Environmental Management Plan

February 2022

Nauru: Sustainable and Climate-Resilient Connectivity Project

Fuel Pipeline

(Financed by Asian Development Bank, Green Climate Fund, and Government of Australia)

Prepared by the China Harbour Engineering Company for Nauru Maritime Port Authority and the Government of Nauru.

Site-Specific Environmental Management Plan

For Fuel Pipeline

REV.	DESCRIPTION	PREP'D	CHK'D	REV'D	APP'D	DATE
R4	For Engineer Approval					2022-02-18
R3	For Engineer Approval					2021-12-20
R2	For Engineer Approval					2021-12-20
R1	For Engineer Approval					2021-12-15
R0	For Engineer Approval					2021-12-14

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ABBREVIATIONS

ADB	Asian Development Bank
CEMP	Construction Environmental Management Plan
CSC	Construction Supervision Consultant
CLO	Community Liaison Office
ERP	Emergency Response Plan
HSE	Health, Safety & Environment
m	metre
PPE	Personal Protective Equipment
PMU	Project Management Unit
RO	Reverse osmosis
SEMP	Site-Specific Environmental Management Plan

1 SCOPE OF WORKS

1.1 General

This Site-Specific Environmental Management Plan (SEMP) for the fuel pipeline installation has been designed to provide the necessary methodologies and procedures for upgrading the existing fuel pipeline to protect the environment and workers and surrounding community from the anticipated negative impacts.

The SEMP must be implemented in conjunction with following documents:

- Approved Construction Environmental Management Plan (CEMP)
- Method Statement for Fuel Pipeline Construction
- Occupational Health and Safety Plan
- Community Health and Safety Plan
- Noise and Vibration Control Management Plan
- Traffic Management Plan
- Hazardous Substance Management Plan
- Waste Management Plan
- Emergency Response Plan
- HAZID for Fuel Pipeline

1.2 Scope of Works

The general scope of the detailed work for fuel pipeline construction includes:

(1) Preparation

(2) Manufacture and installation of fuel pipeline support

(3) Excavation of trench and placement of fuel pipeline

(4) Field welding for fuel pipeline.

(5) Inspection of field welding for fuel pipeline.

(6) Repairing damage of pipe coating

(7) Anti-corrosion treatment for fuel pipeline.

(8) Backfilling of pipeline trench

(9) Installation of pig launcher and pig receiver

(10) Testing of fuel pipeline.

(11) Tie-in into existing terminal lines.

(12) Final preparation prior to putting into operation

(13) Construction of accessory facilities (bollards, eye washer)

The scheduled work for the construction of the pipeline will not be included as part of any night works activities beyond 10 pm.

1.3 Site Description

A new discharge pipeline ending at wharf area was designed and will be constructed to replace the existing fuel pipeline on cantilever structure. The length of pipeline corridor is around 800m, consisting of two pipes comprised of 1620m DN200 fuel pipes, 50m DN100 fuel pipes, 20m DN250 fuel pipes and 60m DN50 fuel pipes. Pig launcher and receiver are designed at ends of the pipeline and the new pipeline will connect to the existing pipeline at the furthest end from wharf.

The layout of fuel pipeline is shown as below. Most of the pipes will be underground pipe in the original design, with only the ends at wharf (wharf end) and existing pipeline area (tie-in end) being above-ground.

Figure 1-1 Layout of Fuel Pipeline

However, as the Nauru memorial was built after the design of the fuel pipeline and right on the excavation area of pipeline, an alternative is to go through the centre of the road in front of memorial to avoid any impact on the memorial area. See Figure 1-2:

