



SIEGFRIED NAKAMURA BUILDING

T-DOCK, MEKETII, KOROR STATE

SITH CONSULTANCY

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REPUBLIC OF PALAU 96940

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1.0 Project Summary

Proposed Project. Mr. Siegfried Nakamura is proposing to backfill a submerged area and construct a two-storey building in Meketii, Koror State on an open lot currently leased to Mr. Nakamura. This proposed building project will have offices on the bottom floor of the building and four (4) two-bedroom apartment units on the second floor. The proposed backfilled area will be utilized along with the area surrounding the building as parking for the Apartments and the Law Office and will be concrete paved. The utilities required such as water, power, and communications will be provided for by the public infrastructure systems.

Environment of the Affected Location. The project location is in T-dock area of Meketii, Koror State. It is located in a man-made reclaimed area approximately 816 sq. meters large. The vegetation of the project site consists of several larger native trees and other single strand trees. The marine area is located in a mud flat area that is highly impacted from road runoff and previous site developments in the surrounding areas.

Possible Impacts that may Result from the proposed Project. There are various potential impacts that may result from this proposed project during the preparation, construction and operation phase of this project. Loss of vegetation, spread of invasive species within and outside the site, erosion and sedimentation, decreased water quality, generation of solid waste, noise and dust impacts as well as the increase in traffic in the area are some of the potential impacts. There are also social impacts to consider that may affect the residential homes and businesses near the project site.

The construction company that will be responsible for the development of the proposed project is also a potential contributor to the impacts if they are not qualified or do not implement the recommended mitigation controls.

Mitigation and Control Measures. Measures are proposed to address the noted potential impacts above. There are specific measures for each impact such as the use of turbidity curtains and silt fences to negate the impacts of erosion and sedimentation as well as other measures to address social impacts, and the construction process of the project. These mitigation measures when implemented properly can significantly reduce or negate the potential impacts of this proposed project.

2.0 Project Introduction

2.1 Background Information

Environmental Assessments (EA) are a mandatory requirement for the Environmental Quality Protection Board (EQPB) often triggered by major construction or development that has expected impacts on a project site. The proposed development falls under that category and therefore an EA is required as part of its application.

Title 24 PNCA requires the preparation of a competent Environmental Assessment (EA) report for major developments and sections 2401-61-03 of the Act provides an EA Process that all mandated project applicants to identify and address environmental concerns for review and consideration by EQPB. This Environmental Assessment (EA) report was prepared in accordance with the *Checklist of Requirements for Environmental Assessments*.

The EA prepared includes baseline information conducted through marine, terrestrial and socio-economic assessments on the status of the existing environment of the project location and other areas that might be potentially impacted by the proposed development. These assessments along with information regarding the proposed development informed the impacts that could result from the proposed development. The document also includes proposed mitigation measures to be used to minimize or mitigate those impacts.

Alternative options were also proposed and considered with the selection of a balance between the most practical and cost-effective for the proponent as well as environmentally and socio-economically sound alternatives for the project. For the purpose of this EA, the directions noted in the document are the same as the cardinal directions, unless otherwise specifically stated in any section.

2.2 Project Proponent

The project proponent is Mr. Siegfried Nakamura. Mr. Nakamura is a well-known lawyer in the Republic of Palau. He is currently the owner and managing partner in the Law Office of Siegfried Nakamura. The contact person for the Office/Apartment Building Project is listed below:

Siegfried Nakamura
PO Box 901
Koror, PW 96940
Phone: 6804882010
email: snakamura76@gmail.com

2.3 Project Contractor

At this time, a contractor has not yet been decided on and the proponent will inform EQPB of the decision when it has been made prior to project commencement. Care will be taken with the selection of a qualified contractor to ensure success of the project development, but also in their capacity to implement the necessary and required mitigation to reduce or negate environment impacts of this project.

2.4 Project Consultant

STAR Express dba SITH Consultancy was contracted to prepare the environmental assessment for this project. The lead preparer has a Bachelors and Master degrees in Natural Resources and Environmental Management from the University of Hawaii at Manoa. The focuses of the degrees are in the areas of geographical information systems (GIS), forest management, water use management, and socio-economic valuation of natural resources.

As part of their education, the lead preparer took courses in environmental assessment that included practical preparation of EAs as part of their coursework to build experience in preparing EAs. The lead preparer has work in Palau for the last six (6) years at the National Government in the environmental field and also as a private consultant in developing and implementing various projects including EA preparations. The EA preparer's Statement of Accountability is attached as *Appendix 1* of this EA.

2.5 EA Documentation

The documentation of the EA process noted the important events in the development of the EA for this project. The preparer noted meetings with the proponent, experts, assessments and surveys related to this project.

A scoping meeting was held on April 5, 2017 with Mr. Nakamura, the EA Preparer and representatives from EQPB to review the project. Several issues were discussed with the main issue being the wastewater discharge and marine water quality.

The table 1 below outlines the meetings that were held prior to the finalized EA document submitted to the proponent.

