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LOGAN WATER
INFRASTRUCTURE ALLIANCE

CONCEPT STORMWATER MANAGEMENT PLAN FOR SPS157

wsp

PLANS AND DOCUMENTS
referred to in the PDA
DEVELOPMENT APPROVAL

Approval no: DEV2018/998

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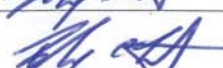
Concept Stormwater Management Plan for SPS157

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ABBREVIATIONS

AEP	Annual Exceedance Probability
AHD	Australian Height Datum
AO	Acceptable Outcome
ARR	Australian Rainfall and Runoff
CSMP	Concept Stormwater Management Plan
DTM	Digital Terrain Model
EP	Equivalent persons
EY	Exceedances per year
GC	Gauged Catchment
ha	hectares
HEC-RAS	Hydraulic Engineering Centre – River Analysis System
IC	Inputted Catchment
IFD	Intensity Frequency Duration
LWA	Logan Water Alliance
m	metres
PO	Performance Outcome
QUDM	Queensland Urban Drainage Manual
RFFE	Regional Flood Frequency Estimation
SPP	State Planning Policy
SPS	Sewage Pump Station

1 PROJECT BACKGROUND

1.1 OVERVIEW

Proposed Wastewater Pump Station SPS157 is located in South East Queensland approximately 34km south west of Brisbane, within the Greater Flagstone Priority Development Area.

The Greater Flagstone Priority Development Area (PDA) is a key greenfield development in South-East Queensland (SEQ), comprising 7,188 hectares to the west of the Jimboomba township. The population of the area is projected to increase from the current 2,500 equivalent persons (EP) to more than 161,000 EP by ultimate development. The Greenbank and North Maclean development areas form the northern most part of this PDA.

At present no wastewater infrastructure exists to service this development. The driver for the proposed works is to service the anticipated growth in this region. The proposed pump station will initially convey flows from the Greenbank and North Maclean catchments, with the area to be serviced by the Cedar Grove WWTP.

This Concept Stormwater Management Plan (CSMP) has been prepared on behalf of Logan Water Infrastructure Alliance (LWIA) to provide supporting information to the Sewage Pump Station (157) Development Application. The CSMP includes strategies to manage potential stormwater quantity and quality impacts caused by the proposed development. Key elements include:

- review of natural flow paths on the existing site
- identification of potential stormwater quantity and quality impacts from the proposed development
- demonstration that the proposed diversion channel protects the pump station from the 1% AEP local event.
- description of the outcomes of the study including key design assumptions and recommendations.

1.2 SITE DESCRIPTION

The proposed SPS157 wastewater pump station is located in New Beith, Queensland, approximately 15km west of Logan Village and 5km west of the Mount Lindsay Highway, as shown in Figure 1.1 . The site chosen is within Lot 1 on RP43903 and south of the proposed New Beith Railway station as shown in Figure 1.2. The site is adjacent to the Brisbane to Sydney railway corridor and future Salisbury to Beaudesert Railway.

At present, the site is undeveloped and predominantly covered in bushland.

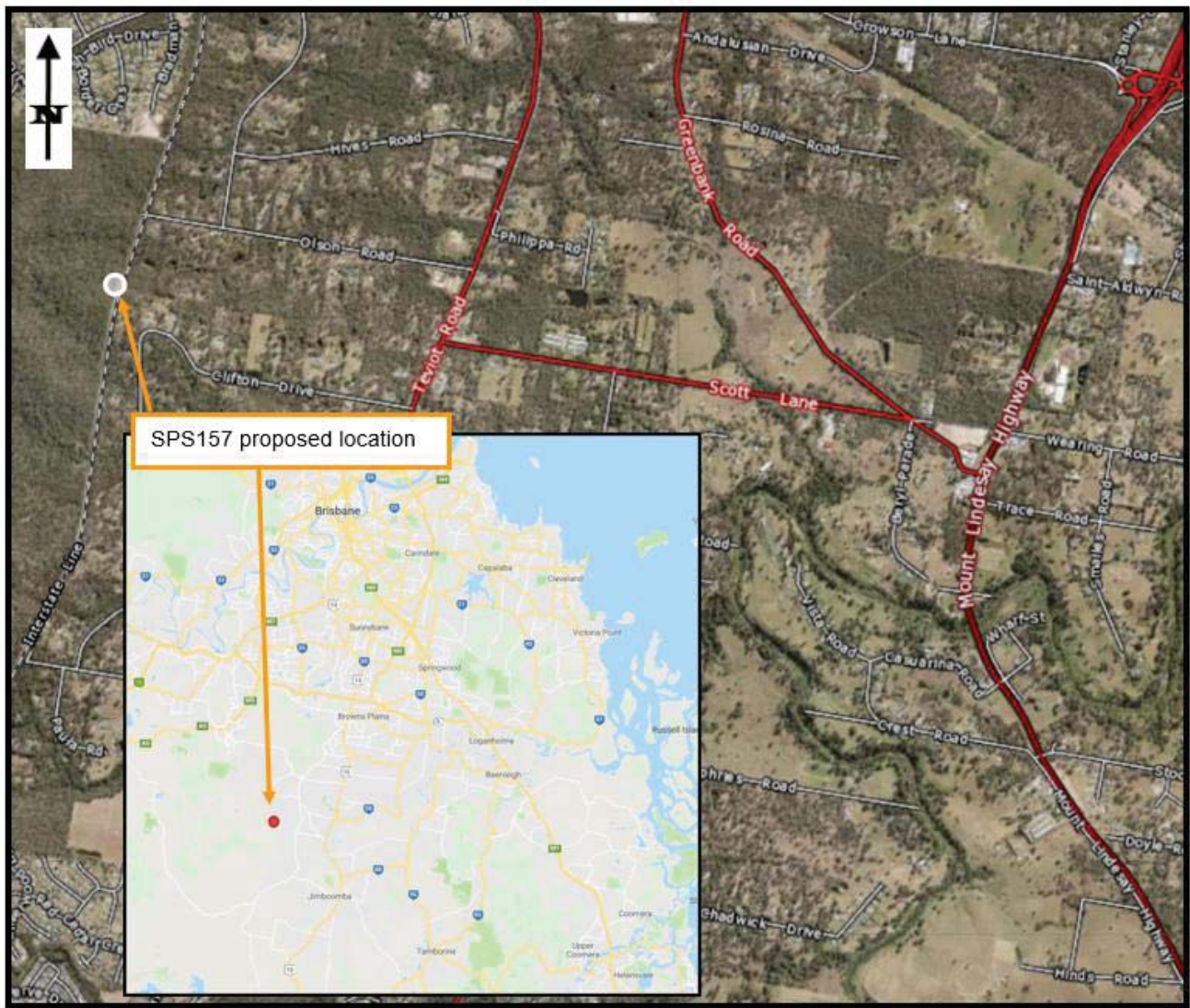


Figure 1.1 Locality Map of Proposed Sewage Pump Station SPS157 (Source: Queensland Globe Retrieved 7/12/18. Inset Source: Google Earth Retrieved 7/12/18)

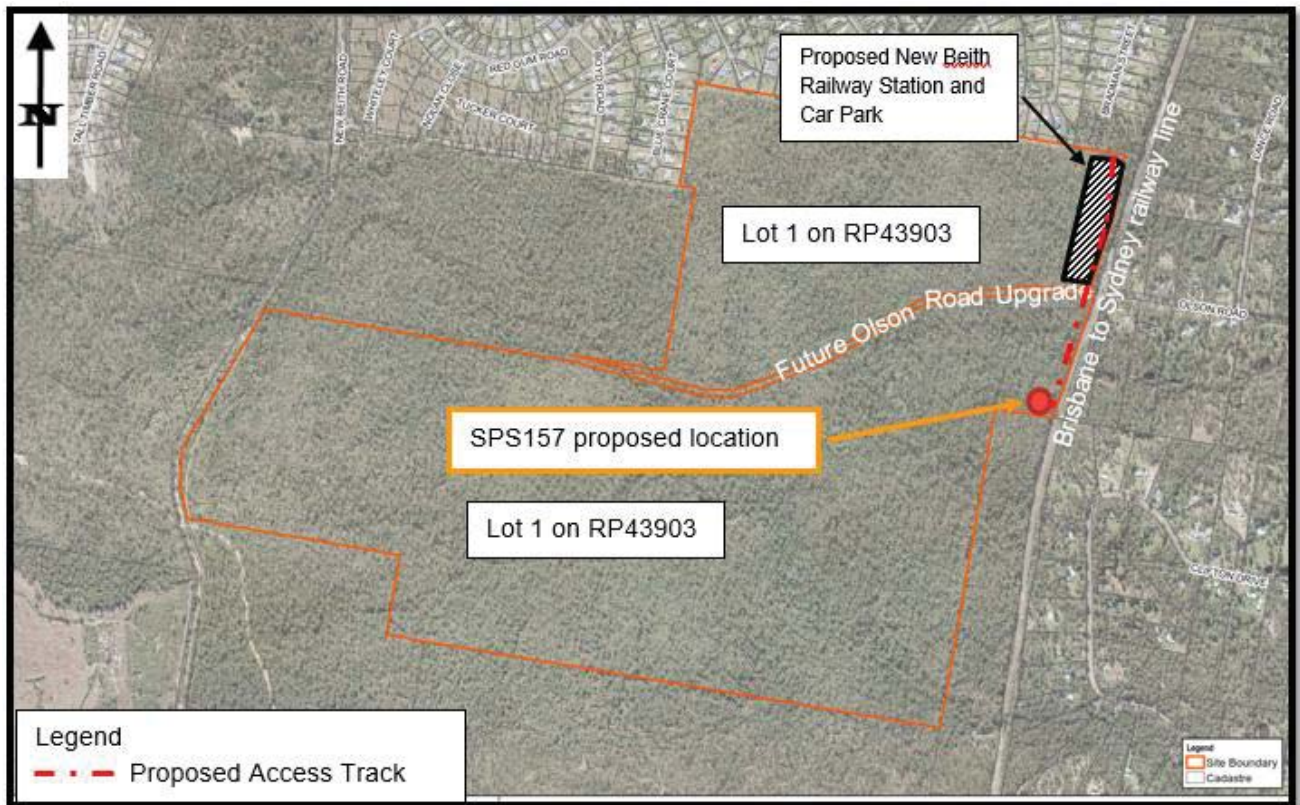


Figure 1.2- Location of Proposed works for SPS157 within Lot 1 on RP43903:

1.2.1 PROPOSED DEVELOPMENT

The pump station works will involve constructing the pump station and an approximately 900m long access road. The construction of the associated rising mains forms a separate package of works. The chosen location allows the pump station to service both the local catchment and flows from Greenbank and North Maclean.

The proposed development will ultimately include:

Earthworks to grade the site to 2.5%;

- A below ground pumping well and valve pit;
- A transformer;
- Switchboard, switch room, generator, water tank which shall include concrete slabs;
- A hardstand area;
- Internal roads;
- Associated pipework.

The wastewater pumping station will have an impervious area of approximately 500 m². The access road will have a sealed area of approximately 4,800 m². The total development area is approximately 2 ha and lies within Lot 1 on RP43903 which has an area of almost 318 ha. Therefore, the development represents approximately 0.6% of the total allotment area.

The pump station and access road locations within the allotment are shown on in the Site Layout on Drawing Number LS305-04-S-DWG-CI-2400, and the pump station site general arrangement on Drawing Number LS305-04-S-DWG-CI-2401. These drawings are both included in Appendix A. Alternative access road locations to allow for adjacent development are shown in the Site Layout included in Appendix A

2 POLICIES, STANDARDS AND GUIDELINES

The project will be assessed under the State Planning Policy 2017 (Department of Infrastructure, Local Government and Planning, 2017) and under the State Development Assessment Provisions (SDAP)

2.1 AUSTRALIAN RAINFALL & RUNOFF: A GUIDE TO FLOOD ESTIMATION

Australian Rainfall & Runoff: A Guide to Flood Estimation (ARR) covers a broad range of disciplines related to flood estimation. The current edition was issued in 2016 and is the first edition to include all Australian data, reflecting the increase in available Australian data since previous editions.

The disciplines of interest to this CSMP relate to the estimation of hydrographs and peak flow from catchments by computer modelling. The methods and data from the 2016 edition of ARR have been adopted.

2.2 THE QUEENSLAND URBAN DRAINAGE MANUAL

The Queensland Urban Drainage Manual (QUDM, 2016) is the principal guideline for the design of the stormwater drainage system at the Site.

The issues covered by QUDM include

- lawful point of discharge
 - estimation of stormwater discharge flows
 - design of major and minor stormwater drainage systems
 - environmental considerations, including the conservation of waterway integrity and water quality
 - safety in design considerations
-

2.3 STATE PLANNING POLICY: STATE INTEREST GUIDELINE - WATER QUALITY

The purpose of The State Planning Policy: State interest - water quality is that “The environmental values and quality of Queensland waters are protected and enhanced.” With respect to development assessment: “The purpose of the SPP code: Water Quality is to ensure development is planned, designed, constructed and operated to manage stormwater ... in ways that support the protection of receiving waters and environmental values that are identified in the Environmental Protection (Water) Policy 2009.” (Department of Infrastructure, Local Government and Planning, Queensland Government¹, April 2016, p.31 and p.69).

Application of the State Planning Policy, Water quality is discussed further in the State Planning Policy – state interest guideline Water Quality, August 2017.

This CSMP responds to the SPP by incorporating measures within the proposed development to protect environmental values associated with stormwater quantity and quality.

2.4 APPROACH ADOPTED FOR THIS CSMP

Generally, the approach adopted for this CSMP for the development of methodologies and standards is:

- refer to the Queensland Urban Drainage Manual (2016) as a principal reference for issues related to stormwater quantity
- refer to State Planning Policy: State interest - water quality for the establishment of appropriate stormwater pollutant reduction targets.

3 SITE CHARACTERISTICS

3.1 TOPOGRAPHY AND DRAINAGE CHARACTERISTICS

The site lies within moderately sloping, heavily vegetated land, that drains towards the eastern site boundary and into the existing and future railway corridors. The site has three discharge locations. The topography of the site and surrounds, and the location of the site discharge locations are shown in Figure 3.1.

The pump station is to be located on land currently ranging in elevation from 53.4 m to 56.6 m AHD (Australian Height Datum). The proposed earthworks for the pump station shall reduce the grade through the pump station from 9% to 2.5% and the elevation range to 55 m to 56.2 m. These earthworks will not change the site discharge location for runoff from the pumping station area.

The proposed access road will similarly maintain the existing site drainage regime.

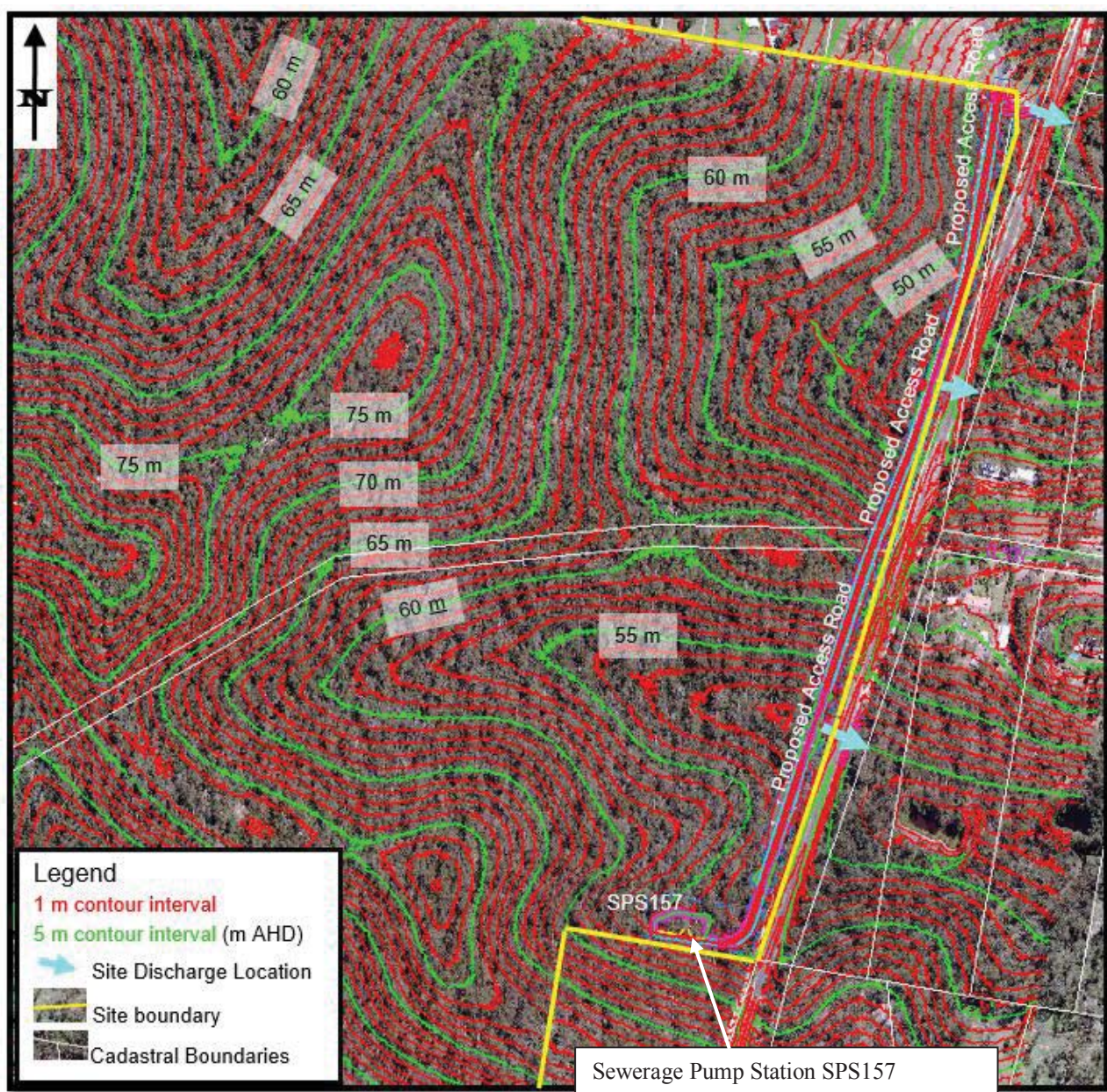


Figure 3.1 Site Topography and Discharge locations

3.1.1 LAWFUL POINTS OF DISCHARGE

The Queensland Urban Drainage Manual 2016 (QUDM) describes the principal of lawful point of discharge as follows.

“The term lawful point of discharge has no prescribed legal meaning. A point of discharge which is ‘lawful’ will be determined according to whether all applicable regulatory and other legal requirements have been met and any necessary statutory approvals have been obtained. There may be more than one lawful point of discharge for any particular property.

Determination of whether a lawful point of discharge exists at a particular location includes the following two-point test:

(a) That the location of the discharge is under the lawful control of the local government or other statutory authority from whom permission to discharge has been received. This will include park, drainage or road reserve, stormwater drainage easement.

(b) That in discharging in that location, the discharge will not cause an actionable nuisance (i.e. a nuisance for which the current or some future neighbouring proprietor may bring an action or claim for damages arising out of the nuisance). In general terms this implies no worsening as a result of the discharge.

Where the conditions of the first test have not been satisfied prior to development, it will be necessary to obtain a lawful point of discharge. This will usually be achieved by the acquisition of stormwater drainage easements or drainage reserves over one or more downstream properties until the conditions of the second test have been met. It will normally be necessary for a large part of the design to have been completed prior to determining the extent of any necessary easements.

Note that a watercourse may not necessarily constitute a lawful point of discharge, unless the requirements of the above two tests and other legal requirements have been satisfied”.

The earthworks proposed for the project do not significantly change the existing drainage regime of the site. The downstream property is the railway corridor for the existing Brisbane to Sydney railway and future Salisbury to Beaudesert Railway. Discharge locations are not proposed to be changed by the development and there will be no change to the area of the catchments reporting to the existing railway cross drainage culverts.

4 STORMWATER INFRASTRUCTURE

The existing drainage regime will be maintained by the development with stormwater conveyed through the existing overland flow paths and natural channels, and also through proposed constructed drains and existing/proposed cross drainage culverts.

The drainage infrastructure for the proposed treatment plant and access road has been designed as part of the Logan Water Alliance (LWA) application package LWA305 and is shown schematically in Figure 4.1.

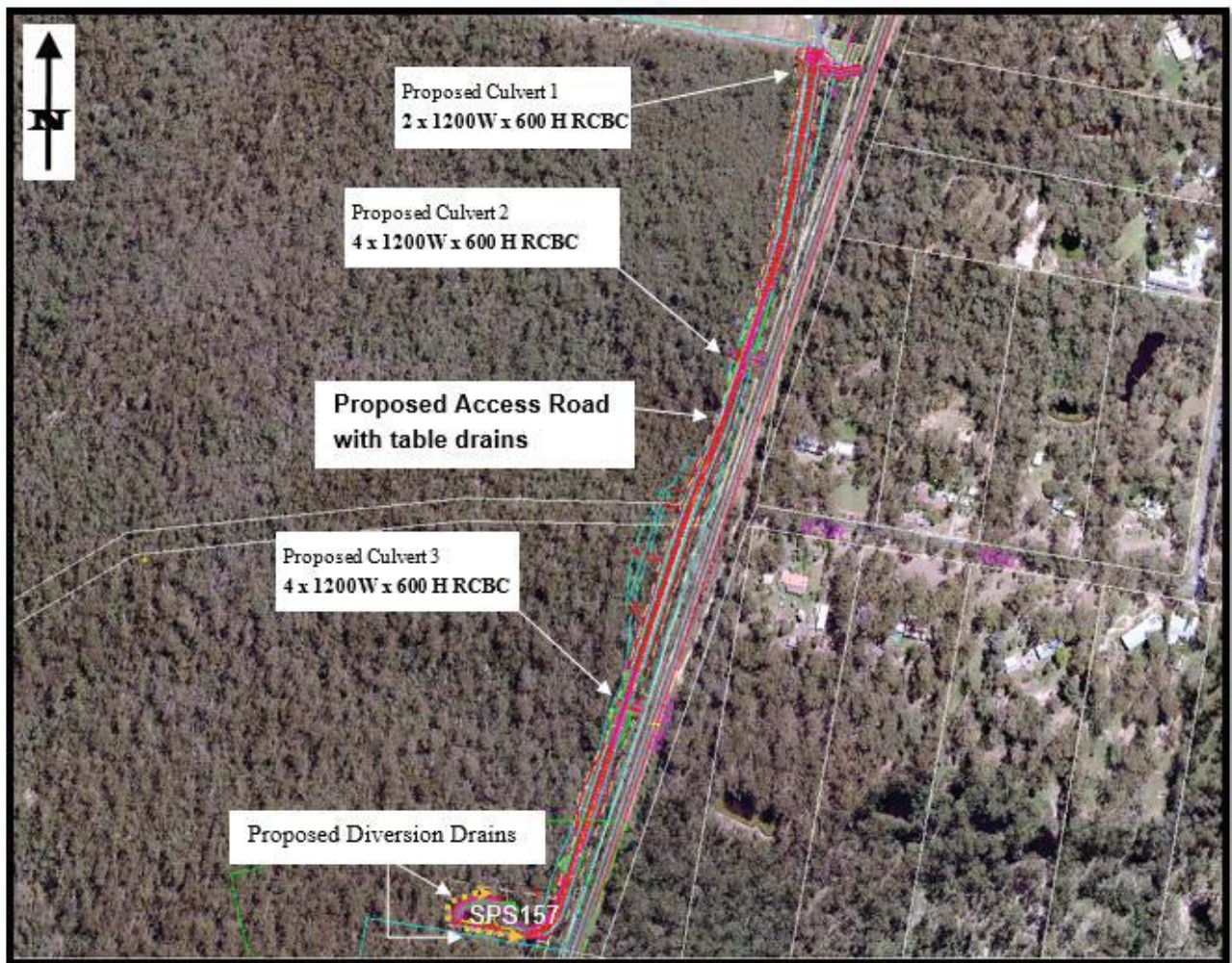


Figure 4.1 Proposed Stormwater Infrastructure

The Access Road intercepts three separate stormwater runoff catchments, including the catchment in which proposed pump station SPS157 is located. Table drains on the upstream side of the access road divert flow to proposed cross drainage culverts beneath the access road. There are three proposed culverts, each being aligned with the natural drainage low points. Much of the catchment flow reports to the proposed access road culverts without being intercepted by the access road table drains. Each of the proposed access road culverts is just upstream of an existing railway culvert. The access road has table drains on the downstream side where required. The stormwater runoff catchments to the proposed culverts are shown in Figure 4.2.

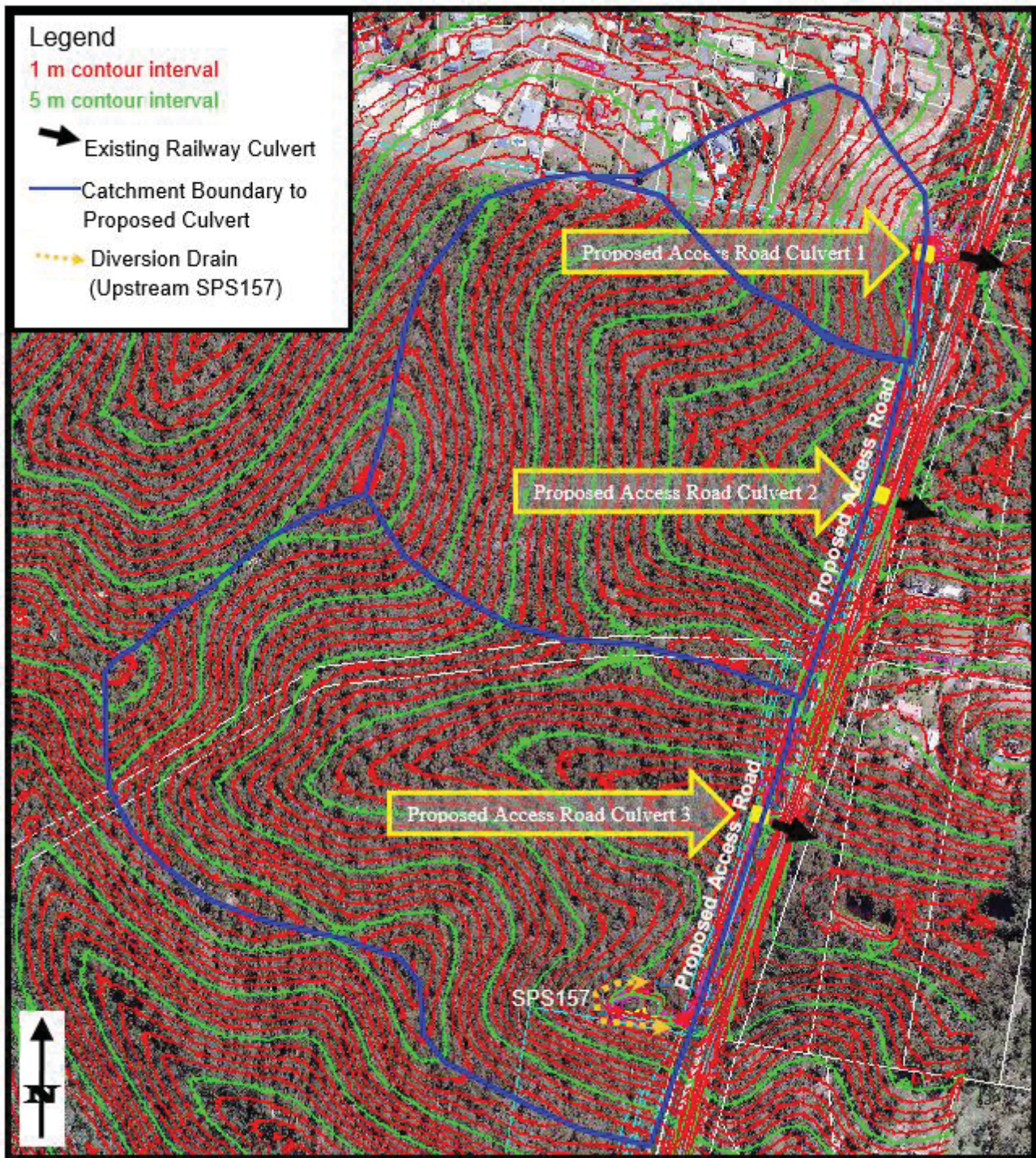


Figure 4.2 Catchments to proposed access road culverts

Runoff from the catchment upstream of the pump station will be diverted around the pump station as follows.

- A diversion drain on the western and northern sides of pump station fill pad will divert runoff from these upstream catchments around the fill pad to its downstream side. This diversion drain will consist of a rock lined section upstream of a grass lined channel with rock check dams at 10 m centres. At the downstream end of the grass lined channel, a rock lined transition will return this flow to the existing natural flow path. This flow will report to Proposed Access Road Culvert 3.
- A spoon drain/half pipe will divert the runoff from the southern side of the pump station fill pad, and adjacent access road, to the east into a shotcrete lined V shaped table drain, which runs alongside this part the access road. At this

location, the access road will be in an excavated earthworks profile, so flow will be carried wholly in the roadside table drain. The access road table drain will carry these flows downstream until the location where the access road is running parallel to the railway corridor and has then transitioned from an excavated profile into a fill earthworks profile, thereby allowing flow to discharge to the existing drain in this vicinity. At this point, the existing drain then flows to the existing 1500 mm diameter arch rail culvert, immediately downstream of Proposed Culvert 3.

The pump station fill pad has a direct catchment area of approximately 0.1 ha. Runoff from this small area will either remain as overland flow or will be caught by the internal road kerbs. The kerb flows and much of the overland flow will drain down the fill pad northern embankment into the diversion drain transition, which is rock lined. The remainder of the overland flow will discharge down the eastern embankment and continue as overland flow until it is intercepted by the access road table drain downstream. From here, the direct site runoff will flow to Proposed Culvert 3.

The following drawings provide details of the proposed site drainage described above. These drawings are included in Appendix A.

- LS305-04-S-DEWG-CI-2402 – SPS157 Wastewater Pump Station - Site set out plan
- LS305-04-S-DEWG-CI-2404 – SPS157 Wastewater Pump Station - Earthworks plan and set out
- LS305-04-S-DEWG-CI-2421 - SPS157 Wastewater Pump Station - Access Road Plan and Longitudinal Section - Road 01, Sheet 1
- LS305-04-S-DEWG-CI-2422 – SPS157 Wastewater Pump Station - Access Road Plan and Longitudinal Section - Road 01, Sheet 2
- LS305-04-S-DEWG-CI-2423 – SPS157 Wastewater Pump Station - Access Road Plan and Longitudinal Section - Road 01, Sheet 3
- LS305-04-S-DEWG-CI-2428 – SPS157 Wastewater Pump Station - Access Road Typical Sections - Road 01
- LS305-04-S-DEWG-CI-2440 – SPS157 Wastewater Pump Station -Culvert 1 Details, Chainage 20
- LS305-04-S-DEWG-CI-2441 – SPS157 Wastewater Pump Station -Culvert 2 Details, Chainage 287
- LS305-04-S-DEWG-CI-2442 – SPS157 Wastewater Pump Station -Culvert 3 Details, Chainage 620

The Access Road Hydraulic Analysis is described in Memo 2260542A-HYD-MEM-001 Rev4 , a copy of which is included in Appendix A

4.1 CATCHMENTS CONTAINING THE DEVELOPMENT AREAS

The catchments containing the proposed development are shown in Figure 4.2. The catchment boundaries, areas and slopes were determined from the Digital Terrain Model (DTM) provided by the Logan Water Alliance (LWA). The LWA DTM is based on survey undertaken by Vision Survey (30 July 2018) and is accurate to ± 10 mm and in the upper catchment reaches Lidar with an accuracy of ± 50 mm.

It may be seen from Figure 4.2 that the proposed development area represents only a small portion (less than 5%) of the runoff catchments in which the development site is to be located.

The only change to the drainage regime of the catchments to Proposed Culverts 1 and 2 is the interception of the lower catchment overland flow by the proposed access road and the conveyance of the catchment flows through culverts beneath the access road. These culverts have been designed to convey the 10% AEP flow. Culvert design is reported in Memo 2260542A-HYD-MEM-001 Rev4 , a copy of which is included in Appendix A. Flows exceeding this AEP will over top access road and report to the railway culverts thus maintaining the existing drainage regime. The catchments with respect to the proposed development are shown in Figure 4.2.

Table 4.1 Catchment Areas impacted by the development

LOCATION	CATCHMENT AREA, HECTARES	PROPOSED DEVELOPMENT AREA, HECTARES	% OF CATCHMENT AREA TO BE DEVELOPED
Proposed Culvert 1	4.7	0.2	4.3
Proposed Culvert 2	19.3	0.5	2.6
Proposed Culvert 3	27.0	0.7	2.6
Total Runoff Catchment	51.0	1.4	2.7

5 HYDRAULIC MODELLING

This analysis only considers the flows from local catchments. Regional catchment flooding from the Logan River, where these local catchments will ultimately drain, has not been considered.

Figure 5.1 shows the sub catchment within the catchment to Proposed Culvert 3 where the drainage regime is changed in the vicinity of the SPS157 site. This is the only portion of the site requiring a detailed hydraulic assessment. This is to ensure the proposed diversion drain is adequately sized to protect the pump station from the 1% AEP local flood event. The total catchment area reporting to the culvert downstream is unchanged by the development and therefore the assessment was not continued beyond this sub catchment.

The 1% Annual Exceedance Probability (AEP) Event has been investigated. Demonstration that the diversion channel protects the pump station fill pad during the 1% AEP event also shows that the fill pad is protected during more frequent events.