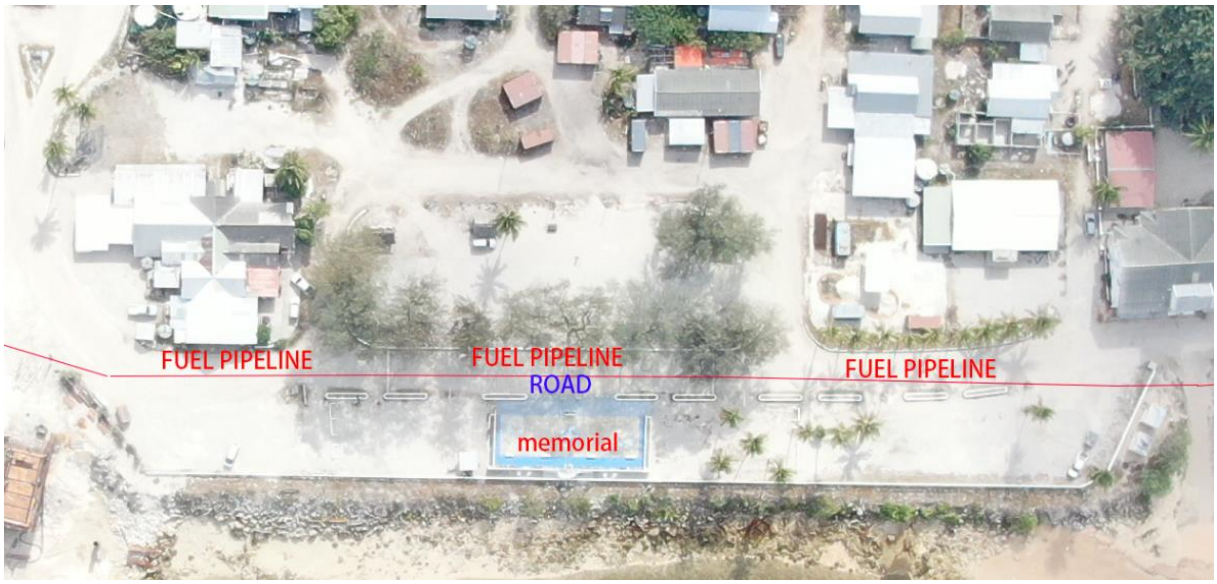

Figure 1-2 Proposed New Pipeline Layout in Memorial Area (All Underground in This Area)

For details，please refer to *Method Statement for Fuel Pipeline Construction.*

2 ROLES & RESPONSIBILITIES

The works will be undertaken based on the organization of roles and delegation of responsibilities per the main project.

2.1 Contract Manager

The Contract Manager is the key person responsible for the success of the project and has overall responsibility for the implementation and administration of the management system. The Contract Manager's responsibilities include, but are not limited to:

- Track project progress, report issues and manage project resources;
- Provide quality assurance for project documentation as appropriate;
- Facilitate or participate in project-related workshops, meetings and discussions;
- Ensure safety, environment and other risk management practices are performed for all work activities undertaken on site generally. This includes ensuring that such practices are modified and updated when required;
- Ensure action is initiated to reduce or eliminate risks or hazards;
- Supervision of project staff.

2.2 Site Engineer

Site engineer is responsible for overseeing that the works undertaken on-site are conducted in a safe and efficient manner. They report directly to the Contract Manager and are assisted by the HSE officer. The site engineer's responsibilities include but are not limited to:

- Conduct pre-start meetings, assign tasks, discuss project needs, potential problems, project progress, current performance and future plans;
- Ensure reporting procedures concerning significant hazards and incidents are followed accurately in the prescribed time frame;
- Conduct information and induction sessions;
- Assist in the identification of hazards in the workplace;
- Recommend preventative measures, including control systems to detect deviation from agreed safety policy;
- Liaise with the site management team on the safety aspects plant/process modification, including equipment specifications, waste disposal and industrial hygiene, protective clothing and the storage of dangerous materials and other substances;
- Initiate and manage site emergency procedures;
- Ensure that site plant is serviced and maintained to manufacturers' specifications;
- Provide constant on-site supervision of worksite safety practices;
- Ensure that workers are supplied with protective clothing and equipment along with training in the use Personal Protective Equipment (PPE) where necessary;
- Investigate and document all recordable incidents in incident register, and ensure corrective action and notification is actioned and recorded in Action Tracking Register;
- Participate in, and contribute to, the effectiveness of health and safety meetings;

2. 3 HSE officers

The Health, Safety & Environment (HSE) officers (2 persons) are responsible for implementing and monitoring of the SEMP.

Specific duties of the HSE officers include, but are not limited to:

- Ensure implementation of the approved CEMP and its sub-plans and SEMP;
- Monitor and report on the effectiveness of CEMP implementation;
- Ensure safety programs and procedures in force at the time are implemented;
- Review new procedures and manage their implementation;

- Ensure reporting procedures concerning significant hazards, incidents, effluent and emission are followed accurately reported in the prescribed manner;
- Identify safety training requirements and consult with the Contract Manager for appropriate programs;
- Conduct information and induction sessions;
- Assist in the identification of hazards in the workplace;
- Recommend preventative measures, including control systems to detect deviation from agreed safety policy;
- Liaise with the management team on the safety aspects plant/process modification, including equipment specifications, waste disposal and industrial hygiene, protective clothing and the storage of dangerous chemicals and other substances;
- Initiate site emergency procedures;
- Obtain and coordinate the services and cooperation of external emergency authorities as necessary.