Table 1: Meetings conducted to complete Environmental Assessment

Date	Activity	Contact
February – April 2017	Project design preparation	Proponent
April 5, 2017	Scoping meeting	EQPB, Proponent, Consultant
March – April 2017	Marine, Terrestrial and Socio-economic Assessments	Consultant's Team
April – May 2017	EA Finalization meetings	Proponent & Consultant
May 20, 2017	Submission of EA to Proponent	Consultant

2.6 EA Methodology

The methodology used for this assessment included literature reviews, interviews, as well as ecological and social assessments. Literature review included review of site plans and research of site biodiversity for identification. Interviews were conducted with the proponent and other experts in the areas of construction to provide clarity and understanding of the project as well as during the socio-economic assessment to garner public perceptions of the proposed project.

A marine assessment was conducted using the rapid ecological assessment method for benthic cover and fish survey. An ocular survey was utilized for the terrestrial survey as there were very few plants in the affected project site. A socio-economic survey was conducted through individual interviews with residents and business owners in Meketii T-dock area. Their collective response will be discussed and addressed in the section on socio-economic impacts. The interview and meetings consisted of briefly describing the project, the project location and asking questions regarding their views of the proposed development and any potential impacts they see the project having on the community. The historical clearance for this site to ensure that no historical or cultural artifacts are disturbed has been obtained through the Bureau of Cultural and Historical Preservation under the Ministry of Community and Cultural Affairs.

This EA report provides relevant information on the proposed project, the conditions of the environment and resources of the project location and also provides an adequate discussion and information on the potential impacts and as well as the appropriate mitigation options that the proponent will implement to minimize or negate those potential impacts.

3.0 EA Project Overview and Description

3.1 Goals and Objectives of the Proposed Project

The goal of the proposed project is to provide office space for Mr. Nakamura as well as rental units that will cater for the need for people that have been displaced or are in need of apartments and do not have the financial resources to build houses. They can also provide housing for consultants or expatriates working in Palau.

3.2 Project Location

The project site is located in Meketii Hamlet and specifically in the T-dock area. It is a lot located in between Happy Oilouch's Lot and West Plaza by the Sea. The site is commonly known to the residents in the area as the "Tengadik" lot. The site has previously housed several buildings and businesses such as a laundromat with the most recent building having been used as the Ngiwal State Government Office. When the Ngiwal State Government Office moved to Ngiwal State with the completion of the Compact Road the office was left vacant until recently when Mr. Nakamura acquired the rights for the building and lot and had it torn down in anticipation of building his new office building.



Figure 1. Aerial Photo of Project Site Location (Source: Google Earth)

3.3 Planned Development

3.3.1 Project Layout

The proposed project will require or entail the following actions:

- Set up of erosion and sedimentation control measures prior to any earthmoving or marine activities including the clearing of vegetation and other materials,
- Targeted and controlled clearing of vegetation in preparation for the development of the building and the backfilling as well as targeted clearing of terrestrial vegetation in preparation for construction prior to each phase,
- Construction of the proposed office building and backfilling of the submerged area which will include construction of a retaining wall,
- Set up and implementation of mitigation measures relevant to each development phase of the project to ensure minimized or negated impacts, and;
- Concrete paving of the surrounding area to provide adequate parking and to minimize soil erosion.

3.3.2 Proposed Development

After completion, the project site will consist of a two storey office/apartment building with parking area. The description of the proposed building such as the size of the floor plan, the foundation requirements as well as specific details will be noted in the descriptions for the different structures as follows:

FACILITIES

The proposed project is a two (2) storey 24'W X 86'L building that will have two (2) stair ways on the front left and right side of the building. The building will be surrounded by concrete paved area which will be a driveway and parking area.

Office Space: The Law Office of Mr. Nakamura will take up the entire bottom floor of the building. It will span the length of the 24'W x 86'L building. The office space will contain a lobby area, three (3) office spaces, a cabinet room, three bathrooms, a library, a manager's office, an accounting office, a lounge which will include a kitchen sink and a larger open area office space for the rest of the staff.

Apartment Unit: The second floor of the building will house four (4) two-bedroom apartment units. The floor plan of each unit will be 24'W x 26'L. Each unit will have a combination kitchen and dining room area, a living room, two (2) bedrooms and a toilet and bath.

Parking Area: The concrete paved area surrounding the building is approximately 4,040 square feet large. It will consist of the drive way which has one entry and one exit as well as sixteen (16) parking spots.

Fill area: The fill area is approximately 988.625 square feet in size. Once fill is complete a retaining wall will be constructed to ensure that fill material stays in place stabilizing the site and preventing erosion. This retaining wall will be designed as indicated in the plans attached as *Appendix 2*.

INFRASTRUCTURES

Electrical and Communications: The electrical and communication systems will be installed during the construction phase and utilized fully when the building is operational. These infrastructures are adequately provided by local service providers as the lines already exist in in the project site. The communication such as telephone, internet and cable will be provided by Palau National Communications Corporation (PNCC). The electricity will be provided by the Palau Public Utilities Corporation (PPUC).