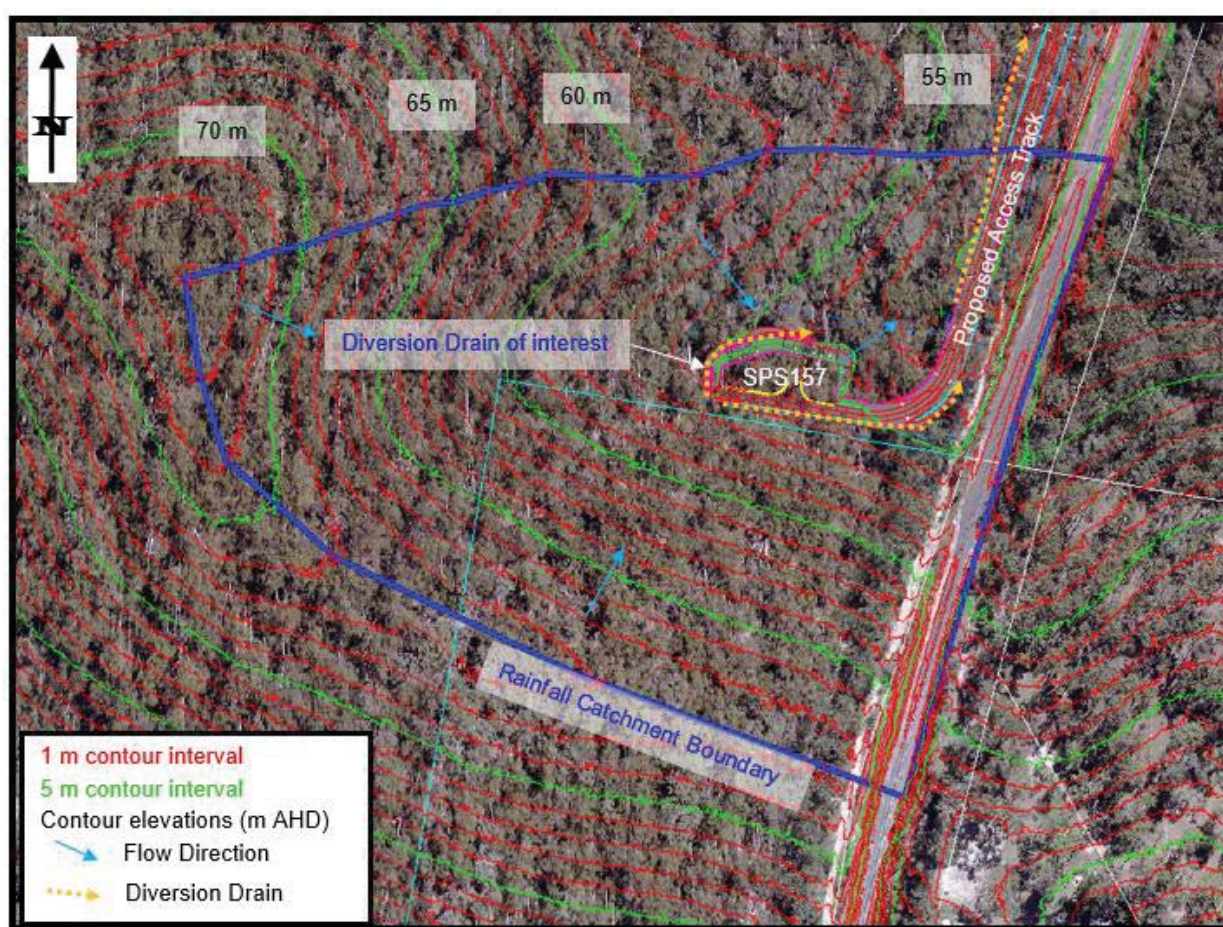


Figure 5.1 Proposed pump station SPS157 and adjacent Access Road Catchment and proposed diversion drain

5.1 MODEL SELECTION

The Hydraulic Engineering Centre – River Analysis System (HEC-RAS) hydraulic model software (version 5.060) was chosen to undertake a hydraulic assessment of the proposed diversion drain around the pump station.

HECRAS) is designed to perform one-dimensional hydraulic calculations (i.e. water depth and velocity varying in one dimension) for a full network of natural and constructed channels, for steady (i.e. flow constant with time) or unsteady (i.e. flow changes with time) flow regimes. HECRAS can model the hydraulic performance of hydraulic structures such as culverts, bridges and weirs.

A steady state, 1D HECRAS model was deemed appropriate for assessment of the proposed diversion drain.

5.2 MODEL INPUTS

The major inputs required for HECRAS are:

- ground survey to create waterway cross-sections and reach lengths;
- catchment flows;
- hydraulic structure details (not applicable to this study); and
- Manning's 'n' roughness values for the waterway corridor
- Upstream and downstream hydraulic boundary conditions

5.2.1 TOPOGRAPHY AND SURVEY

The DTM supplied by LWA was used to provide topographical inputs into the HECRAS model and the peak flow was estimated using the Rational Method, as described in Section 5.2.2 below.

The sub catchment shown in Figure 5.1 has an area of approximately 6 ha and a slope of approximately 9% in the vicinity of the proposed pumping station. It is a sub catchment to Proposed Culvert 3, which has a total catchment area of approximately 27 ha. The fill pad within this sub catchment has a directly reporting area of approximately 0.1 ha.

Cross sections and reach lengths for the model were generated from the DTM. The HECRAS model extents are shown with respect to the proposed Pump Station Fill Pad and Access Road in Figure 5.2. The model extends for a 350 m reach length with cross section at 5 m intervals. The cross sections are typically 20 m wide.

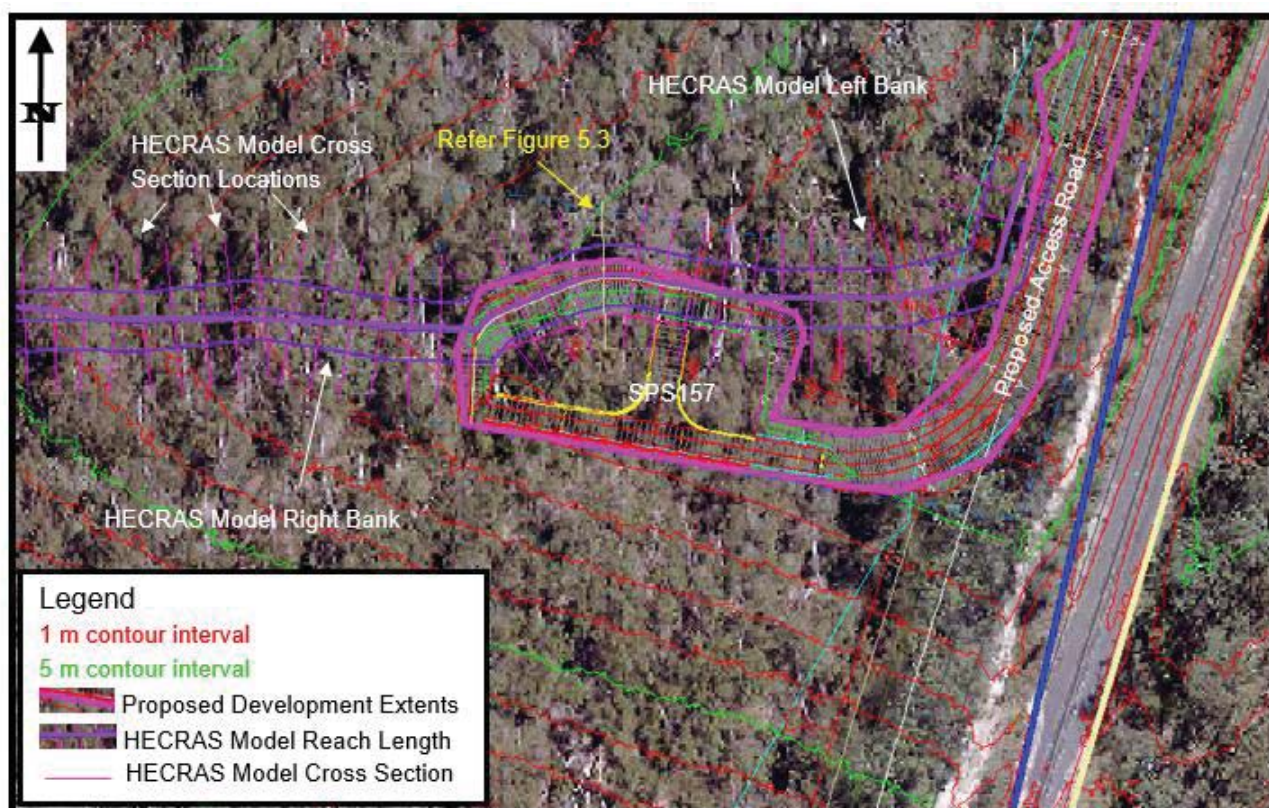


Figure 5.2 HECRAS Model Cross Sections and Reach Length

5.2.2 PEAK FLOW ESTIMATION

In accordance with QUDM (2016), the Rational Method was used to determine the peak flow from this sub catchment. The Rational Method provides an estimate of peak flow for a catchment based on rainfall intensity, catchment area and slope, topography and catchment use. The input parameters were determined using the DTM (refer discussion in Section 4.1), aerial photography (refer Figure 5.1) and Bureau of Meteorology rainfall data for the site (refer Appendix B).

As described in Section 3.1, the site is heavily vegetated and therefore, the Bransby-Williams Method was used to determine time of concentration. A time of concentration of 12 minutes was calculated for this catchment. As a check, the time of concentration was also estimated using the Stream Velocity Method which estimated 14 minutes. This provides sufficient confidence to adopt the value from the Bransby-Williams equation. A runoff coefficient for the 1% AEP event was estimated to be 0.98. The Rational Method estimated a peak flow of 3.4 m³/s for the sub-catchment.

To provide a comparison for the rational method flow, a Regional Flood Frequency Estimation (RFFE) (Australian Rainfall and Runoff (ARR-2016)) was undertaken for the site. This estimation is based on statistical analysis of available stream gauge data and is done via the ARR web based Data Hub. The RFFE uses the proximity and size of an inputted catchment (IC) against data collected on a number of stream gauged catchments (GC). The RFFE output for this catchment is included in Appendix C.

A summary of the peak flows calculated for the sub catchment are reported in Table 5.1

Table 5.1 1% AEP Peak Flows for SPS157 Subcatchment

ANNUAL EXCEEDENCE PROBABILITY (AEP)	RATIONAL METHOD PEAK FLOW M3/S	RFFE PEAK FLOW M3/S
1%	3.4	13.1

There is significant variation between the Rational Method and RFFE Method Peak Flows presented in Table 5.1. This discrepancy is likely to be due to the sub catchment area (0.06 km²) being significantly smaller than the recommended minimum catchment area for use with the RFFE Method (0.5 km²). Therefore the peak flow determined with the Rational Method, 3.4 m³/s, will be used for this investigation, as the RFFE Method values are considered to be unreliable. This peak flow is a conservative estimate for the HECRAS model flow input as it is calculated based on the catchment area to the downstream end of the model. Portions of the diversion channel will actually carry lesser flow.

5.2.3 MANNING'S ROUGHNESS COEFFICIENTS

Manning's 'n' roughness coefficients for the HECRAS model were adopted in accordance with a review of site aerial imagery, and design drawings. A Manning's roughness value of 0.05 was adopted throughout the channel except where the channel is to be rock lined. Manning's roughness of 0.08 was used for rock lining. These values are considered to provide a suitably conservative estimate for peak water level.

5.3 HYDRAULIC MODEL RESULTS

The HECRAS model has demonstrated that the proposed diversion channel will provide immunity to the proposed pump station fill pad in the 1% AEP local catchment flood. This may be seen in Figure 5.3. At this location the fill pad is approximately 0.8 m above the 1% AEP water level in the diversion channel.

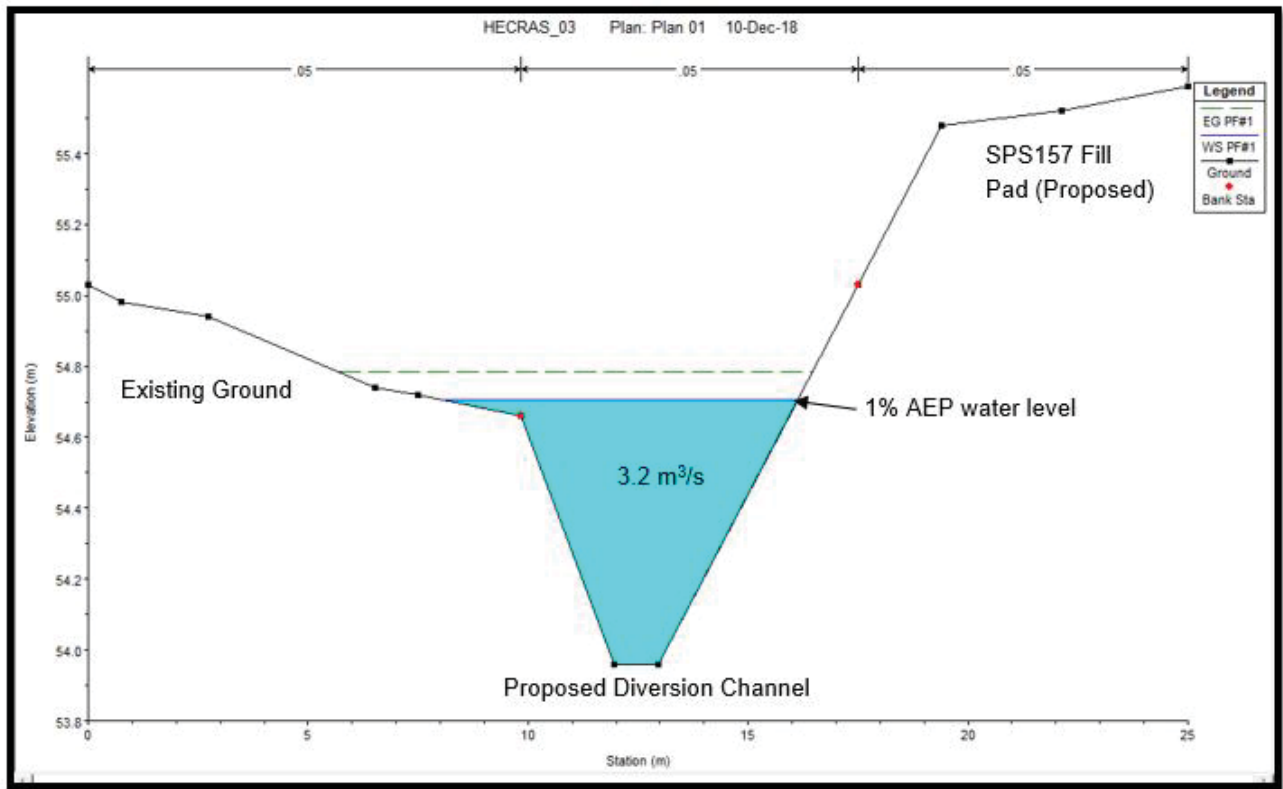


Figure 5.3 HECRAS model section – 1% AEP flow 1

1 Refer Figure 5.2 for section location

6 WATER QUALITY

Development of land generally results in increased exports of total suspended solids (TSS) and nutrients, which are measured in terms of total nitrogen (TN) and total phosphorous (TP). This is reflected in the SPP water quality objectives. However, the project and associated activities that may potentially cause an impact on water quality at the site are limited, primarily due to the relatively small area of the catchment that is to be developed and type of development. Sediment may be generated from the site, due to vehicle movements and from runoff from the access roads and pumping station fill pad. There are no fuels or lubricants associated with the pump station. Wastewater overflows in the case of power supply or system failure, or if inflow exceeds the station's capacity, present only a minor risk to storm water quality. Based on this, the water quality mitigation measures will only focus on sediment.

From a review of the design drawings and the site acquisition plan, the following key points are noted:

- The SPS157 pump station will be acquired in freehold title on its own parcel of land (refer to Drawing LS305-00-S-DWG-SU-7316 Rev A for details). The net developable area of this land parcel is 2869 m²;
- Within the SPS157 land parcel, the overall area of paved road surface and adjacent sloping hardstand to top of kerb is 320 m². This area has been conservatively assumed to have 100% impervious area component, comprising asphalt seal and concrete hardstand.;
- Within this SPS157 land parcel, the overall area of concrete finished surface is 141 m². This area has been assumed to have 100% impervious area component, comprising concrete pads to generator slab, building platforms, transformer slab, poly tank slab, switchboard control slab, wet well valve chamber structure, various pits and maintenance chambers.;
- Within this SPS157 land parcel, the overall area of crushed rock pavement surface is 396 m². This area has been assumed to have 50% impervious area component, comprising a 100mm thick layer of graded crushed rock (100% passing 37.5mm, 40-60% passing 19mm and <5% passing 2.36mm sieve), placed on a 300mm thick layer of imported CBR15 subgrade material.
- The overall impervious area associated with the SPS157 site has been calculated as 659 m², which is 23% of the overall land parcel size for SPS157.
- In respect of the SPP State Interest Water Quality, (refer also to Appendix E), the overall 23% impervious area component is less than the 25% impervious area limit specified under the SPP assessment benchmarks. The proposed development therefore does not trigger additional assessment.

Access to the pumping station will initially be via an approximately 900 m long sealed access road. Erodibility of surface material surrounding the pump station, and access roads will depend on the velocity of the flow across them, erodibility of the soil, vegetative cover quality and extents and finished quality of the construction of the access road and fill pad. During the operational phase, control of sediment loss from these areas will be managed via landscaping and permanent hard surfaces associated with the development. Possible mitigation measures for sediment control during the construction phase are identified in Section 7 of this report.

7 SEDIMENT AND EROSION CONTROL

Soil classification and erodibility testing was undertaken to confirm the erodibility of the soil along the access road and at the pumping station. These results are reported in the Geotechnical Report (Morrison Geotechnic, GE18/110, 8 August 2018).

The following sediment and erosion control measures have been included in the detail design. These may be seen in the design drawings included in Appendix A.

Access Road

- Alignment to minimise disturbance to the existing flow regime.
- Table drains to convey runoff from the road and intercepted flows as required. Grass lined or shotcrete as required to prevent scour.
- Asphalt pavement at possible overtopping locations to prevent erosion of the road.
- Two coat bitumen seal to the remainder of the access road to prevent erosion of the road.
- Rock protection to access road culvert inlets and outlets. Outlet rock protection extends downstream to existing railway culvert inlet aprons.

Pump station fill pad

- Diversion drains divert upstream catchment flows around the fill pad. The hydraulic assessment in Section 5 has demonstrated that the diversion drain will provide immunity up to and including the 1% AEP local storm event.
- Diversion drains grass lined, rock lined or shotcrete.
- Diversion drain includes rock check dams where required to reduce velocity and prevent erosion.
- Diversion drain discharge to natural ground via rock lined transition to disperse concentrated flow to overland flow
- 2.5% cross fall for pump station fill pad platform
- Crushed rock to unsealed areas of pump station fill pad platform

Based on outcomes of the investigation and general good practice, the following provisions are recommended:

- adequate compaction of exposed treated subgrade
- provision of a granular layer across native/clay based subgrades, if encountered
- establishment of sediment collection devices (i.e. sediment fences, grass strips, run-off retention basins) around areas undergoing excavation or filling works to minimise transportation (i.e. run-off) of sediments off-site and into nearby waterways
- site re-vegetation -grass cover or hydro-mulch of exposed site surfaces (i.e. subgrades, batter faces, drainage easements etc.) following construction. Ongoing maintenance of grassed areas as required to ensure grass cover is adequate.
- open excavations should be protected from surface water
- grass cover be installed and maintained immediately downstream of the diversion drain discharge transition

8 CONCLUSIONS

Locating a wastewater pump station and access road at the proposed location will not have any significant adverse impacts on water quality.

The proposed diversion drain satisfactorily conveys the 1% AEP flow of clean water around, and well below the top of the proposed pump station fill pad.

The SPS157 pump station will be acquired in freehold title on its own parcel of land (refer to Drawing LS305-00-S-DWG-SU-7316 Rev A for details). The net developable area of this land parcel is 2869 m². The overall impervious area associated with the SPS157 site has been calculated as 659 m², which is 23% of the overall land parcel size for SPS157. In respect of the SPP State Interest Water Quality, (refer also to Appendix E), the overall 23% impervious area component is less than the 25% impervious area limit specified under the SPP assessment benchmarks. Accordingly, the proposed development therefore does not trigger additional assessment.

There is no significant change to the site drainage regime and no change to site discharge locations or catchment areas due to the proposed development.

Sediment is considered to be the key pollutant associated with the proposed development. The site discharge water quality should not be impacted by the development provided appropriate sediment and erosion control measures are applied, and maintained, alongside proposed access road and pump station.

The impervious percentage of the site is less than maximum 25% allowable by the SPP. Therefore the proposed development is compliant with the Water Quality Procedure in the State Planning Policy.

Assessment benchmarks – water quality

These performance outcomes apply to the following development applications, to the extent the SPP has not been identified in a local planning instrument as being appropriately integrated.

For receiving waters, a development application for:

- (1) a material change of use for an urban purpose that involves premises 2500 metres² or greater in size and;
 - (a) will result in six or more dwellings; or
 - (b) will result in an impervious area greater than 25 per cent of the net developable area; or
- (2) reconfiguring a lot for an urban purpose that involves premises 2500 metres² or greater in size and will result in six or more lots; or
- (3) operational works for an urban purpose that involves disturbing a land area 2500 metres² or greater in size.

For water supply buffer areas, a development application:

- (4) located wholly outside an urban area and relating to premises that is within, or partly within, a water supply buffer area, that involves:
 - (a) a material change of use for the intensive animal industry, medium and high-impact industry, noxious and hazardous industry, extractive industry, utility installation that involves sewerage services, drainage or stormwater services, waste management facilities, or motor sport facility; or
 - (b) reconfiguring a lot to create five or more additional lots if any resultant lot is less than 16 hectares in size, and any of the lots created will rely on on-site wastewater treatment.

The following requirements are assessment benchmarks for the development:

- (1) Development is located, designed, constructed and operated to avoid or minimise adverse impacts on environmental values arising from:
 - (a) altered stormwater quality and hydrology
 - (b) waste water
 - (c) the creation or expansion of non-tidal artificial waterways
 - (d) the release and mobilisation of nutrients and sediments.
- (2) Development achieves the applicable stormwater management design objectives outlined in tables A and B (appendix 2)
- (3) Development in a water supply buffer area avoids adverse impacts on drinking water supply environmental values.

Further information in relation to these requirements is detailed in the water quality guidance material.

Figure 8.1 Water Quality Procedure in the State Planning Policy

9 RECOMMENDATIONS

The following recommendations are proposed for the Operational Works application:

- Access road Erosion and Sediment control measures be adopted in accordance with the detailed design of the access road and pump station
- Exposed treated subgrade be adequately compacted
- Sediment collection devices (i.e. sediment fences, grass strips, run-off retention basins) be placed around areas undergoing excavation or filling works to minimise transportation (i.e. run-off) of sediments off-site and into nearby waterways
- Site re-vegetation -grass cover or hydro-mulch of exposed site surfaces (i.e. subgrades, batter faces, drainage easements etc.) be undertaken as soon as possible following construction.
- Ongoing maintenance of grassed areas be provided as required to ensure grass cover is adequate.
- Open excavations should be protected from surface water
- Grass cover be installed and maintained immediately downstream of the diversion drain discharge transition
- An Operational Works Erosion and Sediment Control Plan shall be developed for the site.
- Erosion and sediment control shall be carried out in accordance with the International Erosion Control Association (IECA) Best Practice Erosion and Sediment Control guideline.
- During construction phase the stormwater management design objectives of the Queensland State Planning Policy (DILGP 1) shall be adhered to. A copy of these objectives has been included in Appendix D.

10 LIMITATIONS

This Stormwater management plan is limited to the accuracy of the design drawings and existing and design DTM provided by the Logan Water Alliance.

11 REFERENCES

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- Brisbane City Council. (2003, November). Natural Channel Design Guidelines
- Department of Infrastructure, Local Government and Planning1, Queensland Government. (2017, August). State Planning Policy. Retrieved June 19, 2017 from <http://dilgp.qld.gov.au/resources/policy/state-planning/spp-april-2016.pdf>
- Department of Infrastructure, Local Government and Planning2, Queensland Government. (2017, August). State Planning Policy – state interest guideline Water Quality. Retrieved June 19, 2017 from <https://www.dilgp.qld.gov.au/resources/guideline/spp/spp-guideline-water-quality.pdf>
- Department of Infrastructure, Local Government and Planning10, Queensland Government. (2017, May 26). State Development Assessment Provisions – Version 2.0. Retrieved June 30, 2017 from <http://www.dilgp.qld.gov.au/resources/policy/sdap/v2/sdap.pdf>
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- International Erosion Control Association (IECA), November 2008, Best practice Erosion and Sediment Control, Book 3 – Appendices H-N.
- Queensland Government9. Planning Act 2016. (current as at July 3, 2017). Retrieved June 30, 2017 from <https://www.legislation.qld.gov.au/LEGISLTN/CURRENT/P/PlanningA16.pdf>

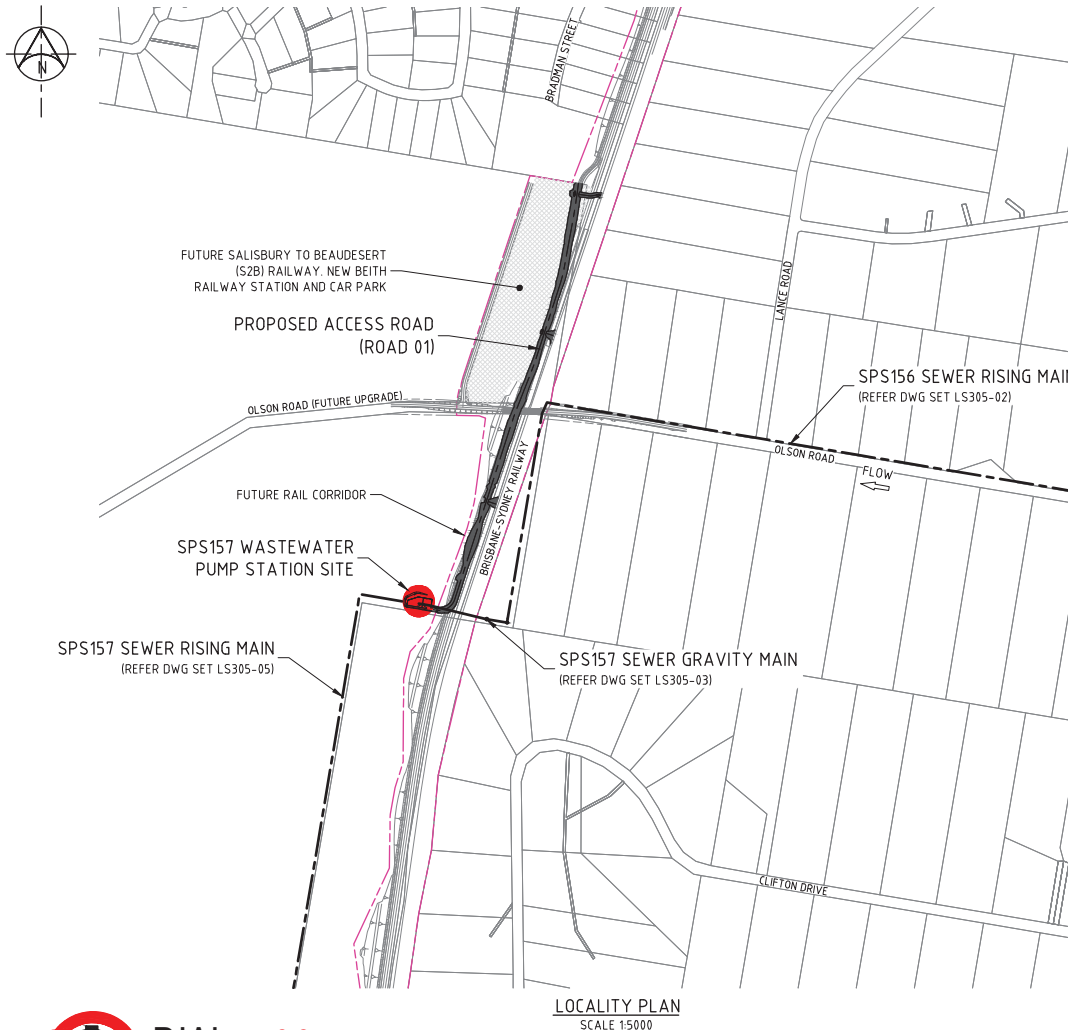
APPENDIX A

SEWAGE PUMP STATION SPS157 DESIGN
EXTRACTS



GREENBANK PDA TO SPS151 WASTEWATER CONVEYANCE

LS305-04 SPS157 WASTEWATER PUMP STATION



LoganWIA - SPS DRAWINGS

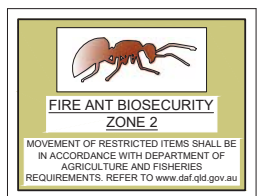
DRAWING No	TITLE
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LS305-04-S-DWG-ND-0040	SPS157 WASTEWATER PUMP STATION, P&ID
LS305-04-S-DWG-ND-0060	SPS157 WASTEWATER PUMP STATION, PUMP & SYSTEM RESISTANCE CURVES, STAGE 1
LS305-04-S-DWG-ND-0061	SPS157 WASTEWATER PUMP STATION, HYDRAULIC PROFILE
LS305-04-S-DWG-ND-0062	SPS157 WASTEWATER PUMP STATION, ROW SET OUT
LS305-04-S-DWG-CI-2400	SPS157 WASTEWATER PUMP STATION, SITE LAYOUT
LS305-04-S-DWG-CI-2401	SPS157 WASTEWATER PUMP STATION, SITE GENERAL ARRANGEMENT PLAN
LS305-04-S-DWG-CI-2402	SPS157 WASTEWATER PUMP STATION, SITE SET OUT PLAN
LS305-04-S-DWG-CI-2403	SPS157 WASTEWATER PUMP STATION, SET OUT COORDINATES
LS305-04-S-DWG-CI-2404	SPS157 WASTEWATER PUMP STATION, EARTHWORKS PLAN AND SET OUT
LS305-04-S-DWG-CI-2405	SPS157 WASTEWATER PUMP STATION, EARTHWORKS SECTIONS
LS305-04-S-DWG-CI-2406	SPS157 WASTEWATER PUMP STATION, INTERNAL ROAD PLAN, LONGITUDINAL SECTION, AND CROSS SECTIONS, ROAD 02
LS305-04-S-DWG-CI-2410	SPS157 WASTEWATER PUMP STATION, GENERAL ARRANGEMENT PLAN, ABOVE ROOF AND BELOW ROOF
LS305-04-S-DWG-CI-2411	SPS157 WASTEWATER PUMP STATION, WET WELL, GENERAL ARRANGEMENT, ELEVATION
LS305-04-S-DWG-CI-2412	SPS157 WASTEWATER PUMP STATION, GENERAL ARRANGEMENT DETAILS, PLAN AND FITTINGS SCHEDULE, SHEET 1 OF 2
LS305-04-S-DWG-CI-2413	SPS157 WASTEWATER PUMP STATION, GENERAL ARRANGEMENT DETAILS, PLAN AND FITTINGS SCHEDULE, SHEET 2 OF 2
LS305-04-S-DWG-CI-2414	SPS157 WASTEWATER PUMP STATION, SITE SERVICES PLAN
LS305-04-S-DWG-CI-2415	SPS157 WASTEWATER PUMP STATION, OVERFLOW DETAILS
LS305-04-S-DWG-CI-2416	SPS157 WASTEWATER PUMP STATION, GRAVITY MAIN INLET DETAILS, LINE 3
LS305-04-S-DWG-CI-2417	SPS157 WASTEWATER PUMP STATION, GRAVITY MAIN INLET DETAILS, LINE 1
LS305-04-S-DWG-CI-2420	SPS157 WASTEWATER PUMP STATION, ACCESS ROAD, KEY PLAN
LS305-04-S-DWG-CI-2421	SPS157 WASTEWATER PUMP STATION, ACCESS ROAD PLAN & LONGITUDINAL SECTION, ROAD 01, SHEET 1
LS305-04-S-DWG-CI-2422	SPS157 WASTEWATER PUMP STATION, ACCESS ROAD PLAN & LONGITUDINAL SECTION, ROAD 01, SHEET 2
LS305-04-S-DWG-CI-2423	SPS157 WASTEWATER PUMP STATION, ACCESS ROAD PLAN & LONGITUDINAL SECTION, ROAD 01, SHEET 3
LS305-04-S-DWG-CI-2424	SPS157 WASTEWATER PUMP STATION, ACCESS ROAD CROSS SECTIONS, ROAD 01, SHEET 1
LS305-04-S-DWG-CI-2425	SPS157 WASTEWATER PUMP STATION, ACCESS ROAD CROSS SECTIONS, ROAD 01, SHEET 2
LS305-04-S-DWG-CI-2426	SPS157 WASTEWATER PUMP STATION, ACCESS ROAD CROSS SECTIONS, ROAD 01, SHEET 3
LS305-04-S-DWG-CI-2427	SPS157 WASTEWATER PUMP STATION, ACCESS ROAD CROSS SECTIONS, ROAD 01, SHEET 4
LS305-04-S-DWG-CI-2428	SPS157 WASTEWATER PUMP STATION, ACCESS ROAD TYPICAL SECTIONS, ROAD 01
LS305-04-S-DWG-CI-2440	SPS157 WASTEWATER PUMP STATION, CULVERT 1 DETAILS, CHAINAGE 20
LS305-04-S-DWG-CI-2441	SPS157 WASTEWATER PUMP STATION, CULVERT 2 DETAILS, CHAINAGE 287
LS305-04-S-DWG-CI-2442	SPS157 WASTEWATER PUMP STATION, CULVERT 3 DETAILS, CHAINAGE 620
LS305-04-S-DWG-CI-2450	SPS157 WASTEWATER PUMP STATION, PAVEMENT PLAN
LS305-04-S-DWG-ST-3000	SPS157 WASTEWATER PUMP STATION, CONCRETE SETOUT, PLANS
LS305-04-S-DWG-ST-3001	SPS157 WASTEWATER PUMP STATION, CONCRETE SETOUT, SECTIONS
LS305-04-S-DWG-ST-3002	SPS157 WASTEWATER PUMP STATION, CONCRETE REINFORCEMENT, TYPICAL CONCRETE DETAILS
LS305-04-S-DWG-ST-3003	SPS157 WASTEWATER PUMP STATION, CONCRETE REINFORCEMENT, BASE DETAILS
LS305-04-S-DWG-ST-3004	SPS157 WASTEWATER PUMP STATION, CONCRETE REINFORCEMENT, INLET LEVEL DETAILS
LS305-04-S-DWG-ST-3005	SPS157 WASTEWATER PUMP STATION, CONCRETE REINFORCEMENT, VALVE CHAMBER DETAILS
LS305-04-S-DWG-ST-3006	SPS157 WASTEWATER PUMP STATION, CONCRETE REINFORCEMENT, PRECAST LID DETAILS
LS305-04-S-DWG-ST-3007	SPS157 WASTEWATER PUMP STATION, FLOW METER CHAMBER

DEVELOPERS AND REFERENCE DRAWINGS

DRAWING No	TITLE
15-878-24-01-C	FLAGSTONE CITY - STAGE 1 TRUNK SEWER, PHASE 2, SEWER LAYOUT PLAN SHEET 2 OF 2
110056-139	FLAGSTONE PRECINCT 1 STAGE 2 ALLOTMENT LAYOUT

SITE SPECIFIC NOTES

- FOR REFERENCE DRAWING LIST REFER TO DWG LS305-00-S-DWG-ND-0010.
- REFER LS305-00 GENERAL DWG SET FOR ASSOCIATED PACKAGES AND STANDARD DRAWINGS.
- FOR FEATURE SURVEY REFER TO VISION SURVEY OUTPUTS 18182 - 01 Rev D 180705.dwg DATED 30/07/2018.
- REFER DWGS CI-2400, CI-2401 AND CI-2421 TO CI-2423 FOR RIGHT OF WAY EXTENTS. NO TREE CLEARING UNLESS PRIOR APPROVAL FROM A LoganWIA REPRESENTATIVE.
- FOR BOREHOLE LOCATIONS REFER TO DWG LS305-00-S-DWG-GE-7200.
- VS-4-S STANDARD SMART VALVE WITH ADJUSTABLE ANTI-SLUDGE FITTING REQUIRED AT AUTOMATIC GAS RELEASE POINTS.
- REFER GEOTECHNICAL REPORT BY MORRISONS INCLUDED IN THE TENDER PACK.