3 RESOURCES TO BE USED FOR THE WORKS

3.1 Personnel

The number of personnel allocated to the construction of the fuel pipeline has been factored into the total complement of personnel planned for the port project. Personnel will be deployed in line with the scheduling and planning of the various project activities current at the time. No night work beyond 10 pm is planned.

Table 3-1 Manpower

No.	Occupation	Nationality	Persons
Common			
1	Contract Manager	Chinese	1
2	Supervisors	Chinese	1
3	Site Engineer	Chinese	1
4	QA/QC Engineer	Chinese	1
5	HSE Officer	Chinese	1
6	Common Labor	Chinese	4
7	CLO	Nauruan	1

8	Surveyor	Chinese	1
9	Security	Nauruan	3
Welding and construction of pipeline			
10	Welding expert	Chinese	1
11	Inspection Engineer	Chinese	2
12	Special welder for fuel pipeline	Chinese	3
13	Pipeline worker	Chinese	3
14	Device Installer	Chinese	3
15	Mobile crane operator	Chinese	1
16	Trailer driver	Chinese	1
Earth work			
17	Dump truck operator	Chinese	3
18	Excavator operator	Chinese	1
19	Mobile crane operator	Chinese	1
Prefabrication of concrete slab			
20	Batching plant operator	Chinese	1
21	Concrete worker	Chinese	2
22	Wheel loader operator	Chinese	1
23	Concrete Truck Driver	Nauruan or Chinese	2

3.2 Plant & Equipment

Table 3-2 Plant & Equipment

No.	Item	Description	Working Content	Units	Quantity
1	Excavator	XCMG 265	Earthworks	No	1
2	Batching plant	50m³/h	concrete mixing	No	1
3	Wheel loader	LN850	Material feeding	No	1
4	Trailer	50t	Transportation work	No	1
5	Mobile Crane	50t	Lifting	No	1
6	Flat compactor	/	Compaction work	No	1

7	Dump truck	15m³	Earth work	No	3
8	X-ray detector	XXG2505	Inspection of welding	No	1
9	Magnetic Particle detector	Y-1	Inspection of welding	No	1
10	Levels	SJ3	Survey work	No	1
11	GPS instrument	X10	Survey work	No	1
12	Total Station	DJ2	Survey work	No	1
13	Welding Machine	TIG-400PDC	Welding	No.	1

4 HEALTH, SAFETY & ENVIRONMENT

4.1 Health and Safety

4.1.1 Occupational Health & Safety Plans

The construction supervision consultant (CSC) will work with the contractor in ensuring safety measures are implemented. The contractor has Occupational Health & Safety Plan and SP13-Social Safeguards Management Plan which was approved by the Employer following review and suggestions for strengthening by the CSC and Asian Development Bank (ADB). The Safe Work Method Statement (SWMS, including HAZID) has been prepared by the Contractor

4.1.2 Safety Equipment

The workers will be provided with daily information on the tasks they will be undertaking and specific hazards and risks to avoid. As required, training will be provided for any special or technical activities or tasks requiring equipment or plant.

While on the site, standard PPE consists of safety helmet (hard hat), high visibility protective clothing, steel capped work boots and where appropriate or the specific tasks, the following protective equipment:

- Safety glasses
- Safety gloves
- Disposable Mask
- Welding Mask

4.1.3 H&S – community

Community consultation with all adjoining property owners and residents will be conducted by way of community meetings and social media eg Facebook. At community meetings, the Contractor will remind local residents that access to the construction site is especially dangerous to adults as well as children. The community is to clearly understand their

responsibility to ensure their children are not entering the construction area and play in any open trenches. Warning signs will be installed around the perimeter of construction area.

The use of mechanical plant and machinery is to be limited between the hours of 7am and 10pm for all earthworks and preparation of the road foundation and drainage structures. Port access is required during the daytime and will require coordination of traffic flow to minimize impact on the fuel pipeline construction activities.

