PORT DEVELOPMENT GUIDELINES

Appendix A

Engineering and Construction Technical Standards

PILBARA PORTS

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1. APPLICATION OF THIS DOCUMENT

This document outlines Pilbara Ports' technical standards for engineering and construction and applies to all works undertaken on port tenure by proponents and is to be read in conjunction with the Port Development Guidelines (PDG) Application Guide.

2. DEFINITIONS

Refer to the PDG Application Guide for definitions and acronyms.

3. TECHNICAL STANDARDS

These technical standards are provided to assist proponents in meeting the expected minimum engineering and construction performance criteria within Pilbara Ports' lands, seabed and waters.

They are intended to complement (rather than override) accepted Australian Standards or legislation. If there is any inconsistency between the technical standards and State/Commonwealth legislation, the order of precedence is as follows: (1) State/Commonwealth legislation; (2) Australian Standards; and (3) these Technical Standards.

Please note that some components of commentary in these technical standards may not be applicable to your development or operations. If you are unsure about the applicability of specific advice in the technical standards, please contact Pilbara Ports' Port Development team.

3.1 Development levels and coastal vulnerability

The land must be developed to adequate levels to avoid damage or minimise the impact from storm surge, hinterland run-off and wave action.

Building platforms and other areas, as determined by Pilbara Ports, must be at a level where the risk of inundation is acceptable to the end user. The end user may be the proponent, Pilbara Ports, a third party, or any combination of these. Evidence of appropriate consultation with the relevant parties will be required.

Finished development levels must be acceptable to the end user depending on the use and importance of the building or area and should be ascertained with reference to the following parameters:

- Adequate clearance to known flood levels, including sea level rise (climate change) scenarios.
- Distance of developments from the shoreline and watercourses.
- Drainage requirements.
- Site accessibility after flooding events.
- Wave run-up and storm surge.

Where applicable, Pilbara Ports recommends that proponents engage a suitably qualified coastal engineer to assess the adequacy of the proposed development levels and coastal protection measures.

3.1.1 Relevant Western Australian State Government planning information

The State Coastal Planning Policy provides for the long-term sustainability of WA's coast. Nearshore coastal zones are a dynamic environment subject to change over time. Proponents proposing to develop new facilities in a Pilbara Ports' area must develop setbacks and development levels taking into consideration information which is provided in State policies, guidelines, reports and plans.

Early consultation with Pilbara Ports is essential to set an agreed basis for developing a detailed design of the proposed infrastructure.

Relevant policy, guidelines, reports and plans can be located on the State Planning Policy 2.6 - Coastal Planning website. Pilbara Ports can provide copies of Coastal Hazard Risk and Adaptation Management Plans (CHRAMP) for Port of Port Hedland, and Port of Dampier upon request.

3.2 Building standards

Buildings of all classes must be designed and constructed in accordance with the National Construction Code (NCC), relevant Australian Standards and all applicable authorities' requirements.

3.2.1 Building permits

The *WA Building Act 2011* requires proponents to obtain building permits for all new buildings and incidental structures unless an exemption applies.

Section 70 of the *Building Act 2011* reads as follows:

(1) A permit is not required for a building or an incidental structure that is, or is proposed to be, used in the construction, operation or maintenance of road, rail, port, harbour, airport, water, sewerage, electricity, oil or gas supply infrastructure.

(2) However, the permit requirement provisions apply to a building or an incidental structure of a kind mentioned in subsection (1) –

a) that is, or is proposed to be, a residential facility or a recreational facility; or

b) that members of the public normally use; or

c) to which members of the public are permitted access.

If a building permit is required, it is the responsibility of the proponent, not Pilbara Ports, to ensure that the building permit is in place prior to the commencement of the works. The proponent is also required to provide a copy of the building permit to Pilbara Ports.

Section 37 of the *Building Act 2011* requires all buildings and incidental structures to comply with the relevant building standards (currently the NCC), whether or not a building permit was in place prior to construction of the building or incidental structure.

The proponent must engage an accredited building surveyor to issue design compliance and Construction Compliance Certificates for all buildings, to demonstrate that the buildings comply with the NCC. A copy of these certificates must be submitted to Pilbara Ports, generally with the closeout report.

If a building permit required an occupancy permit to be obtained by the proponent, then the proponent is also required to provide Pilbara Ports with a copy of the occupancy permit.

Proponents should engage early with Pilbara Ports to discuss their obligations under the *Building Act 2011*.

3.2.2 Building structures

Building structures must be fit for purpose and function efficiently and safely. The site coverage of all buildings must allow for sufficient:

- Space between buildings;
- Setbacks;
- Landscaping;
- On-site sewerage disposal/re-use surface area;
- Vehicle parking;
- Pedestrian access;
- Storage and collection areas for waste;
- Areas for vehicle manoeuvring and access;
- Emergency response resources; and
- Stormwater run-off.

The development application for a building shall specify whether the structure is permanent or temporary, the proposed location and design features in relation to surrounding structures and other physical features.

3.2.3 Sustainable building design principles

Best practice sustainable design principles must be applied to all proposed building structures. With industry moving towards net zero greenhouse emissions by 2050, it is expected new buildings will aim towards near zero greenhouse gas emissions – refer to the WA Climate Change Policy website for more information.

All building structures are required to consider and where applicable incorporate the following construction and operational principles:

- Reduce the environmental impacts of constructing (or renovating) and operating the building through selecting materials with low embodied energy e.g. recycled and recyclable, and/or sourced locally where possible with minimal waste.
- Maximise energy efficiency through thorough consideration of:
  - Building orientation (passive solar design).
  - Effective choice of building material type and mass, minimising heat gain with insulation, glazing and shading.
  - Use of natural and smart lighting (including sensors and timers).
  - Installation of energy management systems, and other monitoring equipment and selection of highly energy efficient equipment and appliances.
- Optimise the production of renewable energy on-site (solar and/or wind), with associated battery energy storage.
- Consider the role for renewable energy-supplied batteries in providing backup power capability in lieu of diesel-powered generators.
- Electrify heating and water services and reduce the use of emission intensive non-renewable fuels such as natural gas.
- Reduce water consumption through use of water-efficient fittings and harvesting of wastewater for re-use. Potable water, as far as practicable should not be used for landscaping irrigation.
- Provide a healthy and comfortable indoor environment that incorporates appropriate materials and fittings, access to natural light and external views, use of low toxicity products, and sufficient noise attenuation.
- Consider the broader impacts of climate change in the building design including rising sea levels, hotter temperatures, and more intense cyclones.

3.2.4 Architectural building design

Proponents are encouraged to engage design consultants who incorporate architectural merit into the appearance of the building that will reflect the climate and environment of the Pilbara region, support the aspirations of the local government authority for achieving an attractive built environment in the vicinity of the port, and capitalise on the port's unique setting.