WARNING

0 50 100 200 300m
A1 - 1:5000

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A. LATORRE	DRAFTING CHECK BY
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DESIGN CHECKED BY	RPEG
S. DICKER	18473
APPROVED BY	RPEG

REFERENCES

PROJECT No	LS305-04
FILE REFERENCE:	
SHEET SIZE	A1
DATUM : AHD	GOA 94 ZONE 56



LOGAN
WATER INFRASTRUCTURE
ALLIANCE



PROJECT:

GREENBANK PDA TO SPS151 WASTEWATER CONVEYANCE

DRAWING TITLE:

SPS157 WASTEWATER PUMP STATION
COVER SHEET, LOCALITY PLAN, DRAWING LIST
AND SITE SPECIFIC NOTES

DRAWING No:

LS305-04-S-DWG-ND-0000

DESIGN COMPANY:

LoganWIA

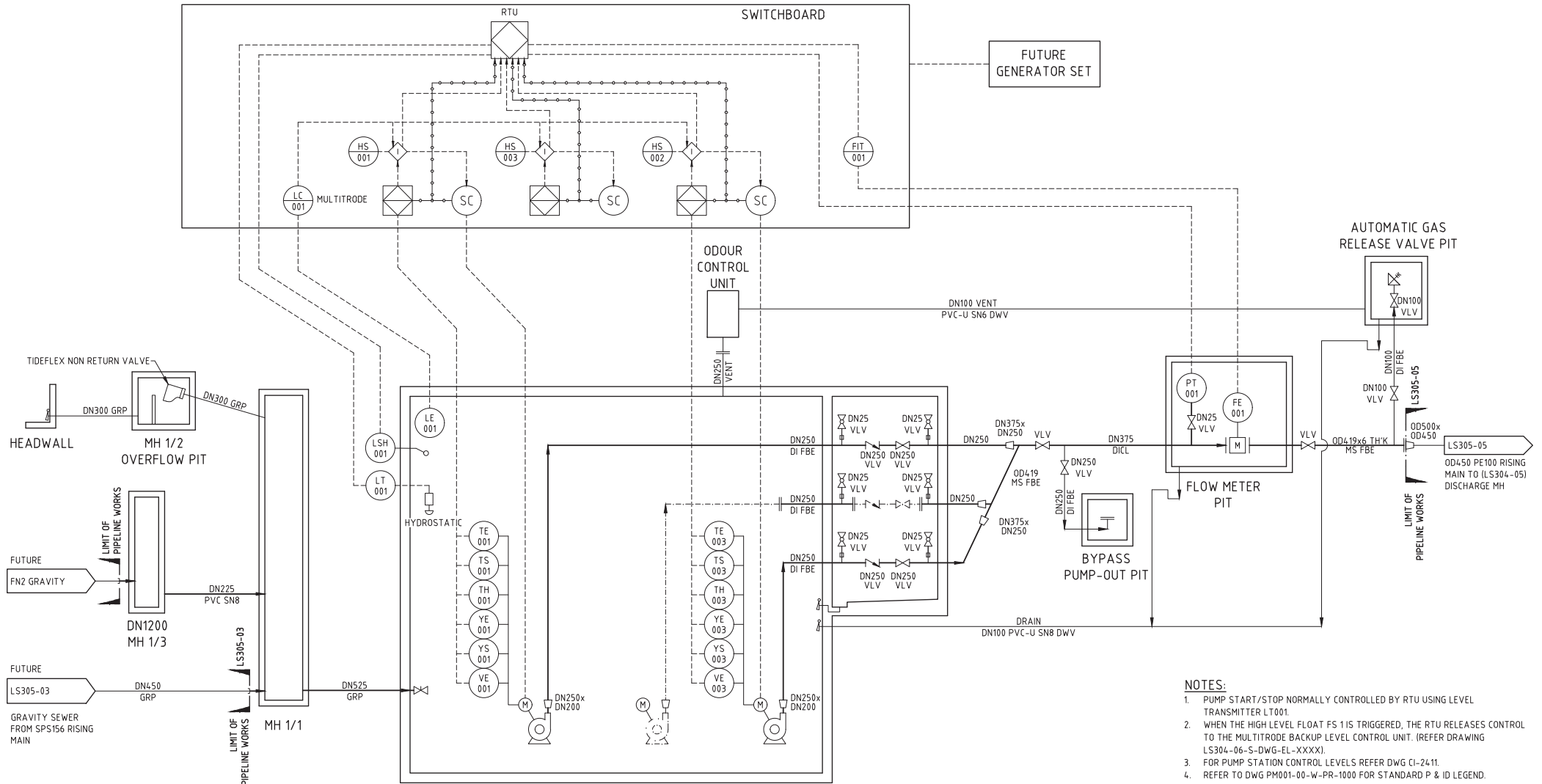
TECH SERVICES DRG No:

REV:

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DATE PLOTTED: 15 October 2018 - 11:04am



- NOTES:**
1. PUMP START/STOP NORMALLY CONTROLLED BY RTU USING LEVEL TRANSMITTER LT001.
 2. WHEN THE HIGH LEVEL FLOAT FS 1 IS TRIGGERED, THE RTU RELEASES CONTROL TO THE MULTITRODE BACKUP LEVEL CONTROL UNIT. (REFER DRAWING LS304-06-S-DWG-EL-XXXX).
 3. FOR PUMP STATION CONTROL LEVELS REFER DWG CI-2411.
 4. REFER TO DWG PM001-00-W-PR-1000 FOR STANDARD P & ID LEGEND.

PIPING AND EQUIPMENT SYMBOLS	
	PLUG VALVE
	FLAP VALVE

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APPROVED BY	RPEQ

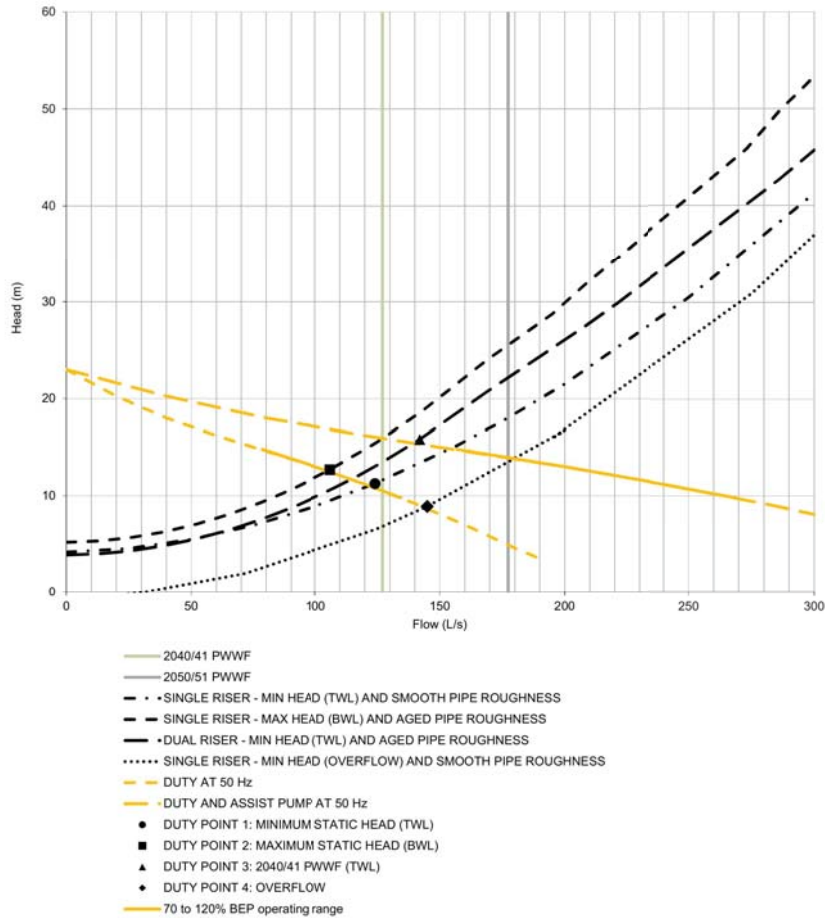
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DATUM : AHD
GOA 94 ZONE 56



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DRAWING No.	LS305-04-S-DWG-ND-0040	REV. B
DESIGN COMPANY:	LoganWIA	
TECH SERVICES DRG No.		

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DATE PLOTTED: 15 October 2018 - 11:04am



SPS157 STAGE 1 PUMP DETAILS	
DESCRIPTION	DETAILS
NO. OF DUTY PUMPS	1
NO. OF ASSIST PUMPS	1
TOTAL NUMBER OF PUMPS	2
TOTAL NUMBER OF WET WELLS	1
PUMP MOUNTING	WET
PUMP MANUFACTURER	FLYGT
PUMP MODEL	NP 3202.185 MT 3-4.35
IMPELLER DIAMETER (mm)	260
DISCHARGE FLANGE DIAMETER (mm)	200
SUCTION FLANGE DIAMETER (mm)	200
MOTOR MANUFACTURER	FLYGT
MOTOR RATING (kW)	37
MOTOR START TYPE	VSD
MOTOR VOLTAGE (V)	415
MOTOR SPEED AT 50 Hz (rpm)	1475
CABLE LENGTH	35
MINIMUM FREQUENCY (Hz)	N/A

SPS157 STAGE 1 PUMP DUTY POINTS		
DESCRIPTION	Q (L/s)	H (m)
DUTY POINT 1: MINIMUM STATIC HEAD (TWL)	124	11.3
DUTY POINT 2: MAXIMUM STATIC HEAD (BWL)	106	12.7
DUTY POINT 3: 2040/41 PWWF (TWL)	142	15.8
DUTY POINT 4: OVERFLOW	145	8.9

- NOTES:
- DUTY POINTS 1 AND 2 IS CATERED FOR BY 1 PUMP AT 50 Hz RATED SPEED.
 - DUTY POINT 3 IS CATERED FOR BY 2 PUMPS AT TOP WATER LEVEL AND AGED PIPE ROUGHNESS.
 - OVERFLOW DUTY POINT 4 IS AT RATED SPEED FOR ONE PUMP.

SPS157 DESIGN FLOW DETAILS										
DESCRIPTION	DESIGN HORIZON FOR FLOW RATES INTO PUMP STATION									
	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2030/31	2040/41	2050/51	ULTIMATE
EP	2,948	3,538	4,129	4,721	5,311	5,901	7,139	10,972	15,322	23,488
ADWF (L/s)	5.6	6.8	7.9	9.0	10.1	11.3	13.6	21.0	29.3	44.9
PWWF (L/s)	34.1	40.9	47.8	54.6	61.5	68.3	82.6	127.0	177.3	271.9
PDWF (L/s)	14.1	16.9	19.7	22.5	25.4	28.2	34.1	52.4	73.2	112.1
ADWF PUMP STARTS / HOUR	1.0	1.1	1.3	1.5	1.7	1.8	2.1	3.0		
ADWF DETENTION TIME (hrs)	27.0	22.5	19.3	16.9	15.0	13.5	11.2	7.3		

NOTE:
PUMP STATION INCLUDES SPS156 AND NM1 LOADS.
ADWF WAS BASED ON 165 L/EP/DAY, WHILE PWWF WAS BASED ON 1000 L/EP/DAY FOR NEW DEVELOPMENTS.
PDWF CALCULATES USING $C2 \times ADWF$ WHERE $C2 = 4.7 \times (EP) - 0.105$ REFER SEQ CODE DESIGN CRITERIA, TABLE 10, ITEM D4; OR 2.5 WHICHEVER IS GREATER DETENTION TIME CALCULATED USING RISING MAIN TOTAL VOLUME OF 548m³ AND SPS157 ADWF FOR EACH HORIZON.

SPS157 RISING MAIN DETAILS													
DESCRIPTION	PUMP RISER	PUMP HEADER	OPEN TRENCH	HDD	OPEN TRENCH	HDD	OPEN TRENCH	HDD	OPEN TRENCH	HDD	OPEN TRENCH	HDD	OPEN TRENCH
PIPE SIZE	DN250	DN375	OD500	OD500	OD500	OD500	OD560	OD560	OD560	OD560	OD560	OD560	OD560
PIPE MATERIAL	DI FBE	DI FBE	PE100	PE100	PE100	PE100	PE100	PE100	PE100	PE100	PE100	PE100	PE100
PIPE PRESSURE RATING (bar)	35	35	16	20	16	20	16	20	16	20	16	20	16
PIPE LENGTH (m)	9	5	123	388	4.6	824	196	336	269	170	170	210	1082
PIPE VOLUME (m ³)	0.5	0.6	16.0	45.2	6.0	95.9	31.9	49.0	43.7	24.8	27.6	30.6	175.9
MAX FLOW VELOCITY AT 142 (m/s)			1.1	1.2	1.1	1.2	0.9	1.0	0.9	1.0	0.9	1.0	0.9

- NOTES:
- FOR SMOOTH PIPE ROUGHNESS, $k = 0.003\text{mm}$ FOR PE100 AND 0.01 FOR DI CL AND DI FBE AS PER AS 2200.
 - REFER TO PM001-00-S-SPE-ME-4000 TECHNICAL SPECIFICATION - SUPPLY OF SUBMERSIBLE PUMPS FOR SEWAGE PUMP STATIONS FOR ADDITIONAL REQUIREMENTS.
 - FOR PUMP OPERATING LEVELS REFER TO DWG CI-2411.
 - OD500 PE100 PN16 MINIMUM SHEAR STRESS AT 124 L/s IS 2.5Pa
 - OD500 PE100 PN20 MINIMUM SHEAR STRESS AT 124 L/s IS 3.2Pa
 - OD560 PE100 PN16 MINIMUM SHEAR STRESS AT 124 L/s IS 1.8Pa
 - OD560 PE100 PN20 MINIMUM SHEAR STRESS AT 124 L/s IS 2.0Pa

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A	FOR 50% DOAR WORKSHOP	MR	AL		10/05/2018

DESIGNED BY	RPEQ	REFERENCES
A. LATORRE		PROJECT No.
DRAFTED BY	DRAFTING CHECK BY	LS305-04
M. RODGER	F. JESPERSEN	FILE REFERENCE:
DESIGN CHECKED BY	RPEQ	SHEET SIZE
S. DICKER	184.73	A1
APPROVED BY	RPEQ	DATUM : AHD
		GOA 94 ZONE 56

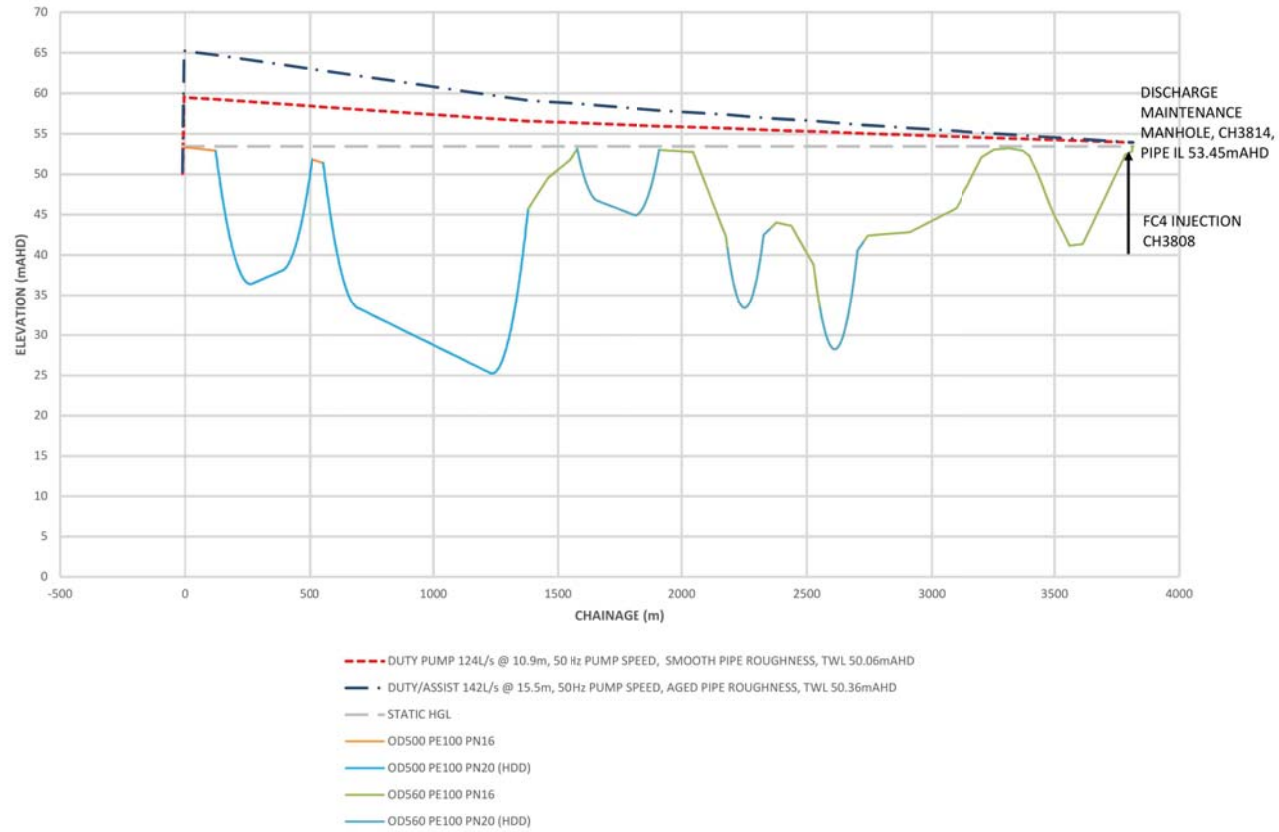


PROJECT:	GREENBANK PDA TO SPS151 WASTEWATER CONVEYANCE		
DRAWING TITLE:	SPS157 WASTEWATER PUMP STATION PUMP & SYSTEM RESISTANCE CURVES STAGE 1		
DRAWING No.	LS305-04-S-DWG-ND-0060	REV.	C
DESIGN COMPANY:	LoganWIA	TECH SERVICES DRG No.	

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PROPOSED SPS157 RISING MAIN HGL - STAGE 1 (2040/41)



- NOTE:
1. FOR FLOW, PUMP AND RISING MAIN DETAILS REFER TO DWG ND-0060.
 2. FOR PUMP OPERATING LEVELS REFER TO DWG CI-2411.

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DESIGN CHECKED BY
S. DICKER
APPROVED BY

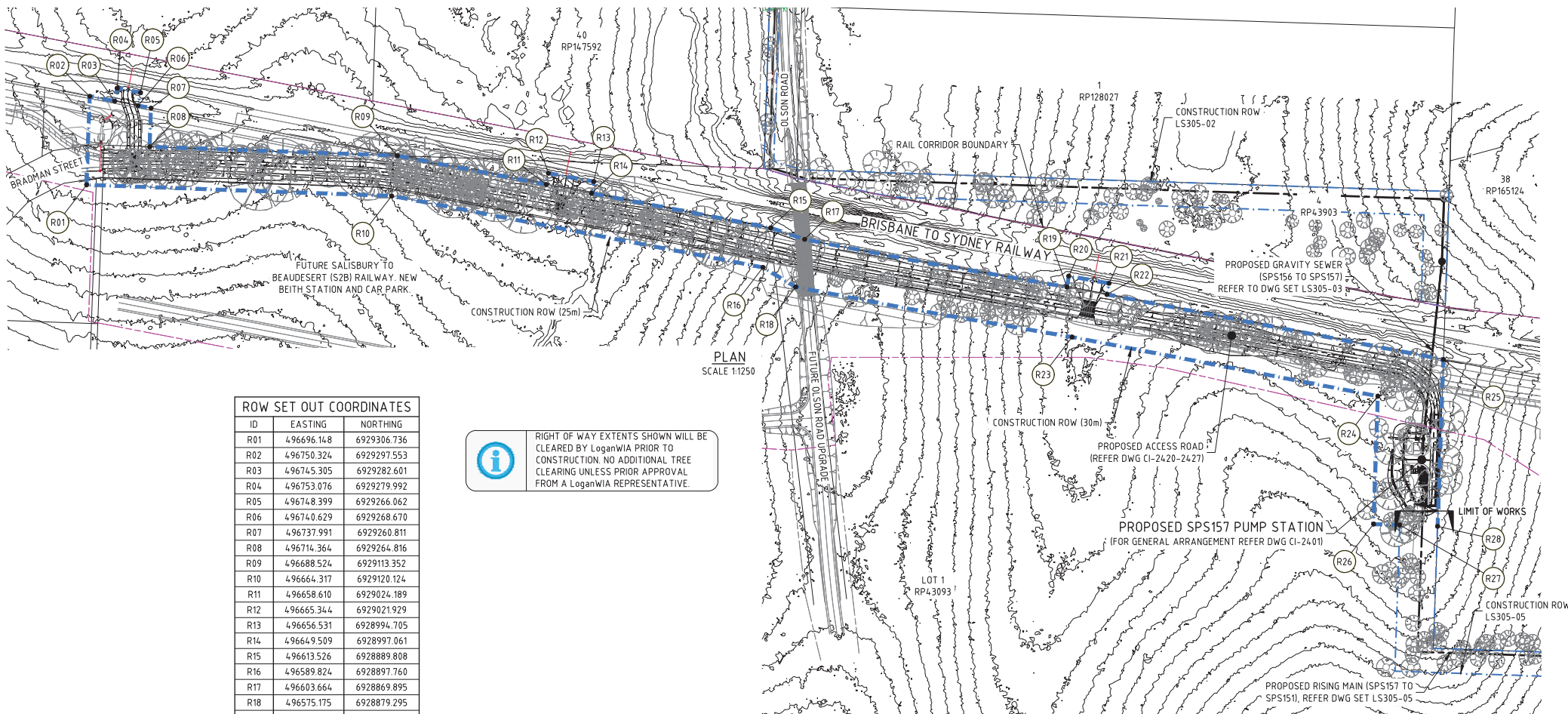
DRAFTING CHECK BY
F. JESPersen

RPEQ
18473
RPEQ

REFERENCES
PROJECT No.
LS305-04
FILE REFERENCE:
SHEET SIZE
A1
DATUM : AHD
GOA 94 ZONE 56



PROJECT: GREENBANK PDA TO SPS151 WASTEWATER CONVEYANCE	
DRAWING TITLE: SPS157 WASTEWATER PUMP STATION HYDRAULIC PROFILE	DRAWING No. LS305-04-S-DWG-ND-0061 DESIGN COMPANY: LoganWIA TECH SERVICES DRG No.
REV. C	



ROW	SET	OUT	COORDINATES
ID	EASTING		NORTHING
R01	466796.148		6929306.736
R02	466750.324		6929297.553
R03	466745.305		6929282.601
R04	466753.076		6929279.992
R05	46674.8.399		6929266.062
R06	466740.629		6929268.670
R07	466737.991		6929260.811
R08	46671.364		6929264.816
R09	466688.524		6929173.352
R10	466664.317		6929120.124
R11	466658.610		6929024.189
R12	466665.344		6929021.929
R13	466656.531		6928994.705
R14	466649.509		6928997.061
R15	466613.526		6928889.808
R16	466589.824		6928897.760
R17	466603.664		6928869.895
R18	466575.175		6928879.295
R19	466552.832		6928712.605
R20	466559.449		6928710.531
R21	466551.633		6928686.389
R22	466544.971		6928688.624
R23	466521.671		6928713.491
R24	466460.269		6928530.472
R25	466477.389		69284.87.182
R26	466381.993		6928543.622
R27	466379.300		6928525.597
R28	466375.382		6928504.461



RIGHT OF WAY EXTENTS SHOWN WILL BE
CLEARED BY LoganWIA PRIOR TO
CONSTRUCTION. NO ADDITIONAL TREE
CLEARING UNLESS PRIOR APPROVAL
FROM A LoganWIA REPRESENTATIVE.

HEAD FILE: T:\ALS305 GREENBANK PDA TO SPS\11\04 FN2 SPS\820 Acad\LS305-96-S-DWG-ND-10662.dwg

DATE PLOTTED: 12 October, 2018 - 11:27am

A	FOR TENDER (95% DESIGN DOCUMENTATION)						MR	AL		12/10/18
REV. No.	DESCRIPTION						DRAWN	DESIGNED	APPR.	DAT

DESIGNED BY		RPEQ
A. LATORRE		
DRAFTED BY		DRAFTING CHECK BY
M. RODGER		F. JESPERSEN
DESIGN CHECKED BY		RPEQ
S. DICKER		18473
APPROVED BY		RPEQ

REFERENCES
PROJECT No.
LS305-04
FILE REFERENCE:
SHEET SIZE
A1
DATUM : AHD
GDA 94 ZONE 56.



PROJECT:	GREENBANK PDA TO SPS151 WASTEWATER CONVEYANCE
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DRAWING TITLE:

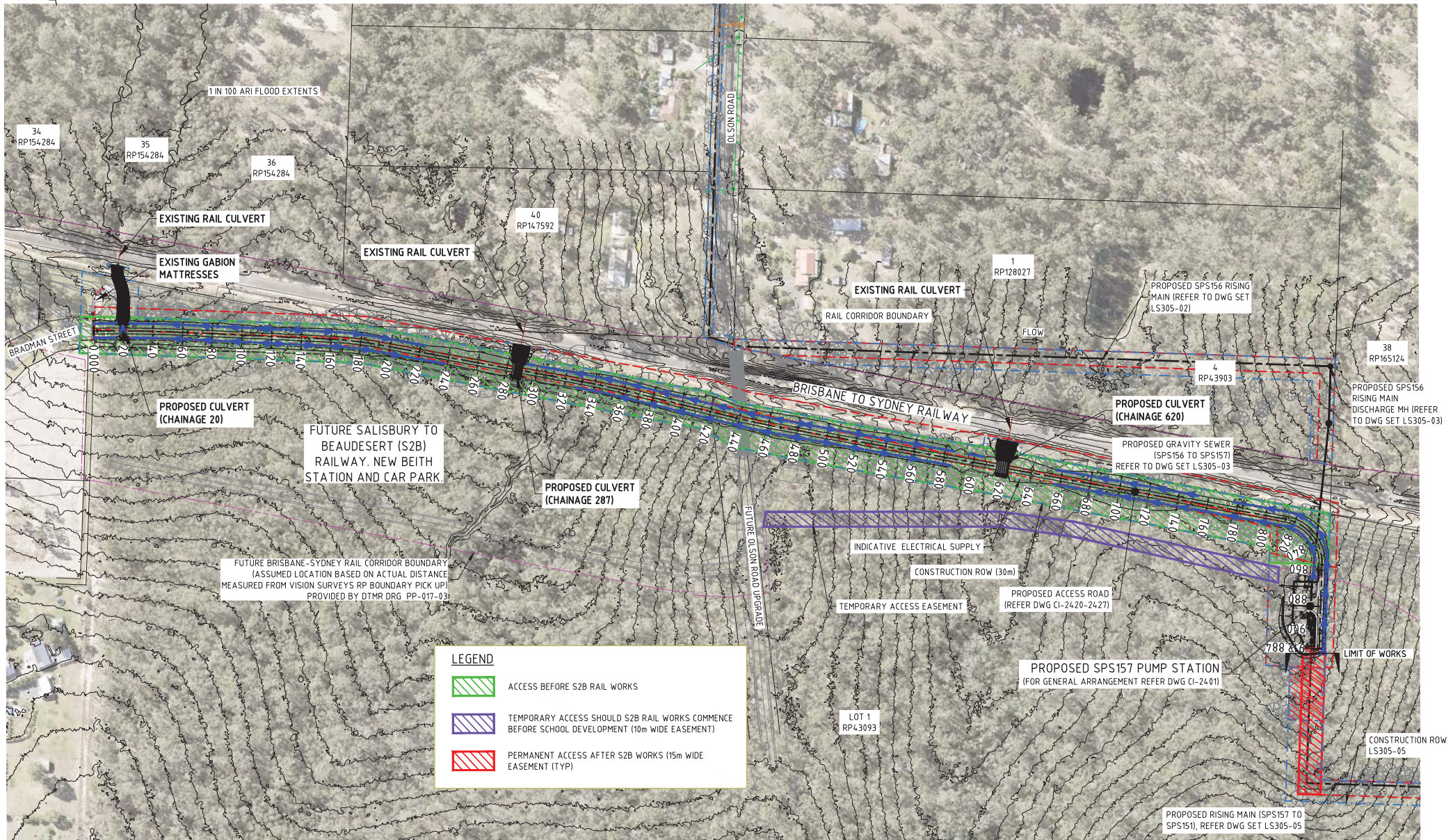
SPS157 WASTEWATER PUMP STATION

ROW SET OUT

DRAWING No.	LS305-04-S-DWG-ND-0062
DESIGN COMPANY.	LoganWIA
TECH SERVICES DRG No.	

0 25 50 75m
A1 - 1:1250

FOR TENDER



PLAN
SCALE 1:1250

0 25 50 75m
A1 - 1:1250

FOR TENDER

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DESIGNED BY
A. LATORRE
DRAFTED BY
M. RODGER
DESIGN CHECKED BY
S. DICKER
APPROVED BY

REFERENCES
PROJECT No.
LS305-04
FILE REFERENCE:
SHEET SIZE
A1
DATUM : AHD
GDA 94 ZONE 56

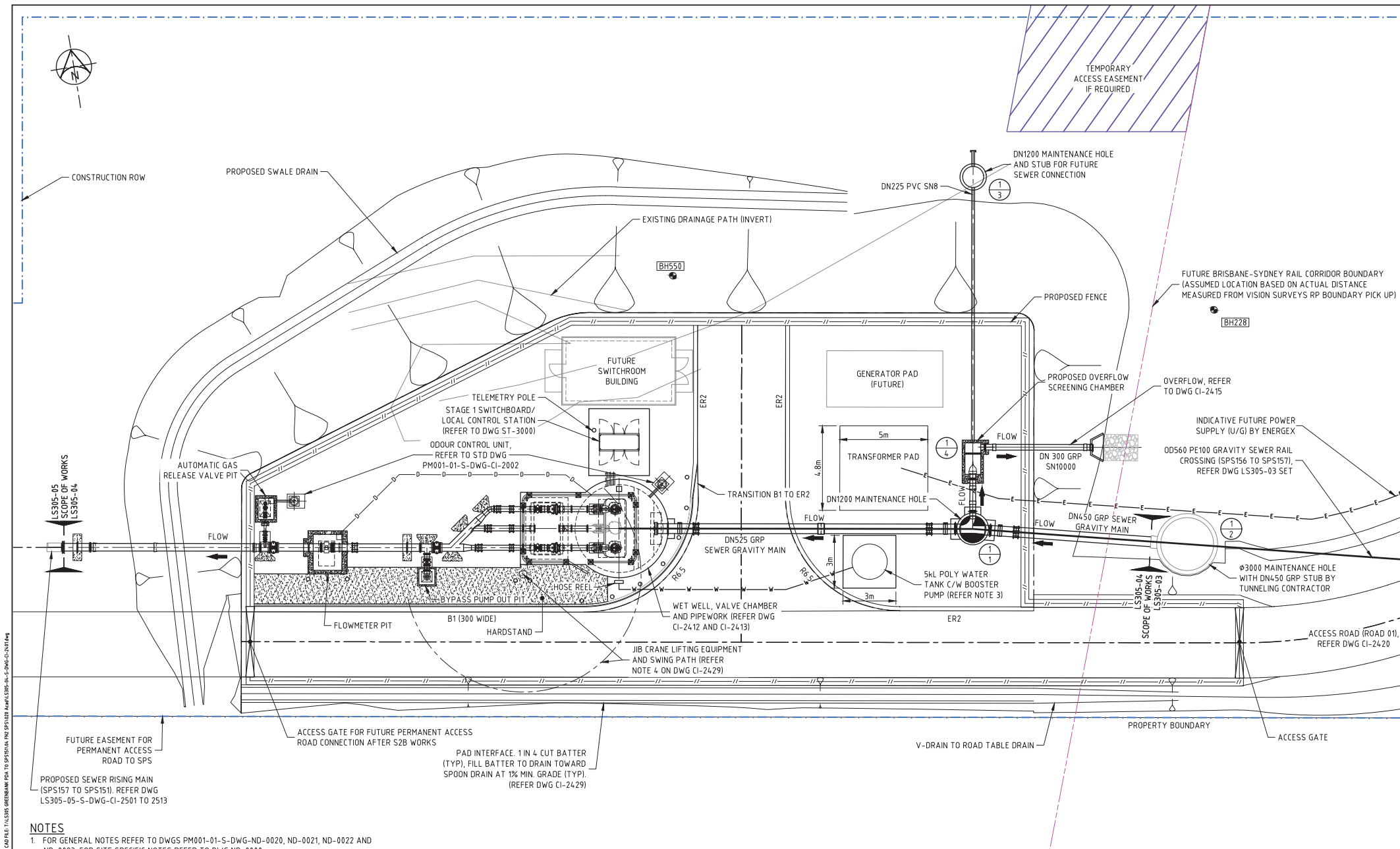


PROJECT: GREENBANK PDA TO SPS151 WASTEWATER CONVEYANCE

DRAWING TITLE:
SPS157 WASTEWATER PUMP STATION
SITE LAYOUT

DRAWING No.
LS305-04-S-DWG-CI-2400
DESIGN COMPANY:
LoganWIA
TECH SERVICES DRG No.
REV. C

REV. No.	DESCRIPTION	DRAWN	DESIGNED	APPR.	DATE
C	FOR TENDER (85% DESIGN DOCUMENTATION)	MR	AL		12/10/2018
B	FOR 70% DOAR WORKSHOP	MR	AL		25/09/2018
A	FOR 50% DOAR WORKSHOP	MR	AL		10/05/2018



NOTES

- FOR GENERAL NOTES REFER TO DWGS PM001-01-S-DWG-ND-0020, ND-0021, ND-0022 AND ND-0023. FOR SITE SPECIFIC NOTES REFER TO DWG ND-0000.
- ACCESS DESIGNED FOR AN 8.8m SERVICE VEHICLE (AUSTRROADS 2013).
- 3 x 3 x 0.15 THICK SLAB WITH SL92 MESH T&B BOOSTER PUMP 24.0V BIANCA S/S (OR SIMILAR)