Water System: The proposed building will be connected to the Public Water Supply System as its main source of water which is provided by the Palau Public Utilities Corporation. Mr. Nakamura will also install four (4) five hundred gallon tanks that will be filled and used as back up water supply in case of water outage or drought. The estimated daily maximum water consumption for the building will be approximately 1,100 gallons per day. The water calculations for the proposed development is shown below in Table 2:

Table 2: Water use Calculations

Location	Justification	Calculations
Ground Floor	The ground floor will be the Law office with 10 regular staff.	10 staff x 15* gpd = 150 gpd
2 nd Floor	Maximum of two persons per room	8 rooms x 2 people per room x 60 gpd = 960 gpd
	Total amount of water used by the building:	1,110 gallons per day

* Water usage per day is based on EQPB 2401-13Toilet and Wastewater Facility Regulations.

Wastewater System: The wastewater system will collect wastewater from the kitchen sinks, shower and toilet and dispose of that through the existing wastewater system for Koror, a service provided by PPUC, when the building is operational. The wastewater calculation is based on the assumption that 100% of the total water consumed in the household will become wastewater. If we take this into consideration, a total of approximately 1,110 gallons of wastewater is expected to be added to the existing wastewater system in Koror once the building is fully operational.

Fire System: For the proposed building, the proponent will provide smoke detectors in the units and the office space. Fire extinguishers will also be made available to the entire building in locations accessible to building tenants.

Storm Water Management Systems: This project is focused on maintaining the water quality of the marine area located adjacent to the project site. The project will include construction of drainage that will lead to the public drainage system located in front and on the side of the building as it has a catch basin which will allow for sediments to settle out before the water drains into the ocean. The project will also incorporate rain water gutters to direct the flow coming from the building so it does not drain directly into the ocean.

3.4 Description of Project Phases

3.4.1 Pre-Construction Phase

The first step will be when the proponent selects a contractor or construction firm to be responsible for constructing the proposed development project. When the contractor has been hired, their first work will be the implementation of the erosion and sedimentation control (ESC) plan attached as an appendix to the EA.

The contractor will be responsible for proper installation and maintenance of adequate control and mitigation measures, as noted in the plans. Silt fences would be properly installed, following the Erosion and Sedimentation plan, surrounding the construction site to isolate and contain erosion and sedimentation within the construction area. Turbidity or silt curtains will be used in the marine areas to ensure containment of sedimentation and erosion.

There will be minor excavation and filling of the site to develop a leveled area suitable for the proposed building. The clearing of vegetation will target all areas within the project site and especially where buildings will be built. To ensure that potential invasive species are not spread from this site, the Bureau of Agriculture will be approached for guidance on the proper treatment and disposal of vegetation before they are removed from the site.

Temporary and portable toilet facility will be set up at the site for workers assigned to the proposed project. Maintenance of the toilet would be responsibility of the contractor. A local company may be contracted to care and be responsible for the proper disposal of sanitary waste materials.

3.4.2 Construction Phase

The construction phase of the project will begin after the ESC plan has been implemented. During the construction phase of the project the backfilling of the submerged area will commence immediately once the silt curtains are installed. Materials from EQPB permitted sites and ongoing road water work will be used to back fill the submerged area. Once the backfilling is of sufficient height and width a retention wall will be constructed as indicated on the plans attached as appendix to this EA. This will then be followed by the construction of the building. It will involve minor filling to level out the land in preparation for the construction of the

office/apartment building. This phase will also begin major construction of the building foundations, the laying out of pipe connections for the water and sewer system. The buildings and facilities will be quality inspected during this phase to ensure proper procedures and building codes are strictly followed.

After all the construction is completed the area surrounding the site will be concrete paved and utilized as driveway into and out of the site as well as parking spaces. Once this is completed the site will be cleared of any excess materials and disposed of at the proper disposal sites as required and mandated by EQPB.

3.4.3 Operational Phase

This phase will begin after the completion of the backfill, building construction, and parking lot paving. The bottom floor will be utilized as office space for Mr. Nakamura's law offices and the second floor will be rented out as apartment units to the people of Palau.

During the three phases of this project, solid waste will be generated as a result of construction during the first two phases and by the office workers and the tenants during the operational phase of the project. Most solid waste will be disposed of at the State Landfill. However, measures will be implemented to support recycling. Segregation of waste and recycling will be encouraged and disposal bins for recycling be made available to tenants while those remaining will be disposed of at the Koror State Landfill.

3.4.4 Abandonment Phase

This phase will be considered and implemented if and only if the proponents of the proposed project decides to cancel the plans or that EQPB office rescinds the proponent's permit for the proposed project for any relevant reason during the process.

If, however, that final decision is made to abandon the proposed plans, any and all disturbed areas by actions of the applicant would be properly restored and rehabilitated. EQPB office may wish to conduct proper inspection of the project site and the restoration efforts.