Steel barriers of an appropriate height and associated warning signs will be set up around the excavated trench and defined walkways to prevent accidental entry into the construction area. Notices will be provided two weeks in advance to the community and adjoining business premises of excavation and construction work and any anticipated changes to existing access and the need for detours.

Screens will be set up to block the radiation used in the X-ray welding testing process, especially nearby dwellings and community facilities.

The screens are a dedicated proprietary radiation-blocking material with a thickness of 5mm and will be set up as a closed area of length* width*heigh=1m*1m*1m around the welding join being tested.

Appropriate signs will be placed when testing is underway, especially when testing is carried out around the memorial site The testing area will be barricaded and 24/7 security will be arranged to avoid unauthorized entry to the work area.

4.1.4 Traffic management

The Traffic Management Plan will be updated and approved prior to construction to include any specific measures relevant to the construction of the fuel pipeline that may arise. Haulage of materials will comply with the Traffic Management Plan. Trucks to follow designated haulage route and take special consideration to local traffic conditions. Signs will be placed on site according to the traffic management plan.

Vehicle access for adjoining owners will be managed and the works will be staged so that disruption to any access to their property will be minimised. During construction of the fuel pipeline, traffic flow along the road will be diverted. Concrete barriers will be placed along the open trench where there is any interaction with traffic.

The concrete public muster area directly in front of the Nauru memorial will be barricaded with concrete barricades to prevent it being used for temporary storage of equipment or parking by construction traffic.

4.2 Environmental Management

Environmental controls are to be implemented at the commencement of the project and maintained throughout the fuel pipeline construction process.

4.2.1 Noise and Vibration

Noise suppression measures outlined in the Noise and Vibration Control Management Plan are to be implemented at all times. Use of mechanical plant and machinery is to be limited to that which has already been approved between the hours of 7am and 10pm.

Ambient day and night time noise levels have been recorded using the hand-held noise sensor over 13 days during July 2021 at a number of sites around the port entrance road and the boulevard to provide base line data for the prospective work schedules in those locations.

The average day and night noise levels recorded the month of July 2021 indicate that the ambient day and night noise level near the NUC power plant (points K and L), which operates 24 hours per day, exceeds the maximum permissible noise level for project night work.

The main sound source at point H is the church while at point I is passing traffic. These are the two relevant monitoring points for the pipeline works and will be monitored for the duration of the pipeline construction.

Table 4-1: Ambient day and night noise levels

dB	H	I	J	K	L
Average day	69.4	68.1	69.2	77.8	73.9
Average night	67.2	67.6	70.2	78.4	74.5

During the construction and installation of the fuel pipeline along the boulevard, noise monitoring will be carried out at the ambient noise monitoring locations H and I as shown in Figure 4.1.

Figure 4-1: Location of ambient noise monitoring sites

Vibration is only anticipated during backfilling and compacting of the pipeline trench and will be carried out with a small manually operated plate compactor. This work will be limited in extent and duration and is not expected to affect any dwellings along the pipeline. No extra monitoring is envisaged due to the low level of vibration from such hand operated equipment, the generally short duration of the work and the distance from any buildings. The maximum vibration level from such hand operated equipment is not expected to exceed the specified level in the Vibration Attenuation Plan, which was based on the use of a mobile vibrating compactor for the backfilling and compaction of the Northern Container Yard. Compliance with the applicable vibration mitigation and management measures will be monitored as outlined in the VAP.

4.2.2 Dust control

Spread water on work areas as required. Dust suppression measures outlined in the Air Quality and Emission Management are to be implemented at all times.

Workers on site will be equipped with disposable mask in case dust is generated during fuel pipeline construction activities.

Stop work during high winds.

4.2.3 Erosion and Sediment Control

No excavation is to be undertaken outside the boundaries of the area shown on the design drawings.

Provide appropriately sized channels and soak pits to contain any surface water runoff during the construction period and as agreed with the PMU/CSC Environmental Specialist. Soak pits will be placed such that they do not impede local traffic access.

Due to the highly porous nature of the coral substrate, runoff water in the soak pits will quickly drain away, as evidenced by similar surface water controls established to manage runoff in the port area during construction. Monitoring by HSE staff will ensure these soak pits remain clear of any buildup of sediment which can retard the ability to soak into the substrate.

Work during heavy rain will cease.

4.2.4 Flora and Fauna

There are no protected, ecologically valuable or Red List threatened species reported within the project area.