PLAN
SCALE 1:100

0 1 2 4 6m
A1 - 1:100

FOR TENDER

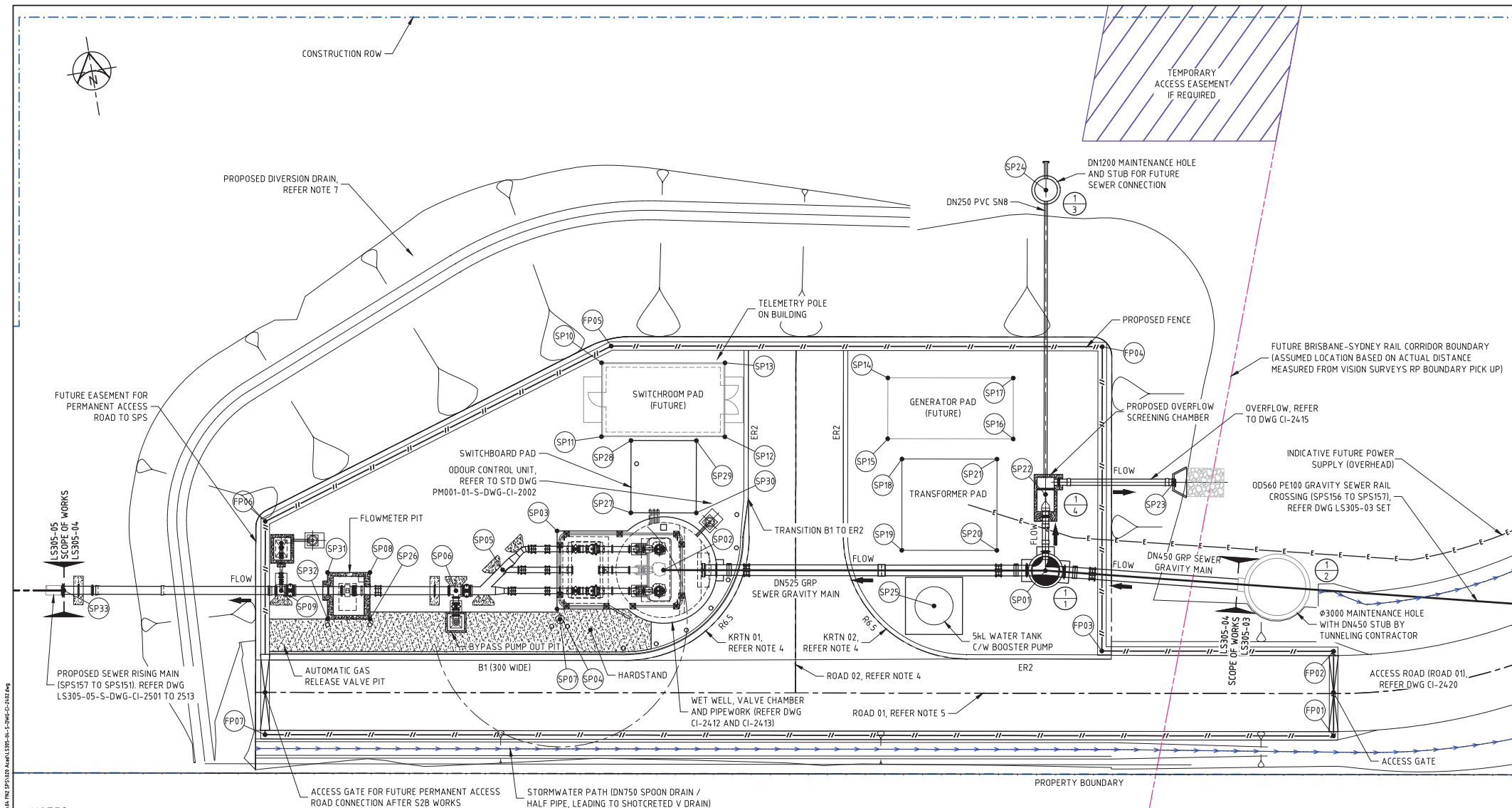
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REV. No.	DESCRIPTION	DRAWN	DESIGNED	APPR.	DATE
C	FOR TENDER (85% DESIGN DOCUMENTATION)	MR	AL		12/10/2018
B	FOR 70% DOAR WORKSHOP	MR	AL		25/09/2018
A	FOR 50% DOAR WORKSHOP	MR	AL		10/05/2018

DESIGNED BY	RPEQ	REFERENCES
A. LATORRE		PROJECT No.
DRAFTED BY	DRAFTING CHECK BY	LS305-04
M. RODGER	F. JESPERSEN	FILE REFERENCE:
DESIGN CHECKED BY	RPEQ	
S. DICKER	18473	SHEET SIZE
APPROVED BY	RPEQ	A1
		DATUM : AHD
		GDA 94 ZONE 56



PROJECT:	GREENBANK PDA TO SPS151 WASTEWATER CONVEYANCE
DRAWING TITLE:	SPS157 WASTEWATER PUMP STATION SITE GENERAL ARRANGEMENT PLAN
DRAWING No.	LS305-04-S-DWG-CI-2401
DESIGN COMPANY:	LoganWIA
TECH SERVICES DRG No.	
REV.	C



NOTES

- FOR GENERAL NOTES REFER TO DWGS PM001-01-S-DWG-ND-0020, ND-0021, ND-0022 AND ND-0023. FOR SITE SPECIFIC NOTES REFER TO DWG ND-0000.
- FOR SET OUT COORDINATES REFER TO DWG CI-2403.
- SITE ACCESS AND INTERNAL TURNING MOVEMENTS DESIGNED FOR AN 8.0m SERVICE VEHICLE (AUSTRROADS 2013).
- FOR ROAD 02 AND KERB RETURN CHAINAGES / CONTROL POINTS REFER EARTHWORKS DWG CI-2402 AND FOR SET OUT COORDINATES REFER DWG CI-2403.
- FOR ROAD 01 CHAINAGES / CONTROL POINTS (WITHIN PAD EXTENTS) REFER CI-2021 AND FOR SET OUT COORDINATES REFER DWG CI-2403.
- FOR EARTHWORKS PAD CONTROL POINTS REFER EARTHWORKS DWG CI-2404 AND FOR SET OUT COORDINATES REFER DWG CI-2403.
- FOR DIVERSION DRAIN CHAINAGES / CONTROL POINTS REFER EARTHWORKS DWG CI-2404 AND FOR SET OUT COORDINATES REFER DWG CI-2403.

PLAN
SCALE 1:100

0 1 2 4 6m
A1 - 1:100

FOR TENDER

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DESIGNED BY	RPEQ
DRAFTED BY	A. LATORRE
DRAFTING CHECK BY	R. AMAYA
DESIGN CHECKED BY	RPEQ
APPROVED BY	RPEQ

REFERENCES
PROJECT No.
LS305-04
FILE REFERENCE:
SHEET SIZE
A1
DATUM : AHD
GDA 94 ZONE 56



PROJECT:	GREENBANK PDA TO SPS151 WASTEWATER CONVEYANCE
DRAWING TITLE:	SPS157 WASTEWATER PUMP STATION SITE SET OUT PLAN
DRAWING No.	LS305-04-S-DWG-CI-2402
DESIGN COMPANY:	LoganWIA
TECH SERVICES DRG No.	
REV.	C

REV. No.	DESCRIPTION	DRAWN	DESIGNED	APPR.	DATE
C	FOR TENDER (85% DESIGN DOCUMENTATION)	MR	AL		12/10/2018
B	FOR 70% DOAR WORKSHOP	MR	AL		25/09/2018
A	FOR 50% DOAR WORKSHOP	MR	AL		10/05/2018

CAD FILE: L:\LS305 GREENBANK PDA TO SPS151\DWG\SPS157 CI-2402 A1-LS305-04-S-DWG-CI-2402.dwg

DATE PLOTTED: 15 October 2018 10:44 AM

DATE PLOTTED: 15 October 2018 - 11:26am CAD FILE: L:\LS305 GREENBANK PDA TO SPS151 WASTE PUMP STATION\DWG\LS305-04-S-DWG-CI-2403.dwg

PROPOSED PAD EARTHWORKS SET OUT TABLE (REF DWG CI-2404)				
ID	EASTING	NORTHING	RL	COMMENT
P01	496443.885	6928494.685	55.14	CORNER PAD (ROAD WIDENING FOR FENCE)
P02	496444.748	6928499.787	55.02	CORNER PAD (ROAD WIDENING FOR FENCE)
P03	496433.220	6928501.738	55.01	CORNER PAD (MID POINT CORNER RADIUS)
P04	496435.558	6928517.266	54.99	CORNER PAD (MID POINT CORNER RADIUS)
P05	496409.793	6928521.786	55.44	CORNER PAD (MID POINT CORNER RADIUS)
P06	496390.038	6928515.581	55.90	CORNER PAD / CONC. EDGE FORMATION FOR SPOON DRAIN
P07	496388.058	6928504.589	56.16	CORNER PAD (ROAD WIDENING FOR FENCE)

EQUIPMENT SET OUT TABLE (REF DWG CI-2402)			
No	DESCRIPTION	EASTING	NORTHING
SP01	INLET MH 1/4	496430.419	6928505.991
SP02	SPS157 WET WELL CENTRE	496410.608	6928509.346
SP03	VALVE PIT CORNER	496405.429	6928512.302
SP04	VALVE PIT CORNER	496404.745	6928508.260
SP05	PIPE CONNECTION CENTRE	496402.268	6928510.758
SP06	SCOUR TEE CENTRE	496399.663	6928510.084
SP07	LIFTING EQUIPMENT CENTRE	496404.800	6928507.692
SP08	FLOW METER PIT CORNER	496395.358	6928511.777
SP09	RM CONNECTION	496390.598	6928511.616
SP10	SWITCHROOM PAD CORNER	496409.204	6928520.637
SP11	SWITCHROOM PAD CORNER	496408.555	6928516.801
SP12	SWITCHROOM PAD CORNER	496414.953	6928515.718
SP13	SWITCHROOM PAD CORNER	496415.603	6928519.553
SP14	GENERATOR PAD CORNER	496423.919	6928517.353
SP15	GENERATOR PAD CORNER	496423.385	6928514.198
SP16	GENERATOR PAD CORNER	496429.892	6928513.096
SP17	GENERATOR PAD CORNER	496430.427	6928516.251
SP18	TRANSFORMER PAD CORNER	496423.946	6928513.026
SP19	TRANSFORMER PAD CORNER	496423.145	6928508.293
SP20	TRANSFORMER PAD CORNER	496428.074	6928507.458
SP21	TRANSFORMER PAD CORNER	496428.876	6928512.191
SP22	OVERFLOW PIT CENTRE	496431.086	6928509.935
SP23	HEADWALL	496437.870	6928509.445
SP24	INLET MH 3/1	496433.758	6928525.710
SP25	WATER TANK CENTRE	496424.328	6928505.129
SP26	FLOW METER PIT CORNER	496394.949	6928509.361
SP27	ST1 SWITCHBOARD CORNER	496409.415	6928512.599
SP28	ST1 SWITCHBOARD CORNER	496410.049	6928516.346
SP29	ST1 SWITCHBOARD CORNER	496413.441	6928515.771
SP30	ST1 SWITCHBOARD CORNER	496412.806	6928512.024
SP31	FLOW METER PIT CORNER	496393.160	6928512.149
SP32	FLOW METER PIT CORNER	496392.751	6928509.734
SP33	END OF RM	496379.323	6928513.514

FENCE SET OUT TABLE (REF DWG CI-2402)			
No	DESCRIPTION	EASTING	NORTHING
FP01	CORNER FENCE	496443.922	6928494.907
FP02	CORNER FENCE	496444.665	6928499.294
FP03	CORNER FENCE	496432.643	6928501.329
FP04	CORNER FENCE	496435.315	6928517.102
FP05	CORNER FENCE	496409.845	6928521.416
FP06	CORNER FENCE	496390.375	6928515.339
FP07	CORNER FENCE	496388.503	6928504.286

PROPOSED ACCESS ROAD (ROAD 01) SET OUT TABLE (REF DWG CI-2421 TO CI-2423 AND CI-2404)							
TYPE	CHAINAGE	EASTING	NORTHING	RL	BEARING	LENGTH	RADIUS
IP	0.000	496709.396	6929295.369	48.39	186°48'16.57"		
TC	2.463	496709.104	6929292.923	48.36	186°48'16.57"		
IP	32.880	496705.499	6929262.711	48.43		60.834	1000
CT	63.297	496700.064	6929232.774	48.75	190°17'24.52"		
TC	159.087	496682.953	6929138.525	49.24	190°17'24.52"		
IP	175.672	496679.986	6929122.183	48.47		33.169	250
CT	192.256	496674.883	6929106.377	47.95	197°53'30.91"		
TC	331.274	496632.174	6928974.083	48.47	197°53'30.91"		
IP	346.533	496627.485	6928959.557	49.35		30.518	500
CT	361.792	496621.918	6928945.345	50.48	201°23'20.36"		
TC	437.922	496594.154	6928874.458	57.93	201°23'20.36"		
IP	453.128	496588.606	6928860.295	59.36		30.413	-500
CT	468.335	496583.930	6928845.820	60.28	197°54'14.20"		
TC	813.408	496477.847	6928517.457	53.49	197°54'14.20"		
IP	834.798	496469.871	6928492.772	54.34		42.779	30
CT	856.187	496444.293	6928497.101	55.08	279°36'20.22"		
IP	912.894	496388.382	6928506.563	56.12	279°36'20.22"		

PROPOSED INTERNAL ROAD (ROAD 02) SET OUT TABLE (REF DWG CI-2406)							
TYPE	CHAINAGE	EASTING	NORTHING	RL	BEARING		
IP	0.000	496416.386	6928501.824	55.61	9°36'20.22"		
IP	18.725	496419.510	6928520.286	55.24	9°36'20.22"		

KERB RETURN 01 (KRTN 02) SET OUT TABLE (REF DWG CI-2406)							
TYPE	CHAINAGE	EASTING	NORTHING	RL	BEARING	LENGTH	RADIUS
IP	0.000	496407.845	6928504.993	55.74	99°36'20.22"		
IP	5.105	496414.254	6928503.909	55.62		10.21	-6.5
IP	10.210	496415.338	6928510.317	55.50	9°36'20.22"		

KERB RETURN 02 (KRTN 02) SET OUT TABLE (REF DWG CI-2406)							
TYPE	CHAINAGE	EASTING	NORTHING	RL	BEARING	LENGTH	RADIUS
IP	0.000	496420.236	6928509.590	55.39	189°36'20.22"		
IP	5.105	496419.151	6928503.181	55.45		10.21	-6.5
IP	10.210	496425.560	6928502.097	55.41	99°36'20.22"		

PROPOSED DIVERSION DRAIN SET OUT TABLE (REF DWG CI-2404)							
TYPE	CHAINAGE	EASTING	NORTHING	RL	BEARING	LENGTH	RADIUS
IP	0.000	496382.779	6928503.697	56.64	5°15'47.90"		
TC	13.619	496384.029	6928517.258	54.47	5°15'47.90"		
IP	18.225	496384.505	6928522.429	54.25		9.212	8
CT	22.830	496389.422	6928524.099	54.03	71°14'14.01"		
TC	35.250	496401.182	6928528.094	53.86	71°14'14.01"		
IP	40.679	496406.451	6928529.884	53.83		10.856	20
CT	46.107	496411.888	6928528.695	53.81	102°20'19.18"		
IP	61.950	496427.365	6928525.309	53.73	102°20'19.18"		

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B	FOR TENDER 185% DESIGN DOCUMENTATION)	MR	AL		12/10/2018				
A	FOR 70% DOAR WORKSHOP	MR	AL		25/09/2018				
REV. No.	DESCRIPTION	DRAWN	DESIGNED	APPR.	DATE				

DESIGNED BY

A. LATORRE
DRAFTED BY
M. RODGER
DESIGN CHECKED BY
S. DICKER
APPROVED BY

DRAFTING CHECK BY
R. AMAYA

RPEQ

184/73

RPEQ

REFERENCES

PROJECT No.
LS305-04
FILE REFERENCE:
SHEET SIZE
A1
DATUM : AHD
GDA 94 ZONE 56



LOGAN
WATER INFRASTRUCTURE
ALLIANCE



PROJECT:

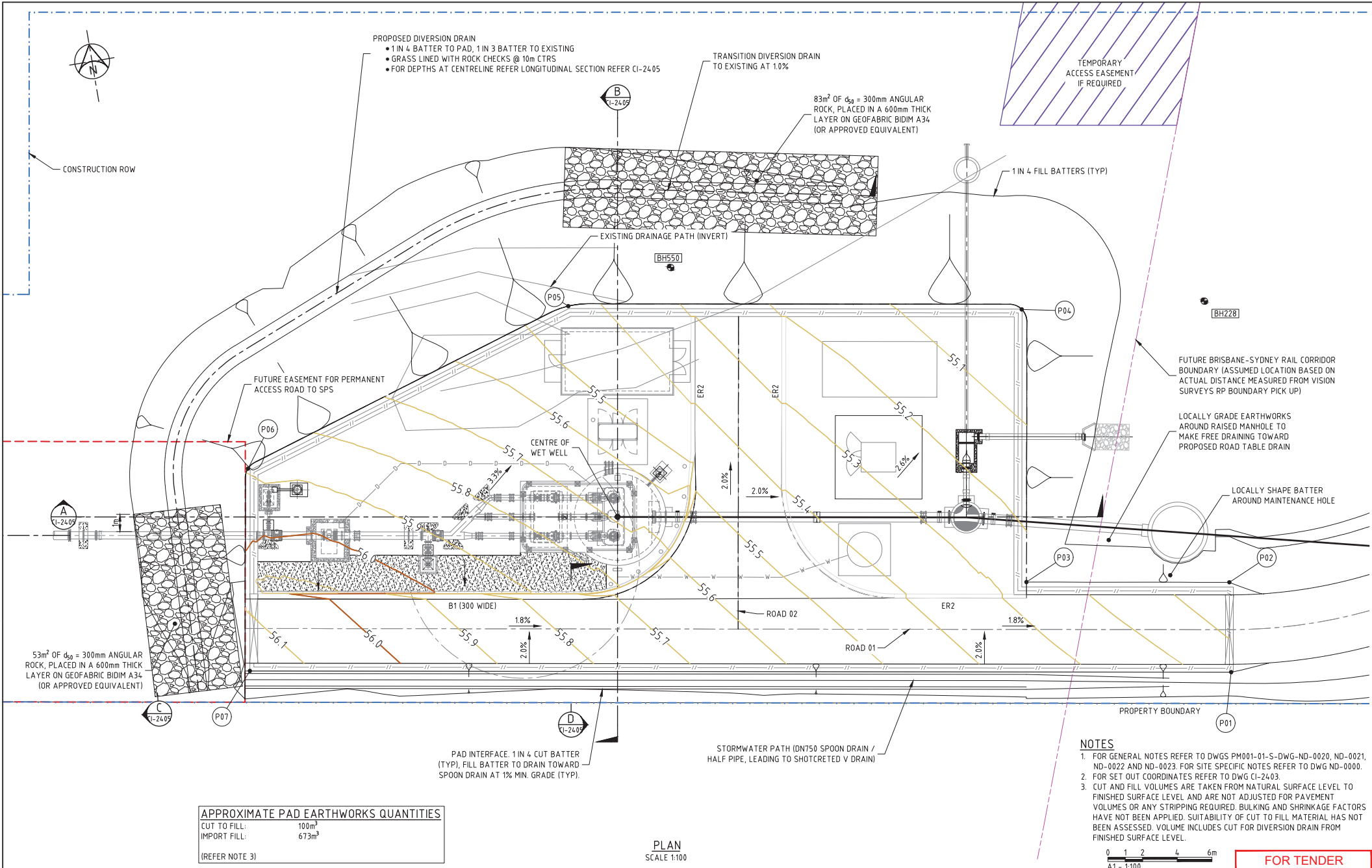
DRAWING TITLE:
SPS157 WASTEWATER PUMP STATION
SET OUT COORDINATES

GREENBANK PDA TO SPS151 WASTEWATER CONVEYANCE

DRAWING No.
LS305-04-S-DWG-CI-2403
DESIGN COMPANY:
LoganWIA
TECH SERVICES DRG No.

REV.
B

FOR TENDER



APPROXIMATE PAD EARTHWORKS QUANTITIES				
CUT TO FILL:	100m ³			
IMPORT FILL:	673m ³			
(REFER NOTE 3)				

PLAN
SCALE 1:100

NOTES

1. FOR GENERAL NOTES REFER TO DWGS PM001-01-S-DWG-ND-0020, ND-0021, ND-0022 AND ND-0023. FOR SITE SPECIFIC NOTES REFER TO DWG ND-0000.

2. FOR SET OUT COORDINATES REFER TO DWG CI-24-03.

3. CUT AND FILL VOLUMES ARE TAKEN FROM NATURAL SURFACE LEVEL TO FINISHED SURFACE LEVEL AND ARE NOT ADJUSTED FOR PAVEMENT VOLUMES OR ANY STRIPPING REQUIRED. BULKING AND SHRINKAGE FACTORS HAVE NOT BEEN APPLIED. SUITABILITY OF CUT TO FILL MATERIAL HAS NOT BEEN ASSESSED. VOLUME INCLUDES CUT FOR DIVERSION DRAIN FROM FINISHED SURFACE LEVEL.

012346m

A1 - 1:100

FOR TENDER

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B	FOR TENDER (85% DESIGN DOCUMENTATION)	MR	AL	12/10/2018
A	FOR 70% DOAR WORKSHOP	MR	AL	25/09/2018
REV. No.	DESCRIPTION	DRAWN	DESIGNED	APPR. DATE

DESIGNED BY	RPEQ	REFERENCES
A. LATORRE		PROJECT No.
DRAFTED BY	DRAFTING CHECK BY	LS305-04
M. RODGER	R. AMAYA	FILE REFERENCE:
DESIGN CHECKED BY	RPEQ	
S. DICKER	184.73	SHEET SIZE
APPROVED BY	RPEQ	A1
		DATUM : AHD
		GDA 94 ZONE 56.

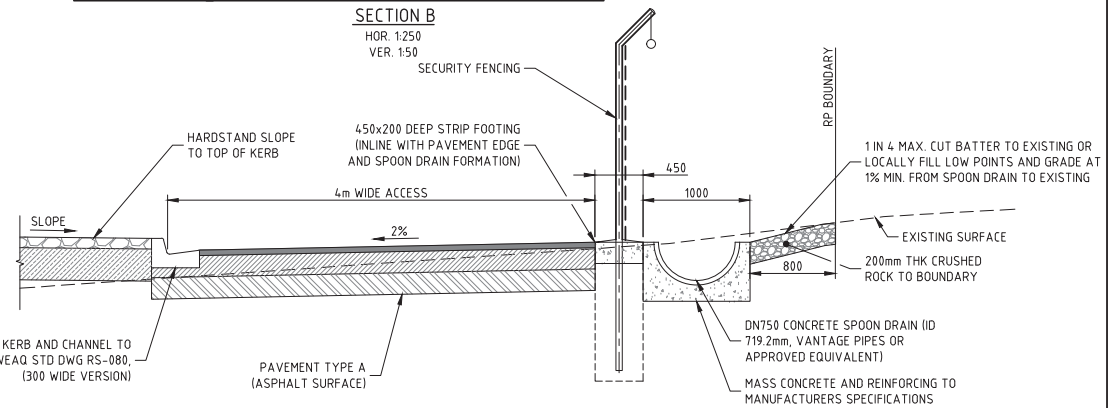
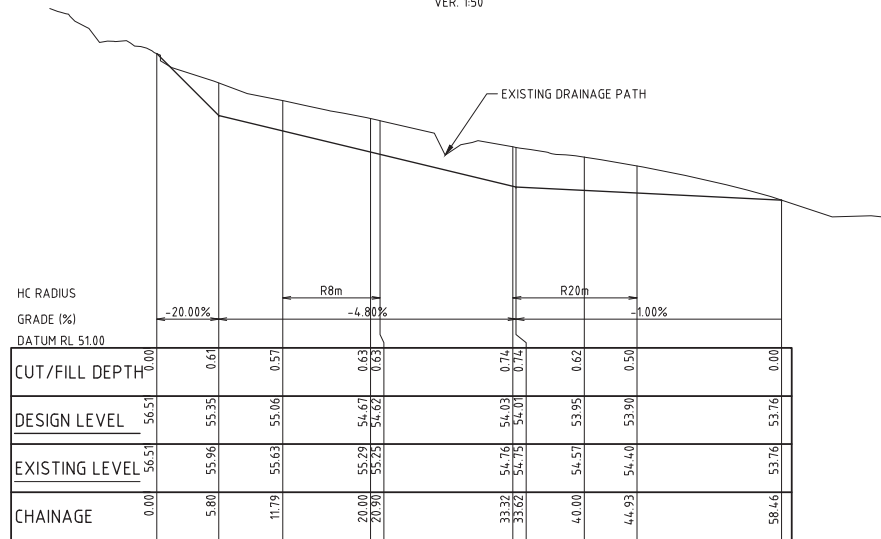
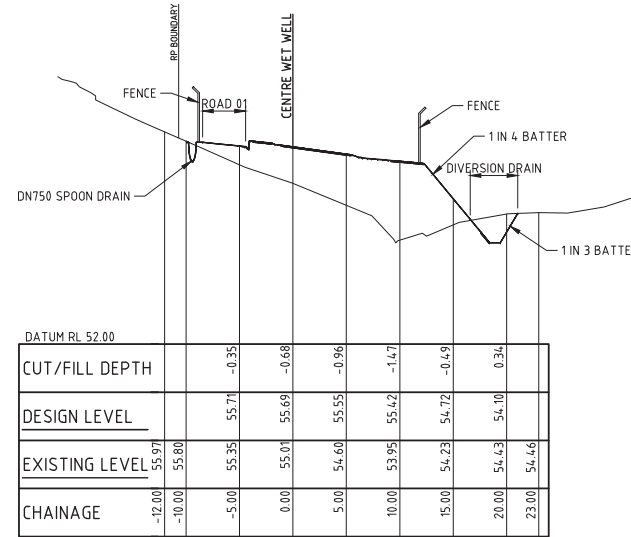
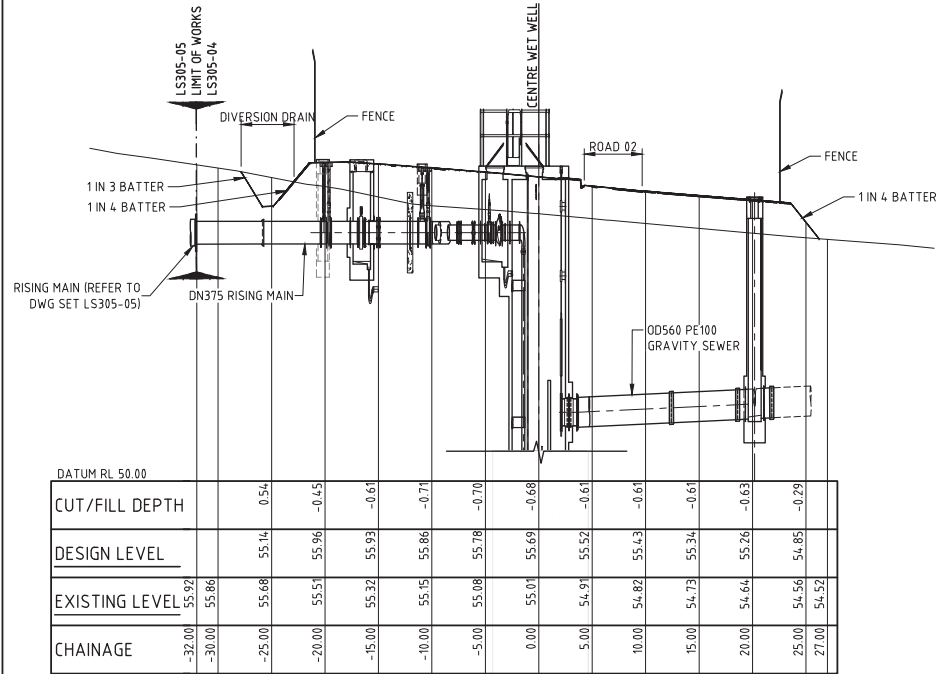


PROJECT: GREENBANK PDA TO SPS151 WASTEWATER CONVEYANCE		DRAWING No. LS305-04-S-DWG-CI-24-04	
DRAWING TITLE: SPS157 WASTEWATER PUMP STATION EARTHWORKS PLAN AND SET OUT		DESIGN COMPANY: LoganWIA	REV. B
		TECH SERVICES DRG No.	

CAD FILE: \LS305 GREENBANK PDA TO SPS151\DWG\CI-24-04-LS305-04-S-DWG-CI-24-04.dwg
DATE PUBLISHED: 11 October 2018 - 11:30am

CAD FILE: I:\EARTHWORKS\GREENBANK PDA TO SPS151 WASTE PUMP STATION\LS305-04-S-DWG-CI-2405.dwg

DATE PUBLISHED: 15 October 2018 REV: 11/2018



- NOTES
- FOR GENERAL NOTES REFER TO STD DWGS PM001-01-S-DWG-ND-0020, ND-0021, ND-0022 AND ND-0023. FOR SITE SPECIFIC NOTES REFER TO DWG ND-0000.



FOR TENDER

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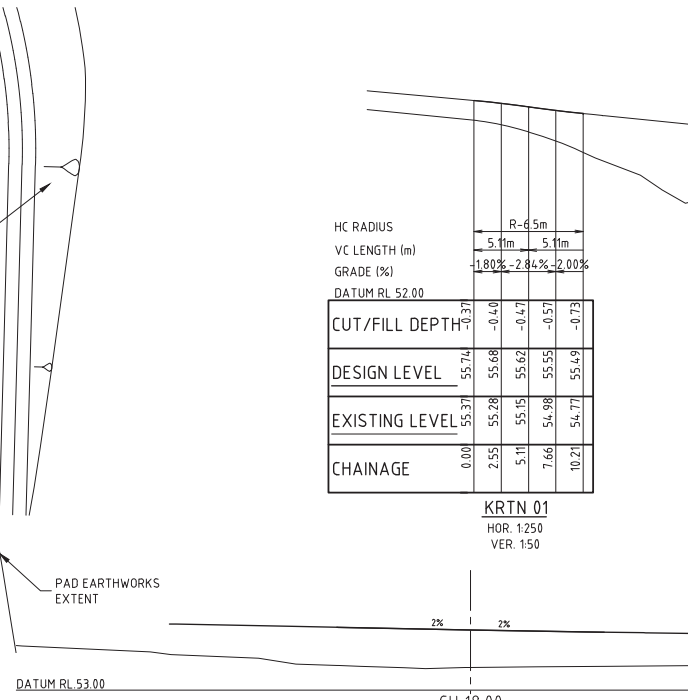
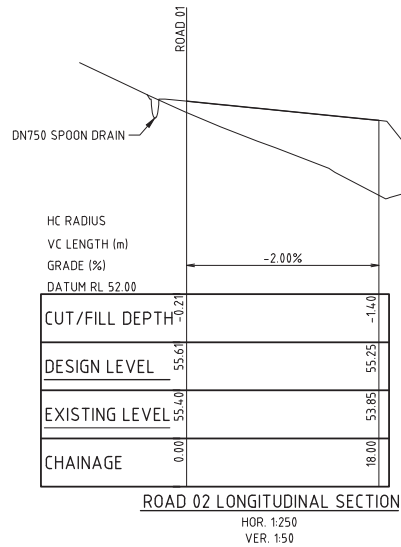
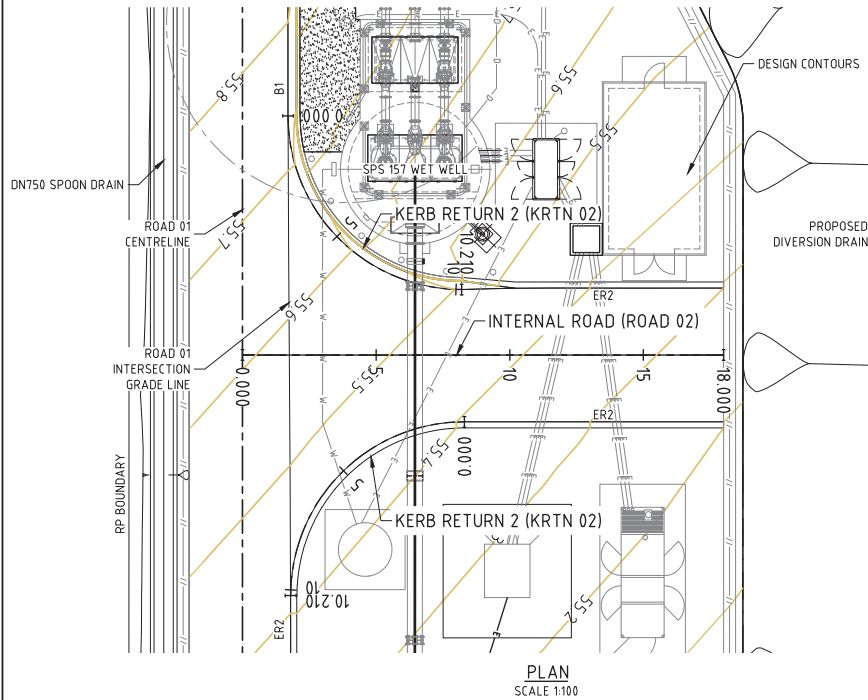
DESIGNED BY	RPEQ	REFERENCES
A. LATORRE		PROJECT No.
DRAFTED BY	DRAFTING CHECK BY	LS305-04
M. RODGER	R. AMAYA	FILE REFERENCE:
DESIGN CHECKED BY	RPEQ	
S. DICKER	184.73	SHEET SIZE
APPROVED BY	RPEQ	A1
		DATUM: AHD
		GOA 94 ZONE 56



PROJECT:	GREENBANK PDA TO SPS151 WASTEWATER CONVEYANCE
DRAWING TITLE:	SPS157 WASTEWATER PUMP STATION EARTHWORKS SECTIONS
DRAWING No.	LS305-04-S-DWG-CI-2405
DESIGN COMPANY:	LoganWIA
TECH SERVICES DRG No.	
REV.	B

CAD FILE: I:\LS305 GREENBANK PDA TO SPS151 WASTE WATER CONVEYANCE\LS305-04-S-DWG-CI-2406.dwg

DATE PUBLISHED: 15 October 2018 - 11:04am



NOTES

- FOR GENERAL NOTES REFER TO DWGS PM001-01-S-DWG-ND-0020, ND-0021, ND-0022 AND ND-0023. FOR SITE SPECIFIC NOTES REFER TO DWG ND-0000.
- FOR SET OUT REFER DWG CI-2402 AND CI-2403.