Exposed areas would be properly restored to prevent further soil erosion. All solid waste materials and debris generated by actions authorized by the proponent would be collected and properly disposed.

3.5 Project Schedule

The project is expected to take 12-24 months depending on the availability of the chosen contractor as well as the availability of the materials needed for the project. The final construction schedule will be submitted to EQPB as soon as the contractor is chosen and the construction schedule is set.

3.6 Project Cost

The project designs are attached as annex to this EA for review. The project is estimated to cost USD \$350,000.00 and is expected to be completed in 12-24 months depending on the availability of materials. The funding sourced for the proposed project will be provided by Mr. Nakamura.

4.0 Possible Alternatives

4.1 No Action Alternative

No action on the site would entail leaving the site as is, continuing the existing condition and situation of this site. This alternative is not feasible as this would mean no development and therefore no economic benefits would be received by the proponent nor the state as well as the Republic in the taxes that it would gain as a result of this project.

4.2 Alternative Site(s)

This proposes an alternate site for building the proposed project. However, there is no alternative site that the owner has in which they can construct the proposed project which will be convenient for his clients and cost effective for the owner and therefore that negates this alternative.

4.3 Preferred Alternative

The preferred alternative is the development of the proposed project which is to build a the office and apartment building at this particular location and be allowed to connect to the public waste water system as soon as the building is completed. However, if this is not possible the proponent is proposing that if the building is completed and the Koror Airai Sanitation Project (KASP) is not completed then he can utilize the office space while leaving the apartment units vacant until the KASP project is completed.

4.4 Other Alternative(s)

Alternate waste water systems were proposed with the client. This included a holding tank for wastewater that will be pumped out and discharged at Malakal until the KASP project is completed and the building can connect to the pump station. This alternative wastewater system was dismissed due to three factors. The first factor was that in the long run it could be cost prohibitive as they don't have a pump truck available and even if they had a contract with a

local pump company they might not be available when they are needed. The second factor was the location of the lot, the fact that it's a reclaimed area and its proximity to the water could be an issue with sea level rise and its impact on the holding tank. The third and final issue was the fact that the lot is located between a residential area and a hotel convinced the project proponent that the pumping out of the holding tank would be a nuisance to his neighbors.

5.0 Affected Environment

5.1 Existing Environment

The lot for the area is identified as Lease Lot B14-01-03 that measures a total of 816 square meters. The area for the proposed fill project is included within the 816 square meters as it was previously a rip-rap wall and fill area that has eroded over time. The project location is in a mixture of residential and commercial area in T-dock - Meketii, Koror State. The project site has been previously disturbed from prior office building and other businesses that were conducted in the area. It had a building that was utilized as an office building previously that has since been torn down in anticipation of this project. The project site is accessible via the main T-dock road.

5.2 Biological Resources

5.2.1 Flora

An ocular assessment of the site was conducted to determine the composition of the vegetation in the area as this was a previously disturbed site with a building located on it. The list of plants found at the site are listed below.

Table 1. Terrestrial Vegetation

Plant	Scientific	Status
Papaya	<i>Carica Papaya L.</i>	Native
Banana	<i>Musa x Sapientum L.</i>	Native
Mango	<i>Mangifera Indica L.</i>	Native
Papaya	<i>Carica Papaya L.</i>	Native
Meradel (kingkang)	<i>Citrus Mitis Blanco</i>	Native
Miich	<i>Terminalia catappa L.</i>	Native
Telentund	<i>Leucaena leucocephala (Lam.) deWit</i>	Invasive
Grass (Udel)	<i>Paspalum conjugatum</i>	Native
Demailei	<i>Heterospathe elata</i> Scheff. Var. <i>palauensis</i> (Becc.)	Native

5.2.2 Fauna and Avifauna

As per EQPB requirements, birds were observed between the hours of 0600 and 0730 at 15 minute intervals. with no bird species found at the site itself but 1 bird was observed flying over the water area closer to Emang. There were also a lack of other animal species within the vicinity except for dogs and chickens in the neighbors property.

5.3 Physical Characteristics

5.3.1 Marine Water Conditions

The project site is bordered by a marine area along side its western edge. A The marine area is highly degraded. A water sample for water quality analysis was collected in the area where the proponent aims to fill and construct a retaining wall. The water quality was analyzed for *Enterococci*, turbidity, salinity, TDS and pH. The *Enterococci* counts were analyzed by EQPB using the IDEXX Enterolert Method with incubator set at 41°C. Turbidity was measured following the EPA 180.1 Method using Turbidity Meter (Hach). As for the other parameters pH was measured using the Corning 350 and TDS and Salinity were measured using the Orion 142. Result of the analysis for Enterococci count revealed that the water behind the site has high traces of coliform bacteria while water turbidity showed high level that exceeded the water quality standards of Class B water as shown in the figure below.