No clearing is to be undertaken outside the boundaries of the area shown on the design drawings.

4.2.5 X-ray

Radiation is associated with X-ray detection and therefore requires radiation caution and protection. The safety measures will include but not limited to the following:

The top of the X-ray machine is equipped with alarm lights visible from all directions.

The lead gate is interlocked with the X-ray high voltage control circuit. If the lead gate is not closed, the ray machine cannot be started.

The workplace for the X-ray machine will have closed screens which block radiation. The screens are a dedicated proprietary radiation-blocking material with a thickness of 5mm. Each screen will be 1m wide and 1m high. In total, 4 screens will be set up to shelter an area of 1 square meter radiation core area.

Prior to the test, warning tape will be set up to indicate the area affected by radiation. All people will be cleared from the operational site to the recommended safe distance.

The device will be set up, and facing away from buildings, main road.

A warning sound is triggered prior to operation to make sure all the personnel knowing there is radiation processing.

The machine has a delay switch, with a maximum delay of 3 minutes, before the x-ray is activated. The delay time shall be set at no less than 30s to leave sufficient time for the Inspection Engineer to leave the welded joint after the start button has been activated.

When the device is working, no persons (including Inspection Engineer) shall stand within active area.

Only after confirming that the device has finish working, can personnel step into the blocked area. The Inspection Engineer will turn off the device after the testing and the device will be sent back to the special container and locked.

The Site Engineer will inform all the safety personnel via interphone to re-open the blocked area to the public and the suspended construction will resume.

The X-ray detector shall be clearly marked and secured. When it is not in use, the detector shall be locked in special container.

Training will be given to all workers on protection of radiation hazard and notice shall be issued to make people aware of this.

4.2.6 Photographic developer and fixer for X-ray Test

The chemical reagent, including developing agent and fixer for X-ray detection, will be transported to site, and stored in laboratory as per instruction from the manufacturer.

The photographic developing agent consists of the following substances:

- Anhydrous sodium sulfite - Na_2O_3S, 50%
- Anhydrous sodium carbonate - Na_2CO_3 ,36.5%
- Potassium bromide - BrK ,5.32%

- Hydroquinone - $C_6H_6O_2$, 8% used in most black and white photographic developers for film and paper where, with the compound phenidone, it reduces silver halides to elemental silver.
- Phenidone - $C_9H_{10}N_2O$, 0.18%

The photographic fixer consists of the following substances:

- Anhydrous sodium thiosulfate - $Na_2O_3S_2$, 72.5%
- Anhydrous sodium sulfite - Na_2O_3S, 9.85
- Boric acid - H_3BO_3 , 9.8%
- Tartaric acid $C_4H_6O_6$, 2%
- Potassium alum $AlKO_8S_2$*$12H_2O$, 5.9%

The chemical reagent shall only be used by qualified personnel such as Inspection Engineer who will wear a mask and rubber gloves when using developing agent and fixer to develop the film.

Approximately 40 litres of developer and fixer is expected for the x-ray testing of the welds on the pipeline. The neutralized chemical reagent shall be collected and stored in the recommended plastic containers prior to disposal. The Contractor will follow the advice of the Nauru Public Health Center and dispose of the used developer and fixer mixture in the main landfill where all medical grade waste from the hospital is also transferred.

4.2.7 Spoil

All surplus excavated material shall be removed from the site and disposed of in the approved disposal site as soon as practicable, so that the work site is kept in a clean and tidy condition. Disposal of excavated and scrap material will be at the main rubbish tip (see Appendix 1).

4.2.8 Waste, Hazardous Waste

Contractor will remove any waste/left over material as a result of the construction works. Disposal of waste resulting from construction of the fuel pipeline will comply with the Waste Management Plan.

5 EMERGENCY RESPONSE

CHEC has an approved emergency response plan (ERP) and as part of its entrance road works, CHEC will follow the ERP approved by the Engineer and Employer.

6 WEATHER

Daily monitoring of the weather will be undertaken by accessing the online weather bureau website. This information will be conveyed to the worker(s) at the morning pre-start and may

have a bearing on the daily undertakings. More regular monitoring and communications will be undertaken where weather conditions and the specific work scopes dictate.

Precautions will be taken to ensure that the stability any structures and the safety of worker(s) on site will be maintained in the event of a sudden and severe change in weather.

All work will cease until conditions abate in case the wind speed is too high to safely operate and work.