KRTN 01	
HOR. 1:250 VER. 1:50	
HC RADIUS	R-6.5m
VC LENGTH (m)	5.1m
GRADE (%)	-1.80% -2.84% -2.00%
DATUM RL 52.00	
CUT/FILL DEPTH	-0.37 -0.40 -0.47 -0.57 -0.73
DESIGN LEVEL	55.74 55.68 55.62 55.55 55.49
EXISTING LEVEL	55.37 55.28 55.15 54.98 54.77
CHAINAGE	0.00 2.55 5.11 7.66 10.21

KRTN 02	
HOR. 1:250 VER. 1:50	
HC RADIUS	R-6.5m
VC LENGTH (m)	5.1m
GRADE (%)	2.00% 0.25% -1.80%
DATUM RL 52.00	
CUT/FILL DEPTH	-0.71 -0.56 -0.42 -0.39 -0.33 -0.29
DESIGN LEVEL	55.39 55.43 55.45 55.45 55.44 55.41
EXISTING LEVEL	54.68 54.88 55.03 55.06 55.12 55.12
CHAINAGE	0.00 2.55 5.11 7.66 10.21

FOR TENDER

DESIGNED BY A. LATORRE		REFERENCES PROJECT No. LS305-04	
DRAFTED BY M. RODGER		FILE REFERENCE: SHEET SIZE A1	
DESIGN CHECKED BY S. DICKER		DATUM : AHD GOA 94 ZONE 56	
APPROVED BY RPEQ			

PROJECT:
GREENBANK PDA TO SPS151 WASTEWATER CONVEYANCE

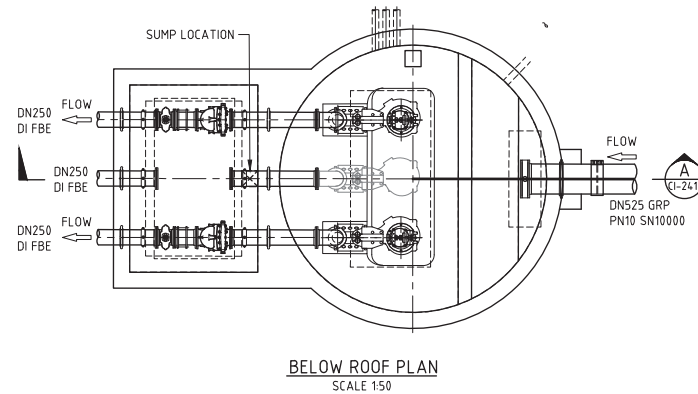
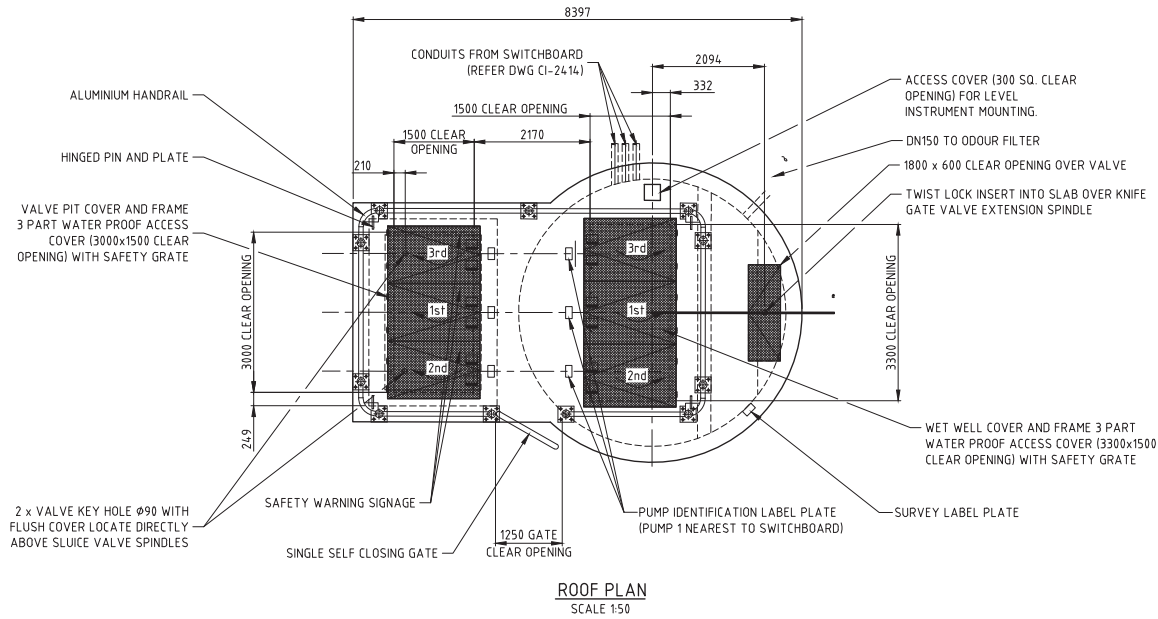
DRAWING TITLE:
SPS157 WASTEWATER PUMP STATION
INTERNAL ROAD PLAN, LONGITUDINAL SECTION
AND CROSS SECTIONS, ROAD 02

DRAWING No.
LS305-04-S-DWG-CI-2406

DESIGN COMPANY:
LoganWIA

TECH SERVICES DRG No.

REV.
A



OPERATORS SHALL PROVIDE MOBILE FALL ARREST ANCHOR POINT AND MOBILE DAVIT SYSTEM. HANDRAILS ARE NOT TO BE USED AS FALL ARREST ANCHOR POINTS.

NOTES

1. FOR GENERAL NOTES REFER TO STD DWGS PM001-01-S-DWG-ND-0020, ND-0021, ND-0022 AND ND-0023. FOR SITE SPECIFIC NOTES REFER TO DWG ND-0000.
2. DIMENSIONS TO BE VERIFIED BY SUB-CONTRACTOR PRIOR TO PROCUREMENT AND CONSTRUCTION.
3. REFER TO STD DWG PM001-01-S-DWG-CI-2010 FOR OTHER DETAILS AND REQUIREMENTS.

0 500 1000 2000 3000mm
A1 - 1:50

FOR TENDER

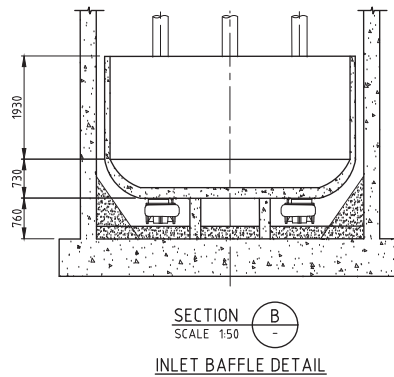
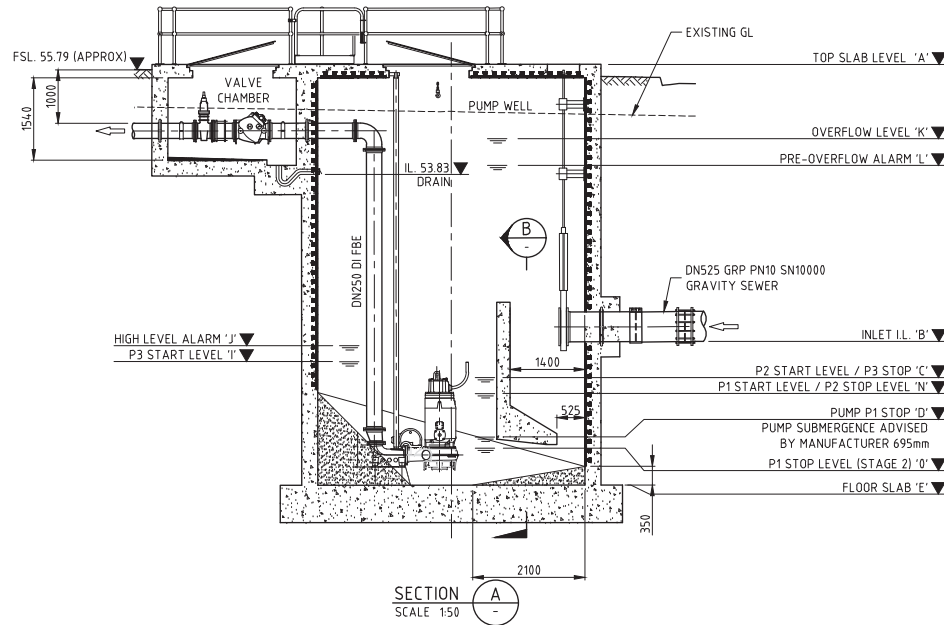
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REV. No.	DESCRIPTION	DRAWN	DESIGNED	APPR.	DATE
B	FOR TENDER 185% DESIGN DOCUMENTATION	MR	AL		12/10/2018
A	FOR 70% DOAR WORKSHOP	MR	AL		25/09/2018

DESIGNED BY	RPEQ	REFERENCES
A. LATORRE		PROJECT No.
DRAFTED BY	DRAFTING CHECK BY	LS305-04
M. RODGER	R. AMAYA	FILE REFERENCE:
DESIGN CHECKED BY	RPEQ	
S. DICKER	18473	SHEET SIZE
APPROVED BY	RPEQ	A1
		DATUM : AHD
		GOA 94 ZONE 56



PROJECT:	GREENBANK PDA TO SPS151 WASTEWATER CONVEYANCE
DRAWING TITLE:	SPS157 WASTEWATER PUMP STATION GENERAL ARRANGEMENT PLAN ABOVE ROOF AND BELOW ROOF
DRAWING No.	LS305-04-S-DWG-CI-2410
DESIGN COMPANY:	LoganWIA
TECH SERVICES DRG No.	
REV.	B



PUMP STATION CONTROL LEVELS - STAGE 1 (2041 DESIGN HORIZON)			
ITEM	DESCRIPTION	LEVEL (m) (A.H.D.)	HEIGHT FROM BASE (m)
A	TOP OF SLAB	55.89	7.87
B	INLET I.L.	50.73	2.71
C	P1 START LEVEL / P2 STOP LEVEL	49.73	1.71
D	PUMP P1 STOP	48.92	0.90
E	FLOOR SLAB	48.02	
F	PUMP STATION DEPTH		7.87
H	EXISTING GROUND LEVEL	55.69*	7.67
I	P3 START LEVEL (STAGE 2)	50.33	2.31
J	HIGH LEVEL ALARM	50.63	2.61
K	OVERFLOW LEVEL	54.50	6.48
L	PRE-OVERFLOW ALARM	54.00	5.98
N	P2 START LEVEL / P3 STOP LEVEL 'N'	50.03	5.66
O	P1 STOP LEVEL (STAGE 2) 'O'	48.71	6.98

* SITE PAD LEVEL TO BE FILLED, REFER TO DWG CI-2404 AND CI-2405

OVERFLOW	
OVERFLOW LEVEL AT WELL	54.50m AHD

NOTES:

- FOR GENERAL NOTES REFER TO DWGS PM001-01-S-DWG-ND-0020, ND-0021, ND-0022 AND ND-0023. FOR SITE SPECIFIC NOTES REFER TO DWG ND-0000.
- CAST IN SITU CONSTRUCTION PROPOSED SUBCONTRACTOR TO CONFIRM METHODOLOGY.
- PIPE BRACKETS ARE OMITTED FOR CLARITY.
- HYDROPHILIC RUBBER SEALS SHALL BE MINIMUM 6mm x 25mm AND SHALL BE FULLY ENCIRCLE PIPE WITH A MINIMUM OF 50mm OVERLAP THAT IS IN CONTACT WITH ITSELF.



FOR TENDER

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REV. No	DESCRIPTION	DRAWN	DESIGNED	APPR.	DATE
C	FOR TENDER (85% DESIGN DOCUMENTATION)	MR	AL		12/10/2018
B	FOR 70% DOAR WORKSHOP	MR	AL		25/09/2018
A	FOR 50% DOAR WORKSHOP	PS	AL		10/05/2018

DESIGNED BY

A. LATORRE

DRAFTED BY

P. SPEAR

DESIGN CHECKED BY

S. DICKER

APPROVED BY

REFERENCES

PROJECT No.

LS305-04

FILE REFERENCE:

SHEET SIZE

A1

DATUM : AHD

GOA 94 ZONE 56



PROJECT:

GREENBANK PDA TO SPS151 WASTEWATER CONVEYANCE

DRAWING TITLE:

SPS157 WASTEWATER PUMP STATION

WET WELL GENERAL ARRANGEMENT

ELEVATION

DRAWING No.

LS305-04-S-DWG-CI-2411

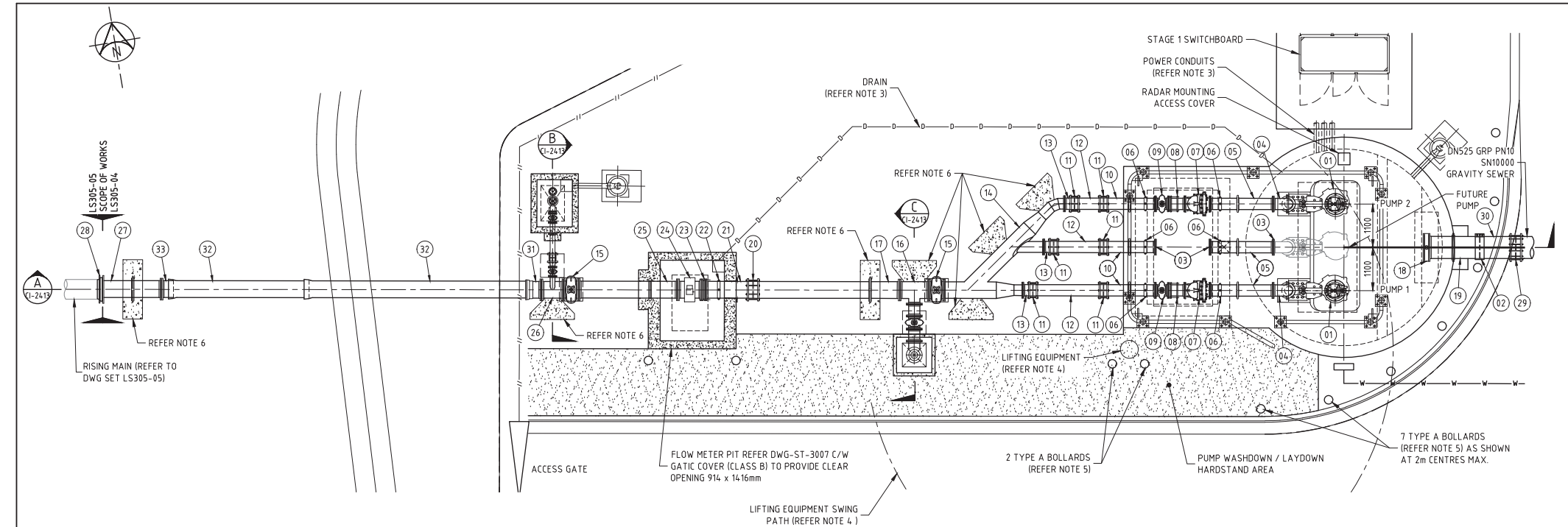
DESIGN COMPANY:

LoganWIA

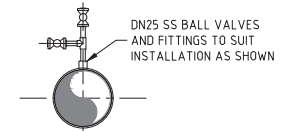
TECH SERVICES DRG No.

REV.

C



PLAN
SCALE 1:50



TYPICAL TAPPING BAND
(ITEMS 06 AND 28 ON CI-2412)
NTS

NOTES

- FOR GENERAL NOTES REFER TO DWGS PM001-01-S-DWG-ND-0020, ND-0021, ND-0022 AND ND-0023. FOR SITE SPECIFIC NOTES REFER TO DWG ND-0000.
- FOR SETOUT COORDINATES, REFER TO DWG CI-2402 AND CI-2403.
- FOR ALL SERVICES LAYOUT, REFER TO DWG CI-2414.
- LIFTING EQUIPMENT IS A COLUMN MOUNTED FULLY MOTORISED OUTDOOR TYPE JIB CRANE WITH 2000kg RATED LIFTING CAPACITY TO BE 4.2m IN HEIGHT FROM GL TO UNDERSIDE OF JIB HOOK WITH A SWING OF 6.7m, A SLEW LIMITED TO 215° (INTERLOCKED TO PREVENT TRAVEL WITHIN NO SWING ZONE AND LIFTING HEIGHT OF 10m. MEISTER OR APPROVED EQUIVALENT. PHYSICAL LOCKING MECHANISM REQUIRED TO PREVENT ROTATION WHEN NOT IN USE.
- BOLLARDS AT 2m CENTRES TO BE PROVIDED TO PREVENT VEHICLE LOADING TO ACCESS COVERS AND JIB COLUMN PROTECTION. BOLLARDS TO BE:
TYPE A - BOLLARDS TO BE SUPER HEAVY DUTY INGROUND FIXED.
• POSTS 219mm DIA. x 1100mm HEIGHT, ADDITIONAL 400mm LENGTH IN 600mm x 600mm x 600mm, N32 CONCRETE FOOTING.
• YELLOW METALLIC POWDER COATED WITH REFLECTIVE TAPE.
• POST CONCRETE FILLED ON SITE AND ROUNDED ON TOP.
- THRUST BLOCK AS PER SEQ CODE STD DRG WAT-1205-1 REV A AND 1206-1 REV B U.N.O.

0 500 1000 2000 3000mm
A1 - 1:50

FOR TENDER

PIPE AND FITTINGS SCHEDULE

ITEM	DESCRIPTION	SIZE	MATERIAL	QTY
01	PUMP FLYGT NP3231/665 3-480 (WITH 170kW MOTOR)	-	-	2
02	VARIGIB STEPPED COUPLING	OD560 MS x DN25 GRP	DI FBE/SS 316	1
03	BLANK FLANGE	DN250	DI FBE	3
04	BEND 90° FL-FL	DN250	DI FBE	2
05	PIPE, FL-FL, 1600mm LONG c/w THRUST FLANGE 900mm FROM ONE END	DN250	DI FBE	3
06	TAPPING BAND WITH 25mm SS BALL VALVE FOR AIR RELEASE/PRESSURE TRANSDUCER. REFER TO DETAIL	DN250xDN25 BSP	316 SS	6
07	CHECK VALVE, FL-FL VALMATIC SWING FLEX (MODEL 512AU) (700mm LONG)	DN250	DI FBE	2
08	DISMANTLING JOINT - THRUST TYPE	DN250	DI FBE	2
09	SLUICE VALVE PN16, FL-FL, RESILIENT SEATED (330mm LONG) c/w NON RISING SPINDLE EXTENSION	DN250	DI FBE	2
10	PIPE, FL-SP, 1306mm LONG c/w THRUST FLANGE 656mm FROM FLANGED END	DN250	DI FBE	3
11	JOINT, GIBALUT	DN250	DI FBE/SS 316	6
12	PIPE, SP-SP, 2500mm LONG (CUT TO SUIT)	DN250	DI FBE	3
13	CONNECTOR, FL-SP	DN250	DI FBE	3
14	DISCHARGE MANIFOLD PIPE SPECIAL FITTING (REFER DWG PI-5000)	DN375xDN250	MS FBE	1
15	SLUICE VALVE PN16, FL-FL, RESILIENT SEATED (381mm LONG) c/w NON RISING SPINDLE EXTENSION	DN375	DI FBE	2
16	TEE, FL-FLxFL	DN375 xDN250	DI FBE	1

17	PIPE, FL-SP, 3716mm LONG c/w THRUST FLANGE 750mm FROM FLANGED END	DN375	DI FBE	1
18	KNIFE GATE VALVE c/w NON RISING SPINDLE EXTENSION	DN500	SS	1
19	PIPE, FL-SP, 1290mm LONG c/w CENTRAL THRUST FLANGE.	OD560 x 8 THICK	MS FBE	1
20	JOINT, GIBALUT	DN375	DI FBE/SS 316	1
21	PIPE, FL-SP, 1300mm LONG	DN375	DI FBE	1
22	TAPPING BAND WITH 25mm SS BALL VALVE FOR AIR RELEASE/PRESSURE TRANSDUCER	DN375xDN25 BSP	316 SS	1
23	DISMANTLING JOINT, NON THRUST TYPE	DN375	DI FBE	1
24	FLOWMETER, FL-FL, IP68 COMPLETE WITH EARTHING RINGS (600mm LONG TBC)	DN375	-	1
25	PIPE, FL-FL, 2517mm LONG c/w THRUST FLANGE 705mm FROM FLANGED END	DN375	DI FBE	1
26	SCOUR TEE INVERTED, FL-FLxFL	DN375 xDN100	DI FBE	1
27	PIPE, FL-FL, (DN375 RAISED FACE - OVERSIZED DN500 FLAT FACE) 1500mm LONG c/w CENTRAL THRUST FLANGE	DN400 (OD406 x 6 THICK)	MS FBE	1
28	FULL FACE STUB FLANGE BUTT WELD (BW) c/w SS BACKING RING (DN500 PN16)	OD500	PE100	1
29	JOINT, GIBALUT	DN525	DI FBE/SS 316	1
30	PIPE, SP-SP, 900mm LONG	DN525	GRP PN10 SN10000	1
31	CONNECTOR, FL-SO	DN375	DI FBE	1
32	PIPE, SO-SP, 5000mm LONG (CUT TO SUIT ON SITE)	DN375	DICACL	2
33	CONNECTOR, FL-SP	DN375	DI FBE	1

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DESIGNED BY

A. LATORRE

DRAFTED BY

M. RODGER

DESIGN CHECKED BY

S. DICKER

APPROVED BY

REV. No.

DESCRIPTION

DRAWN

DESIGNED

APPR.

DATE

REFERENCES

PROJECT No.

LS305-04

FILE REFERENCE:

RPEQ

SHEET SIZE

A1

DATUM : AHD

GOA 94 ZONE 56



PROJECT:

DRAWING TITLE:

SPS157 WASTEWATER PUMP STATION

GENERAL ARRANGEMENT DETAILS

PLAN AND FITTINGS SCHEDULE, SHEET 1 OF 2

REVISIONS

REV. No.

DESCRIPTION

DRAWN

DESIGNED

APPR.

DATE

GREENBANK PDA TO SPS151 WASTEWATER CONVEYANCE

SPS157 WASTEWATER PUMP STATION

GENERAL ARRANGEMENT DETAILS

PLAN AND FITTINGS SCHEDULE, SHEET 1 OF 2

DRAWING No.

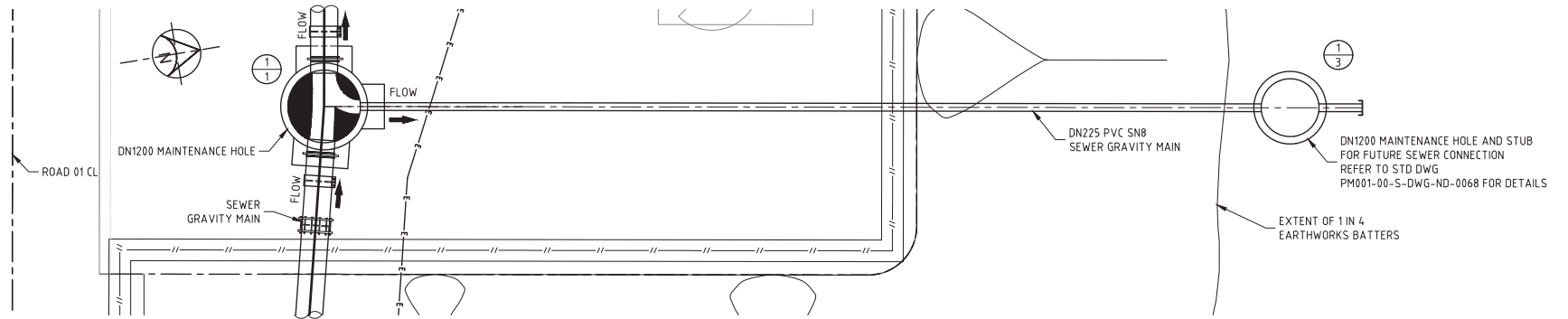
LS305-04-S-DWG-CI-2412

DESIGN COMPANY:

LoganWIA

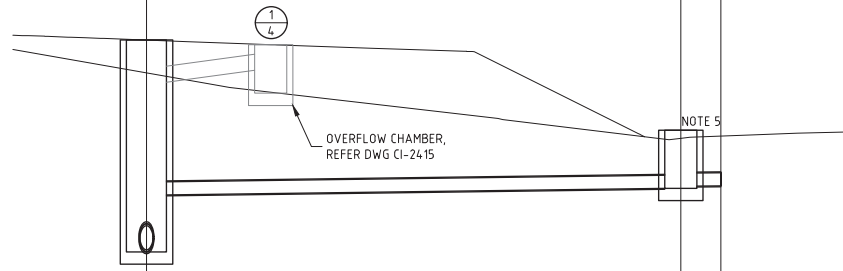
TECH SERVICES DRG No.

REV. C



PLAN
SCALE 1:50

MANHOLE No.	MANHOLE TYPE	LID CLASS	JUNCTION LINE	DROP TYPE
1/1	Ø1200 TYPE B #	D	OD560 PE / DN300 GRP	-
1/3	Ø1200 TYPE B #	-	-	-
1/4	-	-	-	-

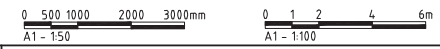


LOCATION	SPS157 PAD	DN225 PVC SN8	DN225 PVC SN8
PIPE SIZE & MATERIAL	DN225 PVC SN8	TRENCH 3A	TRENCH 3A
CONSTRUCTION TYPE (REFER NOTE 5)	1 in 150	1 in 150	1 in 150
GRADE	47.00	0.94	0.90
DATUM RL	51.29	52.35	52.52
DEPTH TO INVERT	3.97	2.90	0.25
INVERT LEVEL	55.25	53.45	52.77
SURFACE LEVEL	0.00	18.65	20.00
CHAINAGE	0.00	18.65	20.00

MH 1/3 TO MH 1/1 (LINE 3)						
DESIGN FLOW DETAILS						
PLANNING HORIZON	2036	2041	2051	2061	2071	ULTIMATE
EP	163	481	1117	1452	1788	2796
ADWF (L/s)	1	1	2	3	3	5
PDWF (L/s)	1	2	5	6	7	11
PWWF (L/s)	2	6	13	17	21	32

- NOTES**
- FOR GENERAL NOTES REFER TO DWGS PM001-01-S-DWG-ND-0020, ND-0021, ND-0022 AND ND-0023. FOR SITE SPECIFIC NOTES REFER TO DWG ND-0000.
 - FOR PUMP STATION SITE LAYOUT REFER TO DWG CI-24-01.
 - THIS DRAWING IS TO BE READ IN CONJUNCTION WITH PM001-01-S-DWG-ND-0050 AND ND-0051.
 - FOR TRENCH DETAILS REFER TO STD DWGS PM001-00-W-DWG-ND-0050 AND ND-0051.
 - MAINTENANCE HOLE 1/3 TOP OF SLAB TO SIT 300mm PROUD OF NATURAL SURFACE.

LONGITUDINAL SECTION
SCALE HOR 1:100, VERT 1:50



FOR TENDER

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REV. No.	DESCRIPTION	DRAWN	DESIGNED	APPR.	DATE
C	FOR TENDER (85% DESIGN DOCUMENTATION)	MR	AL		12/10/2018
B	FOR 10% DOAR WORKSHOP	MR	AL		25/09/2018
A	FOR 50% DOAR WORKSHOP	PS	AL		10/05/2018

DESIGNED BY
A. LATORRE

DRAFTED BY
P. SPEAR

DESIGN CHECKED BY
S. DICKER

APPROVED BY
F. JESPERSEN

FILE REFERENCE:
LS305-04

SHEET SIZE
A1

DATUM : AHD
GDA 94 ZONE 56.

PROJECT:
GREENBANK PDA TO SPS151 WASTEWATER CONVEYANCE

DRAWING TITLE:
SPS157 WASTEWATER PUMP STATION
GRAVITY MAIN INLET DETAILS
LINE 3

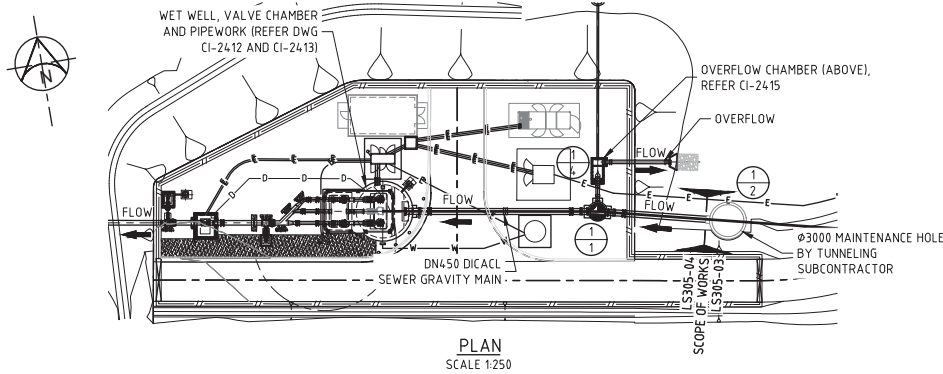
DRAWING No.
LS305-04-S-DWG-CI-2416

DESIGN COMPANY:
LoganWIA

TECH SERVICES DRG No.

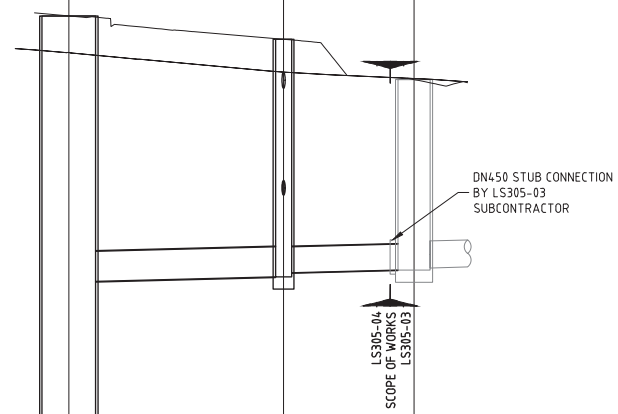
REV.
C

CAD FILE: L:\LS305 GREENBANK PDA TO SPS151\DWG\PM001-01-S-DWG-ND-0050.dwg DATE PLOTTED: 11 October 2018 - 11:20am



PLAN
SCALE 1:250

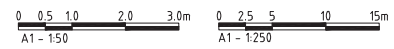
MANHOLE No.	SPS157 WET WELL	1 1	1 2
MANHOLE TYPE	Ø5300	Ø1500 TYPE B #	Ø3000 TYPE B #
LID CLASS	D	D	D
JUNCTION LINE	OD560 PE	OD560 PE, DN225 PVC, DN300GRP	OD560 PE
DROP TYPE	-	-	-



LOCATION				
PIPE SIZE & MATERIAL	DN525 GRP PN10 SN10000			
CONSTRUCTION TYPE (REFER NOTE 3)	TRENCH 3A			
GRADE	1 in 200			
DATUM RL	46.00			
DEPTH TO INVERT	7.28	4.96	4.44	4.37
INVERT LEVEL	48.02	50.73	50.81	50.89
SURFACE LEVEL	55.69		55.25	
CHAINAGE	0.00	16.84	20.09	9.96

LONGITUDINAL SECTION
SCALE HOR 1:250, VERT 1:50

- NOTES**
1. FOR GENERAL NOTES REFER TO DWGS PM001-01-S-DWG-ND-0020, ND-0021, ND-0022 AND ND-0023. FOR SITE SPECIFIC NOTES REFER TO DWG ND-0000.
 2. FOR PUMP STATION SITE LAYOUT REFER TO DWG CI-24-01.
 3. FOR TRENCH DETAILS REFER TO STD DWGS PM001-00-W-DWG-ND-0050 AND ND-0051.



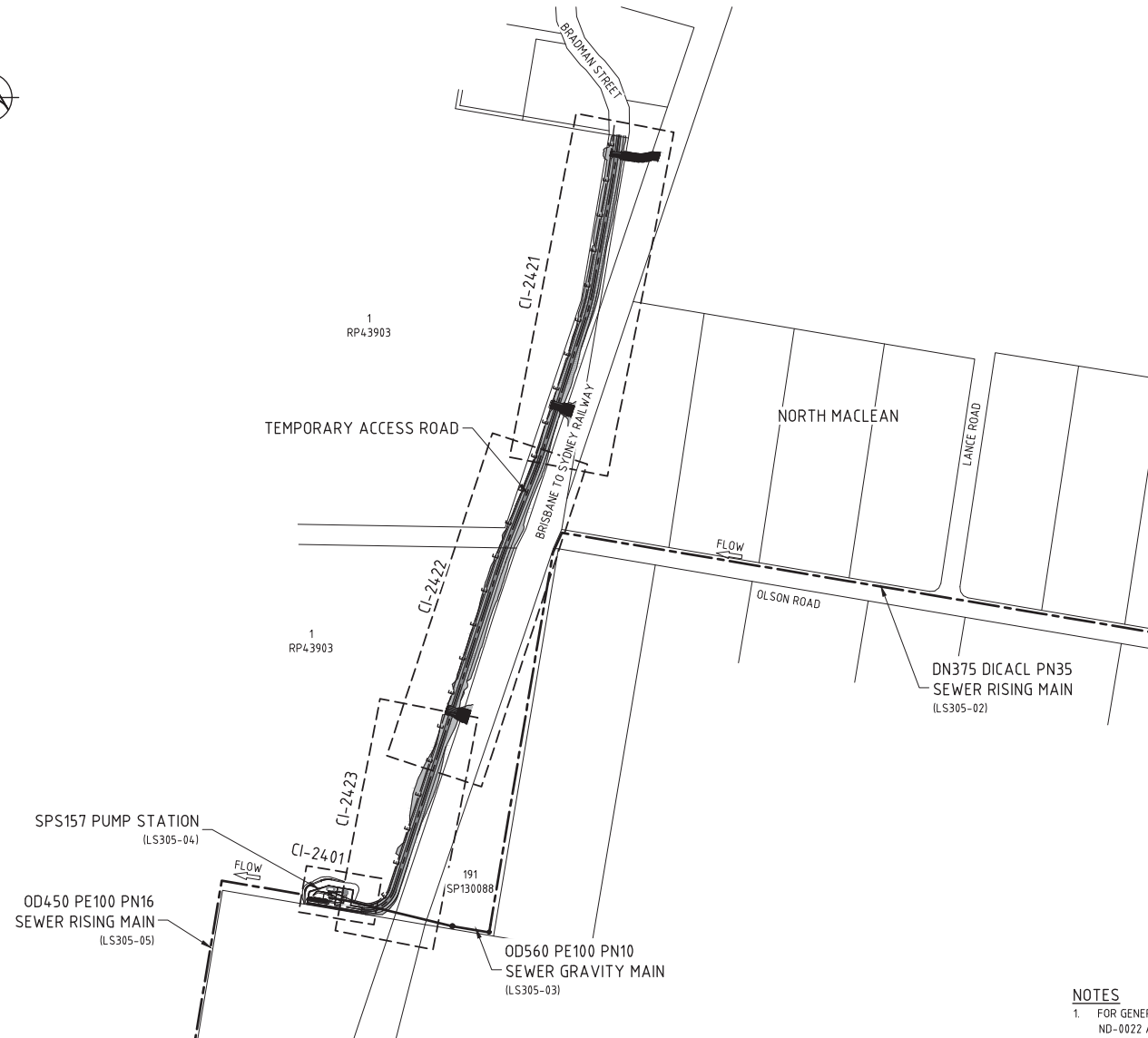
FOR TENDER

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REV. No.	DESCRIPTION	DRAWN	DESIGNED	APPR.
C	FOR TENDER (85% DESIGN DOCUMENTATION)	MR	AL	12/10/2018
B	FOR 10% DOAR WORKSHOP	MR	AL	25/09/2018
A	FOR 50% DOAR WORKSHOP	MR	AL	10/05/2018

DESIGNED BY	A. LATORRE
DRAFTED BY	DRAFTING CHECK BY
S. ZOLLNER	R. AMAYA
DESIGN CHECKED BY	RPEQ
S. DICKER	184.73
APPROVED BY	RPEQ
DATUM : AHD	GOA 94 ZONE 56.