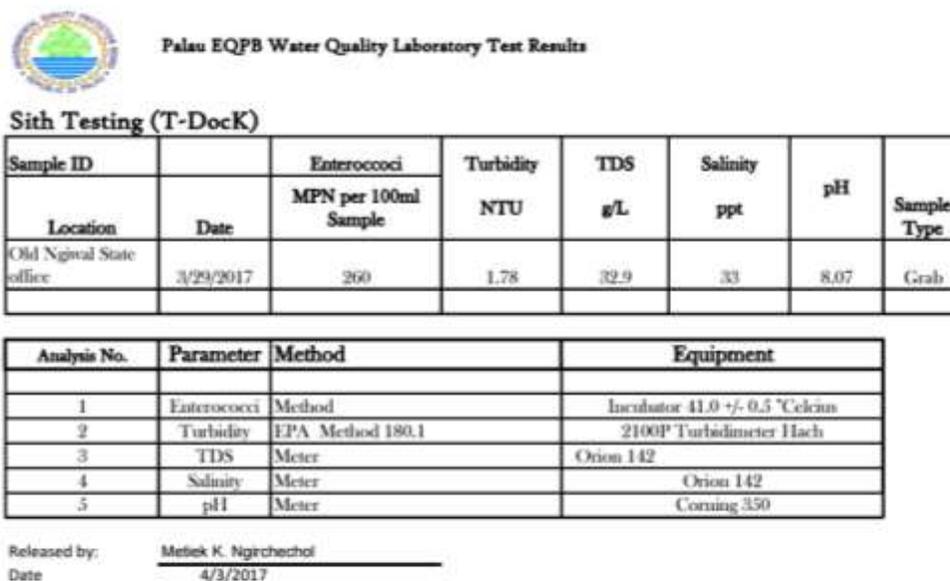


Figure 2. Water Quality Results

The marine environment where the proposed fill is located has been previously disturbed. The site where Mr. Nakamura is proposing to fill is highly impacted as it is located next to an outlet for road drainage. Additionally, high tides have damaged the rip rap wall over time and has washed away part of the fill. Moreover, an EQPB permitted fill project that is approximately five times the size of Mr. Nakamura's fill project is currently occurring adjacent to the area where the proposed fill will take place. A marine survey was conducted with no fishes observed at the time during the assessment. Pictures were also taken underwater, but as can be seen below water was turbid.



Figure 3: Picture of a quadrat used during Marine Survey showing highly turbid water with nothing but mud/sediments at the bottom.



Figure 4. Ocean side of the Project site showing Silt Fence already installed, and a collapsed riprap wall.

5.3.2 Existing Land Uses and Soil Conditions

The site is in T-dock located in Koror which is classified as volcanic upland and has the Soil Type 654 Orthents-Urban Land Complex with 0 to 50 percent slopes as identified in the Soil Survey published in 2009 by the United States Department of Agriculture, Natural Resources Conservation Service. Typic Udorthents and similar soils composes 45% of the soil, urban land composes 40 % of the soil and other minor components composes the remaining 15% of the soil. This Urban land is composed of human transported materials derived from either saprolitic volcanic rocks or limestone. The hydrologic properties note no ponding or flooding, but high runoff. This type of soil is often found in areas that are reclaimed land.

5.3.3 Noise and Air Quality

The site is directly adjacent to the T-dock road which is noisy during the day due to the traffic on the road caused by people visiting business farther down the street such as Ace Hardware or WCTC Auto. However, the ambient noise levels drop at night with decreased traffic. The air quality is fairly good only being impacted by traffic during the day. However, this impact is often reduced due to the constant breeze experienced at the T-dock area.

5.3.4 Historical Properties

The site has no historical properties or items that are found within its boundaries. The proponent previously built in this area and has received clearances to do so including historical clearances.

5.3.5 Public Services and Infrastructure

The project site is formerly the site of an office building. This makes it conducive for constructing another office/apartment building. It has available for hook up for electricity, water, sewer and communications. Electricity, water, and sewerage is provided by the Palau Public Utilities Corporation (PPUC) and the communication such as telephone, internet and cable will be provided by Palau National Communications Corporation (PNCC). Solid waste will be hauled away by Koror State Solid Waste as the project area is covered under their trash pickup routes.

5.4 Socio-Economic Conditions and Consideration

Currently, the site has no socio-economic value as it had been left unutilized when the Ngiwal Government Office moved. This cause the building that was on the site to deteriorate as it was not being taken care of. Once Mr. Nakamura acquired the rights to the site he immediately demolished the building and cleared the area of the solid waste that had accumulated in anticipation of building a new office building. It is currently enclosed by a high tin fence awaiting approval from EQPB for an earthmoving permit so Mr. Nakamura can construct his project.

6.0 Environmental Impacts Assessment

6.1 Environmental Consequences of Planned Project

As with any new development, changes will occur at the project site. This change can lead to impacts on the wildlife and terrestrial plants, or marine species that are located within the site or in the surrounding area. The development can also have an impact on the social and economic condition of the area and the overall community. In order to minimize the overall potential impact of the project, all the potential impacts on the biophysical and socio-economical need to be identified. The potential impacts need to also account for the potential impacts on the surrounding site as a result of this project.