Buildings are to be provided with attractive street facades that:

- Incorporate a variety of cladding materials to increase visual interest and reduce the appearance of building mass.
- Include variation in depth, such as projections, recesses and eave overhangs.
- Avoid large expanses of blank walls and highly reflective building materials.
- Adopt a colour palette consistent with local practice, relieved with strong highlight colours.
- Avoid roller doors and wall vents, unless used judiciously as feature elements.
- Provide clear visual cues for entry points for visitors and deliveries.
- Effectively screen from street view external fixtures and equipment such as roof ventilation.
- Buildings are to include alternative accessibility options for impaired or people with a disability.

Where more than one building is to be established on a site, or there are intended to be outbuildings or ancillary installations, they should all follow a consistent design theme.

3.2.5 Finished floor level

Buildings must have a finished floor level that provides an acceptable level of separation from known flood levels to prevent potential harm to occupants and to minimise disruption to essential operations and services.

Building floor levels must be at a level at which the risk of inundation is acceptable to the end-user. The end user may be the proponent, Pilbara Ports, a third party, or a combination of these. Evidence of appropriate consultation with the relevant parties will be required.

3.2.6 Building materials

Building materials must be durable and suitable for local climatic conditions and operational requirements.

Permanent building and structures must have a minimum design life of 20 years, or the period stated in the Australian Standards, whichever is the greater.

- All buildings and structures, including temporary construction buildings, must be designed to withstand conditions as specified in AS/NZS 1170 Loading Standards. Structural design must be certified by a suitably qualified professional chartered engineer who is registered on the National Engineering Register (NER).
- All components and materials used in every aspect of construction are to be suitably durable and able to withstand local climatic conditions and operational requirements.

3.2.7 Buffer zones

Developments must not pose significant risks to third parties or facilities beyond the site boundary.

Where there is likely to be environmental emissions or other risk to surrounding land uses from a proposal, the proponent must:

- Nominate a buffer zone around the land for which the licence/lease or agreement is obtained, or sufficiently set back any plant, equipment or operation that is the potential source of the emissions or risk for Pilbara Ports' consideration.
- Provide sufficient separation distance between its plant, facilities and/or operations and any adjoining land area, such that the use of the adjoining land area is not adversely affected by reason of gaseous, dust, noise and odorous emissions, and risk that would be generated by the proponent's proposed development.

3.3 Site planning and underground services

Site planning of buildings must prevent impacts upon underground services and vehicle circulation.

The site layout must be designed to avoid locating buildings over existing easements and buried services (e.g. water supply mains, sewers, effluent disposal/reuse area, stormwater drains, and electrical and telecommunications cables) and must also allow for safe and effective manoeuvring of vehicles near such services.

In any instance where a building or structure must be erected near or over a buried service, provisions must be made to protect the buried service, to clearly mark its location, and to provide ready access.

3.3.1 Utilities and services

Land must be adequately serviced to a standard that would be expected of a new development. Services must be designed and installed in compliance with Australian Standards.

Service mains must be located in road verges in accordance with the Utility Providers Code of Practice for WA, to minimise impact on future land use.

If required by Pilbara Ports, the development must include provision for additional infrastructure to facilitate future developments.

Proposed infrastructure designs and layouts should not compromise existing services, easements or planned future land uses.

Utilities or services provided by third parties on Pilbara Ports' land may be subject to easements and/or covenants and may require separate commercial agreements with Pilbara Ports.

Pilbara Ports may hold information regarding the location of existing services. The proponent is however responsible for collecting the most current information regarding location of existing services and easements, etc. and for verifying its accuracy.

All underground services must be surveyed prior to back-filling. As-built drawings and survey information must be provided to Pilbara Ports in PDF and spatial digital data format, refer to PDG Appendix F - Land Survey Technical Standards, and Appendix G - Spatial Data Technical Standards.

Red-line mark-ups/marked-up issued for construction drawings alone will not be accepted by Pilbara Ports.

Reflective tape/markers are to be installed over underground services prior to back-filling.

Any information gathered that improves the location accuracy of existing services must be provided to Pilbara Ports. If local surveys are required to verify buried service locations, this survey data must be provided to Pilbara Ports in spatial (digital) data format.

Any utility services added or removed as part of the construction should be provided as separate data sets as constructed spatial data.

3.3.2 Water

The land must be serviced with potable water to a standard that would be expected of the new development.

Details of water supply and water storage requirements must be submitted to Pilbara Ports for approval, and to the Water Corporation, if necessary.

Water Corporation advice must be obtained if the proponent requires a water supply from existing water infrastructure or if the installation of new infrastructure is required.

New water infrastructure proposed in road reserves must only be located in defined service corridors with the approval of both Pilbara Ports and the Water Corporation.

Installation of water services must be in accordance with all applicable Australian Standards and other regulatory requirements.

New services may need to be designed in such a manner as to enable future growth.

3.3.3 Electrical power

The land must be serviced with electrical power to a standard that would be expected of the new development.

Electrical power infrastructure must be installed underground within the site. Appropriate warning signage indicating the location of buried cables must be installed.

New electrical power infrastructure proposed in road reserves must only be located in defined service corridors with the approval of both Pilbara Ports and Horizon Power. Electrical services installations must be in accordance with all applicable Australian Standards and other regulatory requirements.

Note: Horizon Power must be contacted for establishment of a new service or reticulation off existing mains.

3.3.4 Telecommunications

The land must be serviced with telecommunications to a standard that would be expected of the new development.

New communications infrastructure required in road reserves must only be located in defined service corridors with the approval of both Pilbara Ports and Telstra or another telecommunication provider.

Installation of telecommunication services must be in accordance with all applicable Australian Standards and other regulatory requirements.

Note: Telstra or another applicable telecommunication provider must be contacted for establishment of a new service. Also refer to PDG Appendix F - Land Survey Technical Standards.

3.4 Wastewater and sewerage management

Land and/or buildings must be serviced with wastewater and sewerage treatment or disposal infrastructure to a standard that would be expected of the new development.

All buildings must be serviced by wastewater and sewerage treatment or disposal infrastructure. In locations where connection to off-site reticulated sewerage is not possible, on-site systems must be utilised and manufactured, installed and operated in accordance with the requirements of the Department of Health, the local government authority and/or Department of Water and Environmental Regulation (DWER).

Pilbara Ports encourages fit-for-purpose reuse of wastewater, for example: irrigation, plant reticulation and/or washdown purposes. All wastewater recycling systems must meet the requirements stipulated by the Department of Health, the local government authority and/or DWER.

Pilbara Ports may request copies of maintenance reports and water quality testing results required by other regulatory bodies.

Copies of all approvals and any permits to use wastewater apparatus – granted by regulatory authorities, must be submitted to Pilbara Ports prior to the commencement of use.

