitor decreases environmental damage to the condenser coils. Inorganic coatings increase the performance and lifespan of the equipment while providing consistent protection throughout the life of the system. In addition to extending the listed performance of the equipment, coatings increase the heat transfer capabilities of the system, thus increasing the overall efficiency of the systems. The USEPA and manufacturer's studies show coil coating can recover an existing units' energy efficiency ratio (EER) by an average of 9 to 12 percent, depending on the coating used.

The inhibitor can be applied on units before installation or on already installed (new or existing) units in the field. Existing DX condensing equipment should meet the following criteria to be considered for field coating:

- Equipment is not currently coated.
- Field-identified evidence is of only minor environmental damage.
- Equipment is not beyond 50 percent of its useful life.

This ECM does not apply to equipment with condenser coils deteriorated past the point of restoration. As part of this measure, it is recommended that evaporator and condensing coils be cleaned of dirt and corrosion on identified DX equipment. Condensing coils with damaged fins should be fixed and refrigerant charge corrected. Each condensing coil should receive a protective coating to maintain coil integrity and proper heat exchange properties. The key benefits to the PAG of this solution include the following:

- Reduced energy costs by restoring cooling efficiency performance
- Extended equipment life; coil refurbishment extends the life of the condensing unit

2.2.1.9 General Energy Management System Implementation Process

Energy management is also a fundamental part of a successful energy reduction strategy. Without energy management tools, system performance typically degrades. An energy management program involves implementing a systematic and proactive approach to energy efficiency that is driven by energy monitoring data. Ultimately, energy management is the key to improving performance, conserving energy, and saving money through the lifetime of a facility. These practices are recommended for implementation in strategic coordination with infrastructure upgrades. Best practices include the following:

- Establish metering/submetering plan with metering equipment
- Reduce labor associated with manual energy monitoring and management
- Develop a fault detection and alarm strategy
- Document current O&M procedures that include energy-saving maintenance practices as previously discussed
- Update procurement policies and sustainable design guidelines that prescribe minimum efficiency requirements

A nominal amount of projected savings from these strategies is incorporated into the roadmap; however, the Port will need to perform detailed energy and condition assessment to evaluate specific opportunities at each of the facilities. In addition, the Port should establish a set of sustainability design criteria that include these strategies, as well as incorporate the most current design standards for any new major renovation projects where building envelope upgrades can be incorporated more cost effectively with little to no impact to operations or occupants.

2.2.1.10 Submetering Strategy for Establishing and Validating Energy Conservation Measures (ECMs)

Concurrent to the implementation of the above ECMs, it would be valuable for the Port to implement submetering to understand the direct consumption of electricity.

It is common for a single revenue meter to be installed by the utility company (such as GPA) for an entire campus of buildings. This serves the purposes of the utility company well but does not provide any information about the distribution of the load among buildings within the campus. Information about the loads at individual buildings can be used to equitably allocate energy costs. Submetering would allow the PAG facility managers to track energy costs by building or tenant and an individual piece of large equipment when used with a building energy management system (BMS). The information can be used for creating an overall energy-savings plan, allocating costs and more, as follows:

- Energy Analysis: Gathering energy data to conduct building-level load profiling and benchmarking to isolate causes of load peaks to help cut costs or use energy resources more efficiently.
- Energy Efficiency Initiatives: Establishing energy usage benchmarks and trends to measure and verify the effectiveness of energy-saving programs.
- Tenant Billing: Allocation of energy usage costs to respective tenants based on actual energy usage instead of a flat rate, helping promote energy-savings measures.

A sample commercial submetering architecture is shown on Figure 1 for conceptual illustration. Locations proposed for submetering are highlighted on Figure 2 and listed in Table 8.