APPENDIX 1: SITE FOR STORAGE AND DISPOSAL OF DEMOLITION AND SCRAP MATERIAL (RUBBISH TIP)

Health, Safety, and Environmental Risk Identification for Re-Development of Aiwo Port

Fuel Pipeline

Description:	Pre-Construction Risk Identification
Package:	CHEC
Location:	Aiwo District, Nauru
Completed By:	Wu Shaopeng

Approval & Revision Status				
3				
2				
1				
No:	Originator:	Date:	Approved:	Date:

#	Task / Activity	Hazard / Aspect	Risk / Impact	Raw Score L	Raw Score C	Ranking ∑	Controls	Reference Documents	Residual Risk L	Residual Risk C	Ranking ∑	No:	Assessment & Pending Actions	By When	Responsible	Status
1.0	**Project Admin & Planning**															
1.1	Plan construction methodology for upcoming work	Construction Method Plan	Job planing	4	D	M7	Submit to CSC its methodology prior to work for approval. Work on site shall be carried out consistent with its approved methodology.		5	E	L9					
1.2	Undertake appropriate risk assessment prior to undertaking works - identify high risk activities	Risk Assessments	WHS - High Risk Activity	4	D	M7	High Risk Activities will be identified (within this HAZID) and suitable controls applied.	HAZID for fuel pipeline	5	E	L9					
1.3	HSE training	Inductions, Training & Competency	WHS - Training & Competence	5	D	M8	All site workers will receive training on Method Statement, HAZID and SEMP for fuel pipeline	OHS Plan	5	E	L9					
1.4	Wear personal protective equipment	PPE	WHS - PPE	4	D	M7	CHEC will provide PPE and training for use to workers. HSE officer will inspect site daily to check whether workers wear proper PPE. Disciplinary actions against Individual will be in place if workers does not wear proper PPE.	OHS Plan	5	E	L9					
1.5	Consultation and communication with communities	Land Use	ENV - Nuisance to local community	3	D	H6	Notify the local community by the community meeting or in a way agreed by the PMU and CSC.At community meetings, the Contractor will remind local residents that access to the construction site is especially dangerous to adults as well as children. The community is to clearly understand their responsibility to ensure their children are not entering the construction area and play in any open trenches. Warning signs will be installed around the perimeter of construction area. No storage of spoil, construction materials or vehicles is permitted within the new memorial footprint.	OHS Plan,SEMP for fuel pipeline	4	E	M8					
1.6	Notification of Works	Approvals / Permits to Work	ENV - Compliance	5	D	M8	The Contractor will provide the Engineer with evidence that notification has been given of the proposed Works	Specification section 4.2	4	E	M8					
1.7	Mobilization of equipment to site	Traffic & Transport - Terrestrial	ENV - Nuisance to local community	4	D	M7	Limit the work to normal working hour;The Contractors notify the community via Facebook..	OHSP	5	E	L9					
			WHS - Personnel Safety	5	D	M8	Implement TMP;	TMP	5	E	L9					
			ENV - Air quality	3	D	H6	Implement dust and air emission control measures on site.	Air Quality & Emissions Management	4	E	M8					

#	Activity	Hazard / Aspect	Risk / Impact	Raw Score L	Raw Score C	Ranking ∑	Controls	Reference Documents	Residual Risk L	Residual Risk C	Ranking ∑	No:	Action Requirement	By When	Actionee	Status
2.0	**Fuel Pipeline Construction**															
2.1	Manufacture and installation of fuel pipeline support	Traffic Management	WHS - Personnel Health & Safety	3	C	H5	Trucks to follow designated haulage route and take special consideration to local traffic conditions. Signs will be placed on site. Vehicle access for adjoining owners will be managed and the works will be staged so that disruption to any access to their property will be minimised. During construction of the fuel pipeline, traffic flow along the road will be diverted	TMP	5	E	L9					
		Weldingy Works	WHS - Personnel Health & Safety	3	D	H6	Workers will wear welding masks. Safety shields around the active welding site will be erected.	OHSP	5	E	L9					
		Precast and tilt-up concrete	ENV - Compliance	4	D	M7	Production concrete according to the quantity required on the site,	WMS	5	E	L9					
		Cranes and lifting	WHS - Personnel Health & Safety	3	C	H5	Crane operation shall be carried out in accordance with accepted plan for lifting work.	OHSP	5	D	M8					
	Excavation of trench and placement of fuel pipeline	Earthworks	ENV - Nuisance to local community	3	C	H5	Noise suppression measures outlined in the Noise and Vibration Control Management Plan are to be implemented at all times. Use of mechanical plant and machinery is to be limited to that which has already been approved between the hours of 7am and 10pm.	OHSP	4	D	M7					