3.5 Other waste management

Waste material must be stored in a designated functional and accessible location prior to off-site disposal at an approved disposal area. Pilbara Ports encourages proponents to minimise waste sent to landfill through reducing, reusing and recycling waste.

Each site requires a designated area(s) for the storage of waste material including rubbish bins, waste hydrocarbons and other industrial liquid drums and/or tanks. The size, location and design of the compound should be defined by the proposed use of the site, and include:

- Bins must be fitted with lids and/or covers to stop windblown litter and access by animals, be screened from public view and provided with a tap and adequate water supply with sufficient pressure.
- If not fenced or otherwise enclosed, tie down points or alternative means of securing bins during cyclones must be provided.
- The rubbish compound/bin storage area is to be constructed with bunded concrete flooring graded to an industrial floor waste gully connected to an approved wastewater disposal system for commercial waste.

Waste-storage areas must be sized to suit the frequency of waste removal from site and located for ease of access by waste removal vehicles. As a guide, the location of rubbish pickup compound should take into account the ability for a front-loading single unit truck (12.5m long with a 12.5m turning radius) to access the compound – particularly when using bulk bin service.

Drains are to incorporate a 200 millimetres (mm) bucket trap or an alternate solid particulate capture system.

All waste materials including fuel, oil, chemicals, hazardous materials must eventually be removed from the site and disposed of in accordance with regulatory requirements. Burning or burying of waste is not permitted on port land.

Proponents should refer to WA Waste Avoidance and Resource Recovery Strategy 2030, for waste reduction and recycling targets, as part of a sustainability strategy.

3.6 Drainage and stormwater management

Pilbara Ports may require submission of a stormwater management plan for approval. The plan must include a local area catchment and drainage study, and an on-site catchment and drainage strategy, and demonstrate how stormwater management will:

- Minimise environmental impacts.
- Protect buildings and key infrastructure (including other drainage systems) from flooding and waterlogging.
- Maximise opportunities for fit-for-purpose reuse of stormwater.
- Integrate with hard and soft landscaping.
- Be maintained into perpetuity.

Pilbara Ports requires the adoption of best practice in storm water management. The Stormwater Management Manual for WA and Water Quality Protection Note 52: Stormwater Management at Industrial Sites – are useful guides that may assist in the assessment of catchment conditions, and structural and non-structural stormwater controls.

On-site and off-site stormwater management will need to minimise the export of pollutants from the site, and consider the adoption of the following stormwater quality improvement targets (as compared to untreated stormwater run-off):

- Eighty per cent (80%) reduction in total suspended solids.
- Ninety per cent (90%) reduction in gross pollutants.
- Reductions in contaminant concentrations (e.g. heavy metals, pathogens, nutrients, hydrocarbons) consistent with Australian and New Zealand Environmental Guidelines for Fresh and Marine Water Quality.

3.6.1 Drainage within roads

Stormwater management within roads and road reserves must:

- Maintain a level of serviceability of one (1) in 10-year Average Recurrence Interval (ARI).
- Be designed and constructed to Main Roads WA (MRWA) standards.
- Include adequate protection from scour or erosion by using concrete lining or stone pitching (or an approved equivalent) in a manner satisfactory to Pilbara Ports. Underground piped drains and box culverts are also permitted.
- Include flood ways in locations on roads where significant flows of short duration are anticipated to occur infrequently. Floodways must be designed and constructed to MRWA standards.

Any drainage structure within an intertidal zone will require prior approval from Pilbara Ports.

3.6.2 Drainage infrastructure/systems

Discharge into all Pilbara Ports drainage systems requires prior approval from Pilbara Ports, and all costs and approvals associated with these works (including any works required to modify Pilbara Ports' drainage system) will be the responsibility of the proponent.

The development of the site must not adversely affect existing drainage of the site and/or adjacent sites. If necessary, local on-site drains must be constructed to ensure that run-off will be collected and discharged into perimeter drains or another suitable stormwater conveyance system.

Stormwater discharge points must be located so that they do not adversely impact on areas of high ecological value, or cause nuisance or damage to adjoining properties or facilities. Drain outlets must be appropriately treated to ensure no erosion occurs during design flows.

Peak flow rates must be retained on site at suitable locations to allow management of stormwater quantity and quality. As a guide, first-flush treatment systems should be designed to treat a volume equivalent to one in three months ARI, calculated as 50 per cent of one year ARI or the first 10mm of rainfall from the site, whichever is the greater.

Measures must be implemented to minimise stormwater run-off that flows from construction and/or operational areas to mangrove, tidal and/or waterway areas, as far as practical, and the volume of flow entering these areas.

Inspection of drainage infrastructure may be carried out by Pilbara Ports at its discretion. Pilbara Ports may direct the proponent to modify or improve the drainage infrastructure.

Proponents are encouraged to make provision for stormwater emergency shut-off procedures, where possible, with the aim to prevent or minimise the impact of large spillages, fire or other disasters on the site stormwater system. These provisions are not expected to require complex designs or structures, but rather simple shut-off procedures such as blocking a drain or covering a stormwater field inlet. Details of any initiatives must be included in the construction application.

The location of any installed permanent drainage infrastructure must be picked up in as-built surveys and provided in spatial (digital) data format. Also refer to PDG Appendix G – Spatial Data Technical Standards.

3.7 Washdown pads

Washdown pads must be designed to contain and treat all wastewater from washdown activities, including spills. Washdown activities can only be undertaken at dedicated washdown areas approved by Pilbara Ports, and:

- Washdown pads must be sealed and bunded to prevent runoff.
- The washdown pad dimensions must be designed to cater for the operational use of the pad, to ensure all wash waters are contained.
- The washdown pad must have sufficient cross and longitudinal fall to provide drainage to a collection point for collection and/or treatment.
- Washdown water must not be directly discharged to the environment, including to soils, groundwater and surface water. Only wastewater which has been treated to an approved standard can be discharged. Design details of such systems must be provided by the proponent.
- Proponents may choose to include an evaporation pad that is sized for the usage and volume of the wash bay, with discharge and/or reuse on-site following suitable treatment of the wastewater, to make it fit for purpose.
- Sumps must be pumped out on a regular basis to avoid overflowing and to prevent soil contamination.
- Pump out water must either be adequately treated for disposal on-site or transported off-site for disposal in accordance with waste disposal regulations.
- Sumps may need in-situ treatment to preclude breeding of disease vectors, such as mosquitoes, and in cases where sumps are located adjacent to active wharf areas special treatments may be required.

3.8 Landscaping

Development sites must be adequately landscaped where practical and reasonable. The aim of landscaping is to improve the visual amenity of the site from common/public areas and promote the beautification of commercial and industrial areas within the ports.

Landscaping must be carried out for any areas which will be developed by a proponent but then transferred to Pilbara Ports for control and management.

No clearing of existing landscaping may be carried out without Pilbara Ports approval.