REFERENCES
PROJECT No. LS305-04
FILE REFERENCE:
SHEET SIZE A1
DRAFTING CHECK BY R. AMAYA
DESIGN CHECKED BY RPEQ
S. DICKER 184.73
APPROVED BY RPEQ
DRAFTED BY S. ZOLLNER
DESIGNED BY A. LATORRE

PROJECT: GREENBANK PDA TO SPS151 WASTEWATER CONVEYANCE	
DRAWING TITLE: SPS157 WASTEWATER PUMP STATION GRAVITY MAIN INLET DETAILS LINE 1	DRAWING No. LS305-04-S-DWG-CI-2417
DESIGN COMPANY: LoganWIA	REV. C
TECH SERVICES DRG No.	



KEY PLAN
SCALE 1:2500

NOTES

1. FOR GENERAL NOTES REFER TO DWGS PM001-01-S-DWG-ND-0020, ND-0021, ND-0022 AND ND-0023. FOR SITE SPECIFIC NOTES REFER TO DWG ND-0000.

0 25 50 100 150m
A1 - 1:2500

FOR TENDER

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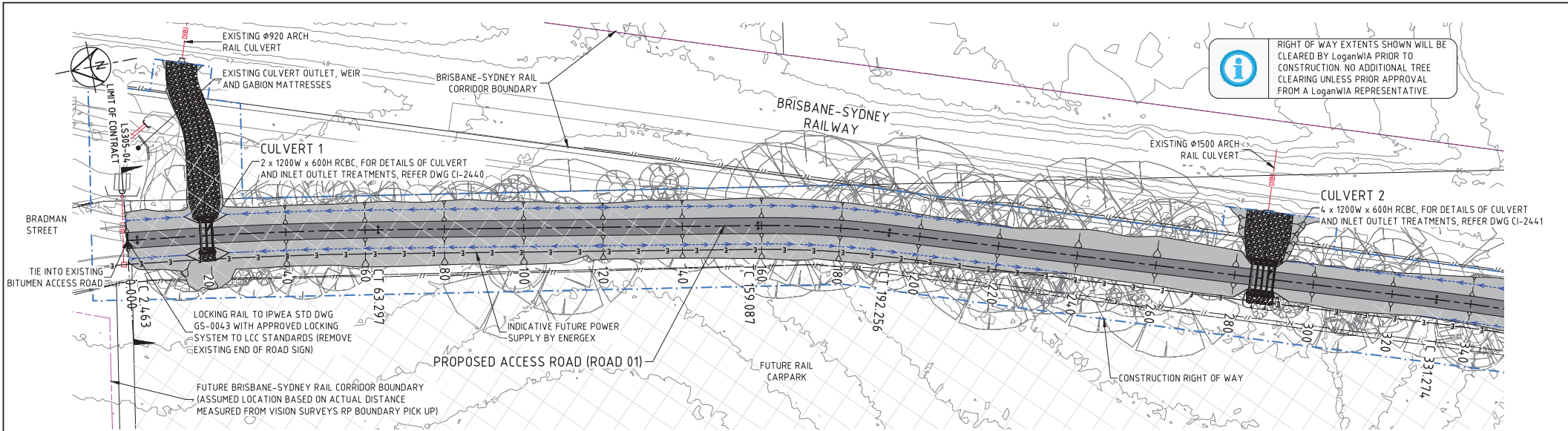
REV. No	DESCRIPTION	DRAWN	DESIGNED	APPR.	DATE
B	FOR TENDER 18% DESIGN DOCUMENTATION	MR	AL		12/10/2018
A	FOR 70% DOAR WORKSHOP	MR	AL		25/09/2018

DESIGNED BY	RPEQ
A. LATORRE	
DRAFTED BY	DRAFTING CHECK BY
M. RODGER	F. JESPERSEN
DESIGN CHECKED BY	RPEQ
S. DICKER	184.73
APPROVED BY	RPEQ

REFERENCES
PROJECT No.
LS305-04
FILE REFERENCE:
SHEET SIZE
A1
DATUM : AHD
GOA 94 ZONE 56



PROJECT:	GREENBANK PDA TO SPS151 WASTEWATER CONVEYANCE		
DRAWING TITLE:	SPS157 WASTEWATER PUMP STATION ACCESS ROAD KEY PLAN		
DRAWING No.	LS305-04-S-DWG-CI-2420		
DESIGN COMPANY:	LoganWIA	REV.	B
TECH SERVICES DRG No.			



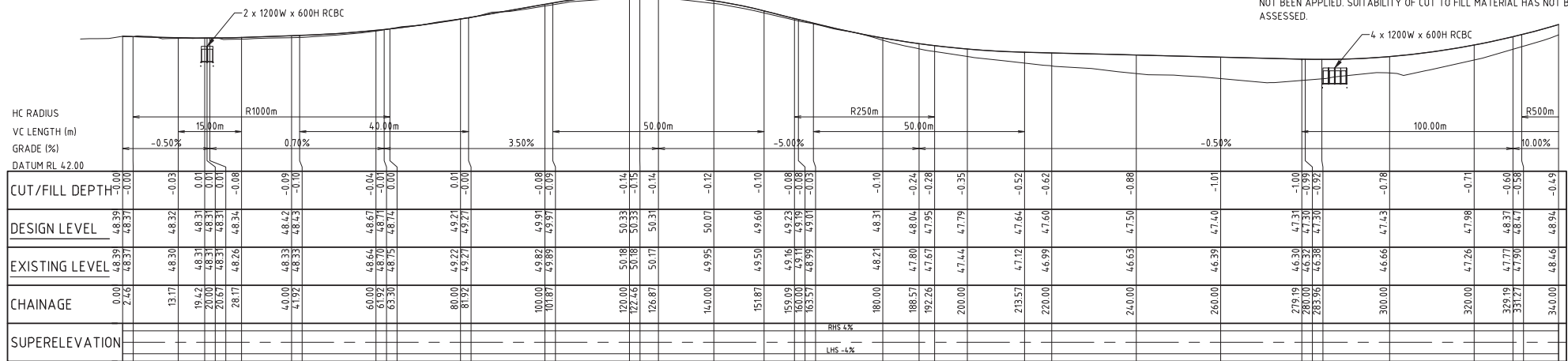
RIGHT OF WAY EXTENTS SHOWN WILL BE CLEARED BY LoganWIA PRIOR TO CONSTRUCTION. NO ADDITIONAL TREE CLEARING UNLESS PRIOR APPROVAL FROM A LoganWIA REPRESENTATIVE.

APPROXIMATE ACCESS ROAD EARTHWORKS QUANTITIES	
CUT TO FILL:	1788m ³
SPOIL:	322m ³
PAVEMENT TOTAL (400mm):	1917m ³
(REFER NOTE 6)	
ADDITIONAL 465m ³ APPROX. OF CUT REQUIRED FOR INLET AND OUTLET CHANNELS (CUT VOLUME IS TO THE CHANNELS FINISHED SURFACE i.e. TOP OF ROCK, AND DOES NOT INCLUDING STRIPPING).	

PLAN
SCALE 1:500

NOTES

- FOR GENERAL NOTES REFER TO DWGS PM001-01-S-DWG-ND-0020, ND-0021, ND-0022 AND ND-0023. FOR SITE SPECIFIC NOTES REFER TO DWG ND-0000.
- PAVEMENT TYPE B FOR TYPICAL ACCESS ROAD.
- PAVEMENT TYPE A FOR ROAD SECTIONS WITH ~6% LONGITUDINAL GRADE.
- REFER TO PM001-01-S-DWG-CI-2030 FOR PAVEMENT TYPE DETAILS.
- LOCALLY FILL AND SHAPE ANY LOW POINTS ALONG ALIGNMENT / FILL BATTERS TO MAKE FREE DRAINING TOWARD CULVERTS AT MINIMUM 0.5%.
- ROAD LIMIT OF WORKS IS TAKEN TO CH856 / SPS157 GATE. CUT AND FILL VOLUMES ARE TAKEN FROM NATURAL SURFACE LEVEL TO SUBGRADE LEVEL WITH 150mm STRIPPING ASSUMED. BULKING AND SHRINKAGE FACTORS HAVE NOT BEEN APPLIED. SUITABILITY OF CUT TO FILL MATERIAL HAS NOT BEEN ASSESSED.



ROAD LONGITUDINAL SECTION

HOR. 1:500
VER. 1:100

0 5 10 20 30m
A1 - 1:500

0 1 2 4 6m
A1 - 1:100

FOR TENDER

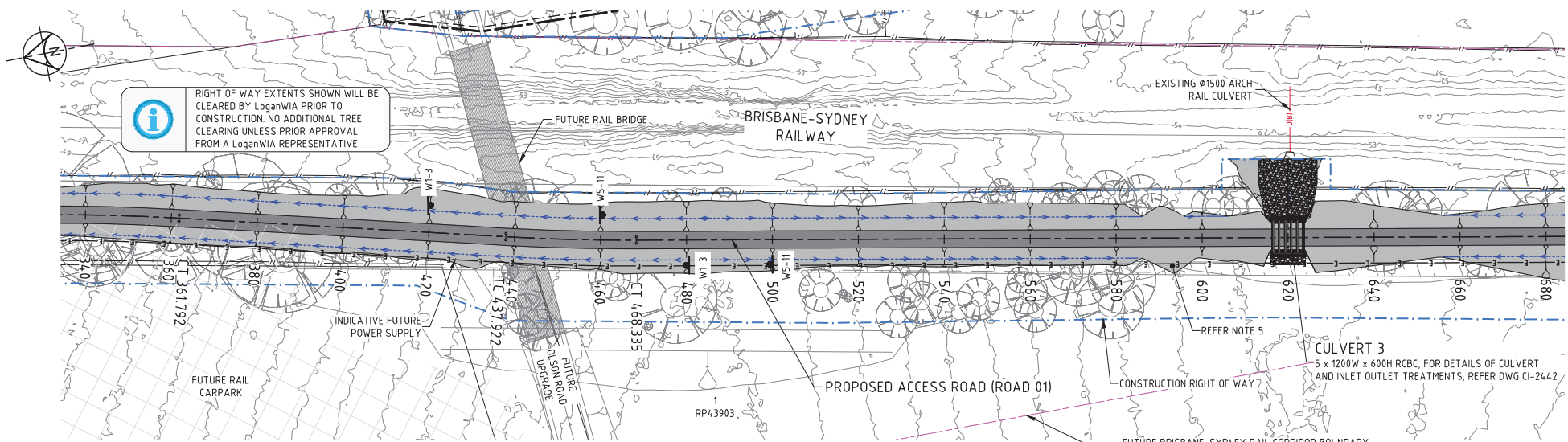
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REV. No.	DESCRIPTION	DRAWN	DESIGNED	APPR.	DATE
B	FOR TENDER (85% DESIGN DOCUMENTATION)	MR	AL		12/10/2018
A	FOR 70% DOAR WORKSHOP	MR	AL		25/09/2018

DESIGNED BY A. LATORRE	RPEQ	REFERENCES PROJECT No. LS305-04
DRAFTED BY M. RODGER	DRAFTING CHECK BY F. JESPERSEN	FILE REFERENCE: RPEQ
DESIGN CHECKED BY S. DICKER	184/73	SHEET SIZE A1
APPROVED BY	RPEQ	DATUM : AHD GOA 94 ZONE 56

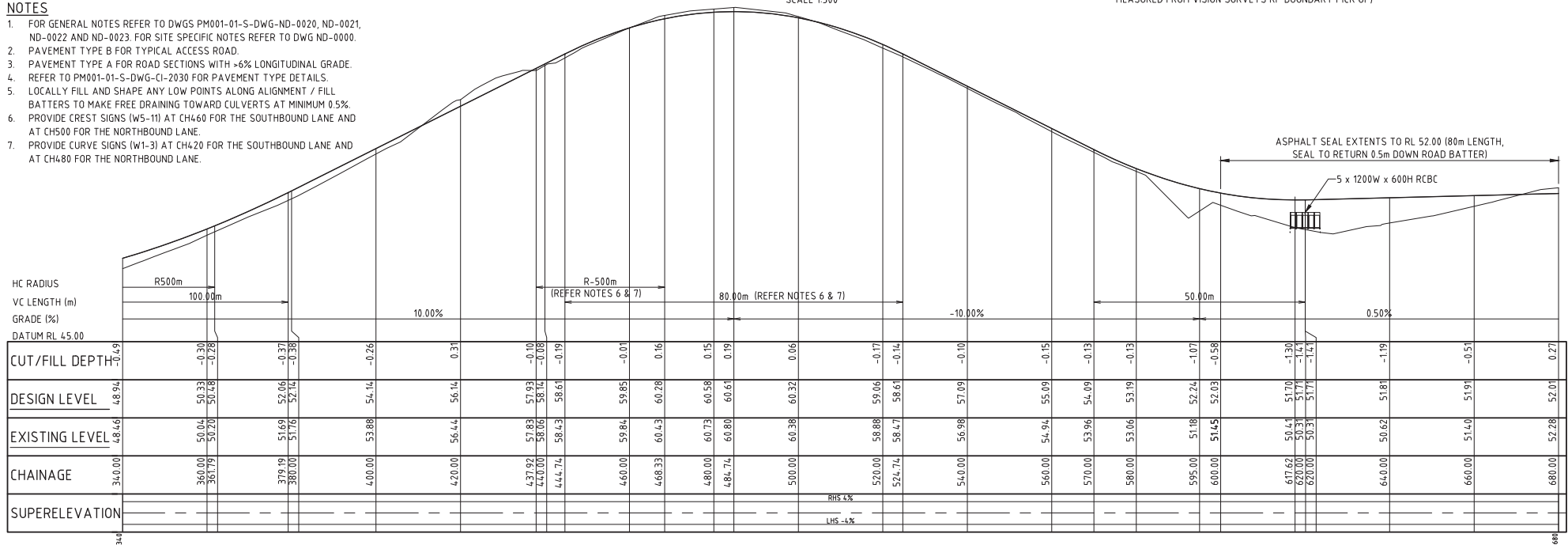


PROJECT: GREENBANK PDA TO SPS151 WASTEWATER CONVEYANCE	DRAWING TITLE: SPS157 WASTEWATER PUMP STATION ACCESS ROAD PLAN & LONGITUDINAL SECTION ROAD 01, SHEET 1	DRAWING No. LS305-04-S-DWG-CI-2421
DESIGN COMPANY: LoganWIA	TECH SERVICES DRG No.	REV. B



NOTES

- FOR GENERAL NOTES REFER TO DWGS PM001-01-S-DWG-ND-0020, ND-0021, ND-0022 AND ND-0023. FOR SITE SPECIFIC NOTES REFER TO DWG ND-0000.
- PAVEMENT TYPE B FOR TYPICAL ACCESS ROAD.
- PAVEMENT TYPE A FOR ROAD SECTIONS WITH -6% LONGITUDINAL GRADE.
- REFER TO PM001-01-S-DWG-CI-2030 FOR PAVEMENT TYPE DETAILS.
- LOCALLY FILL AND SHAPE ANY LOW POINTS ALONG ALIGNMENT / FILL BATTERS TO MAKE FREE DRAINING TOWARD CULVERTS AT MINIMUM 0.5%.
- PROVIDE CREST SIGNS (W5-11) AT CH460 FOR THE SOUTHBOUND LANE AND AT CH500 FOR THE NORTHBOUND LANE.
- PROVIDE CURVE SIGNS (W1-3) AT CH420 FOR THE SOUTHBOUND LANE AND AT CH480 FOR THE NORTHBOUND LANE.



ROAD LONGITUDINAL SECTION

HOR: 1:500
VER: 1:100

0 5 10 20 30m
A1 - 1:500

0 1 2 4 6m
A1 - 1:100

FOR TENDER

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DESIGNED BY
A. LATORRE
DRAFTED BY
M. RODGER
DESIGN CHECKED BY
S. DICKER
APPROVED BY

RPEQ
F. JESPERSEN
RPEQ
RPEQ

REFERENCES
PROJECT No.
LS305-04
FILE REFERENCE:
SHEET SIZE
A1
DATUM: AHD
GDA 94 ZONE 56



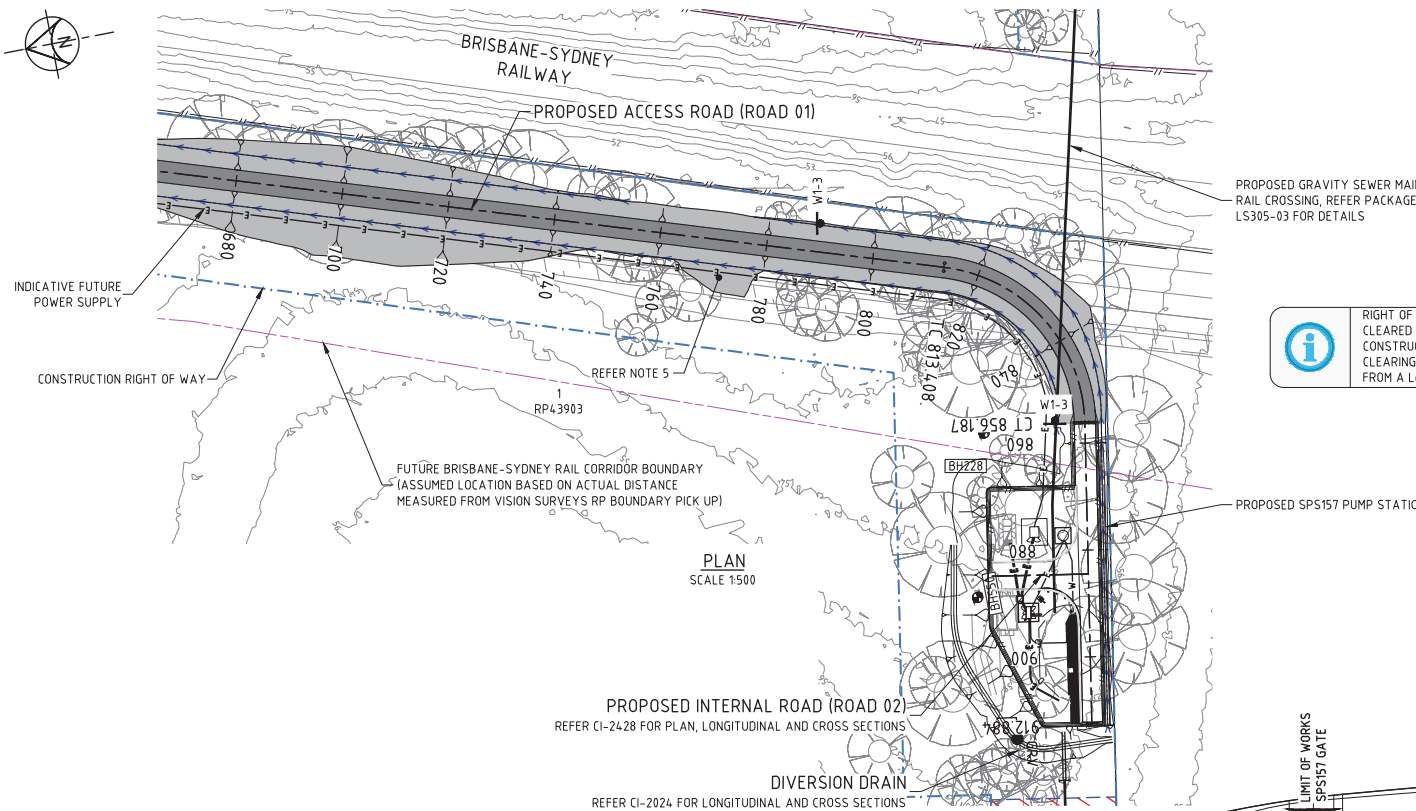
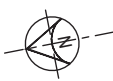
PROJECT: GREENBANK PDA TO SPS151 WASTEWATER CONVEYANCE

DRAWING TITLE:
SPS157 WASTEWATER PUMP STATION
ACCESS ROAD PLAN & LONGITUDINAL SECTION
ROAD 01, SHEET 2

DRAWING No.
LS305-04-S-DWG-CI-2422
DESIGN COMPANY:
LoganWIA
TECH SERVICES DRG No.

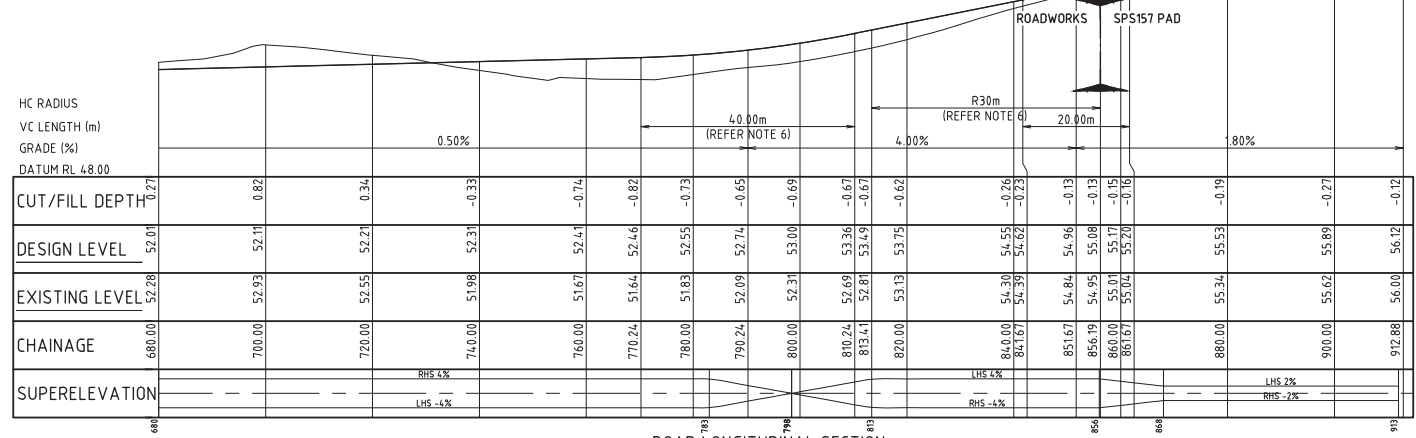
REV.
B

REV. No.	DESCRIPTION	DRAWN	DESIGNED	APPR.	DATE
B	FOR TENDER 18% DESIGN DOCUMENTATION	MR	AL		12/10/2018
A	FOR 70% DOAR WORKSHOP	MR	AL		25/09/2018



RIGHT OF WAY EXTENTS SHOWN WILL BE CLEARED BY LoganWIA PRIOR TO CONSTRUCTION. NO ADDITIONAL TREE CLEARING UNLESS PRIOR APPROVAL FROM A LoganWIA REPRESENTATIVE.

- NOTES**
- FOR GENERAL NOTES REFER TO DWGS PM001-01-S-DWG-ND-0020, ND-0021, ND-0022 AND ND-0023. FOR SITE SPECIFIC NOTES REFER TO DWG ND-0000.
 - PAVEMENT TYPE B FOR TYPICAL ACCESS ROAD.
 - PAVEMENT TYPE A FOR ROAD SECTIONS WITH +6% LONGITUDINAL GRADE.
 - REFER TO PM001-01-S-DWG-CI-2030 FOR PAVEMENT TYPE DETAILS.
 - LOCALLY FILL AND SHAPE ANY LOW POINTS ALONG ALIGNMENT / FILL BATTERS TO MAKE FREE DRAINING TOWARD CULVERTS AT MINIMUM 0.5%.
 - PROVIDE CURVE SIGNS (W1-3) AT CH790 FOR THE SOUTHBOUND LANE AND AT CH856 FOR THE NORTHBOUND LANE.



HC RADIUS
VC LENGTH (m)
GRADE (%)
DATUM RL 48.00

CUT/FILL DEPTH	0.27	0.82	0.34	-0.33	-0.74	-0.82	-0.73	-0.65	-0.69	-0.67	-0.67	-0.62	-0.26	-0.23	-0.13	-0.13	-0.19	-0.27	-0.12
DESIGN LEVEL	52.01	52.11	52.21	52.31	52.41	52.46	52.55	52.74	53.00	53.36	53.49	53.75	54.55	54.62	54.96	55.08	55.53	55.89	56.12
EXISTING LEVEL	52.28	52.93	52.55	51.98	51.67	51.64	51.83	52.09	52.31	52.69	52.81	53.13	54.30	54.39	54.84	54.95	55.34	55.62	56.00
CHAINAGE	680.00	700.00	720.00	740.00	760.00	770.24	780.00	790.24	800.00	810.24	813.41	820.00	840.00	841.67	851.67	856.19	880.00	900.00	912.88
SUPERELEVATION				RHS 4%	LHS -4%								LHS 4%	RHS -4%			LHS 2%	RHS -2%	

ROAD LONGITUDINAL SECTION
HOR. 1:500
VER. 1:100



FOR TENDER

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B	FOR TENDER 18% DESIGN DOCUMENTATION	MR	AL	12/10/2018	
A	FOR 70% DOAR WORKSHOP	MR	AL	25/09/2018	
REV. No	DESCRIPTION	DRAWN	DESIGNED	APPR.	DATE

DESIGNED BY: RPEQ
A. LATORRE
DRAFTED BY: M. RODGER
DESIGN CHECKED BY: F. JESPERSEN
S. DICKER
APPROVED BY: RPEQ

DRAFTING CHECK BY: F. JESPERSEN
RPEQ
184.73

REFERENCES
PROJECT No: LS305-04
FILE REFERENCE:
SHEET SIZE: A1
DATUM: AHD
GOA 94 ZONE 56

LOGAN WATER INFRASTRUCTURE ALLIANCE

Proudly
LOGAN CITY COUNCIL

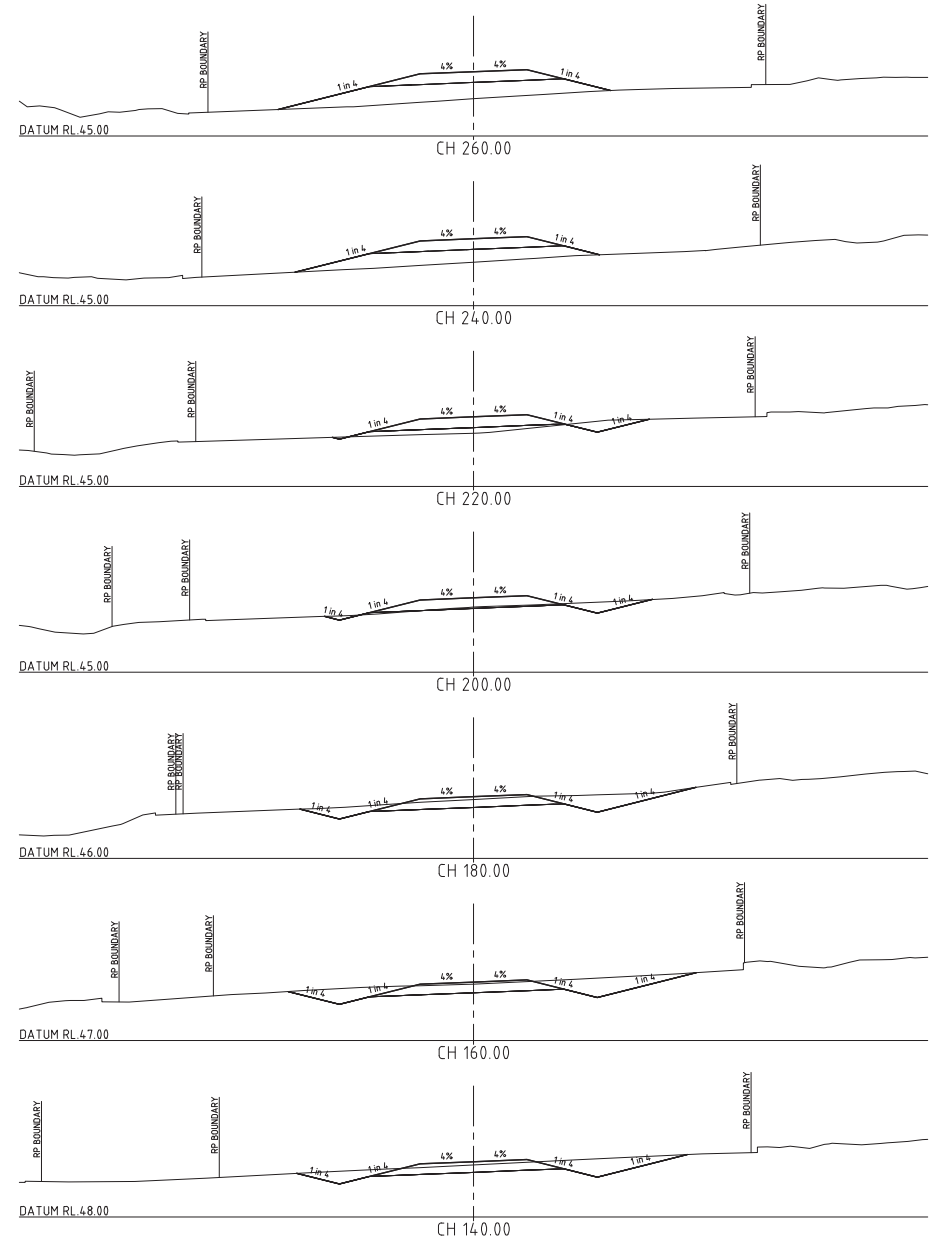
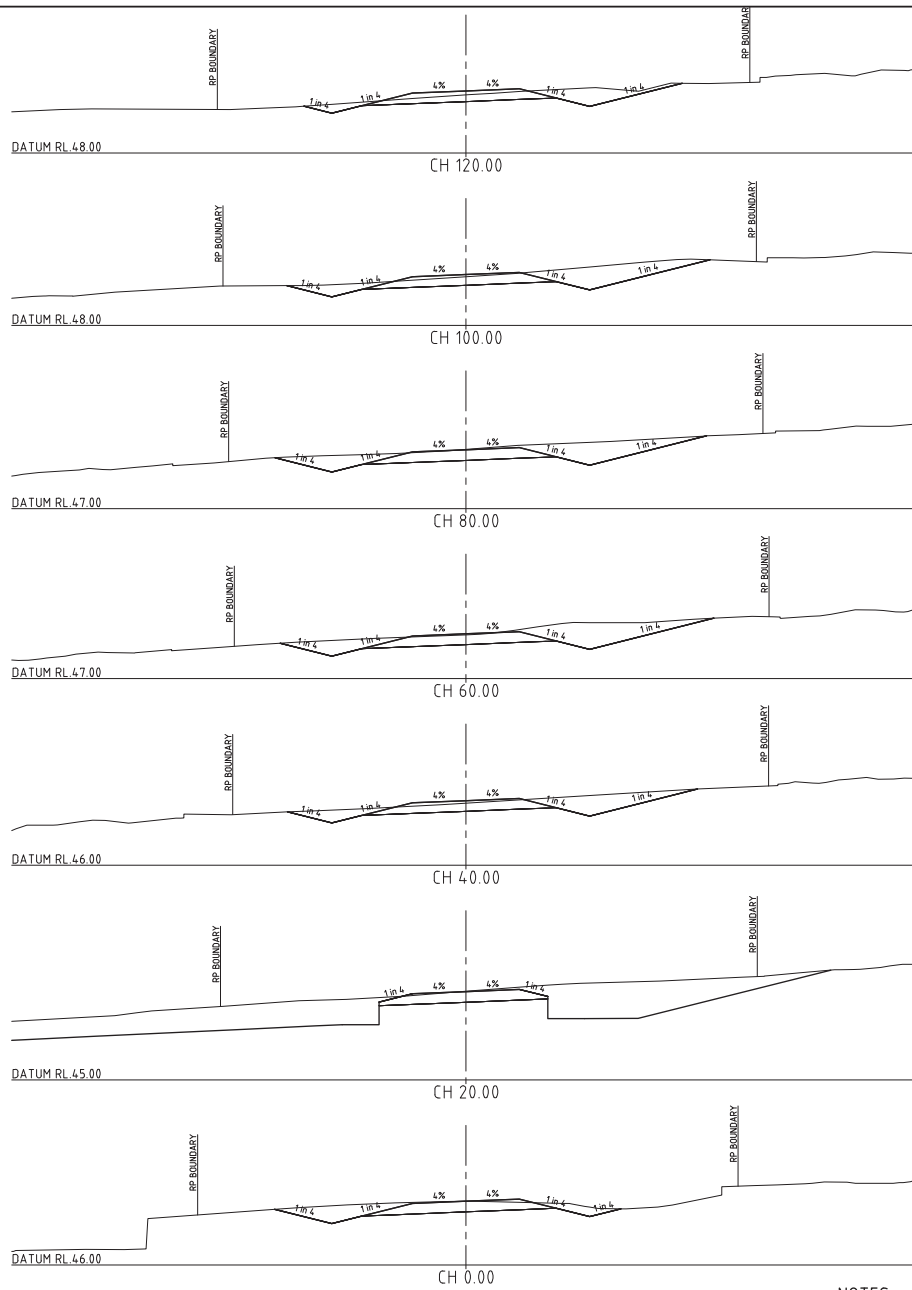
PROJECT: GREENBANK PDA TO SPS151 WASTEWATER CONVEYANCE
DRAWING TITLE: SPS157 WASTEWATER PUMP STATION
ACCESS ROAD PLAN & LONGITUDINAL SECTION
ROAD 01, SHEET 3

DRAWING No: LS305-04-S-DWG-CI-2423
DESIGN COMPANY: LoganWIA
TECH SERVICES DRG No:

REV. B

CAD FILE: I:\LEADS GREENBANK PDA TO SPS151 WASTE WATER CONVEYANCE\LS305-04-S-DWG-CI-2424.dwg

DATE PLOTTED: 15 October 2018 - 15:28pm



NOTES

1. FOR GENERAL NOTES REFER TO DWGS PM001-01-S-DWG-ND-0020, ND-0021, ND-0022 AND ND-0023. FOR SITE SPECIFIC NOTES REFER TO DWG ND-0000.