6.2 Impacts on Biological Resources

6.2.1 Potential Impacts on Wildlife Resources

In a natural habitat, any disturbance will affect the wildlife resources that are found within and surrounding that area. The clearing of vegetation, noise throughout the construction phase of the project and increase in human traffic in the area are expected to have potential impact on the wildlife resources.

The clearing of all vegetation for the buildings, sewage treatment systems and other buildings will have a potential impact as it will leave exposed soils. The process for the removal of the vegetation has the potential for spreading invasive species as well as providing an environment for which invasive species can occupy and spread.

The noise that is generated during the construction can also disturb the avifauna and other fauna that may be in the surrounding area. The machines that will be utilized during the construction period are relatively large and generate quite a bit of noise during their operation. The additional traffic congestion from the machinery and additional vehicles transporting workers will also increase the noise level as well. These noises can be a deterrent to the avifauna in the nearby area as well.

6.2.2 Potential Impacts on Marine Resources

The impacts of erosion and sedimentation on marine life and habitat is well documented in various types of media. The most common impact is on the destruction of habitat leading to diminished presence of marine species and affecting marine environment. For this particular project erosion and sedimentation will come in two forms. The first being erosion and sedimentation from the construction of the building. The second form will be erosion and sedimentation during the filling of the submerged area.

Erosion and sedimentation occurs in all phases of the project and with the highest potential during the pre-construction phase when the soil is bared after clearing and when the soil is also being disturbed during the filling and the grading of the area. During construction phase, while the building is being built, the traffic of people and machines disturb soil as long as they are treading on bare soil leading to erosion. Erosion and sedimentation occurrence is less during the operational phase of the project when everything is complete. However, erosion can still occur at this time if the soil is still left bare and loose.

6.2.3 Endangered, Threatened and Rare Species

The project site had native plants and one invasive species. However, the plants identified were not considered endangered, threatened or rare species. The species are commonly found throughout Palau's environment. As mentioned above there were no bird species observed at the site.

6.2.4 Regulated and Protected Species

There were no regulated or protected species at the site.

6.3 Impacts on Physical Resources

6.3.1 Water

The total water consumption of the building is relatively low at only 1,110 gpd compared to other development options such as a hotel. This is due to the fact that the bottom floor of the

building will be used as office space and the second floor only containing four rental units. However, since this is a new development it has a potential impact on the river and water sources that provide the water and on the water infrastructure system to supply the additional required water for the proposed development.

6.3.2 Soil and Land Uses

The project will require clearing of some vegetation for the construction of the facilities and infrastructures. The clearing of vegetation can destabilize the soil and can lead to erosion and sedimentation within the site and to surrounding areas. The construction activities will also cause erosion and sedimentation as they will require some filling to level the land. Most of the area will be impacted as the construction of the building and backfilling will require the removal of the vegetation within the site which as mentioned above only consists of grass and two larger trees. The existing soil, although a mixture of other soils, will be affected through the filling and grading of the site as well as in the process for installing the water and wastewater piping system. During the limited excavation work there could be instances of erosion and sedimentation which will need to be mitigated against.

The movement of machinery in the site can track dirt to other areas as well as disturb the soils leading to potential erosion and sedimentation. Run-off can be considered part of erosion and sedimentation as that can also cause erosion and sedimentation on exposed areas. The three phases of development can contribute to and has varying levels of erosion and sedimentation impacts. Mitigation measures need to consider all the different activities that cause erosion and sedimentation and address them to ensure minimized impacts.

6.3.3 Noise and Air Quality

As one of the two main concerns of the public regarding this project, noise pollution will mainly affect businesses and people living within the area causing annoyance and disturbances. Noise pollution is expected to occur throughout all three phases wherein the most noise will occur during the first two phases of the project.

Most of the noise will be generated by machines used for conducting the first two phases of the project and most likely the additional noise will continue until the operational phase of the project. During the operational phase of the project, the additional people and vehicles that will result from the occupancy of the building will add additional noise, but minimal compared to the

construction phase of the project. The most impacted from the noise will be the residents of the adjacent house and the WCTC motel they are the closest to the site.

Air pollution, like noise, causes annoyances and disrupts other people's work and health. The air pollution that will be generated will be from the machines used in the construction and will mostly occur during the first two phases of the project. Dust may contribute to the air pollution through the disturbance by vehicles.

6.3.4 Historical Properties

The project is not expected to have any potential impacts any historical or cultural artifacts within the project location. This has been confirmed with Historical Preservation Office.

6.3.5 Public Services and Infrastructure

Waste management is an important issue with potential impacts on the environment and the aesthetics of the project location. Waste management is needed for both solid and liquid waste throughout all three phases of the project as they will incur some type of waste whether solid and liquid. Waste management needs to be considered not only for the site, but for the additional burden on other sites where they are disposed of.