Landscaping design must not compromise visibility or personal security in streets and around buildings. Areas that Pilbara Ports encourages landscaping include:

- Around office/administration buildings.
- Outdoor amenities areas.
- Car parking areas.
- Along perimeter boundaries.
- Adjacent to swale drains.

Landscaping design elements of the development should aim to:

- Utilise native species.
- Manage and control weeds.
- Promote water-wise principles.
- Retain significant vegetation.

The Pilbara Ports Landscaping Guideline is available on request.

Landscaped areas must be fully reticulated. Proposed irrigation must utilise alternative water sources, such as captured stormwater or recycled wastewater wherever possible.

3.8.1 Landscaping plan

A landscaping plan must be submitted as part of the construction application for any land which is to be developed by a proponent and then transferred to Pilbara Ports for operational control and management.

The landscaping plan must address the proposed clearing of any existing landscaping and must include a site plan clearly showing the proposed areas to be cleared. Pilbara Ports will consider the effect of the proposed clearing on the surrounding area and determine whether or not offset planning is required.

3.9 Fill material

All fill material brought onto Pilbara Ports' lands by proponents must be inert and uncontaminated. It must also meet relevant environmental, safety and engineering requirements.

The proponent must obtain Pilbara Ports' approval for all fill material intended to be imported onto the development site. Pilbara Ports defines imported fill as being any material that does not originate from the area being developed, and includes material sourced from a borrow pit or quarry.

Notwithstanding Pilbara Ports' approval, and unless agreed otherwise, the proponent shall remain responsible for its obligations under any tenure agreement. All contamination risks associated with placing fill on the land and subsequent activities upon that land also remain the responsibility of the proponent.

Pilbara Ports' agreement must be obtained prior to any dredge material being placed on land and/or the seabed. Also refer to the PDG Appendix E -Environment and Heritage Technical Standards.

3.9.1 Soil samples

The use of acid sulphate soil material, blended fill and high plasticity clay as fill material is not permitted, unless agreed otherwise by Pilbara Ports.

The proponent must sample and test the material intended to be imported to demonstrate compliance with the criteria for clean fill. These criteria are indicated in the DWER publication Landfill Waste Classification and Waste Definitions 1996 (as amended).

The proponent must submit a risk assessment to Pilbara Ports for placing imported fill at the nominated location and include a plan for monitoring the quality of the material.

Compaction requirements for the imported fill will depend on the intended end use, as determined by a suitably qualified and experienced geotechnical engineer. Pilbara Ports may request the proponent to undertake a geotechnical analysis of the fill material to ensure its adequacy for the intended purpose.

The proponent must maintain records of the source(s), volume(s) and placement location(s) of imported fill (including maps of the placement locations) and compaction test results. Proponents must provide such information to Pilbara Ports as each stage of filling is completed, or every six months, whichever is the shorter timeframe.

3.10 Permanent fences

Development and lease areas must be appropriately delineated with approved fencing that provides adequate site security for the proposed use.

All fencing and footings must be certified, by way of Proof of Engineering Certification, to withstand the Pilbara region D, and terrain category appropriate to its location as specified in AS/NZS 1170.2: Structural Design Actions – Wind Actions.

As a minimum, fences must stand 1.8 metres (m) high and be of chain wire construction. Fences up to a maximum of 3.0 m high may be considered only when an increased need for security can be demonstrated.

The use of green or black palisade or spear top fencing up to a maximum height of 2.4 m is encouraged along boundaries that front public roads or places otherwise only black or green poly-coated chain link fencing is permitted.

Solid fencing such as colorbond fencing or other impervious materials may be used within lease areas for security, privacy or to screen certain areas such as where waste materials are stored.

The location, dimensions and style of boundary and internal fencing must be demonstrated on the development site plan.

To reduce the risk of harm to wildlife, Pilbara Ports discourages the use of barbed wire unless the proponent can demonstrate a legal, security or other relevant requirement. In such cases, no more than three strand barbed wire is permitted.

Perimeter fences must be located on the boundary line. Prior to the installation or replacement of perimeter fences, the proponent shall engage a licensed surveyor to confirm the boundary coordinates. Boundary coordinates can be obtained from Pilbara Ports. A feature survey must be submitted once the fences are installed, in order to confirm that they have been installed on the correct alignment.

If the terrain or topography restricts the installation of a perimeter fence, this matter should be raised with Pilbara Ports as soon as possible.

3.11 Temporary construction boundary site fences

Installation of temporary construction site boundary fences is permitted on construction sites. Fences must be installed prior to the commencement of construction activities and details included in the construction application. Temporary fences are to be removed once the construction activities are completed and/or in preparation for a cyclone event.

3.12 Permanent signage

Drawings showing structural details, height and location of the sign in relation to the property boundaries and/or existing buildings on the property, the inscription to appear on the sign, the method of construction and fixing of the sign (includes painting/sign writing on structures), must be submitted to Pilbara Ports for approval (refer to the Pilbara Ports Application for Signage Approval Form, provided on request).

In accordance with the *Work Health and Safety (General) Regulations 2022* warning signs must be displayed in the workplace as they relate to identified hazards (refer AS 1319 Safety signs for the occupational environment).

Sign writing, lettering, and colouring must be in accordance with AS 1744 Standard Alphabets for Road Signs and/or MRWA requirements, as appropriate. All signs must be maintained in good order. Remedial or repair works must be carried out promptly and:

- Must not endanger public safety.
- Must not obstruct or impede the sightlines required for the free and safe movement of traffic into or from any street, vehicle circulation path.
- Must not be confused with, or mistaken for, an official traffic sign or single or contravene the *Road Traffic Act 1974* or *Main Roads Act 1930*.
- Must not detrimentally affect the structural integrity of the building or structure on which it is affixed.
- Must not be installed on a road reserve, footpath, drainage reserve, or carriageway, unless approved by Pilbara Ports.
- Must be situated within a proponent's lease area.

Permanent signs must be designed and maintained to withstand region D terrain category 2 cyclonic wind conditions (AS/NZS 1170.2) with certification provided by way of Proof of Engineering Certification. Some signage may require appropriate barriers/bollards to minimise the potential for vehicle impact.

3.13 Temporary signage

Temporary signs must be securely fixed to the structure by which it is supported and must be removed during cyclone events or constructed to permanent sign standards.

Construction sites must be appropriately signed. Any such sign must be removed within seven days of completion of the site works, unless otherwise directed by Pilbara Ports.

Third party advertising signage is not permitted to be installed within lease areas without the prior written consent of Pilbara Ports. Mobile variable message boards or signs are not permitted within port lands or waters without the prior written consent of Pilbara Ports.

3.14 Lease signage

Permanent lease areas are to be identified with approved lot signage erected within the lease area in a suitably visible area.

The lot sign stating the minimum personal protective equipment (PPE), HAZCHEM classification and dangerous goods placarding (as appropriate), site entry requirements, speed limit, emergency/afterhours contact number(s), and traffic flow direction must be placed at the entrance of the lease area.