		Confined Spaces	WHS - Personnel Health & Safety	3	C	H 5	Supports will be placed within the excavated trench to ensure it is stable when working at depth. Working in confined space safety measures adopted.	MS for fuel pipeline construction	4	E	M 8					
		Access & Walkways	WHS - Community Health & Safety	3	C	H 5	Steel barricades placed around all open excavations to prevent unauthorised access to the trench. Defined walkways around the site will be established. Security may be required.	OHSP	4	E	M 8					
		Guards, Barricading and Signage	ENV - Cultural matters	3	C	H 5	The concrete public muster area directly in front of the Nauru memorial will be barricaded with concrete barricades to prevent it being used for temporary storage of equipment or parking by construction traffic. Concrete barriers will be placed along the open trench where there is any interaction with traffic.	TMP, SEMP	4	D	M 7					
		Flora & Fauna - Terrestrial	WHS - Working conditions	5	D	M 8	There are no protected, ecologically valuable or Red List threatened species reported within the project area. No clearing is to be undertaken outside the boundaries of the area shown on the design drawings.	OHSP	6	E	L 10					
2.2		Dust emission	WHS - Personnel Health & Safety	3	D	H 6	Spread water on work areas as required. Dust suppression measures outlined in the Air Quality and Emission Management are to be implemented at all times. Workers on site will be equipped with disposable mask in case dust is generated during fuel pipeline construction activities. Stop work during high winds.	SEMP for fuel pipeline	4	E	M 8					
		Erosion & Sediment Control	ENV - Compliance	3	D	H 6	No excavation is to be undertaken outside the boundaries of the area shown on the design drawings. Provide appropriately sized channels and soak pits to contain any surface water runoff during the construction period and as agreed with the PMU/CSC Environmental Specialist. Soak pits will be placed such that they do not impede local traffic access.	SEMP for fuel pipeline	5	E	L 9					
		Public utilities protection	ENV - Nuisance to local community	3	D	H 6	Place barricades around any above ground utltiies. Care requlred when operating machinery.Firstly, the excavation will be carried out to expose the existing pipeline, the exposed pipeline will be temporarily supported by batten. Then the bridge will be placed underneath the existing pipeline to take place of temporary batten support. Then excavation will continue and the part underneath bridge will be excavated with manual assistance. The bridge will take the load of existing pipeline during construction to avoid any damage to the existing pipeline causing by bending.	MS for fuel pipeline construction	5	E	L 9					
		Traffic & Transport - Terrestrial	ENV - Spoil disposal	3	D	H 6	Dispose of spoil in approved location	SEMP for fuel pipeline	5	E	L 9					
		Cranes and lifting	WHS - Personnel Health & Safety	3	C	H 5	Crane operation shall be carried out in accordance with accepted plan for lifting work.	OHSP	5	D	M 8					
2.3	Field welding for fuel pipeline	Weldingy Works	WHS - Working conditions	3	D	H 6	No matter where the welding to be carried out, shelter protection from high winds or rain will be set up. Normally the shelter will be made of steel frame and covered with tarpaulins.	MS for fuel pipeline construction	5	E	L 9					
			WHS - Personnel Health & Safety	3	D	H 6	Workers will wear welding masks when welding the pipes	OHSP	5	E	L 9					