Solid waste, hazardous waste and wastewater have impacts on the terrestrial as well as marine environment such as blanketing of plants and bare areas by solid waste and impacting plant growth. In the marine environment, the solid waste or wastewater will impact marine habitat and the organisms living in it.

Solid waste and hazardous waste such as used oil will have a higher potential of impacting the environment as its generated most throughout the first two phases of the project. In the long term, waste that is generated by the building will contribute to the already overfilled National Landfill.

The impact to the wastewater system is the additional load contributed by the proposed project. Wastewater during those two phases will be contained in the portable toilet that is used by the

construction crew. When the building is operational, solid waste and wastewater will be generated.

6.4 Socio-Cultural Impacts

Surrounding businesses and residents were interviewed to determine public opinion of the project as well as the potential impacts of concern to them. Overall those interviewed were supportive of the project as it meant additional apartment units for people that have been displaced due to the increase in tourism as well as apartments for contract workers. Additionally, a majority of the people surveyed says that this project will make the place look better rather than an abandoned building. There were concerns regarding the traffic congestion and noise that would be generated as a result of the office building during construction and to some extent, during the operational phase of the project, but they felt that this business would be better for the Meketii/T-dock area overall.

Noise Pollution

As one of the two main concerns of the public regarding this project, noise pollution will mainly affect businesses and people living within the area causing annoyance and disturbances. Noise pollution is expected to occur throughout all three phases wherein the most noise will occur during the first two phases of the project.

Most of the noise will be generated by machines used for conducting the first two phases of the project and most likely the additional noise will continue until the operational phase of the project. During the operational phase of the project, the additional people and vehicles that will result from the occupancy of the building will add additional noise, but minimal compared to the construction phase of the project. The most impacted from the noise will be the residents of the adjacent house and the WCTC motel they are the closest to the site.

Air Pollution

Air pollution, like noise, causes annoyances and disrupts other people's work and health. The air pollution that will be generated will be from the machines used in the construction and will mostly occur during the first two phases of the project. Dust may contribute to the air pollution through the disturbance by vehicles.

Traffic Congestion

The second main concern for business and residents in the area was the traffic congestion that would occur with the increase in traffic due to the project. A traffic study conducted noted the traffic areas in the morning before work hours and after work hours as being the busiest time of the day for that area. It also noted that on government payday week on Friday tallied the most number of cars in the area due to the bank being located within the vicinity of the project.

During the first two phases of the project, the traffic will increase in the area because of the use of the machinery needed to do the work. During the operational phase of the project, the traffic will also increase due to the office workers, the tenants and Mr. Nakamura's clients.

There are positive socio-economic impacts which include the following:

- Increase in property values surrounding the site as the lot is now being utilized and a new building is built.
- Increased population in the area will provide increased customers for the businesses in the area such as Ace Hardware.
- The project once completed will increase housing available for locals and foreigners who work in Palau and are looking for housing.
- Through the fees generated by the building such as business license fee, government tax, etc. will provide additional income to Koror State and Palau which is in turn used to provide services for the people in the surrounding area and the country.
- Once the project is completed it will also provide economic benefits to Mr. Nakamura in the form of not having to pay rent on his office building and being able to use that to support other businesses. Additionally, the building will provide income from the rental units.

7.0 Mitigation of Environmental Impacts

Based on the information in section 6 of this EA, the impacts from this project can be generalized into several categories and mitigation measures proposed will be addressing those categories. These categories are: Loss of Vegetation and Invasive Species; Erosion and Sedimentation Controls; Waste Management; Noise, Air Quality and Traffic; and Water and Sewer Infrastructures. An Impacts Matrix is attached as *Appendix 3* of this document.

7.1 Mitigation and Control Measures

7.1.1 Loss of Vegetation and Invasive Species

Since plants provide soil cover and the removal of the plants exposes the soil, the potential for erosion and sedimentation is high. Targeted clearing of vegetation will be implemented where in the area where the construction will be done at that particular time will be clear for construction. The other areas with no construction or in which construction has not begun will be left until such time that the construction will begin. Care will be taken to reduce potential erosion by ensuring that bare areas will be covered during rain events or when there is no construction planned at that time.

Proper removal of invasive species would assist in ensuring that the area does not contribute to the spread of invasive. The Bureau of Agriculture (BOA) will be consulted to develop the best method for preventing the spread of invasive species during its removal from the site and where it will be disposed. During the removal process for the terrestrial species, BOA will be consulted on the possibility of collecting specimens for restoration efforts or potential relocation of species.

7.1.2 Erosion and Sedimentation Controls (ESC)

ESC structures will be placed during the pre-construction phase to prevent erosion or sedimentation from leaving the site during any clearing or construction activities. Silt fences have already been installed on the water side of the project site with a tin fence surrounding the actual project site. Silt curtains will be installed in the water surrounding the fill area site before the backfilling of the submerged area commences. These ESCP devices will be inspected by EQPB to ensure proper installation to ensure a higher success rate in preventing erosion and sedimentation to the surrounding sites. Covering of stockpiles as well as bare areas to reduce the potential for erosion of bare soil will be implemented.