The lot sign must be set vertically and located within 1.5 m of the entrance of the lease area. The lowest part of the lot sign must be a minimum of 1.8 m above the ground level or 2.2 m above ground level, if the sign is located in a pedestrian circulation area.

The lot sign support post(s) must be made from galvanised steel or sufficiently painted to prevent corrosion.

Entry statements may include a fence or wall constructed of masonry or other materials which identify the entrance of an industrial lot, and may also include, but are not limited to, signage, sculptures, flagpoles, and flags. Entry statements must be harmonious with the local environment and improve the amenity of the area.

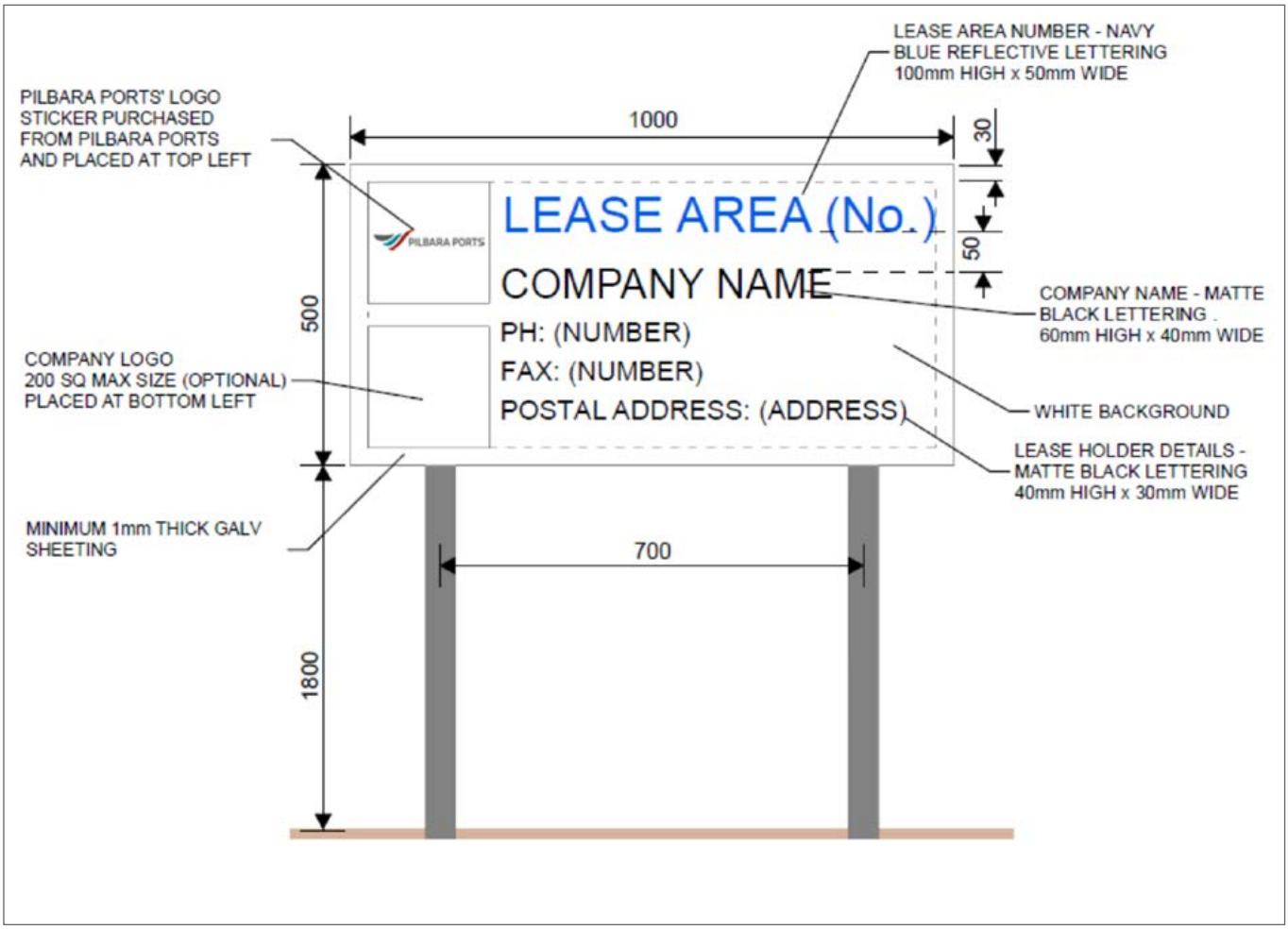
In addition to the above requirements, entry statements may include associated landscaping, and must improve the amenity of the area.

All drawings must be submitted to Pilbara Ports for approval. Minimum signage installations must conform to relevant standard and codes with minimum requirements identified in an appropriate proof of engineering certification, submitted for Pilbara Ports acceptance prior to installation.

Signage adjacent to public roads may also require MRWA and local authority endorsement.

Contact Pilbara Ports' Port Development team for a copy of the Application for Signage Approval Form, which is provided on request. Pilbara Ports will also determine if the proposed entry statement is of such size and complexity that a development application is required.

Example: Lease Area Signage Detail (not to scale):



3.15 Storage and laydown areas

Storage areas for goods, materials and containers must be configured in a manner that does not affect the safety of the area and the environment, or impact on port operations.

All goods, materials or machinery stored on-site must be stored in a safe manner that satisfies all regulatory and legislative requirements.

Installation of sea containers is permitted within the site only for storage purposes and must be approved by Pilbara Ports prior to instalment. Tie-down details of sea containers must be certified by a chartered engineer, registered on the NER, or equivalent registered professional engineer.

Storage facilities, depots, laydown areas and any other open areas must be maintained in good condition by the operating proponent.

Laydown areas are to be designed and constructed to be safe, effective and dust-free as practical. Laydown areas may be sealed and the application of dust suppressants is permitted however these must be approved by Pilbara Ports before use.

Pilbara Ports may consider a dispensation to sealing laydown areas where the proponent can demonstrate:

- Sealing of the laydown area would be impractical or unduly expensive.
- The unsealed option would serve the same function as pavement without an unacceptable reduction in health and safety standards.
- Appropriate dust suppression measures are provided in lieu of sealed paving.

The request for dispensation and supporting details must be submitted with the construction application for Pilbara Ports approval.

3.16 Temporary facilities

If compliance with a development requirement cannot be achieved for a temporary facility, proponents may seek a dispensation from Pilbara Ports. Proponents are encouraged to discuss any issues with Pilbara Ports as early as possible.

Temporary buildings and structures must be removed at the completion of the construction phase unless approved by Pilbara Ports. The site is to be cleaned up, made good and left in a safe and tidy state.