2.4	Inspection of field welding for fuel pipeline- X-ray detection	OH&S Aspect	WHS - Personnel Health & Safety	3	C	H5	The top of the X-ray machine is equipped with alarm lights visible from all directions. The lead gate is interlocked with the X-ray high voltage control circuit. If the lead gate is not closed, the ray machine cannot be started. The workplace for the X-ray machine will have closed screens which block radiation. The screens are a dedicated proprietary radiation-blocking material with a thickness of 5mm. Each screen will be 1m wide and 1m high. In total, 4 screens will be set up to shelter an area of 1 square meter radiation core area. Prior to the test, warning tape will be set up to indicate the area affected by radiation. A warning sound is triggered prior to operation to make sure all the personnel knowing there is radiation processing. The machine has a delay switch, with a maximum delay of 3 minutes, before the x-ray is activated. The delay time shall be set at no less than 30 secs to leave sufficient time for the Inspection Engineer to leave the welded joint after the start button has been activated. When the device is working, no persons (including Inspection Engineer) shall stand within active area. Only after confirming that the device has finish working, can personnel step into the blocked area. The Inspection Engineer will turn off the device after the testing and the device will be sent back to the special container and locked. The Site Engineer will inform all the safety personnel via interphone to re-open the blocked area to the public and the suspended construction will resume. The X-ray detector shall be secured in a locked in container when not in use.	SEMP for fuel pipeline	4	D	M7					
			WHS - Community Health & Safety	3	D	H6	The device will be set up, and facing away from buildings, main road ." The top of the X-ray machine is equipped with alarm lights visible from all directions. The lead gate is interlocked with the X-ray high voltage control circuit. If the lead gate is not closed, the ray machine cannot be started. The workplace for the X-ray machine will have closed screens which block radiation. The screens are a dedicated proprietary radiation-blocking material with a thickness of 5mm. Each screen will be 1m wide and 1m high. In total, 4 screens will be set up to shelter an area of 1 square meter radiation core area. Prior to the test, warning tape will be set up to indicate the area affected by radiation. Any members of the public standing nearby will be moved to the recommended safe distance away from the test site. Only after confirming that the device has finish working, can personnel step into the blocked area. The Inspection Engineer will turn off the device after the testing and the device will be sent back to the special container and locked. The Site Engineer will inform all the safety personnel via interphone to re-open the blocked area to the public and the suspended construction will resume.	SEMP for fuel pipeline	5	E	L9					
		Chemical Management	ENV - Compliance	3	D	H6	The chemical reagents shall only be used by qualified personnel such as Inspection Engineer. The neutralised reagent shall be collected and stored in the recommended plastic container prior to disposal at the Nauru landfill as advised by Nauru Public Health Centre	SEMP for fuel pipeline	4	E	M8					
2.5	Repairing damage of pipe coating	Dust emission	WHS - Personnel Health & Safety	3	D	H6	Workers on site will be equipped with disposable mask in case dust is generated during repairing damage of pipe coating	SEMP for fuel pipeline	4	E	M8					
2.4	Anti-corrosion treatment for fuel pipeline	OH&S Aspect	WHS - Personnel Health & Safety	3	D	H6	The anticorrosion treatment includes cathodic protection, pouring of concrete slurry and coating. Screens will be erected to protect adjacent area and equipment from abrasive blasting, workers shall wear protective glasses, gloves, mask and other PPE to protect themself.	OHSP, WMS	5	E	L9					

	2.5	Backfilling of pipeline trench	Vibration and Noise	ENV - Nuisance to local community	3	D	H6	Noise suppression measures outlined in the Noise and Vibration Control Management Plan are to be implemented at all times. Use of mechanical plant and machinery is to be limited to that which has already been approved between the hours of 7am and 10pm. Vibration is only anticipated during backfilling and compacting of the pipeline trench and will be carried out with a small manually operated plate compactor.	Noise and Vibration Management Plan,SEMP for fuel pipeline	5	E	L9						
			Dust emission	WHS - Personnel Health & Safety	3	D	H6	Workers shall wear protective glasses, gloves, mask and other PPE to protect themself.	SEMP for fuel pipeline	4	E	M8						
			Traffic & Transport - Terrestrial	ENV - Nuisance to local community	3	D	H6	Trucks to follow designated haulage route and take special consideration to local traffic conditions	TMP	5	E	L9						
			Wastes - Uncontrolled	ENV - Soil and groundwater contamination	4	D	M7	Contractor will remove any waste/left over spoil material. Disposal of waste will comply with the Waste Management Plan.	Waste management Plan	5	D	M8						
			Cranes and lifting	WHS - Personnel Safety	3	C	H5	Crane operation shall be carried out in accordance with accepted plan for Crane.	Plan for Crane. OHSP	5	E	L9						
	2.6	Installation of pig launcher and pig receiver	Precast and tilt-up concrete	ENV - Compliance	4	D	M7	Production concrete according to the quantity required on the site,	WMS	5	E	L9						
			Cranes and lifting	WHS - Personnel Health & Safety	3	C	H5	Crane operation shall be carried out in accordance with accepted plan for lifting work.	Plan for Crane. OHSP	5	E	L9						