0 1 2 4 6m
A1 - 1:100

FOR TENDER

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REV. No	DESCRIPTION	DRAWN	DESIGNED	APPR.	DATE
B	FOR TENDER 185% DESIGN DOCUMENTATION	MR	AL		12/10/2018
A	FOR 70% DOAR WORKSHOP	MR	AL		25/09/2018

DESIGNED BY
A. LATORRE
DRAFTED BY
M. RODGER
DESIGN CHECKED BY
S. DICKER
APPROVED BY

RPEQ
F. JESPERSEN
RPEQ
18473
RPEQ

REFERENCES
PROJECT No.
LS305-04
FILE REFERENCE:
SHEET SIZE
A1
DATUM : AHD
GOA 94 ZONE 56



PROJECT:

DRAWING TITLE:

GREENBANK PDA TO SPS151 WASTEWATER CONVEYANCE

SPS157 WASTEWATER PUMP STATION

ACCESS ROAD CROSS SECTIONS

ROAD 01, SHEET 1

DRAWING No.

DESIGN COMPANY:

LoganWIA

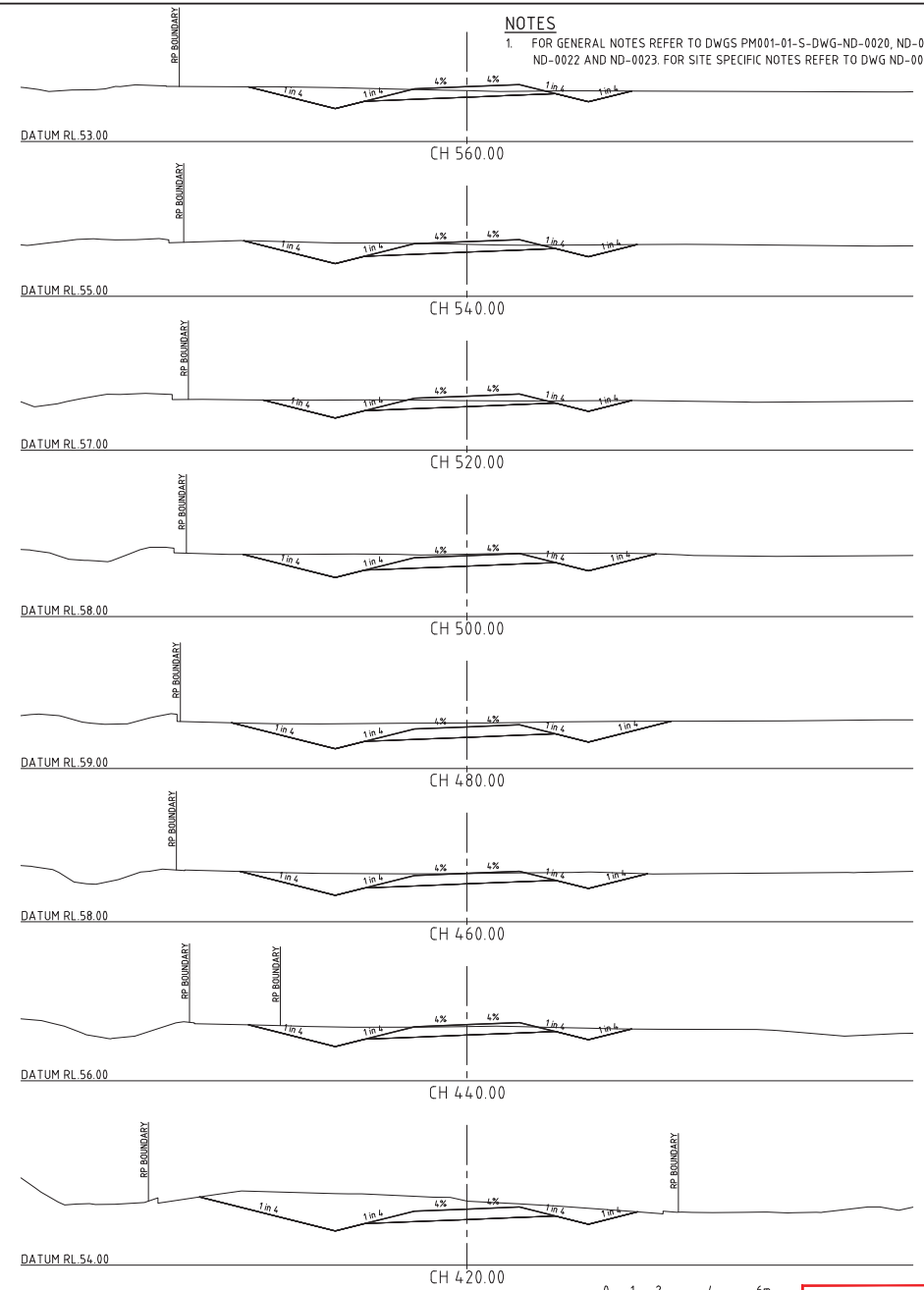
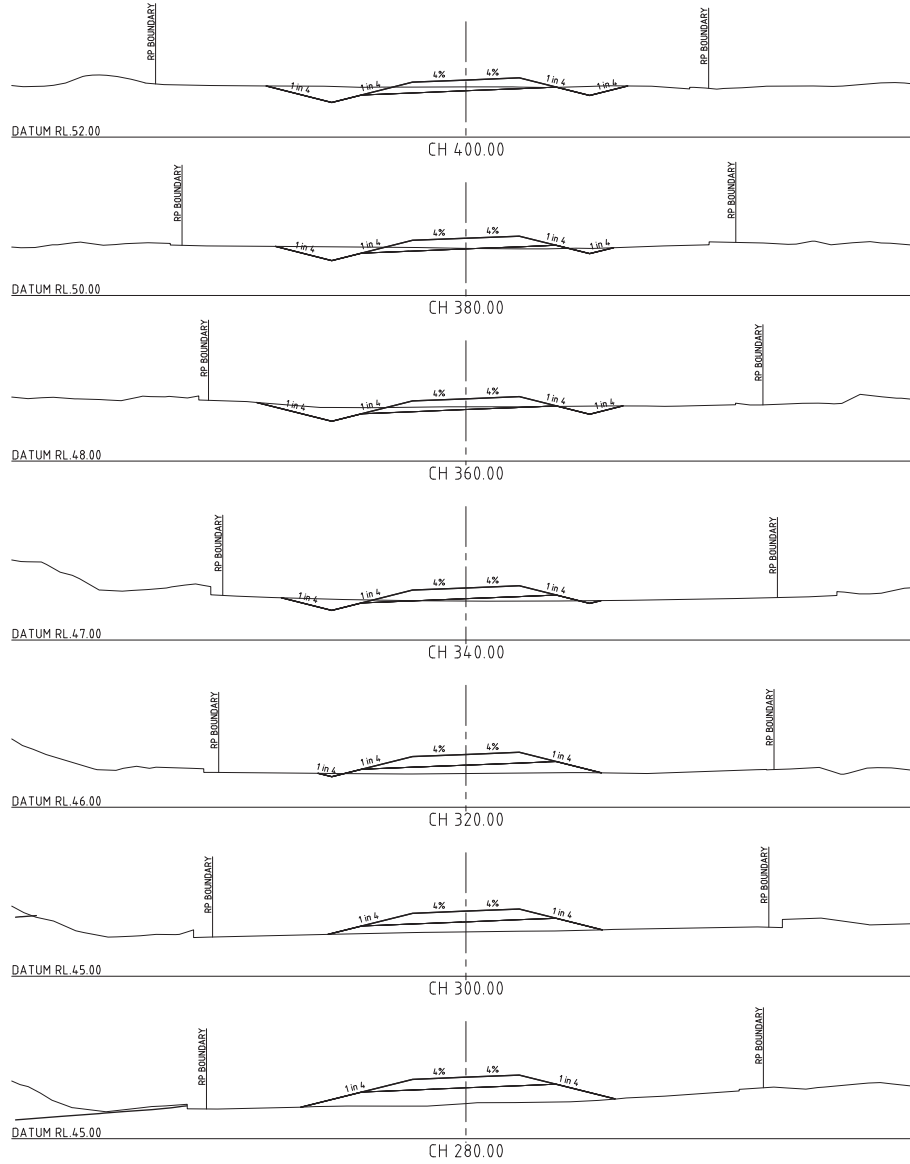
TECH SERVICES DRG No.

REV.

B

CAD FILE: L:\LS305 GREENBANK PDA TO SPS151 WWS\DWG\LS305-04-S-DWG-CI-2425.dwg

DATE PLOTTED: 15 October 2018 10:29am



NOTES

1. FOR GENERAL NOTES REFER TO DWGS PM001-01-S-DWG-ND-0020, ND-0021, ND-0022 AND ND-0023. FOR SITE SPECIFIC NOTES REFER TO DWG ND-0000.

0 1 2 4 6m
A1 - 1:100

FOR TENDER

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REV. No	DESCRIPTION	DRAWN	DESIGNED	APPR.	DATE
B	FOR TENDER 18% DESIGN DOCUMENTATION	MR	AL		12/10/2018
A	FOR 70% DOAR WORKSHOP	MR	AL		25/09/2018

DESIGNED BY
A. LATORRE
DRAFTED BY
M. RODGER
DESIGN CHECKED BY
S. DICKER
APPROVED BY

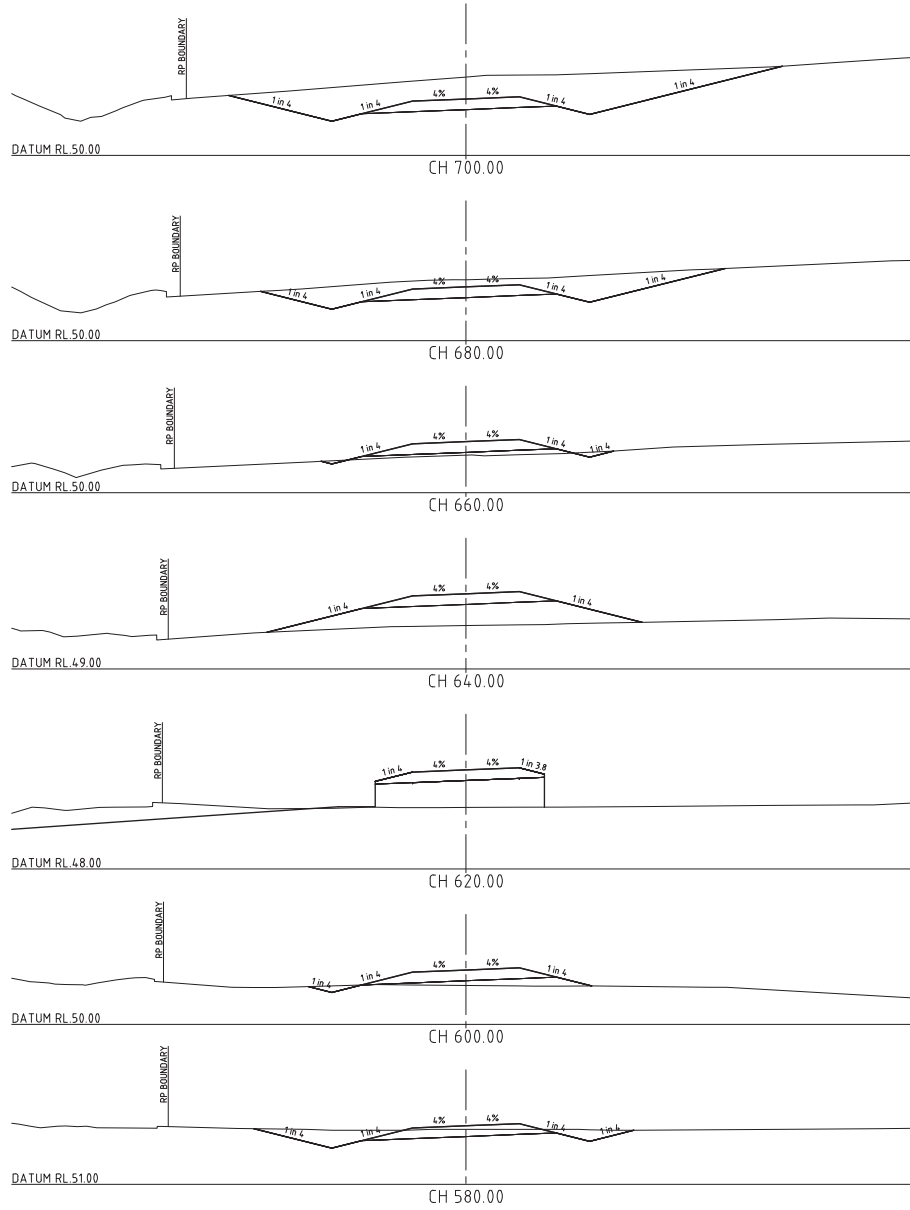
RPEQ
RPEQ
RPEQ
RPEQ

REFERENCES
PROJECT No.
LS305-04
FILE REFERENCE:
SHEET SIZE
A1
DATUM : AHD
GOA 94 ZONE 56



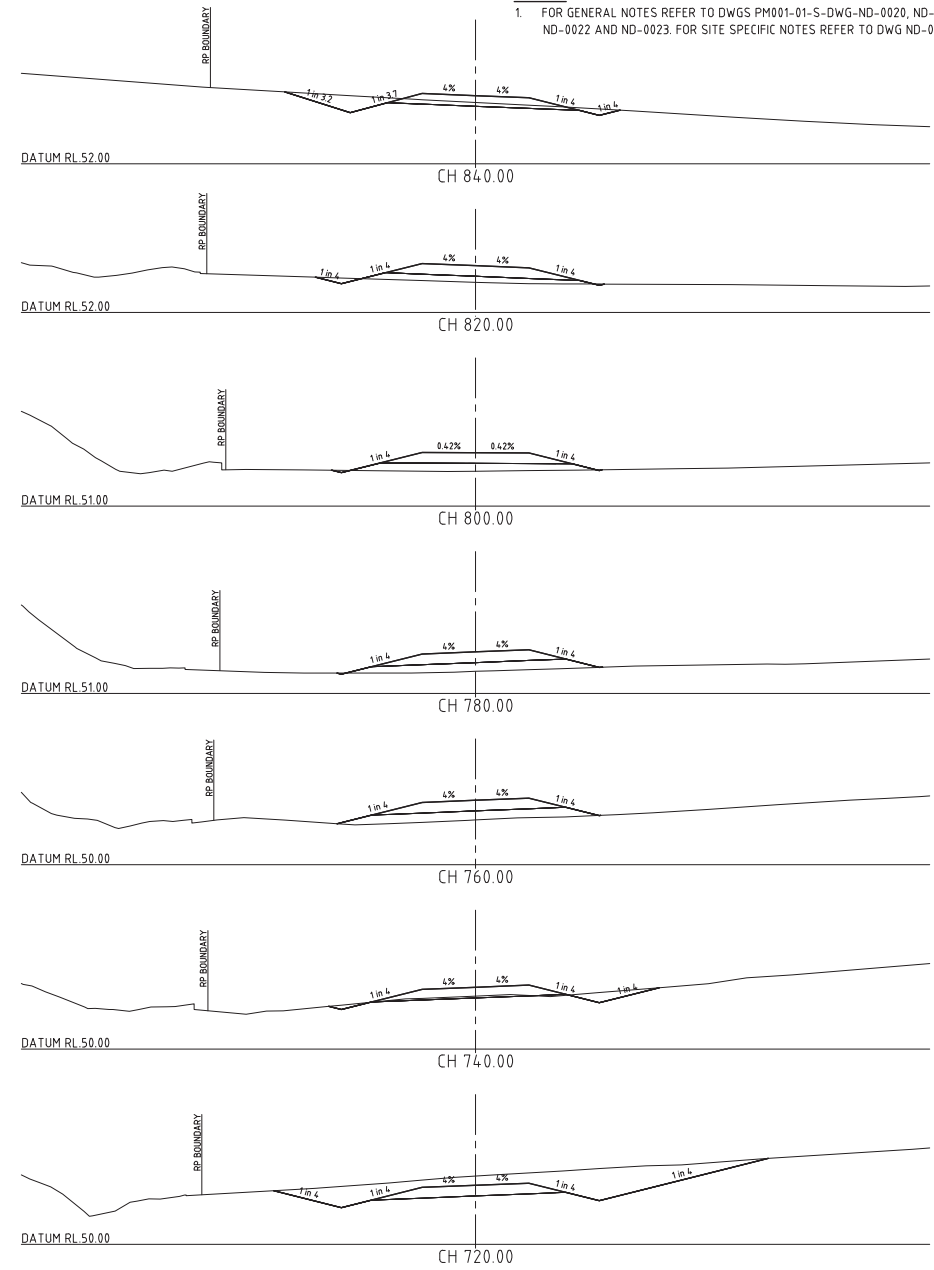
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DRAWING TITLE: SPS157 WASTEWATER PUMP STATION ACCESS ROAD CROSS SECTIONS ROAD 01, SHEET 2		DESIGN COMPANY: LoganWIA	REV. B
		TECH SERVICES DRG No.	

DATE PLOTTED: 15 October 2018 - 15:30pm
CADD FILE: I:\LS305 GREENBANK PDA TO SPS151 WASTE WATER CONVEYANCE\LS305-04-S-DWG-CI-2426.dwg



NOTES

1. FOR GENERAL NOTES REFER TO DWGS PM001-01-S-DWG-ND-0020, ND-0021, ND-0022 AND ND-0023. FOR SITE SPECIFIC NOTES REFER TO DWG ND-0000.



0 1 2 4 6m
A1 - 1:100

FOR TENDER

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REV. No	DESCRIPTION	DRAWN	DESIGNED	APPR.	DATE
B	FOR TENDER 18% DESIGN DOCUMENTATION	MR	AL		12/10/2018
A	FOR 70% DOAR WORKSHOP	MR	AL		25/09/2018

DESIGNED BY
A. LATORRE
DRAFTED BY
M. RODGER
DESIGN CHECKED BY
S. DICKER
APPROVED BY

RPEQ
F. JESPERSEN
RPEQ
RPEQ

REFERENCES
PROJECT No.
LS305-04
FILE REFERENCE:
SHEET SIZE
A1
DATUM: AHD
GOA 94 ZONE 56



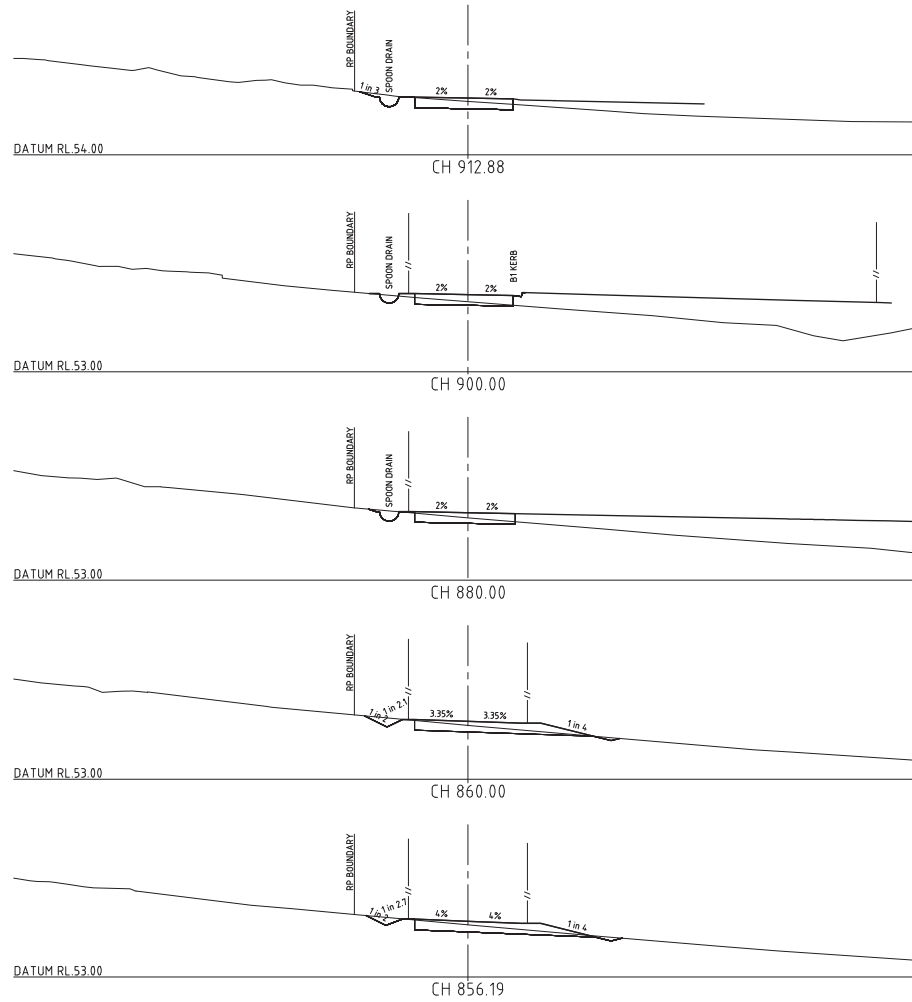
PROJECT: GREENBANK PDA TO SPS151 WASTEWATER CONVEYANCE

DRAWING TITLE:
SPS157 WASTEWATER PUMP STATION
ACCESS ROAD CROSS SECTIONS
ROAD 01, SHEET 3

DRAWING No.
LS305-04-S-DWG-CI-2426
DESIGN COMPANY:
LoganWIA
TECH SERVICES DRG No.
REV. B

NOTES

- FOR GENERAL NOTES REFER TO DWGS PM001-01-S-DWG-ND-0020, ND-0021, ND-0022 AND ND-0023. FOR SITE SPECIFIC NOTES REFER TO DWG ND-0000.



0 1 2 4 6m
A1 - 1:100

FOR TENDER

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REV. No	DESCRIPTION	DRAWN	DESIGNED	APPR.	DATE
B	FOR TENDER 185% DESIGN DOCUMENTATION	MR	AL		12/10/2018
A	FOR 70% DOAR WORKSHOP	MR	AL		25/09/2018

DESIGNED BY	RPEQ
A. LATORRE	
DRAFTED BY	DRAFTING CHECK BY
M. RODGER	F. JESPERSEN
DESIGN CHECKED BY	RPEQ
S. DICKER	184.73
APPROVED BY	RPEQ

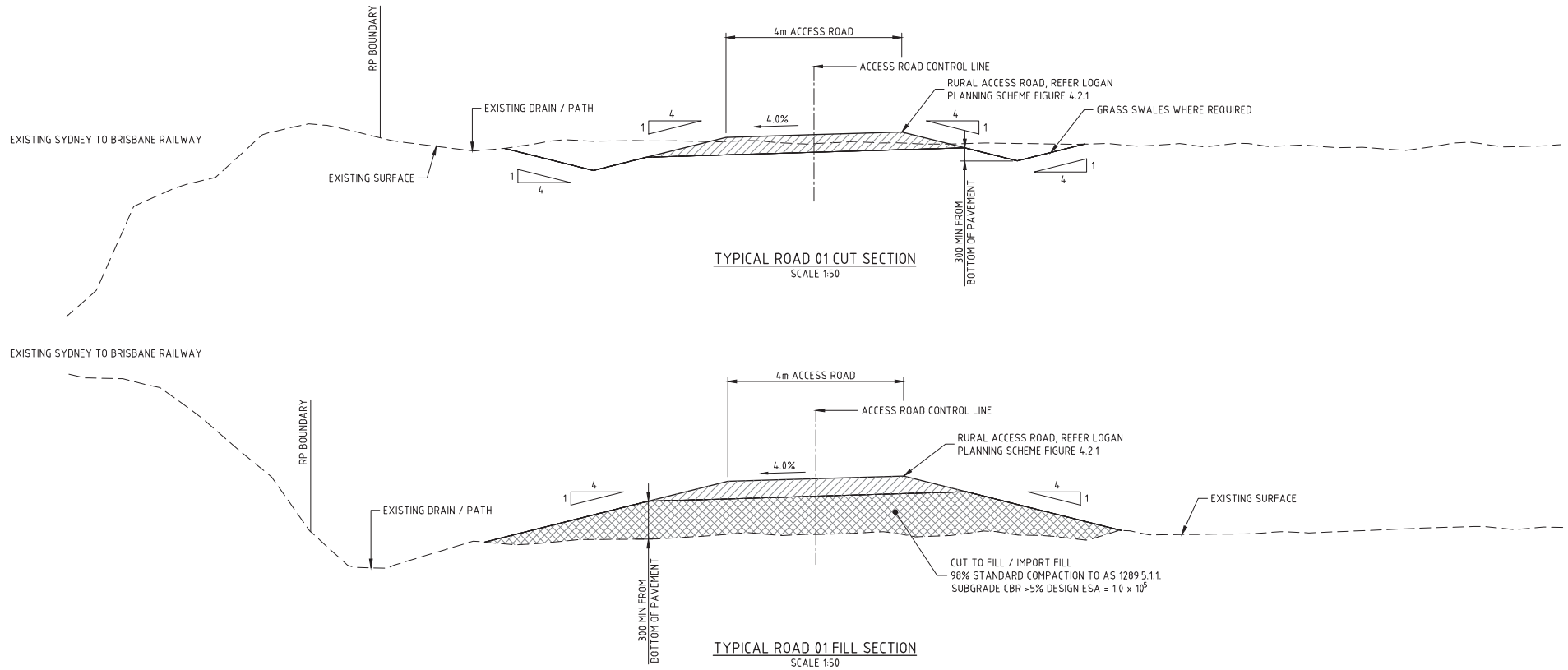
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LS305-04
FILE REFERENCE:
SHEET SIZE
A1
DATUM : AHD
GOA 94 ZONE 56



PROJECT:	GREENBANK PDA TO SPS151 WASTEWATER CONVEYANCE		
DRAWING TITLE:	SPS157 WASTEWATER PUMP STATION ACCESS ROAD CROSS SECTIONS ROAD 01, SHEET 4		
DRAWING No.	LS305-04-S-DWG-CI-2427		
DESIGN COMPANY:	LoganWIA	REV.	B
TECH SERVICES DRG No.			

CAD FILE: I:\LS305 GREENBANK PDA TO SPS151 WASTE WATER CONVEYANCE\LS305-04-S-DWG-CI-2428.dwg

DATE PLOTTED: 15 October 2018 - 15:29pm



NOTES

1. FOR GENERAL NOTES REFER TO DWGS PM001-01-S-DWG-ND-0020, ND-0021, ND-0022 AND ND-0023. FOR SITE SPECIFIC NOTES REFER TO DWG ND-0000.
2. ROAD TYPE 2.2 ROAD BASE 150mm DEEP TO MRT'S 05 SPECIFICATION UNLESS SHOWN OTHERWISE.

0 0.5 1.0 2.0 3.0m
A1 - 1:50

FOR TENDER

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DESIGNED BY
A. LATORRE
DRAFTED BY
M. RODGER
DESIGN CHECKED BY
S. DICKER
APPROVED BY

RPEQ
F. JESPERSEN
RPEQ
RPEQ

REFERENCES
PROJECT No.
LS305-04
FILE REFERENCE:
SHEET SIZE
A1
DATUM : AHD
GDA 94 ZONE 56



PROJECT: GREENBANK PDA TO SPS151 WASTEWATER CONVEYANCE

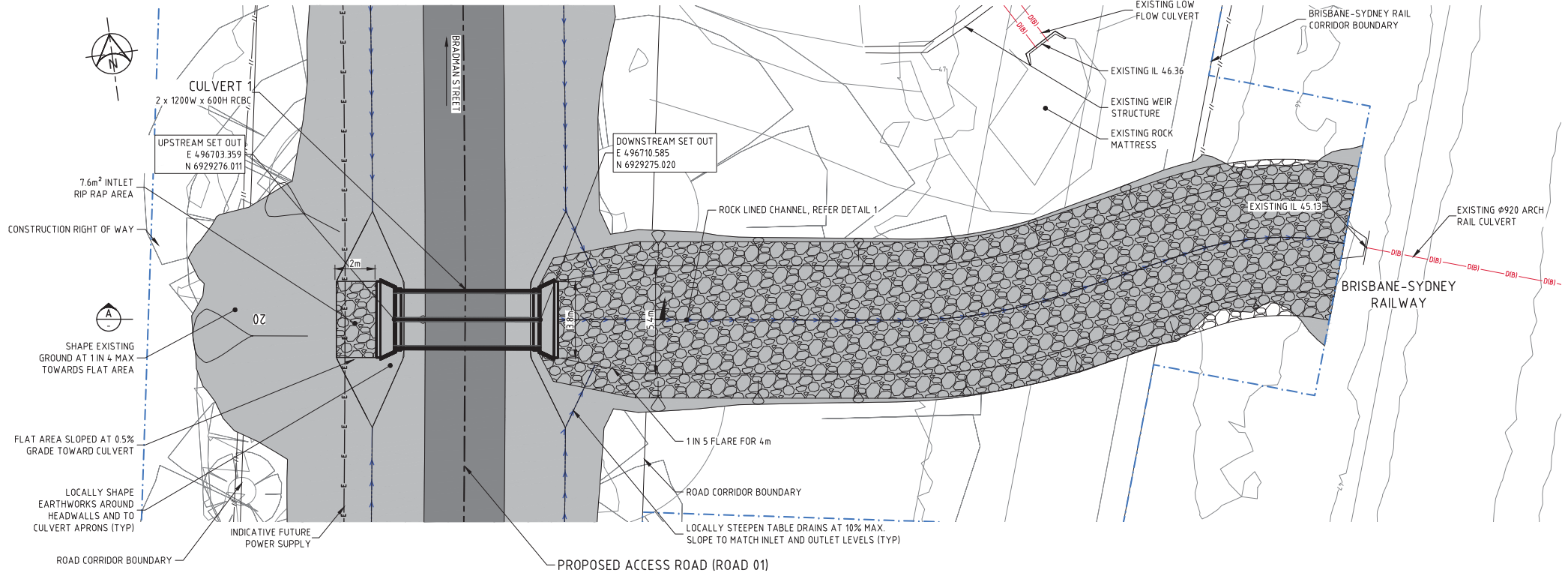
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SPS157 WASTEWATER PUMP STATION
ACCESS ROAD TYPICAL SECTIONS
ROAD 01

DRAWING No.
LS305-04-S-DWG-CI-2428
DESIGN COMPANY:
LoganWIA
TECH SERVICES DRG No.
REV.
B

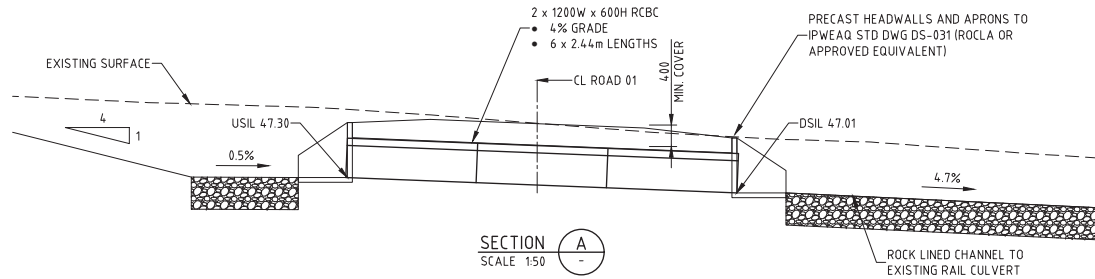
REV. No	DESCRIPTION	DRAWN	DESIGNED	APPR.	DATE
B	FOR TENDER (85% DESIGN DOCUMENTATION)	MR	AL		12/10/2018
A	FOR 70% DOAR WORKSHOP	MR	AL		25/09/2018

CAD FILE: L:\LS305 GREENBANK PDA TO SPS151 WASTE WATER CONVEYANCE\LS305-04-S-DWG-CI-2440.dwg

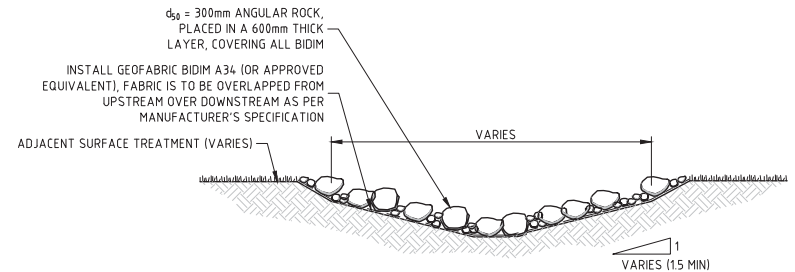
DATE PUBLISHED: 11 October 2018 - 11:30am



PLAN
SCALE 1:100



SECTION A-A
SCALE 1:50



DETAIL 1 - TYPICAL RIP-RAP SWALE

N.T.S.
APPROX. AREA = 317m²

NOTES

- FOR GENERAL NOTES REFER TO DWGS PM001-01-S-DWG-ND-0020, ND-0021, ND-0022 AND ND-0023. FOR SITE SPECIFIC NOTES REFER TO DWG ND-0000.
- PRECAST HEADWALLS AND APRONS TO IPWEAQ STD DWG DS-031 (ROCLA OR APPROVED EQUIVALENT).
- LOCALLY FILL AND SHAPE ANY LOW POINTS ALONG ALIGNMENT / FILL BATTERS TO MAKE FREE DRAINING TOWARD CULVERTS AT MINIMUM 0.5%.