The length of time a building can remain on site and be considered temporary:

Development type	Timeframe
Type 1	Up to 6 months
Type 2	Up to 1 year
Type 3	Up to 2 years
Type 4	Up to 3 years

The proponent must produce a demobilisation plan for Pilbara Ports approval, prior to the demobilisation of any temporary facilities which identifies the extent of remediation including where applicable:

- Removal of all waste to a recognised waste treatment facility.
- Remediation of contaminated areas to acceptable levels.
- Site revegetated as necessary.

Refer to the PDG Appendix E - Environment and Heritage Technical Standards for more information.

3.17 Security

The proponent must develop and implement a Security Management Plan and/or Port Facility Maritime Security Plan that sets out the systems, practices, and procedures to govern access, surveillance, and security of the premises, plant, equipment, cargo and infrastructure etc.

Where the development is in a Security Regulated Port and employees require access to and from, or within Maritime Security Zones, a Security Management Plan and/or Port Facility Maritime Security Plan must include and fulfil the requirements of the *Maritime Transport and Offshore Facilities Security Act 2003* (Cth) and *Maritime Transport and Offshore Facilities Security Regulations 2003* (Cth).

Guidance material on the development of Port Facility Maritime Security Plans can be found on the cyber and infrastructure security centre website.

The proponent's Security Management Plan and/or Port Facility Maritime Security Plan will be subservient to the relevant Pilbara Ports Maritime Security Plan.

A component or extract of the Security Management Plan and/or Port Facility Maritime Security Plan is to be provided to Pilbara Ports upon request, to demonstrate that it is in keeping with and are consistent with the relevant Pilbara Ports' Maritime Security Plan.

The proponent will at Pilbara Ports' request make their Security Management Plan and/or Port Facility Maritime Security Plan available to Pilbara Ports to audit for assurance purposes.

If the proponent is intending to move, handle or store goods subject to Customs control, they must also consider their obligations under the *Customs Act 1901* (Cth).

3.18 Lighting standards

The land must be serviced with external lighting to a standard that would be expected of the new development.

Where it is intended that work activities will be undertaken at a facility, the proponent must ensure lighting is provided in accordance with relevant legislation and standards. AS 1680.5: Interior and workplace lighting - Outdoor workplace lighting and Safe Work Australia's Code of Practice: Managing the Work Environment and Facilities are recommended as guidelines.

Pilbara Ports may require the proponent to provide off-site lighting as part of the development. Off-site lighting (namely street lighting beyond the lease boundary for vehicles or pedestrians) must be designed in accordance with the Australian Standard series AS/NZS 1158.3.1 Lighting for Road and Public Spaces Pedestrian Area (Category P) lighting – Performance and Design Requirements.

On-site and off-site lighting must not interfere with the visibility of existing or planned navigational aids.

Any light spillage from the site, project area or activity into the surrounding environment should be minimised where practical to avoid adverse impacts on fauna and neighbouring activities.

Pilbara Ports reserves the right to stop work activity where work activities are being undertaken with inadequate lighting.

The location of any installed permanent lighting must be included in as-built surveys and provided in spatial (digital) data format.

3.19 Pavement construction

Trafficable surfaces including external and internal roads, driveways, crossovers, car parking areas, laydown areas and pedestrian walkways must be treated with an appropriate pavement type, and maintained to a standard that is fit for the proposed purpose.

Pavement specifications for roads must be consistent with Pilbara Ports' Roads Minimum Development Requirements table 1 below.

3.19.1 Pavement types

Pavement types proposed for heavy use trafficable areas must be certified by a suitable qualified NER chartered engineer, or equivalent international standard. Evidence of certification must be submitted to Pilbara Ports with the construction application confirming:

- The type and specification of pavement or surface treatment of trafficable areas will be dependent on the proposed use including:
  - Type and class of vehicles.
  - Frequency and volume of vehicular movements.
  - Type and weight of cargo or materials being laid down.
  - The location of the site and desirable level of local area amenity e.g. remote location or industrial/port area.

3.19.2 Pavement design

All pavements and sealed areas must be fit for purpose, durable, hard wearing, drained and regularly maintained including line marking where applicable.

The minimum design life of sealed pavement types must be 20 years unless the proponent can demonstrate a lesser required timeframe. This might be dependent on the length of tenure proposed to be granted by Pilbara Ports.

Where Pilbara Ports considers a particular area requires a higher standard of surface treatment than what has been proposed, the proponent must provide written justification as to why the particular pavement is most suitable.

After construction, certification that construction has been undertaken in accordance with the approved plans and drawings must be submitted to Pilbara Ports for all sealed areas including but not limited to roads, crossovers, laydown areas, and back of wharf areas that will be transferred to Pilbara Ports after practical completion.

3.19.3 Geotechnical and geohazard conditions

Ground level geotechnical conditions must be sufficient to allow for proposed loadings.

All ground level pavements, slabs and hardstand areas must be certified by a NER chartered engineer or equivalent to withstand proposed loading of buildings, vehicles, structures, and cargo stacking, where applicable.

All geotechnical reports and studies carried out in relation to the proposed development must also be submitted to Pilbara Ports. Refer to PDG Appendix G - Land Survey Technical Standards.

3.20 Internal site road access and driveways

On site vehicle access must be designed to be safe, effective and minimise conflicts with site operations and other vehicles manoeuvring.

The minimum design life for internal site road access and driveways and common road pavements must be 20 years, with design loadings as applicable for the road use.

Internal site road access and driveways must be designed in accordance with Austroads and MRWA standards and specifications, to enable sufficient turning area for the maximum class of vehicle proposed to traverse the site. This includes providing sufficient vertical and horizontal clearances.

Crossovers that intersect with Pilbara Ports' roads or other public roads must be constructed to an equal or higher pavement specification standard. The turnout radius of crossovers must be designed to ensure that all wheels for the maximum class of vehicles proposed to access the site remain in contact with the pavement.

A minimum first six (6)m of an internal site driveway must be constructed to an equal or higher pavement specification standard as the adjoining crossover.

Where applicable, culvert design, including diameter, headwalls and erosion protection, must be appropriately designed by a NER chartered engineer. Pilbara Ports' approval must be obtained for pipe or culvert details and driveway design at all access points.

3.21 Road maintenance

Road access and driveways must be permanently maintained by the proponent to the satisfaction of Pilbara Ports. Road access and driveways must be maintained in good condition into perpetuity. Proponents are responsible for maintaining driveways to the main road interface, including clearing any culverts of obstruction prior to cyclone season that may be beyond the lease boundary.

The proponent will be responsible for the clean-up of any soil and debris that washes out from within the proponent's site onto communal areas, and repair of any erosion and/or scour at their expense.