Figure 1. Sample Commercial Submetering Architecture from Honeywell

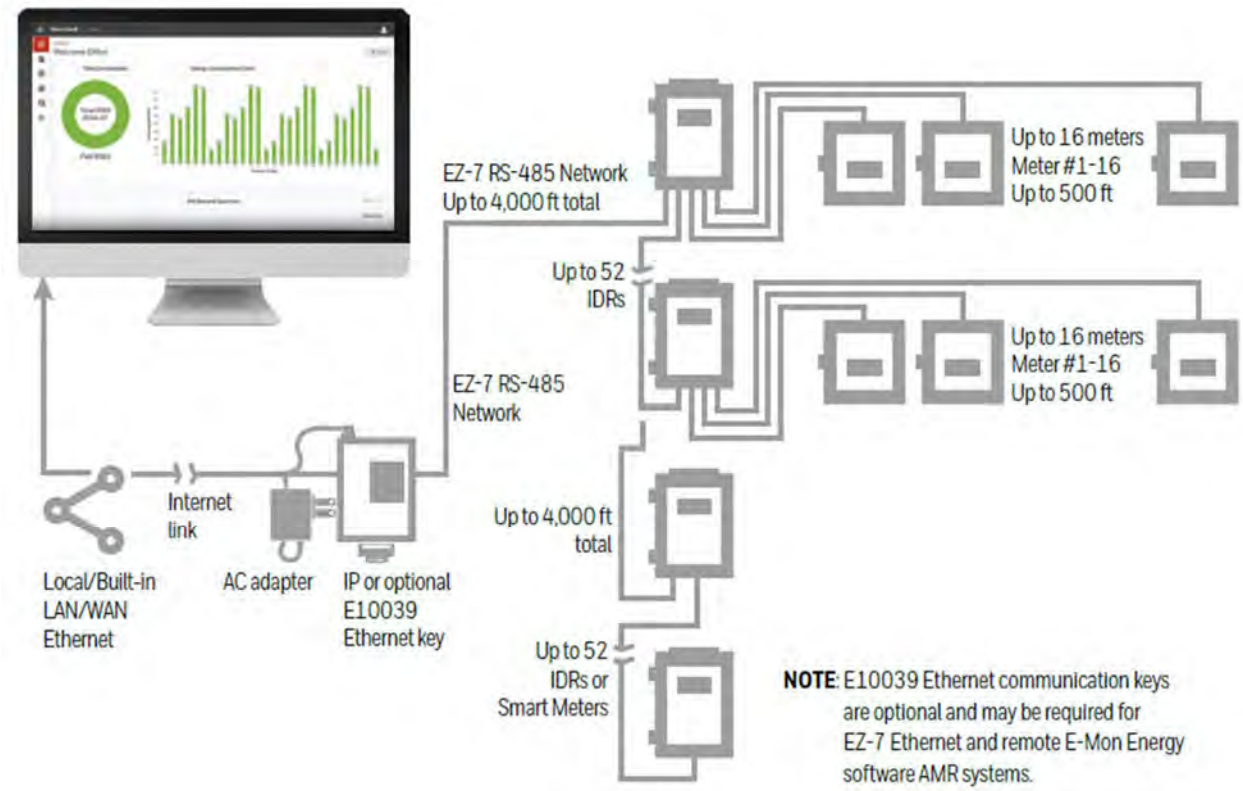


Figure 2. Proposed (Highlighted) Locations for Submetering across Port Property

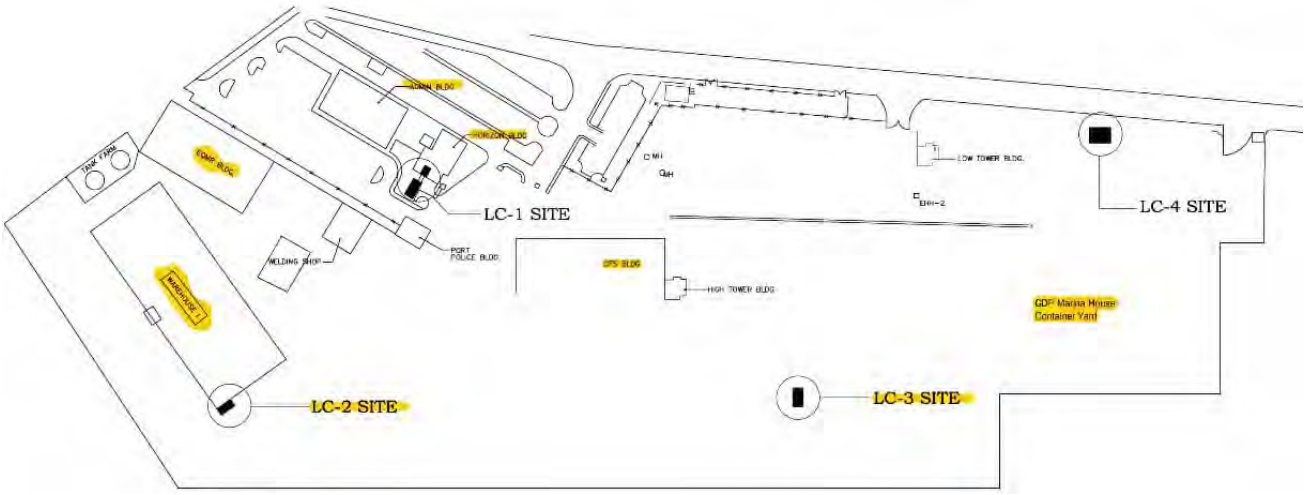


Table 8. Suggested Locations for Proposed Submetering

	Location	Usage Submeter Unit	Demand Submeter Unit[a]
1	Admin Building	kWh	kW 15-min
2	Horizon Building	kWh	kW 15-min
3	EQMR Building	kWh	kW 15-min
4	Warehouse 1	kWh	kW 15-min
5	CFS Building	kWh	kW 15-min
6	GDP Marina House	kWh	kW 15-min
7	Container Yard	kWh	kW 15-min
8	LC-2	kWh	kW 15-min
9	LC-3	kWh	kW 15-min

[a] Unit refers to the interval at which the energy demand is measured and recorded. For example, for kW 15-min, the submeter would record the average KW demand over 15 min intervals.

2.2.2 GHG Emissions

The Port uses electricity and diesel as the primary sources of energy to support its daily operations. Electrical consumption is metered and distributed by a total of five load centers. When considering the operational control boundary for GHG emissions, LC-1 to LC-5 provide electricity for direct Port operations. The meter at LC-1 includes consumption from LC-2 and LC-3. Table 9 provides the 2023 summary for electrical consumption across these load centers.

Table 9. Scope 2 GHG Emissions Based on Electrical Consumption

Meter Location	Usage kWh/year (2023)	Cost ($)	Emissions (MT CO2e)
LC-1 (including LC-2 and LC-3)	2,408,338	$890,161	1854
LC-5	329,610	$132,538	254
LC-4	728,939	$324,768	561
Total	**3,466,888**	**$1,347,467**	**2670**

Because the PAG meters electric usage only at the load center level, individual consumption for buildings in scope were estimated using square footage and typical usage of each facility. Table 10 provides baseline energy summary data for each facility. It is important to note that while a comprehensive energy summary can aid in the recognition of energy trends at a high level, understanding consumption at the individual sites helps gain further insight into how each contributes to the overall portfolio and prioritize facilities for project implementation.

Table 10. PAG Portfolio Baseline Energy Summary Data

Building/Facility	Area, SqFt	Annual Electric Baseline Estimate, kWh	Annual Electric $	Notes	Comments from PAG/Baseline Summary
Admin	25,398	393,773	$134,954		The PAG's administrative offices, Board Room, and leased shipping related port users' offices. **AC Chiller not-in-service**
Annex A	3,400	52,714	$18,066		Engineering and Safety
CFS Container Freight Station	24,000	395,311	$135,481		**Being renovated** Operations, Transportation, Dispatch, Terminal Offices, Stevedoring, Safety, and breakbulk covered storage
Collapsible Container			$0		N/A
Container Yard		665,957	$228,237		Served by LC-4 Piti
EQMR	24,000	372,098	$127,526		**Being renovated**. Facilities, Supply, and Fleet M&R Staff
Fire Pump Bldg	336	6,253	$2,143		
Gantry Crane office	1,088	16,868	$5,781		
Gatehouse	882	16,415	$5,626		
GDP Marina office	16,200	251,166	$86,080		
High Tower	625	31,279	$10,720		
Horizon (Admin Annex, Port Police)	10,400	193,552	$66,334		Port Police, Guam Customs & Quarantine, training/conference rooms, **AC Chiller not-in-service,** break rooms and other multiuse spaces.
LC-1			$0	Included in other facilities	GPA's LC1 meter reads LC1, LC2, and LC3 combined
LC-2			$0	Included in other facilities	Gets power from LC-1 & distributes power to: WH1, Main Gate guard shack, Hi Mast Nos. 1, 2, & 3 lights, F3/F4 shore power pits
LC-3			$0	Included in other facilities	Gets power from LC-1 & distributes power to: CFS Bldg, High Tower, Lower Tower, Yard lighting, F5/F6 shore power pits
LC-4			$0	Included in other facilities	Supplies power to: Reefer outlets, Yard lighting
LC-5			$0	Included in other facilities	Supplies power to: Fire Pump Bldg, Gatehouse Bldg, Truck Gate complex, Guard shacks, Hi Mast Nos. 4 & 5 lights
Lower Tower	1,750	87,580	$30,015		
New Operations (former Port Police bldg)	2,025	37,687	$12,916		Operations, U.S. Customs & Border Protection Agency
PCC Port Command Center	5,050	93,984	$32,210		Port Police, Port's video surveillance, access control, TWIC readers, communications systems
Port Police Shacks	60	3,003	$1,029		
Street Lights					
Terminal Gates Booths	2,412	120,710	$41,370		Secure entry into and out of the container and breakbulk terminal areas
Warehouse 1	55,144	366,872	$125,735		**Being renovated.** Stevedoring, Cable Storage (Subcom), and PAG electrical equipment and supply storage
Welding Shop	3,660	98,469	$33,747		Welders and equipment shed

2.2.3 Decarbonization Solutions

To estimate the overall savings for the implementation of the identified ECM measures and submetering, a conservative top-down approach was taken. Based on previous project experience and expert opinion, it was estimated that the Port could reduce their annual Scope 2 GHG emissions by 10 percent after implementing all measures. An additional 3 percent per year over the lifetime of potential upgrade measures was estimated if submetering was conducted based on opportunity for a more targeted approach to carbon hotspots and general awareness of electricity consumption leading to changes in behavior.