7.1.3 Waste Management

During first two phases of the project, cost efficient measures utilizing as much of the materials as possible to reduce waste will be implemented. Solid waste that is generated will be kept in an assigned container that will be disposed of properly and contained to avoid leakage

Solid waste has a higher potential than wastewater to impact areas because unlike wastewater that is contain through its systems, solid waste is carried easily by people to other locations. In order to ensure proper disposal of these wastes, disposal bins will be placed at convenient locations and disposed of at the National Landfill. With hazardous materials such as petroleum products, used oil or hydraulic oil, the contractor will ensure that they are stored in a covered area that has a berm around it to ensure that in the event of heavy rains the hazardous materials do not runoff into the ocean. If necessary, oil changes will be conducted off site or over an impermeable material to ensure that it does not spill into the environment. The contractor will also be instructed to keep the construction area clean after each day.

Solid waste generated by the staff and tenants will be disposed of at the Koror State Landfill, but recycling will be encouraged and opportunities such as recycling bins will be provided to the building for office staff and tenants to help reduce solid waste. Recycling will be encouraged by providing clearly marked recycling bins for the building. The recyclable material will then be transported to the Koror State Redemption Center.

7.1.4 Noise, Air Quality and Traffic

To ensure minimal noise pollution, the work hours for construction will take into account the time when most people are not home and therefore the impact is less. The work will also utilize efficiency to reduce the amount of machines used and how often used. This will help reduce the noise, but is also a cost saving measure for the owner. Residents will be informed of the scheduled time for working hours so that they are aware. To minimize the impact to the two closest neighbors, after the clearing of the area and when construction begins, a fence will be erected similar to the existing fence at the site. This fence will serve to buffer the noise to the adjacent houses as well as serve to secure the site from trespassing as well as a wall to prevent erosion and sedimentation from running off the site.

To mitigate air pollution, the machinery will only be used during times when there is less people in the surrounding areas especially for the residents. In other words, the time period or working

hours will occur during the work week when most people are not home. The machinery used will also be minimized through efficiency in work to help reduce contribution to air pollution. The fence that will be erected during construction will help reduce the air pollution to the surrounding houses and businesses. The building will mostly be concrete to reduce soil disturbance that can result in dust, but also has a wall surrounding the building to help reduce potential dust pollution to surrounding areas.

During the construction phases, work hours will incorporate the peak traffic times for the area and avoid as much as possible to having the machinery operating at that time. This will help manage the traffic congestion until such time the machinery is not needed. A flagman will be posted during construction to help direct traffic and ensure a smoother flow of traffic. The flagman will also help guide vehicles to help reduce potential accidents in the area due to the heavy traffic.

It is harder to regulate the timing for vehicles during the operational phase of the project when there are tenants, guests or clients. The building design includes a one-way entrance and exit out of the property to help reduce traffic congestion. The design also includes adequate parking space for the office to reduce the need to park on the side of the road in front of the building.

7.1.5 Water and Sewer Infrastructures

The main source of the water supply for the building is from the public water supply system. There is also a back-up water system in the form of four (4) 500 gallon tanks which will be made available for the building's water source in the event the public water supply system is unavailable or during events in which it is impacted. Water saving measures such as high efficiency toilets and low flow shower heads will be installed and therefore reduce the overall water usage as well as the wastewater generated by the building.

7.1.6 Socio-Economic Impacts

There are various mitigations which could be structural, design or environmental that have been proposed in this section ensure the reduction or negate the potential impacts of this project on the surrounding area as well as the marine resources that are located adjacent to the fill area. Some of the impacts stated are also positive impacts which negate the need for mitigation. Through planning and proper implementation of ESC devices, a traffic control plan, and construction methods the potential impacts raised by residents and surrounding businesses will be mitigated. Overall, the people interviewed supported the project believing that it will bring added benefits to the area and the State.

8.0 Summary & Conclusions

The project proposed is to build a two-story building containing office buildings for 10 staff in the first floor and four 2-bedroom units on the second floor. This project is being proposed in T-Dock in the Meketii area of Koror in a heavily developed area on a reclaimed land. It includes fill in a marine area that has been heavily degraded as well.

This project has potential impacts as a result of the preparation, construction and operation of the proposed development. However, mitigation measures are proposed that addresses the various impacts identified in the EA such as loss of vegetation, erosion and sedimentation, waste management and potential socio-economic concerns and opportunities. These mitigation measures if properly implemented, consistently monitored and maintained could potentially mitigate the impacts on the environment and also provide positive impacts to Koror State.

Base on assessment of the environment and resources of the project location and the understanding of the magnitude of the planned development project, it can be safely assumed that any negative or adverse impacts that may result from the development of the project could be adequately minimized through implementation of competent mitigation and control measures that have been proposed in this EA report.

9.0 References

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10.0 Appendices

Appendix 1: Statement of Accountability

Appendix 2: Site Plans

Appendix 3: Impact Matrix