3.22 Onsite vehicle access

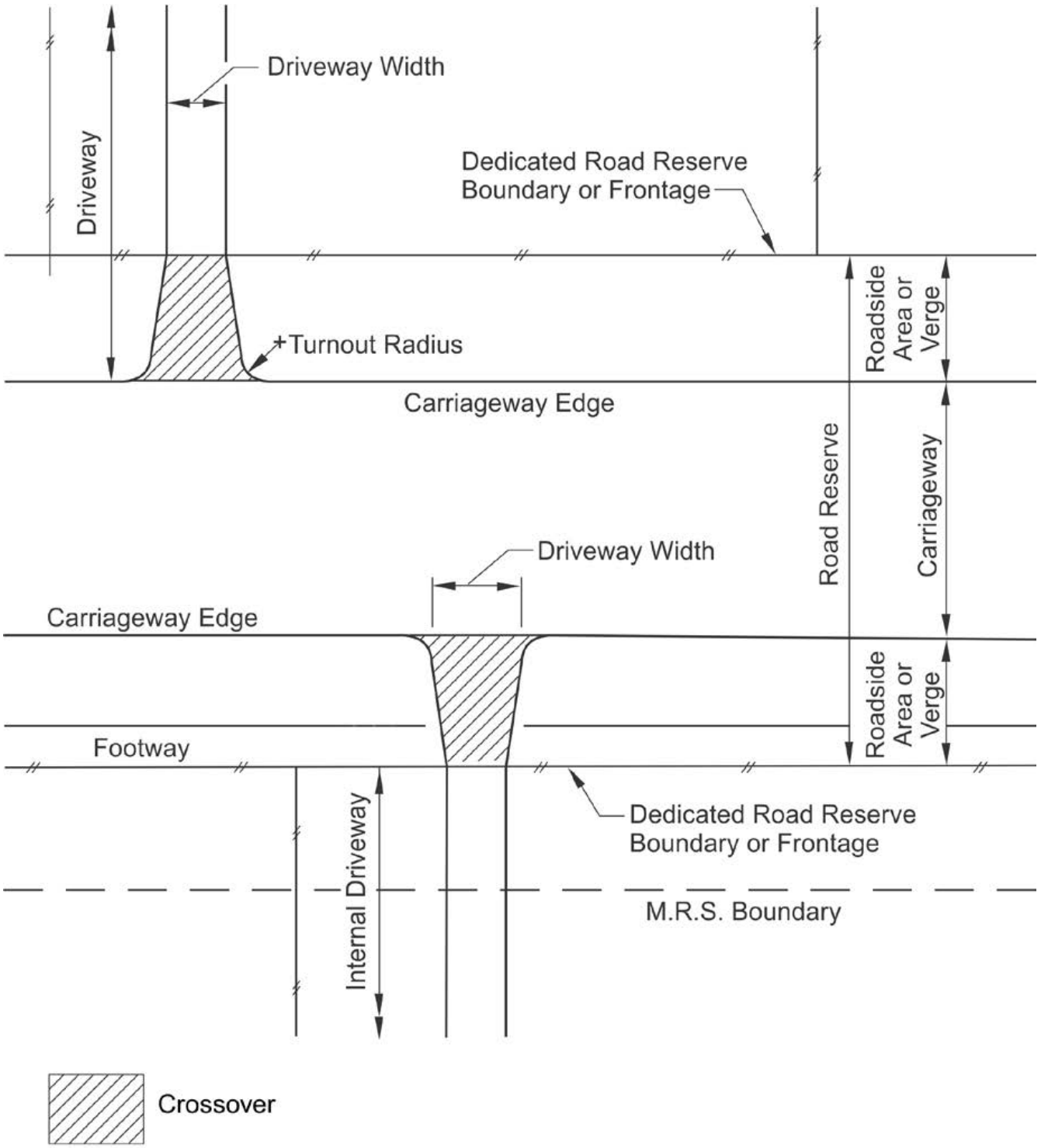


Image Source: Main Roads (2015). Driveways D12#57413. Retrieved from
https://https://mainroads.wa.gov.au/BuildingRoads/StandardsTechnical/RoadandTrafficEngineering/GuidetoRoadDesign/Pages/Driveways.aspx

3.23 Vehicle parking areas

Vehicle parking areas are to be provided on site to meet all operational, employee and customer needs.

Parking areas are to be provided on site to accommodate all vehicles expected to visit and remain on the site during the construction and operational phases.

- On-street vehicle parking is not permitted.
- The minimum design life for permanent vehicle access and parking areas must be 20 years, with design loadings suitable for the pavement use.
- The proponent must designate, for Pilbara Ports' consideration, which pavement or surface treatment types are proposed for vehicle parking.
- Delineation of parking bays, signage, kerbing, wheel stops and aisle width must be designed and provided in accordance with AS 2890 Parking facilities, with a minimum standard car park bay dimension of 2.8m wide and 5.8m long.
- The proponent must ensure the provision and location of car parking bays that are designed for use by people with a disability in accordance with AS2890.6 and the number of bays provided as required by the NCC.

Vehicle parking areas must be permanently maintained by the proponent (including drainage, line marking, lighting, filling potholes, etc.) to ensure that the parking area performs as it was originally designed/constructed.

Electric vehicle (EV) parking areas and installation of charging infrastructure should be considered, refer to the WA state government Position Statement: EV Charging Infrastructure.

3.24 Traffic management

Traffic flow generated by the development during both construction and operational phases must be managed in accordance with an approved construction Traffic Management Plan (TMP) and in some cases, an operational TMP. For more information on management plans refer to the PDG Application Guide.

Vehicle circulation and manoeuvring must be provided on-site to meet all operational, employee and customer needs. On-site road and pavement layout must ensure safe and effective manoeuvring of vehicles around the site.

The internal road layout must facilitate entering the site without queuing across footpaths or onto external roads. All traffic must be accommodated within property and/or lease boundaries.

Access, circulation, manoeuvring and parking drawings/reports should illustrate the following details, as a minimum:

- Estimated traffic volumes.
- Type of vehicles and loadings.
- Dimensions of all pavement and areas.
- Turning circles for the largest vehicle accessing the site.
- All gradients of parking, access and circulation areas.

Appropriate signage, line markings and lighting must be provided for on-site circulation routes in accordance with the relevant MRWA Standards. Appropriate barriers/bollards must be provided where required.

Access and manoeuvring of emergency service vehicles must be considered in the design and construction of driveways and on-site roadways.

3.25 Hazardous chemicals

Transportation, storage, handling, use and disposal of hazardous chemicals must not pose a threat to health, safety, the environment, any adjoining land users, common access areas or personnel and must comply with all local, State and Commonwealth legislation and/or requirements.

For any development where hazardous chemicals are to be transported, stored, handled, used or disposed, a risk assessment must be undertaken.

Safe systems of work, such as policies, procedures, manifests, signage and training, must be implemented commensurate with the risk assessment outcomes. Also refer to PDG Appendix D - Health and Safety Technical Standards.