2.2.4 Cost Analysis

While it is recommended to integrate sustainability measures into capital improvement planning and projects wherever possible to maximize project impacts and take advantage of capital cost avoidance, additional funding is expected to be required to support implementation of projects and programs as part of the decarbonization masterplan. Therefore, it is important to explore alternative funding options to supplement capital funding. The next section provides an overview of some of the key funding mechanisms available to the PAG to support their sustainability initiatives, including the following:

- Power Purchase Agreements (PPAs)
- Revolving Loan Funds (RLFs)
- Inflation Reduction Act (IRA)
- Utility incentive programs
- Energy Savings Performance Contracts (ESPC)

2.2.4.1 Power Purchase Agreements

PPAs are a contract between the buyer and a renewable energy generator ensuring the electricity is generated by a specific renewable energy project. The contract itself specifies the commercial terms, including delivery, price, and payment. In many markets, these contracts secure a long-term stream of revenue for the renewable energy project. PPAs are another instrument that organizations can use to reduce or claim zero (if the PPA covers the consumers entire electricity consumption) emissions. PPAs can help minimize risk of utility tariff rate escalation by either locking in a specific rate tariff or agreed upon scheduled rate increase limits. Typically, PPA contracts last from 10 to 20 years. According to the GHG Protocol Scope 2 *A Corporate Accounting and Reporting Standard* (Greenhouse Gas Protocol 2015), for consumers to say they are buying the electricity of the specific generator, attributes must be contractually transferred to the consumer with the electricity. Typically, PPAs are more expensive than purchasing renewable energy certificates (RECs) but are a credible, precise instrument to reduce emissions and meet sustainability goals. GPA Energy is currently running a solar PV incentive program. Customers can enter a PPA with a third-party renewable energy supplier to produce energy from a solar generator located on the customer's premise. Alternately, GPA does allow independent customer-owned net metering, so any additional electricity generated can be sold back to GPA Energy up to 100kW capacity.

2.2.4.2 Revolving Loan Fund Programs

RLFs are capital resources made available for loans to be used for clean energy projects. As loans are repaid, the available capital is then reloaned for other projects, to provide a continuous source of capital funding to support energy projects over time. These programs often focus on financing efficiency upgrade projects, such as appliances, lighting, insulation, and heating and cooling system upgrades. These programs start with a fixed amount of funding that is then "lent out" to specific projects. Some programs require loans to be secured by additional collateral, while others create loan loss reserve funds to serve as a cushion for potential defaults. The savings resulting from those projects are then used to repay, with interest, the loan and replenish the funding pool for new projects. They can provide cheaper access to credit for building improvements with shorter paybacks (so the funds can be quickly recharged and reused); RLF loan terms are typically shorter than 10 years. RLFs provide a simple, low-interest financing option for supporting energy projects. However, some challenges are that capital must be available to start the fund, and they might be slow to revolve, depending on timeline of project implementation and realization of the savings to repay the loans. Several entities can administer revolving funds, from

government-sponsored programs to entities in the private sector. More than 30 states have established loan programs for energy efficiency and renewable energy improvements (USEPA 2024a). The National Association of State Energy Officials provides a centralized location for information on state RLF and energy financing opportunities (NASEO 2024).

2.2.4.3 Inflation Reduction Act

The IRA was signed into law in August 2022 and went into effect in 2023. The Act provides several tax credits related to domestic energy production and clean energy initiatives for both public and private sectors to deepen their investments in resilience and sustainability. Some of the IRA's key provisions include the following:

- New financing approaches that include tax credits with a "direct pay" option, which would allow nonprofit agencies with no tax liability to participate. (Previously, nonprofits were not eligible for tax credits because they pay no taxes. Through the direct pay option, nonprofit entities can receive a direct payment from the federal government for the value of the credit.)
- Tax credits for energy efficiency in commercial buildings, and incentives for solar panels, battery storage, and microgrids.
- EV and alternative fuel tax credits to help transition fleet to EVs. This value is captured in Table 3 in Section 2.1.4.
- Funding for "green banks," which use public funds to lower the costs and risks for private investments in climate-friendly projects that might not otherwise attract financing. This innovative approach could be used to fund measures to reduce carbon dioxide emissions at facilities.

2.2.4.4 Energy Savings Performance Contracts

An ESPC is a funding vehicle to pay for today's facility upgrades with tomorrow's energy savings, without tapping into an organization such as the PAG's capital budget. An ESPC constitutes a long-term partnership between facility owner and an energy service company (ESCO). It is considered a time and cost-effective method for completing comprehensive energy-savings measures. Typical benefits of ESPCs include the following:

- Facility upgrades are paid for now with future energy and operational savings.
- Lower interest financing options often are available, including tax-free municipal leases, which are considered non-appropriated funds.
- The ESCO represents a single point of accountability, simplifying the upgrade process significantly.
- An ESCO is selected based on the best value, not necessarily the lowest bid.
- The building owner participates in equipment and subcontractor selection.
- Annual energy savings are measured and verified according to the International Performance Measurement & Verification Protocol (IPMVP). This is perhaps the most valuable benefit, as the ESPC contractor assumes this risk and is liable to pay back the client for savings shortfalls. Review of ESCO's past performance and contract language plays a crucial role to ensure optimal risk management for the life of the performance period.
- There is a guaranteed project cost, energy and financial savings, and equipment performance.

Implementing an ESPC in a large facility can be a complex process that requires careful planning and coordination. Some of the challenges that can arise during implementation include the following:

- Understanding the PAG's energy usage: Before implementing an ESPC, it is important to understand how the facility uses energy and where the biggest opportunities for energy savings are. This can be a complex process, especially in a large facility with multiple buildings and facilities.
- Developing a comprehensive energy efficiency plan: Once the PAG's energy usage has been fully analyzed using sub-metered or calibrated baselines, a comprehensive energy efficiency plan must be

developed. This plan should identify specific energy-saving measures and technologies that can be implemented to reduce energy consumption.

- Coordinating with facility staff: Implementing an ESPC in a large facility requires close coordination with facility staff. This includes ensuring that energy-saving measures do not interfere with Port operations or facility operations and that staff are trained on new systems and technologies.
- Meeting regulatory requirements: Facilities are subject to numerous regulations related to energy usage and emissions. Implementing an ESPC requires ensuring that all regulatory requirements are met, which can be a complex and time-consuming process.
- Defining maintenance requirements: ESPC programs typically require that the energy-saving measures be maintained by the ESPC firm. This can be complicated in a Port environment with variable traffic that needs to be resolved. In many cases, facilities insist on performing the maintenance themselves, which then negates any recourse if the measures are unsuccessful.
- Managing the project: Implementing an ESPC is a complex project that requires careful management. This includes coordinating with contractors and vendors, tracking progress, and ensuring that the project stays within budget and on schedule.

Overall, implementing an ESPC in a large facility requires careful planning, coordination, and management to ensure that the project is successful and delivers the desired energy savings.

2.2.5 Implementation Roadmap

2.2.5.1 Facility Energy Audits and Condition Assessments

Performing an onsite facility energy audit at each of the PAG's facilities will yield a more complete list and viability of potential mechanical and electrical energy efficiency measures that may be incorporated to maximize energy reduction across the PAG's portfolio of facility locations. The onsite audits will involve assessment of buildings and systems equipment, interviews with facility management and staff, and collection of specifications and historical data. These observations will be used to perform engineering calculations and/or simulate facility energy performance to estimate potential reduction in energy usage, annual energy costs, and capital investment associated with various implementation scenarios. Possible energy efficiency measures may include no- and low-cost measures, modifications to system controls, and facility automation, operational changes, capital upgrades and Port-specific technologies for energy reduction. An initial facility assessment is typically commensurate with an ASHRAE Level 2 energy audit, as access to facility historical data, equipment specifications, and facility personnel allows the PAG to do the following:

1. Validate low-hanging-fruit, including additional LED lighting upgrades.
2. Qualify, quantify, and assess feasibility of ECMs identified under ECM implementation strategies.
3. Identify hot spot locations and areas to focus on for quick reduction.

2.2.5.2 Onsite Large Scale Solar Photovoltaic with Battery Storage Feasibility Study

In contrast to small scale solar PV proposed previously, this discussion pertains to performing a feasibility analysis for large megawatt (MW) scale solar PV farm installation, including a detailed evaluation of earthwork and structural requirements and electrical infrastructure impacts. This includes a concept design in the study so the final product can be used to seek funding or partnerships for implementation such as a PPA. This activity builds on the high-level financial analysis included in the framework to provide a more comprehensive economic evaluation. This can be done in conjunction with the onsite solar PV feasibility study to support the cost/benefit analysis of onsite versus purchased RECs. This is a fundamental requirement prior to formal consideration of any PPAs, energy infrastructure installation, or green utility rate commitments. For each potential energy supply or technology option, an annual cash flow will be projected to support the cost-benefit analysis and assess the economic viability of all options. The evaluation will include a multicriteria analysis using net present value, internal rate of return, payback period and/or sensitivity analysis tools to compare the cost-benefit of all energy supply options. The outputs from this analysis will be used to identify which energy supply and technology options are economically feasible and should be further evaluated for implementation. The outputs will also serve as the economic foundation of a future renewable energy implementation plan.

3.0 Collaborative Actions

3.1 Collaboration with Guam Power Authority

3.1.1 Description

Electricity consumption (Scope 2 emissions) is the Port's largest source of GHGs. Targeting a reduction in these emissions is critical for achieving Net Zero. Previous strategies have provided insight for improving energy efficiency and reducing consumption. However, ultimately, the Port will need to seek renewable sources of energy to fully reduce these emissions and achieve their goal of Net Zero by 2050.

GPA is a public corporation and the leading provider of electricity on Guam. According to their website, they are aiming to achieve 50 percent energy generation through renewable sources by 2030, and 100 percent renewable by 2040. As of 2024, they are at 16 percent.

It is recommended that the Port explore partnership and collaborative opportunities with GPA to support these renewable energy initiatives and deliver against the Port's own Net Zero target. The Port has significant areas of land that could be used for renewable energy generation. The following sections identify several similar collaborative initiatives across Guam already underway that provide insight into potential opportunities.

3.1.1.1 Guam Green Growth (G3) Renewable Energy Project

This project will install a 100kWh solar system with a total of 255 solar frames at CHamoru Village. This project is a collaboration between the University of Guam, Department of CHamoru Affairs, Guam Energy Office (GEO), GPA, and the Office of the Governor and Lieutenant Governor.

3.1.1.2 Installation of Solar Panels at Layon Landfill

The Guam Solid Waste Authority (GSWA) will be installing solar panels across 300 acres at the Layon Landfill. This is a significant multi-million-dollar project that is estimated to reduce GHG emissions approximately 107,090 MT CO2e annually. This project will be primarily coordinated by GSWA with support from GPA.

3.1.1.3 Solar for All Guam

This project aims to make solar energy accessible to low-income households through the development of a loan program with advantageous rates to install solar PV systems. This project will be led by GEO with technical insight from GPA. The Guam Economic Development Authority (GEDA) will oversee and manage the loan program, with outreach support conducted by the University of Guam.

3.1.1.4 Solar Virtual Power Plant Program – GDOE School Focus

This project will see GPA implement a solar PV virtual power plan that will support Guam Department of Education (GDOE) Schools for installing solar systems and standalone plug and play microgrid controllers. GDOE will be paid a fixed fee for use of their rooftops and ground level properties. They will also be charged the lesser of the solar PPA rate and the Levelized Energy Adjustment Clause (LEAC) rate in place of the LEAC tariff for electricity consumed by the school.

3.1.2 GHG Emissions

The current GHG baseline indicates that emissions from electrical consumption contribute 54 percent of total emissions. As the Port trends towards decarbonization solutions, the energy demand of the Port will change. For example, if the Port were to electrify all yard equipment and passenger fleets, it is estimated that the consumption of the Port will increase from 3,466,888 kWh per year to 4,514,060 kWh per year. At

the current energy mix, that would deliver emissions increasing from 2,670 MT CO2e per year to 3,476 MT CO2e per year for Scope 2.

3.1.3 Decarbonization Solutions

Understanding the impact of decarbonization solutions upon Scope 1 and 2 emissions is critical for developing an effective strategy. As shown in Section 2.1, the electrification of yard equipment and passenger fleets may deliver a decrease in Scope 1 emissions but, unless the electricity grid is decarbonized, Scope 2 emissions will increase and the desired outcome will not be achieved. That is why identifying solutions to collaborate and support GPA are the most critical and most effective measures for reducing the GHG emissions of the Port.

For example, if GPA were to achieve their goal of 100 percent renewable energy generation by 2040, the Port could see a reduction of over 60 percent of yearly emissions (depending on electrification measures implemented).

3.1.4 Implementation Roadmap

It is suggested that the Port review the multiple initiatives on Guam for renewable energy generated as identified in Section 3.1.1. A meeting should then be conducted between GPA, the PAG, and energy and carbon subject matter experts to review plans and discuss potential partnerships and collaborative approaches moving forward.

4.0 Nature-based Solutions

4.1 Description

Nature-based carbon projects are an effective long-term solution for sequestering carbon. They provide additional benefits such as coastal resilience and biodiversity enhancement, delivering a multi-benefit carbon solution that can be realized by both the PAG and the surrounding communities.