3.26 Bulk liquids pipelines

Bulk liquids pipelines must be installed to meet all relevant Australian Standards and best industry specifications in order to minimise the risk of environmental harm and threat to health and safety.

- Where possible, all pipelines should be consolidated within common service and infrastructure corridors.
- Pipelines located above ground should be adequately separated or protected from traffic and port operations, where there is potential for collision.
- Road crossings should be limited and when road crossings cannot be avoided, pipelines should be installed within culverts unless the proponent can demonstrate the installation method will not increase the risk of environmental contamination, and any future maintenance or inspections will not cause unreasonable disruption to port operations.
- The location and method of pipeline installation should take into consideration possible damage through storm surge inundation and wave action.
- Pipelines should have a minimum design life of 20 years.
- Cathodic protection or other suitable mechanism of corrosion prevention must be installed on steel pipelines.
- Periodic inspections and maintenance procedures must be established under operational management plans.
- Import and export bulk liquids pipelines should be designed to maximise flow rates and minimise vessel berthing times.

3.27 Rail transport of products in port areas

Any railway constructed on port land must meet the operational needs of Pilbara Ports, the proponent and its stakeholders.

Railway infrastructure and railway operations must meet the requirements of the regulatory framework prescribed in the WA Railways (Access) Code administered by the Economic Regulation Authority WA (ERA) or any equivalent successor body.

Railway infrastructure and railway operations must meet the requirements of the Rail Safety National Law, administered by the Office of the National Rail Safety Regulator (ONRSR) when it is enacted by the WA Parliament.

Railway infrastructure and railway operations must meet the requirements of the standards, rules, codes of practice and guidelines issued from time to time by the Rail Industry Safety and Standards Board (RISSB).

Note: that the RISSB is accredited by the Australian Board of Standards Development Organisations as a Standards Development Organisation, and all new standards commenced by RISSB after 31 July 2007 are published as Australian Standards.

The RISSB publishes a regularly updated schedule of products (codes, standards and guidelines) that are available for use in the absence of RISSB standards, and these should be followed to the extent that they may be relevant.

Proponents are encouraged to consider adopting the guidelines to best practices published by the International Heavy Haul Association to the extent that they may be relevant.

Proponents are encouraged to consider adopting best practice in the fields of railway infrastructure and railway operations on the basis of lessons learned from established railways in the Pilbara region, to the extent that they may be relevant.

3.28 Port roads

Roads within lease areas must be permanently maintained by the proponent to the satisfaction of Pilbara Ports.

Roads must be maintained in good condition into perpetuity, including road furniture, line markings and signs. Roads must be designed to be safe, effective and minimise traffic conflicts. For more information refer to the Roads Minimum Development Requirements table below.

1. **Table** - roads - minimum development requirements

Section no.		High wide load (HWL) corridors (*)	Primary/major road	Secondary	Lease area access road
A2.1	**Typical functional characteristics**				
A2.1.1	Traffic volume	Volume not restricted	Between 750 to 1500 vehicles per day, per lane (v/d/l)	<750(v/d/l)	As necessary for site operations
A2.1.2	Light vehicles	Primary route	Primary route	Primary route	Primary route
A2.1.3	Heavy vehicles	Primary route	Primary route	Primary route	Access only
A2.1.4	High wide load	Primary route	Primary route	Should bypass except for access	Access only
A2.1.5	Maximum traffic speed environment	As required by the HWL movement	80km/h	60km/h	40km/h
A2.1.6	Design vehicle	Class 1 RAV	Triple road train or heavier	B Double	B double or lighter
A2.1.7	Lighting	Flag lighting at intersections	Flag lighting at intersections	Flag lighting at intersections	As necessary
A2.2	**Pavement and surfacing**				
A2.2.1	Desirable road reserve width	100m	100m	40m	30m
A2.2.2	Desirable carriageway width (**)	>12m with removable road furniture, when required	10-11m	9-10m	8-10m depending on the site-specific traffic volume and type
A2.2.3	Desirable lane width (**)	3.5m	3.5m	3.5m	3.5m
A2.2.4	Desirable shoulder width (**)	>2.5m	1.5-2.5m	1.5m	1.0m
A2.2.5	Sealed Shoulder Width (**)	>=1.5m	1-1.5m	0.5-1m	0.5m
A2.2.6	Cross section	Undivided carriageways and lanes	Undivided carriageways and lanes	Undivided carriageways and lanes	Undivided carriageways and lanes
A2.2.7	Shoulder crossfall	Preferred practice is not to steepen or flatten shoulders	Preferred practice is not to steepen or flatten shoulders	Preferred practice is not to steepen or flatten shoulders	Preferred practice is not to steepen or flatten shoulders

Section no.		High wide load (HWL) corridors (*)	Primary/major road	Secondary	Lease area access road
A2.2.8	Pavement crossfall	2%	3%	3%	3%
A2.2.9	Surface treatment (***)	Sealed	Sealed	Sealed/unsealed-depending on safety risks and traffic conditions	Sealed/unsealed-depending on safety risks and traffic conditions
A2.2.10	Minimum pavement thickness (****)	650mm	350mm	350mm	250mm
A2.2.11	Batter slope	3:1 – 6:1	3:1 – 6:1	3:1 – 6:1	3:1 – 6:1
A2.2.12	Delineation and road markings	Removable guideposts at max 150m on straights and at 30m in floodways to delineate the edge of the pavement.	Painted centreline and edge lines throughout. Reflective raised pavement markers, as necessary. Guideposts at max 150 m on straights and at 30m in floodways to delineate the edge of the pavement.	As necessary	As necessary

(*) Pilbara Ports supports the provision of HWL corridors within its land to facilitate the development of industrial areas and to improve the safety and efficiency of the load movements.

(**) Table 4.3 Main Roads Supplement to Austroads GRD Part 3: Geometric design must be used as the primary guide for determining lane and shoulder widths.

(***) Typical treatments for new or unsurfaced rural pavements are specified in MRWA Materials Engineering Branch's Document No. 6706/04/154 'Guidelines for Surfacing Type Selection'. At its discretion, Pilbara Ports may require a higher specification surface treatment including for roads proposed for high frequency movements heavy load.

(****) The above pavement thicknesses are indicative only, pavement thicknesses shall be determined by utilising MRWA Engineering Road Note 9 'Procedure for the Design of Road Pavements'.

(+) The cut and fill clear zone widths are determined in accordance with both Table 4.1 of MRWA Supplement to Austroads Guide Part 6 and the traffic volumes in the above table. Anything steeper than 3:1 for a cut batter and a 4:1 for a fill batter shall be subject to safety barrier installation.

Document amendment table

VERSION	PREPARED BY	DATE	AMENDMENT DETAILS
V2	Pilbara Ports	5/7/2024	Replaces: PDG V1.6 and Appendix 2 Minimum Development Requirements Roads V1.

Document owner

The Developments Manager is responsible for the Port Development Guidelines.

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