Identifying and implementing these solutions requires systems-level thinking, as often environments and ecosystems are not confined to the same ownership boundaries as commercial entities. Therefore, to simplify the implementation roadmap for the PAG, these solutions have been categorized into two approaches based on geographic extent:

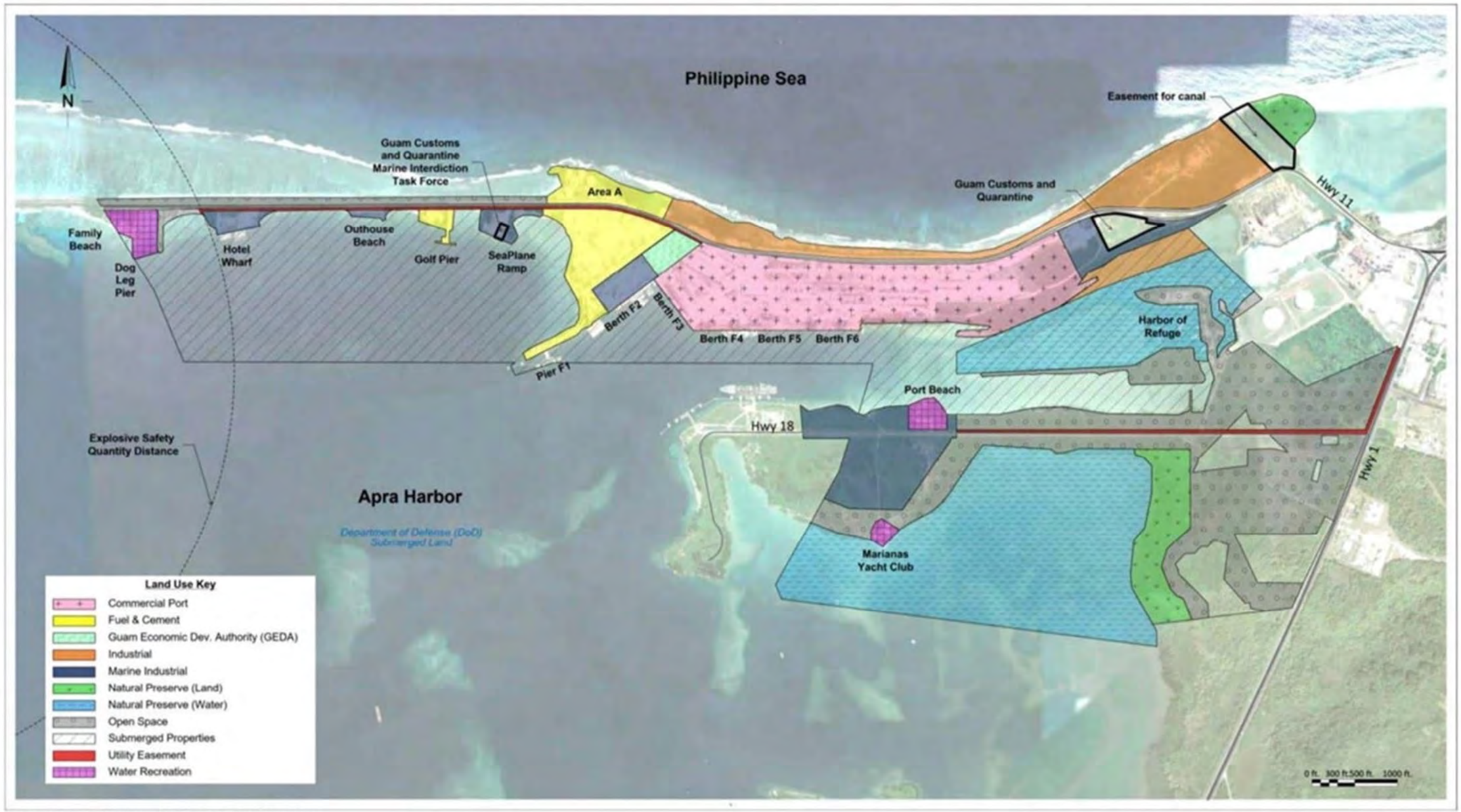
1. Restoration and enhancement of natural systems within the PAG's boundary and in the neighboring Apra Harbor region.
2. Restoration and enhancement of natural systems within the wider watershed region of Piti, as well as other habitats across Guam.

Considering nature-based solutions for the PAG with the approach listed above allows for manageable steps needed for implementation. These solutions are based upon the principles of protection, promotion, and collaboration. Each of these opportunities will provide greater potential for carbon sequestration with increase in the land cover.

Ultimately, an adaptable approach to implementing nature-based solutions is core to providing successful strategies that have multi-layered benefits. Nature-based solutions have the potential to provide additional value beyond carbon sequestration, including ecosystem restoration, floodplain reconnection, recreation and tourism, community collaboration, improved air and water quality, and other economic benefits. Aligning approaches to these wider benefits (such as identifying funding opportunities within community engagement) will allow for solutions to achieve their full potential.

The following sections expand on the two identified approaches and provide additional insight and next steps for delivery of nature-based solutions. As this is the first step in the PAG's journey, the intention is to provide inspiration and insight into how these solutions could be developed further. For reference, Figure 3, the Port Authority Guam Land Use Designations Map, displays the different locations and land use of the PAG's property.

Figure 3. Port Authority Guam Land Use Designations Map



Source: Google Earth and WSP Analysis of PAG Data

4.1.1 Restoration and Enhancement of Natural Systems within the PAG's Boundary and in Neighboring Apra Harbor Region

The Port, Apra Harbor, and surrounding areas under the PAG are home to a number of different vegetation types, including the following:

- Corals, seagrasses, and mudflats
- Estuarine
  - Forested Wetland
  - Scrub/Shrub Wetland
  - Emergent Wetland
- Palustrine
  - Forested Wetland
  - Scrub/Shrub Wetland
  - Emergent Wetland
- Evergreen Forest

These vegetation types create significant ecosystem value and are a source of carbon sequestration and storage if protected and maintained. For example, mangrove forests and other coastal wetland ecosystems such as salt marshes and seagrass beds have the capacity to store large quantities of carbon by doing the following (NOAA 2022):

- Capturing (or sequestering) carbon as they grow each year
- Storing carbon in their soil due to the anaerobic conditions that can allow the carbon to decompose slowly over hundreds to thousands of years.

Mangroves sequester high rates of carbon and are important habitats to a variety of species critical to the island's biodiversity (Choudhary et al. 2024). They are adapted to living in deltaic, estuarine, lagoonal, and open coast environments with varying levels of salinity. Table 11 identified the types of mangroves and associated species occurring in Guam.

Table 11. List of Mangrove species identified on Guam

Species	Common name
Rhizophora mucronata	Red mangrove
Rhizophora apiculata	Red mangrove
Bruguiera gymnorrhiza	Large-leafed orange mangrove
Avicenna marina var. *alba*	Grey mangrove
Lumnitzera littoral	Black mangrove
Nypa fruticans	Mangrove palm
Xylocarpus moluccensis	Cannonball mangrove
Heritiera littoralis	Native hibiscus tree
Hibiscus tiliaceus	Native hibiscus tree
Acrostichum aurem	Golden-leather fern

There are several nature preservation areas in and around the Port that can serve as useful examples of conservation for the PAG. These include the Orote Point Ecological Reserve Area, the Sasa Bay Marine Preserve, and the Piti Bomb Holes Marine Preserve, as well as several national parks. The Sasa Bay Marine Reserve provides an important space for the preservation of mangrove forests in Guam. These mangrove forests hold much ecological importance including protecting coastlines from erosion and storm

damage, serving as a nursery for a variety of fish and sea life, and providing nutrients for the marine environment (Bindiya et al. 2023).

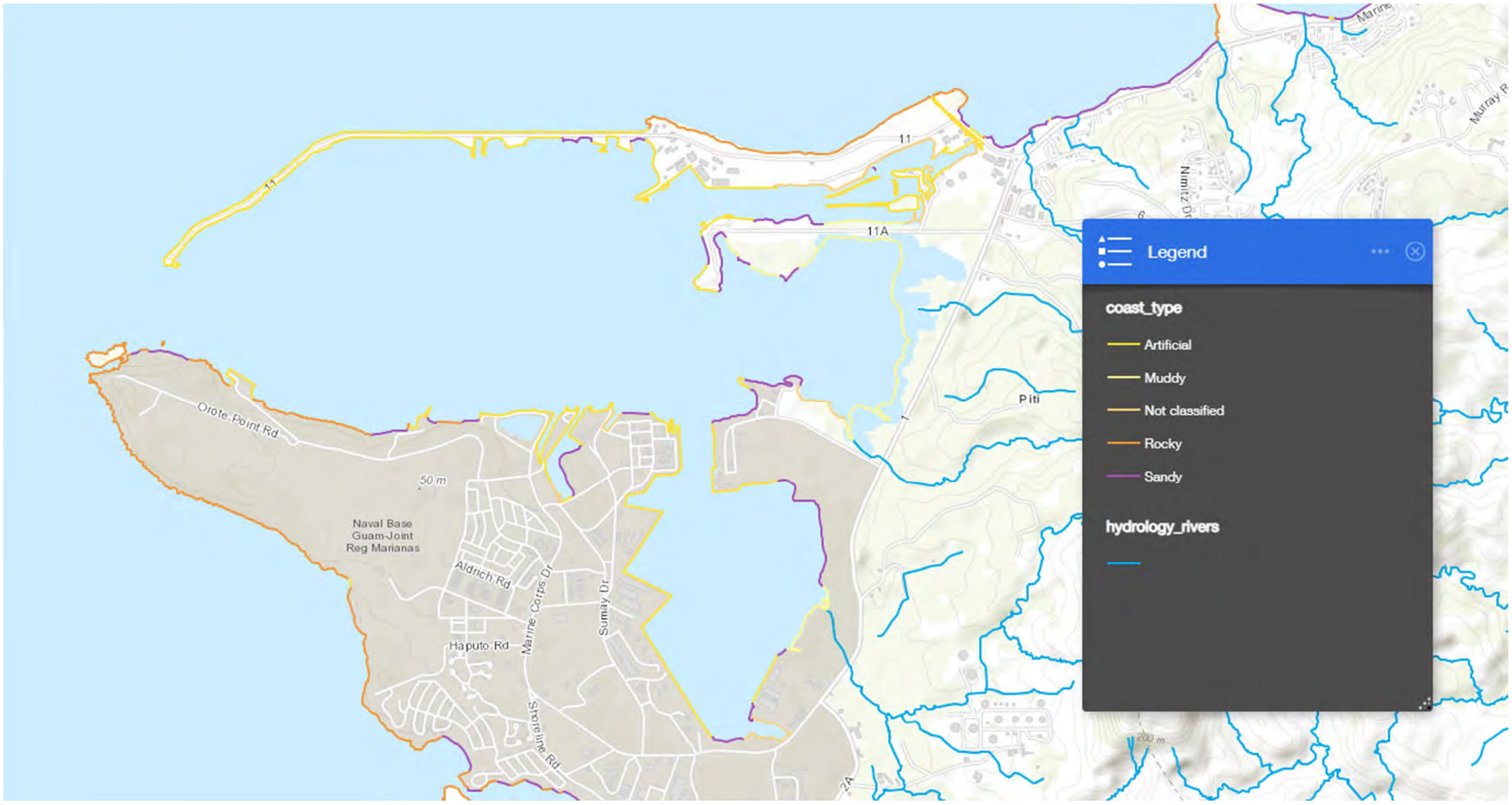
For the PAG to claim carbon sequestration benefits from these habitats, suitable areas for establishment and enhancement need to be identified.

Initially, based on the available information, the north-west bar (around the Dog Leg Pier, Outhouse Beach, including the western boundary of the fuel and cement area [Area A] on the Philippine Sea) provides opportunities to promote regrowth of native seagrass, corals, and other emergent vegetation. Opportunities are primarily on the south side of the north-west bar, due to assumed rough conditions on the north shore. Mangrove restoration may be possible in certain areas along the northwest bar. However, further research is needed to confirm such opportunities. This area may be susceptible to degradation if water quality is poor due to pollution. To further understand possible sources of degradation, a study of water quality and possible sources of contamination including leaking tanks and pollution from stormwater runoff should be conducted.

In addition, much of the coast surrounding Apra Harbor and the land owned by the PAG is classified as artificial, indicating that the coastline has been modified from the original natural coastline. This might provide an opportunity to restore some of these areas to their natural state and reestablish the native vegetation based on their suitability. The Guam Coast Type Map on Figure 4 shows the areas owned by the PAG and the surrounding areas, with their corresponding coastline types. The coastline classification will aid in further research into finding areas suitable for establishing vegetation and new plantings. Stormwater runoff water quality (from paved areas, pier, energy plant, the marina of sunken boats, abandoned facilities) could also impact the reestablishment of native species. Therefore, a water quality analysis may be beneficial to determine the effects of stormwater on biological communities and their promotion of growth (including in marsh, littoral forest, mangrove, seagrasses, benthic, and coral)

Another area to promote revegetation of native species is by recovering hydrology regimes on the east side of PAG land, which are currently interrupted by roads. Further studies could investigate ways to reestablish watershed connectivity and explore its impact on native species.

Figure 4. Guam Coast Type Map



4.1.2 Community Collaboration

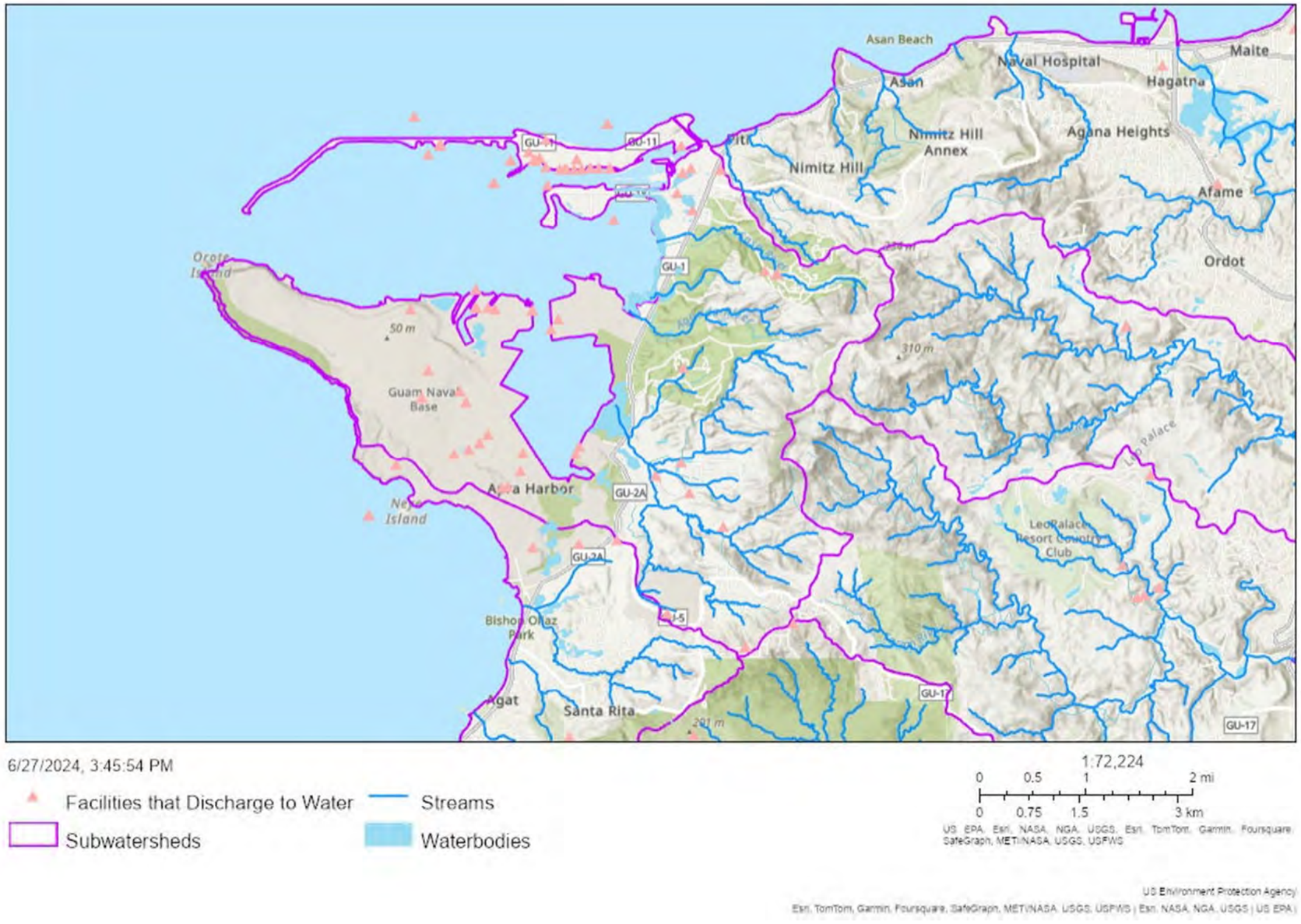
The largest and most significant opportunities for carbon sequestration will depend on PAG leadership establishing partnerships with organizations across the Piti watershed or even the whole island to apply a watershed approach associated with Apra Harbor. A watershed approach can be considered a systems-thinking approach, whereby the boundaries for a targeted area are defined by the watershed, rather than ownership of land. To effectively work towards achieving a healthy watershed, the PAG will need to collaborate with surrounding organizations, businesses, government agencies, and similar. Relevant organizations may include the following:

- The University of Guam and other universities in the United States
- The Guam Naval Base
- GPA
- Tourist guides (for diving, fishing, snorkeling, and similar)
- Organizations across Marine Corps Drive (Route 1)
- Tristar Terminals Facility
- Guam Environmental Protection Agency (EPA)
- Guam Department of Agriculture's Division of Aquatic and Wildlife Resources
- Pacific Islands Fish and Wildlife Office of the U.S. Fish and Wildlife Service
- U.S. Forest Service
- Natural Resources Conservation Service
- Local farmers
- Community members

The Port and PAG facilities are located within the Atantano River-Frontal Apra Harbor sub-watershed. This watershed encompasses all the area surrounding Apra Harbor and contains several stream discharge points into the bay. The Apra Harbor Surrounding Water Features Map (Figure 5) also indicates all facilities that discharge to the water. To preserve and protect the existing ecosystems (especially the wetland environments that surround much of Apra Harbor), it is necessary to understand the health of the entire watershed. Three of the main catchments in the surrounding area include the Sasa River, the Aguanda River, and the Atantano River. Both the Aguanda and Atantano rivers run through or adjacent to the Guam Naval Base and therefore may present an opportunity to partner with the Base to work towards restoration of the watershed.

The goal of this approach will be to promote and recover carbon capture and ecosystem services through the restoration of vegetation and ecosystems across the watershed. This will provide multiple benefits including restoring biological communities, improving water quality, reducing erosion, and reconnecting floodplains.

Figure 5. Apra Harbor Surrounding Water Features Map



4.1.3 Summary

Additional information is required to further develop these identified strategies. Relevant information includes but is not limited to the following:

- Most recent land cover analysis (aquatic and terrestrial)
- Carbon sequestration and storage rates for each community
- Bathymetry of the area
- Habitat suitability
- Land-use history and future planning
- Influence of power plant effluent
- Active vs. abandoned areas
- Areas that have a stormwater management plan
- Sasa River effluent
- Soil analysis in potential mangrove forest restoration areas
- Sediment stability in potential seagrass restoration areas

4.2 Carbon Reduction Solutions

Considering the approaches in Section 4.1, the PAG may be able to use carbon sequestration as a means of offsetting their residual emissions. To quantify this potential, the sequestration values as provided in Table 12 were used against potential land available within the Port and surrounding regions.

For the purposes of this activity, it was estimated that approximately 44 hectares (ha) of additional land could be used for nature-based solutions strategies by establishing or restoring forested land and mangroves. Although this is a rough estimate, it provides valuable insight into the potential carbon sequestration benefits for the Port. For instance, planting and restoring 18 ha of mangroves and 26 ha of forest cover could result in a carbon reduction of approximately 407 MT CO2e per year, which would provide a significant and long-term contribution to the PAG achieving Net Zero by 2050.

4.2.1 Avoided Emissions and the GHG Inventory

There is currently a significant area of mangrove and forested land within the PAG's geographic boundary that is providing carbon sequestration benefits. Table 12 provides a summary of the area and the associated total carbon sequestration rates of these habitats.

Table 12. Carbon Dioxide Equivalent sequestration values for Mangroves and Forested Land habitat types within the PAGs property.

Habitat Type	Within Port Area (ha)	Sequestration Rate (MT CO2e/ha/year)	Total Sequestration (MT CO2e/year)
Mangroves	**10.59**	**6.74** [a]	**71**
Forested Land	**44.93**	**11** [b]	**494**
Total			**567**

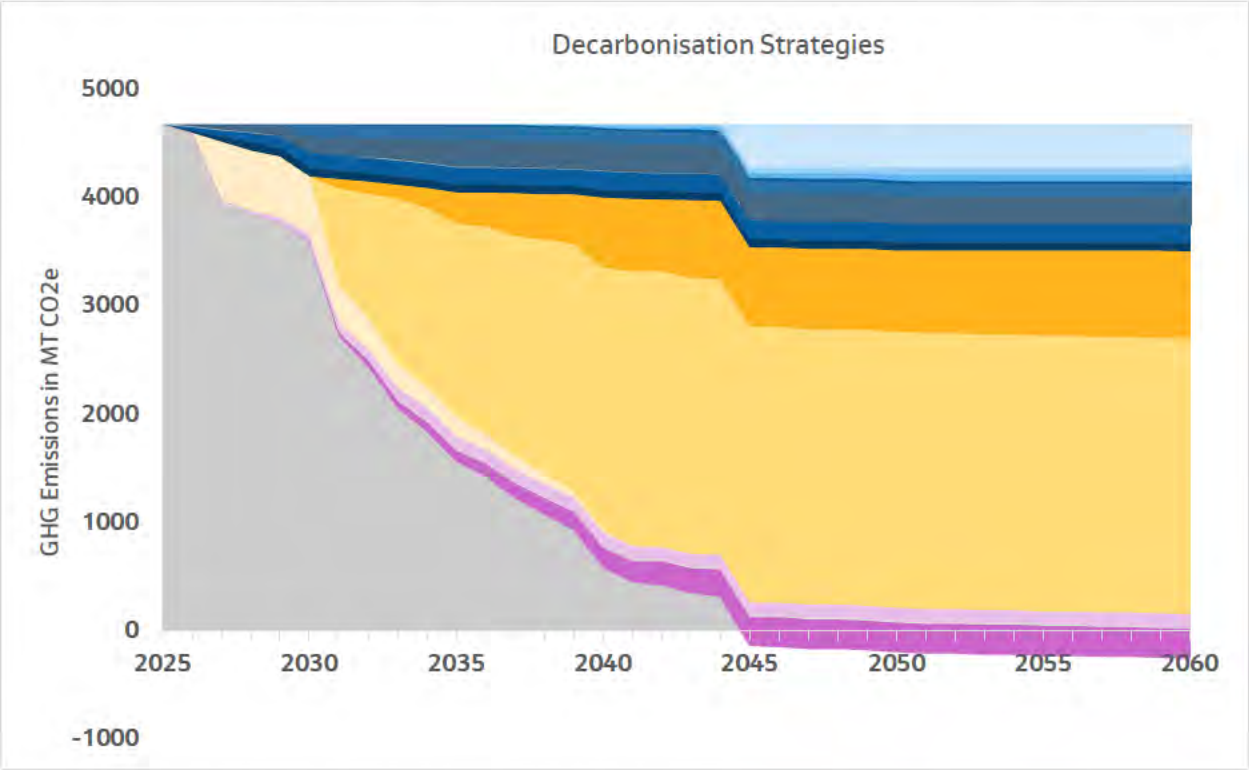
[a] Alongi 2012

[b] MIT 2024

MT CO2e = metric tons of carbon dioxide equivalent

These mangrove vegetated areas and forested land are currently sequestering 567 MT CO2e per year and are accounted for in the PAG's GHG inventory. However, if these areas were to be disturbed or removed in any way, the resulting yearly net emissions value will increase; as a result, this sequestration is referred to as avoided emissions in our calculations. A graphical representation of how these avoided emissions would affect the GHG inventory baseline, if the natural systems were removed, is provided on Figure 6. As is evidenced, without these natural systems, additional measures will need to be actioned by the PAG to achieve Net Zero by 2050.

Figure 6. Increase to GHG Baseline due to Removal of Natural Vegetation within Port Property



Currently, the GHG Protocol for Land Sector and Removals Guidance is under development and due to be published in early 2025. It is anticipated that this guidance will inform entities on how to incorporate carbon removal through land-use change into their mitigation strategies. Therefore, the above insights may change post publication of this guidance document.

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Appendix L
Greenhouse Gas Inventory

Doc. No. 38GL-26-2386.*

Port Authority of Guam
GHG Inventory - Scope 1 & 2 Emissions

Scope 1 Emissions	Year 2021	Year 2022	Average	Unit
Mobile: off road	1,644,559	1,853,691	1,749,125	kgCO2e / yr
Mobile: fleet	211,717	186,583	199,150	kgCO2e / yr
Stationary	26,735	77,840	52,288	kgCO2e / yr
Total	**1,883,011**	**2,118,114**	**2,000,563**	**kgCO2e / yr**
GRAND TOTAL	**1883**	**2118**	**2001**	**tCO2e / yr**

Scope 2 Emissions	Usage kWh/yr (2023)	EF (kgCO2e/ kWh)	Emissions	Unit
LC1 Port Authority Substation, Piti	2,408,338.23	0.77	1,854,420.44	kgCO2e/yr
LC5 East Side of Port Gate, Piti	329,610.40	0.77	253,800.01	kgCO2e/yr
LC4 (&LC4-2) Port Authority Substation, Piti	728,939.40	0.77	561,283.34	kgCO2e/yr
Total	**3,466,888**	**kWh / yr**	**2,669,504**	**kgCO2e/yr**
GRAND TOTAL	**3467**	**MWh**	**2670**	**tCO2e / yr**

Total GHG emissions per year	Baseline	Unit
Scope 1	2073	tCO2e / yr
Scope 2	2670	tCO2e / yr
Total	**4743**	**tCO2e / yr**

S1 Equipment (Off Road and Stationary)	Year 2021	Year 2022	Average	Unit
Gantry	949,544.90	1,079,992.22	1,014,768.56	kgCO2e / yr
Top Loaders	366,453.35	405,949.38	386,201.36	kgCO2e / yr
Tractor	279,631.09	309,186.70	294,408.90	kgCO2e / yr
Load Centre	18,426.58	65,061.50	41,744.04	kgCO2e / yr
Forklift	39,465.61	47,173.10	43,319.35	kgCO2e / yr
Air Compressor	6,978.34	10,808.08	8,893.21	kgCO2e / yr
Manlift	4,842.22	5,803.95	5,323.09	kgCO2e / yr
Dump Truck	1,770.68	3,970.94	2,870.81	kgCO2e / yr
Backhoe	1,909.83	1,366.56	1,638.20	kgCO2e / yr
Welding Machine	791.76	1,331.55	1,061.65	kgCO2e / yr
Flatbed Truck	732.37	248.31	490.34	kgCO2e / yr
Others (Auxilary Tank, Light Plant, Generator, Genset, Gas Container)	538.60	639.14	588.87	kgCO2e / yr
Mule	208.71	0.00	104.35	kgCO2e / yr
Total	**1,671,294**	**1,931,531**	**1,801,413**	**kgCO2e / yr**
GRAND Total	**1671**	**1932**	**1801**	**tCO2e / yr**

Fugitive Emission Sources	2021	2022	Average	tCO2e
Total Installed Kgs Leaked	989.05	1,186.56	1,087.81	
Total Operated kgs leaked	53,588.68	51,300.54	52,444.61	
Total Decommisioned kgs leaked	17,845.84	20,686.52	19,266.18	
Total Fugitive Emissions (kg)	**72,424**	**73,174**	**72,799**	**73**

S1 Fleet data	kgCO2e	kgCO2e	Average
Vehicle Type	**2021**	**2022**	**2021.5**
Passenger Vehicle	1,494.48	2,140.67	1,817.58
Other Light Duty Trucks	15,316.97	15,432.54	15,374.75
Pickup Truck	76,309.78	102,837.09	89,573.44
SUV	110,837.42	44,630.36	77,733.89
Van	7,758.29	21,542.16	14,650.22
Total	**211717.1349**	**186582.822**	**199149.8828**
Grand Total	**199**	**tCO2e**	