FOR TENDER

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REV. No.	DESCRIPTION	DRAWN	DESIGNED	APPR.	DATE
B	FOR TENDER (85% DESIGN DOCUMENTATION)	MR	AL		12/10/2018
A	FOR 70% DOAR WORKSHOP	MR	AL		25/09/2018

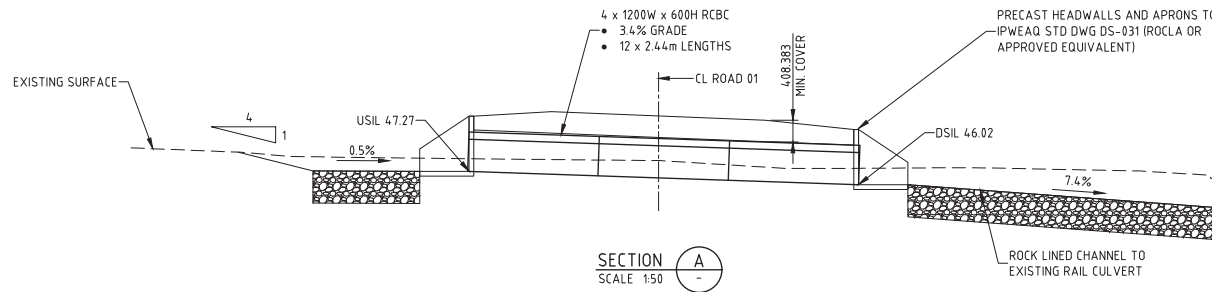
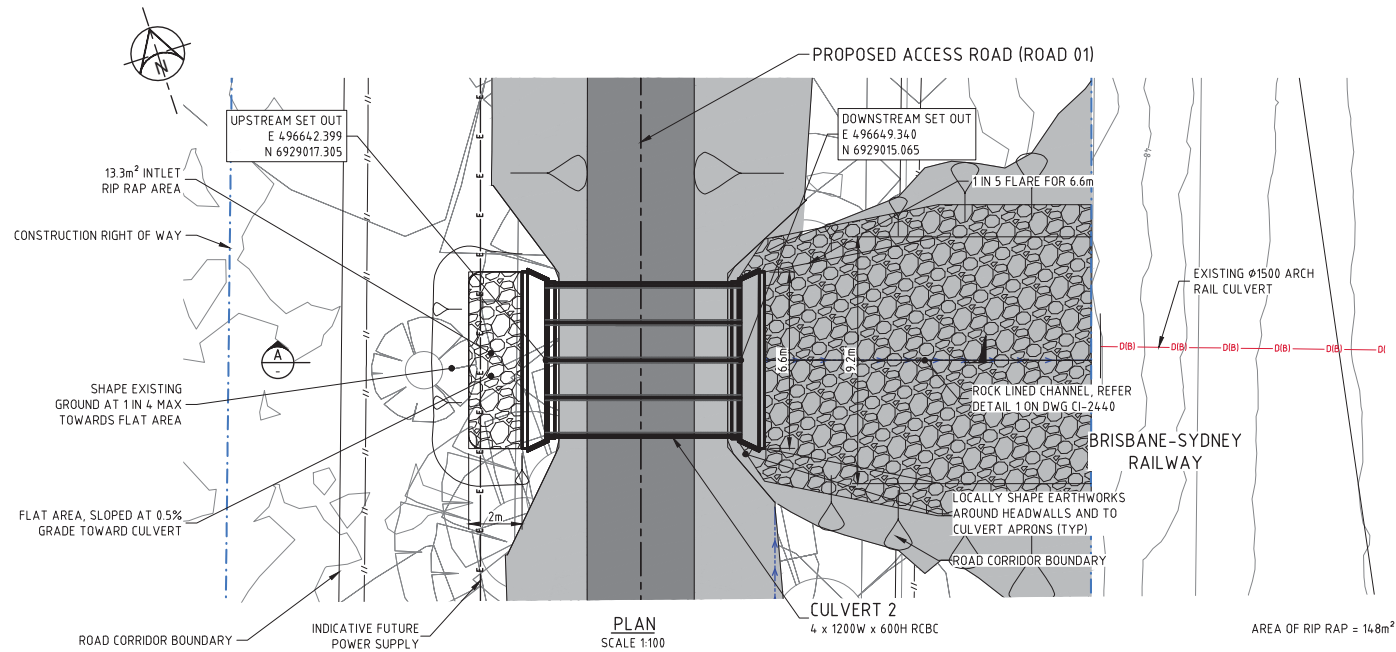
DESIGNED BY	RPEQ
DRAFTED BY	A. LATORRE
DESIGN CHECKED BY	R. RODGER
APPROVED BY	S. DICKER

REFERENCES	PROJECT No.
FILE REFERENCE:	LS305-04
SHEET SIZE	A1
DATUM: AHD	GOA 94 ZONE 56.



PROJECT:	GREENBANK PDA TO SPS151 WASTEWATER CONVEYANCE
DRAWING TITLE:	SPS157 WASTEWATER PUMP STATION CULVERT 1 DETAILS CHAINAGE 20
DRAWING No.	LS305-04-S-DWG-CI-2440
DESIGN COMPANY:	LoganWIA
TECH SERVICES DRG No.	

REV. B



NOTES

1. FOR GENERAL NOTES REFER TO DWGS PM001-01-S-DWG-ND-0020, ND-0021, ND-0022 AND ND-0023. FOR SITE SPECIFIC NOTES REFER TO DWG ND-0000.
2. PRECAST HEADWALLS AND APRONS TO IPWEAQ STD DWG DS-031 (ROCLA OR APPROVED EQUIVALENT).
3. LOCALLY FILL AND SHAPE ANY LOW POINTS ALONG ALIGNMENT / FILL BATTERS TO MAKE FREE DRAINING TOWARD CULVERTS AT MINIMUM 0.5%.



FOR TENDER

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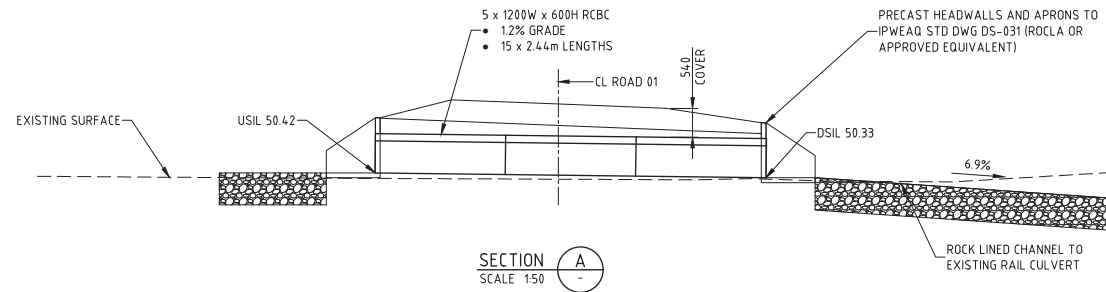
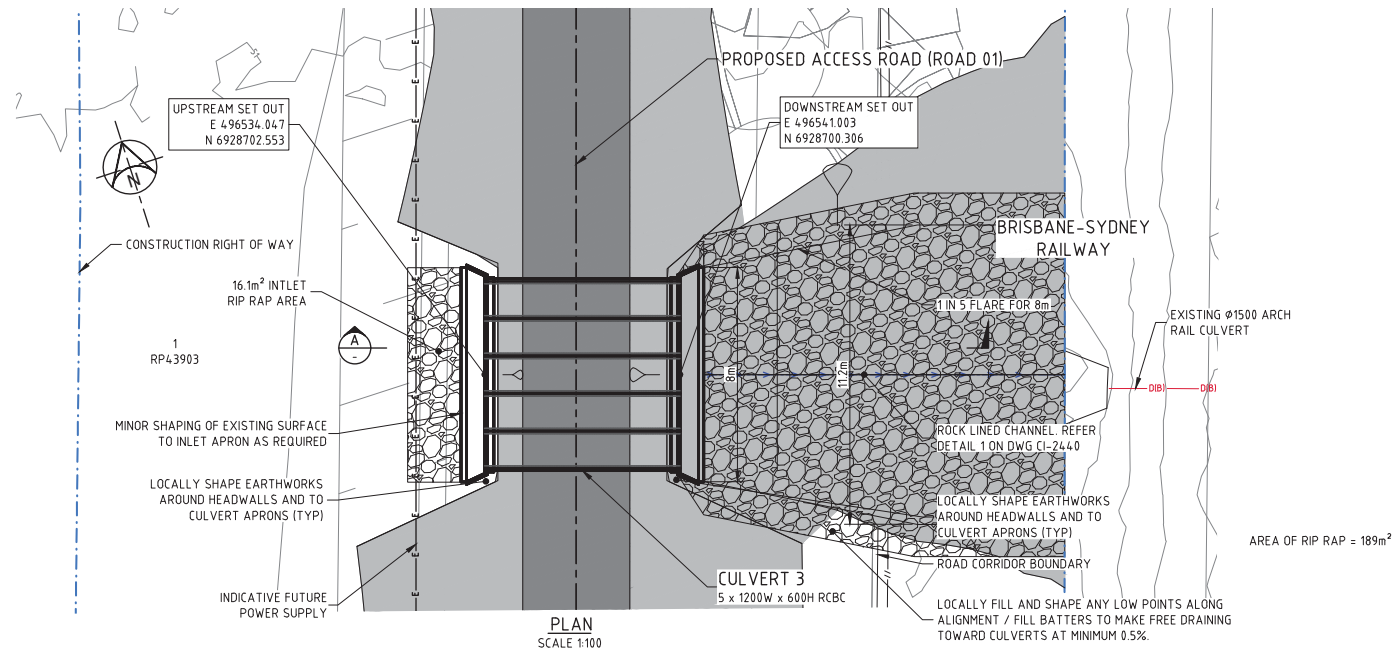
REV. No.	DESCRIPTION	DRAWN	DESIGNED	APPR.	DATE
B	FOR TENDER (85% DESIGN DOCUMENTATION)	MR	AL		12/10/2018
A	FOR 70% DOAR WORKSHOP	MR	AL		25/09/2018

DESIGNED BY	RPEQ
DRAFTED BY	A. LATORRE
DESIGN CHECKED BY	R. AMAYA
APPROVED BY	RPEQ

REFERENCES
PROJECT No.
FILE REFERENCE:
SHEET SIZE
DATUM : AHD
GOA 9% ZONE 56.



PROJECT:	GREENBANK PDA TO SPS151 WASTEWATER CONVEYANCE
DRAWING TITLE:	SPS157 WASTEWATER PUMP STATION
DRAWING No.	LS305-04-S-DWG-CI-2441
DESIGN COMPANY:	LoganWIA
TECH SERVICES DRG No.	
REV.	B



NOTES

- FOR GENERAL NOTES REFER TO DWGS PM001-01-S-DWG-ND-0020, ND-0021, ND-0022 AND ND-0023. FOR SITE SPECIFIC NOTES REFER TO DWG ND-0000.
- PRECAST HEADWALLS AND APRONS TO IPWEAQ STD DWG DS-031.
- LOCALLY FILL AND SHAPE ANY LOW POINTS ALONG ALIGNMENT / FILL BATTERS TO MAKE FREE DRAINING TOWARD CULVERTS AT MINIMUM 0.5%.



FOR TENDER

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REV. No.	DESCRIPTION	DRAWN	DESIGNED	APPR.	DATE
B	FOR TENDER (85% DESIGN DOCUMENTATION)	MR	AL		12/10/2018
A	FOR 70% DOAR WORKSHOP	MR	AL		25/09/2018

DESIGNED BY	RPEQ
DRAFTED BY	A. LATORRE
DRAFTING CHECK BY	R. AMAYA
DESIGN CHECKED BY	S. DICKER
APPROVED BY	

REFERENCES	PROJECT No. LS305-04
FILE REFERENCE:	
SHEET SIZE	A1
DATUM : AHD	GOA 94 ZONE 56.



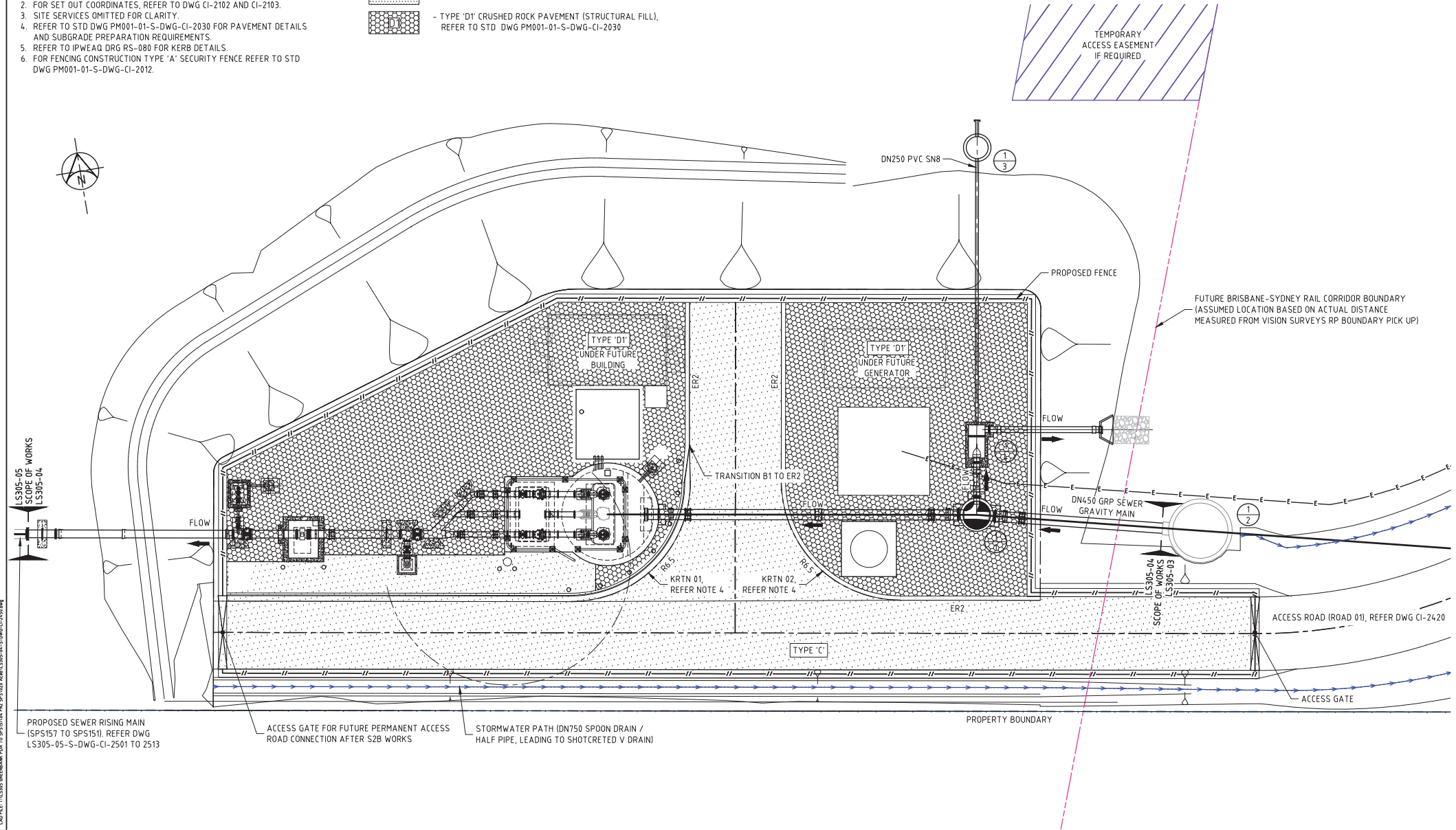
PROJECT:	GREENBANK PDA TO SPS151 WASTEWATER CONVEYANCE	
DRAWING TITLE:	SPS157 WASTEWATER PUMP STATION CULVERT 3 DETAILS CHAINAGE 620	
DRAWING No.	LS305-04-S-DWG-CI-2442	REV. B
DESIGN COMPANY:	LoganWIA	
TECH SERVICES DRG No.		

NOTES

- FOR GENERAL NOTES REFER TO STD DWGS PM001-01-S-DWG-ND-0020, ND-0021, ND-0022 AND ND-0023, AND PM001-00-S-DWG-ND-0020 AND ND-0021. FOR SITE SPECIFIC NOTES REFER TO DWG ND-0000.
- FOR SET OUT COORDINATES, REFER TO DWG CI-2102 AND CI-2103.
- SITE SERVICES OMITTED FOR CLARITY.
- REFER TO STD DWG PM001-01-S-DWG-CI-2030 FOR PAVEMENT DETAILS AND SUBGRADE PREPARATION REQUIREMENTS.
- REFER TO IPWEAQ DRG RS-080 FOR KERB DETAILS.
- FOR FENCING CONSTRUCTION TYPE 'A' SECURITY FENCE REFER TO STD DWG PM001-01-S-DWG-CI-2012.

LEGEND

-  - TYPE 'C' PAVEMENT
-  - TYPE 'D1' CRUSHED ROCK PAVEMENT (STRUCTURAL FILL), REFER TO STD DWG PM001-01-S-DWG-CI-2030



PLAN
SCALE 1:100

0 1 2 4 6m
A1 - 1:100

FOR TENDER

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DESIGNED BY	RPEQ	REFERENCES
A. LATORRE		PROJECT No.
DRAFTED BY	DRAFTING CHECK BY	LS305-04
S. ZOLLNER	F. JESPERSEN	FILE REFERENCE:
DESIGN CHECKED BY	RPEQ	
APPROVED BY	RPEQ	SHEET SIZE
		A1
		DATUM : AHD
		GOA 94 ZONE 56

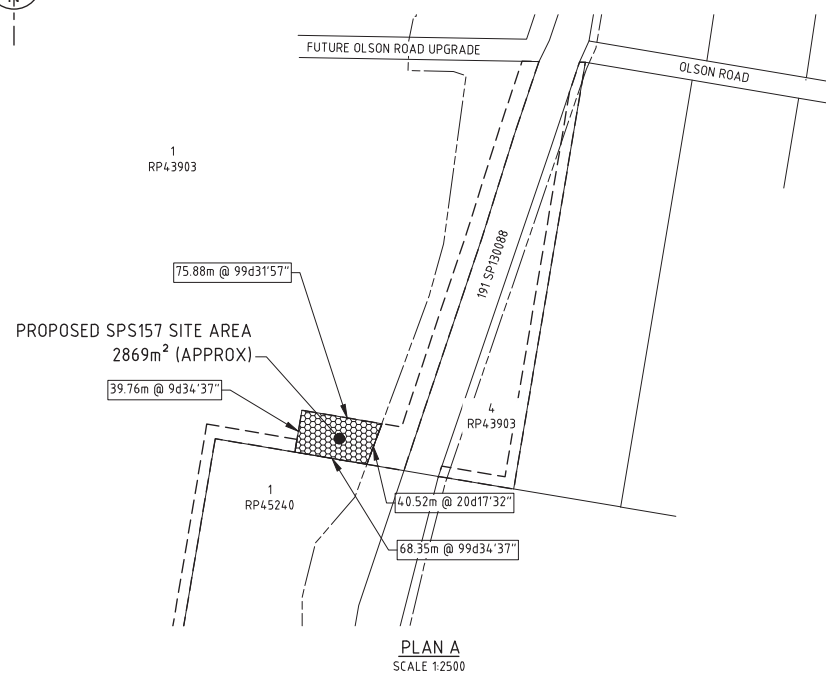


PROJECT:	GREENBANK PDA TO SPS151 WASTEWATER CONVEYANCE
DRAWING TITLE:	SPS157 WASTEWATER PUMP STATION PAVEMENT PLAN
DRAWING No.	LS305-04-S-DWG-CI-2450
DESIGN COMPANY:	LoganWIA
TECH SERVICES DRG No.	
REV.	A

REV. No.	DESCRIPTION	DRAWN	DESIGNED	APPR.	DATE
A	FOR TENDER (85% DESIGN DOCUMENTATION)	SZ	AL		12/10/2018



PROPOSED SPS157 SITE AREA
LOT 1 RP43903
(PRIVATE PROPERTY)
AREA = 2869m²



0 25 50 100 150m
A1 - 1:2500

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DESIGNED BY		RPE
A. LATORRE		
DRAFTED BY	DRAFTING CHECKED BY	
P. SPEAR	F. JESPERSEN	
DESIGN CHECKED BY		RPE
APPROVED BY		RPE

REFERENCES
PROJECT No.
LS305-00
FILE REFERENCE:
SHEET SIZE
A1
DATUM : AHD GDA 94 ZONE 56.



PROJECT: GREENBANK PDA TO SPS151 WASTEWATER CONVEYANCE

DRAWING TITLE:

ACQUISITION PLAN

LOT 1 RP43903 - SPS157

DRAWING No.	LS305-00-S-DWG-SU-7316
DESIGN COMPANY.	LoganWIA
TECH SERVICES ORG No.	

LEAD FILE: T:\LS395 GREENBANK PDA TO SP515\100 General Set\1020 Acq01\LS395-00-S-DWG-SU-7316.dwg

DATE PLOTTED: 02 November, 2018 - 3:18pm



MEMO

TO: Logan Water Infrastructure Alliance
FROM: Riley Moore
SUBJECT: SPS157 Access Road Hydraulic Analysis
OUR REF: 2260542A-HYD-MEM-001 Rev4.docx
DATE: 25 September 2018

INTRODUCTION

LoganWIA engaged WSP to conduct a hydraulic review of the access road design for the proposed sewerage pumping station SPS157. The review has included the following tasks:

- Impact assessment of road embankment design on hydrology and hydraulics
- Verification of longitudinal drainage channels and proposed lining specification

A 12D model detailing the existing terrain and design road geometry was provided to WSP to conduct the review. The alignment of the access road is shown in the attached Figure 01A. Details of the existing drainage infrastructure under the interstate rail embankment, located to the immediate east of the access road, were also supplied by LoganWIA.

The review process was as follows:

1. Determine hydraulic performance of existing features.
2. Determine impact of design road embankment and transverse drainage.
3. Propose options for design changes to transverse drainage features.
4. Determine hydraulic performance of longitudinal drainage.
5. Propose lining type and configuration to suit.
6. Determine capacity of SPS Pad drainage channels

The following memorandum has been prepared to outline the analysis and results of the review process.

EXISTING FEATURES

The horizontal alignment of the access road runs parallel to the existing interstate rail corridor, located to the immediate east. The vertical alignment of the access road roughly follows the existing natural terrain on the western (upstream) side of the rail corridor. The rail's vertical alignment has a constant grade of approximately 1.5% running north to south. The rail embankment has three arched cross drainage culverts positioned in the low points of the existing terrain. Adjacent ground cover on both sides of the rail alignment is heavily vegetated bushland with residential properties located to the north and east. Aerial photography shows a

road culvert at the point which the access road ties into Bradman Street to the north of study area. Data for this culvert was unavailable and as such it was not considered in the analysis.

Design runoff information for the contributing catchments to the culvert crossings was taken from (Australian Rainfall & Runoff, 2016) regional flood frequency estimation model (RFFEM). The output for each contributing catchment is detailed in table Table 1 below.

Table 1 Existing Catchment Flow Data RFFE

AEP (%)	North Catchment			Middle Catchment			Southern Catchment		
	Discharge (m3/s)	Lower Confidence Limit (5%) (m3/s)	Upper Confidence Limit (95%) (m3/s)	Discharge (m3/s)	Lower Confidence Limit (5%) (m3/s)	Upper Confidence Limit (95%) (m3/s)	Discharge (m3/s)	Lower Confidence Limit (5%) (m3/s)	Upper Confidence Limit (95%) (m3/s)
50	0.51	0.24	1.11	1.76	0.81	3.81	2.45	1.13	5.31
20	0.95	0.45	2.03	3.26	1.54	6.96	4.54	2.14	9.68
10	1.33	0.58	3.02	4.55	1.97	10.4	6.33	2.76	14.4
5	1.74	0.68	4.45	6.01	2.35	15.3	8.38	3.28	21.4
2	2.41	0.81	7.1	8.29	2.78	24.5	11.6	3.87	34.1
1	2.98	0.9	9.85	10.3	3.08	34	14.4	4.3	47.4

The outputs obtained from RFFEM came with a disclaimer of inaccuracy for catchments less than 500ha. Accordingly, the design flow rates were also cross checked using the Rational method using rainfall data sourced from AR&R 2016. The design flow estimates calculated using the Rational method are presented below in Table 2. Comparison of the RFFEM flows against the corresponding Rational method flows showed a reasonable match. However, as the Rational method flows were typically higher, they were conservatively adopted for the design of the cross drainage culverts on the access road.

It is noted that the horizontal alignment of the access road was shifted 5m further upstream (to the west) after the initial analysis of catchment areas and design flow were completed. However, the change in location of the road's horizontal alignment did not increase the resultant total catchment areas or design flows.

Table 2 Existing Catchment Flow Data Rational Method AR&R 87

	North Catchment	Middle Catchment	Southern Catchment
Area (ha)	4.9	19.4	25.8
Time of Concentration (Tc) (mins)	13.1	18.9	26.3
Fraction Impervious	0.9	0.9	0.9
AEP (%)	Discharge (m3/s)	Discharge (m3/s)	Discharge (m3/s)
50	0.89	3.04	3.80
20	1.24	4.24	5.30
10	1.47	5.01	6.26
5	1.90	6.49	8.13
2	2.48	8.46	10.58
1	2.87	9.89	12.38

The details of the upstream and downstream terrain, rail embankment, culvert geometry and design flow data were input to the USFHWA HY-8 software to determine the existing headwater level under different flow scenarios.

An options assessment was carried out for the access road cross drainage. This assessment took into account the inundation of the access road resulting from the choked flow through the rail embankment culverts. Table 3 shows maximum culvert capacity and corresponding design flood immunity for each catchment, just prior to overtopping of the access road (highlighted in blue).

Table 3 Catchment Flows resulting in road overtopping

	North Catchment	Middle Catchment	Southern Catchment
AEP (%)	Discharge (m3/s)	Discharge (m3/s)	Discharge (m3/s)
50	0.89	3.04	3.80
20	1.24	4.24	5.30
10	1.47	5.01	6.26
5	1.90	6.49	8.13
2	2.48	8.46	10.58
1	2.87	9.89	12.38

Flow Overtopping Road



ROAD EMBANKMENT TRANSVERSE DRAINAGE

Option 1

The rail's cross drainage culverts are the primary controls affecting the design of the cross drainage culverts for the proposed access road. The proposed immunity for the access road is 50% AEP. The configurations for culverts designed to prevent overtopping of the access road in the 50% AEP design storm event are shown in Table 4:

Table 4 Option 1 Piped Culvert Configuration

Catchment	Northern Catchment	Middle Catchment	Southern Catchment
50% AEP Flow (m3/s)	0.89	3.04	3.80
Culvert Configuration	3 / 600dia	3 / 900dia	3 / 900dia
Road Embankment Headwater Level (m)	47.8	46.8	50.8

Option 2

Reinforced concrete box culverts were considered in place of pipe culverts to increase flood immunity to a 10% AEP. Minimal earthworks will also be required at the inlet as box culverts require minimal cover and can be installed at ground level. The results of this analysis are shown in Table 5.

Table 5 Option 4 RCBC Configuration

Catchment	Northern Catchment	Middle Catchment	Southern Catchment
10% AEP Flow (m ³ /s)	1.47	5.01	6.26
600x1200mm Box No. of Cells	2	4	5
Headwater level (m)	47.8	47.2	51.6

AFFLUX TO ADJACENT PROPERTIES

In modelling the road culvert drainage, the upstream afflux to the adjacent properties was determined. The worst case event is suspected to be the 10% AEP. For flows greater than a 10% AEP, weir flow over the road way will occur with minimal upstream headwater increase. The increase in headwater at the property boundaries is noted in the table below.

Catchment	North	Middle	South
HW RL at QR Culvert (m)	46.7	47.1	51.6
HW RL at SPS Road Culvert (m)	48.1	47.2	51.7
Increase in Water Level at Property Boundary (m)	0	0.1	0.1

For the northern catchment there was no ponding in the adjacent properties. A flood map has been produced indicating headwater level extents, as noted in that attached Fig 01A.

LONGITUDINAL DRAINAGE

Culvert Outlet Protection

Table drains are required between the access road culverts and the rail culverts to minimize scour of the channel. A configuration of rock lined channels using a $D_{50}=300\text{mm}$ rock connecting the two sets of culverts will prevent excessive scour from frequent 50% AEP rain events. The width of the channel shall match the width of the culvert bank with side slopes of 2H:1V and a depth of 600mm.

Access Track Longitudinal Drainage

Longitudinal drainage for the access track was assessed using the Manning's equation assuming normal flow conditions for a 10% AEP rain event. Each open drain was assessed for velocity and depth. A low Manning's n roughness coefficient was used to determine the maximum velocity and a high roughness coefficient was used to determine the maximum depth of flow. The worst case scenario flow velocity was found to be the left hand side cut drain between access road CH650 to CH745. The flow velocity for this reach was 1.2 m/s for the 10% AEP storm. The velocity of the channel was also checked for a 2% AEP or 50-year storm and it was found to be 1.6m/s. The maximum flow depth for the open drains is 0.47m for a 10% AEP storm for the drain between CH.0 and CH.122.

Grass lining is recommended for the open drains. The velocities for the design storms do not exceed 1.3 m/s which would lead to scouring in grass lined channels. For a 2% AEP (50 year) storm, some scouring may be expected along the drains, due to the higher flow velocities. Accordingly, some repair work is expected to be required following major storm events. An unlined channel would require flow velocities to be reduced to below 0.3 m/s. Based on the results of our analysis, this is not practical in this situation.

SPS Pad Diversion Drains and Kerb

The Sewerage Pumping Station Pad was assessed for flood immunity during a 10% AEP event. To achieve the required 10% AEP flood immunity, a diversion drain will be required to

divert external catchment runoff around the pad. The diversion drain catchment area was provided as 0.73ha which aligns with that determined from the 12D tin model. Using the rational method for rainfall runoff based on AR&R 2016 runoff data, the resulting design flow for a 1:10 AEP storm from this catchment was 0.3m³/s. A table drain was originally proposed to divert this runoff, however a 750dia half pipe diversion drain was also analysed (at client request). The half pipe drain was able to contain the flow in the 10% AEP design flows with approximately 100mm freeboard.

Flows through the kerb and channel on the pad were also assessed for immunity. The pad was assumed to have a 2% road cross fall and 2% longitudinal fall. It was found that for a 10% AEP storm, the kerb and channel would convey the estimated 7L/s runoff in the channel with 120mm freeboard. Approximately 2m flow width can be expected at the end of the channel where the flow is greatest.

SUMMARY

Flow modelling for the proposed access road to SPS157 found that the existing alignment could be configured for a 50% AEP or 10% AEP. The models were checked after the receipt of a shift in the access road's horizontal alignment 5m upstream of the original geometry. The shifted alignment had no further adverse impacts to the hydrology of the contributing catchments.

Small increases in water level to the neighbouring properties are seen for the middle and southern catchments for the 10% AEP design event. In larger storm events, the impacts are expected to be reduced, as the access road will then be overtopped in storm events that exceed the 10% AEP, resulting in a large increase in cross drainage capacity over the road.

It is recommended that rock-lined table drains between the access road outlet and the rail culvert inlets be constructed to mitigate scour. The degree of rock protection at rail culvert inlets may be required to be increased, although details of existing scour protection and culvert inlet arrangements are not available.

Grass lined channels are recommended for the design 1 in 4 V-drains running either side of the road embankment. Some scouring of the roadside table drains may occur during major storm events such as the 2% AEP storm,. Overtopping of the drains may also occur in a 10% AEP. Accordingly, some repairs may be required to the table drains following major storm events that exceed the 10% AEP design standard adopted for the access road.

The SPS pad drainage proposed by Logan WIA was deemed suitable for serviceability of a 10% AEP. To provide flood immunity to the pad, a 750dia half pipe diversion drain at the edge of the pad will be required, as well as kerb and channel along the access roads.



10% AEP FLOOD EXTENT



SPS157 ACCESS ROAD STRINGS



DATE	20/09/18	DRAWN	R.MOORE
SCALE	AS NOTED	CHECKED	D.BYKIW
SHEET SIZE	A3	APPROVED	B.TITE

PROJECT	LOGAN WIA SPS157 Access Road
CLIENT	LOGAN WIA

	Telephone 61 7 3368 6600 Facsimile 61 7 3368 6699 brisbane@wspgroup.com
---	---

TITLE		
SPS157 ACCESS ROAD FLOOD MAP		
PROJECT NO.	DRAWING NO.	REVISION

APPENDIX B

INTENSITY FREQUENCY DURATION DATA
FROM THE BUREAU OF METEOROLOGY





Australian Government
Bureau of Meteorology

Location

Label: SPS157

Latitude: -27.769 [Nearest grid cell: 27.7625 (S)]

Longitude: 152.964 [Nearest grid cell: 152.9625 (E)]

IFD Design Rainfall Depth (mm)

Issued: 10 December 2018

Rainfall depth for Durations, Exceedance per Year (EY), and Annual Exceedance Probabilities (AEP).

[FAQ for New ARR probability terminology](#)

Duration	Annual Exceedance Probability (AEP)						
	63.2%	50%#	20%*	10%	5%	2%	1%
1 min	2.33	2.67	3.72	4.42	5.10	6.00	6.68
2 min	3.75	4.28	6.00	7.20	8.43	10.1	11.4
3 min	5.32	6.07	8.49	10.2	11.9	14.1	15.9
4 min	6.82	7.79	10.9	13.0	15.1	17.9	20.0
5 min	8.22	9.39	13.1	15.6	18.0	21.3	23.8
10 min	13.7	15.7	21.8	25.8	29.7	34.8	38.7
15 min	17.4	19.9	27.7	32.9	37.8	44.3	49.1
20 min	20.1	23.0	32.0	38.1	43.8	51.4	57.1
25 min	22.2	25.4	35.4	42.1	48.6	57.1	63.5
30 min	23.8	27.3	38.1	45.4	52.4	61.7	68.8
45 min	27.5	31.4	44.0	52.5	61.0	72.2	80.9
1 hour	30.0	34.3	48.1	57.6	67.0	79.7	89.6
1.5 hour	33.7	38.5	53.9	64.8	75.7	90.6	102
2 hour	36.5	41.7	58.4	70.2	82.3	98.9	112
3 hour	41.0	46.7	65.4	78.9	92.8	112	127
4.5 hour	46.5	52.9	74.1	89.5	105	128	146
6 hour	51.2	58.2	81.6	98.6	116	141	161
9 hour	59.2	67.4	94.6	115	135	164	188
12 hour	66.0	75.3	106	128	152	184	211
18 hour	77.4	88.6	126	152	180	219	251
24 hour	86.6	99.5	142	173	204	249	286
30 hour	94.3	109	156	190	226	275	316

36 hour	101	116	168	205	244	298	342
48 hour	111	129	188	230	275	337	387
72 hour	125	146	214	265	317	391	451
96 hour	134	155	230	285	343	424	491
120 hour	139	161	238	296	357	442	513
144 hour	142	164	242	301	363	450	523
168 hour	143	166	242	302	363	450	524

Note:

The 50% AEP IFD **does not** correspond to the 2 year Average Recurrence Interval (ARI) IFD. Rather it corresponds to the 1.44 ARI.

* The 20% AEP IFD **does not** correspond to the 5 year Average Recurrence Interval (ARI) IFD. Rather it corresponds to the 4.48 ARI.

This page was created at **04:19 on Monday 10 December 2018 (AEST)**

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APPENDIX C

AUSTRALIAN RAINFALL AND RUNOFF REGIONAL FLOOD FREQUENCY ESTIMATION



RFFE

Results | Regional Flood Frequency Estimation Model

Shape Factor vs Catchment Area

Intensity vs Catchment Area

Bias Correction Factor vs Catchment Area

Download

TXT

PDF

Nearby

JSON

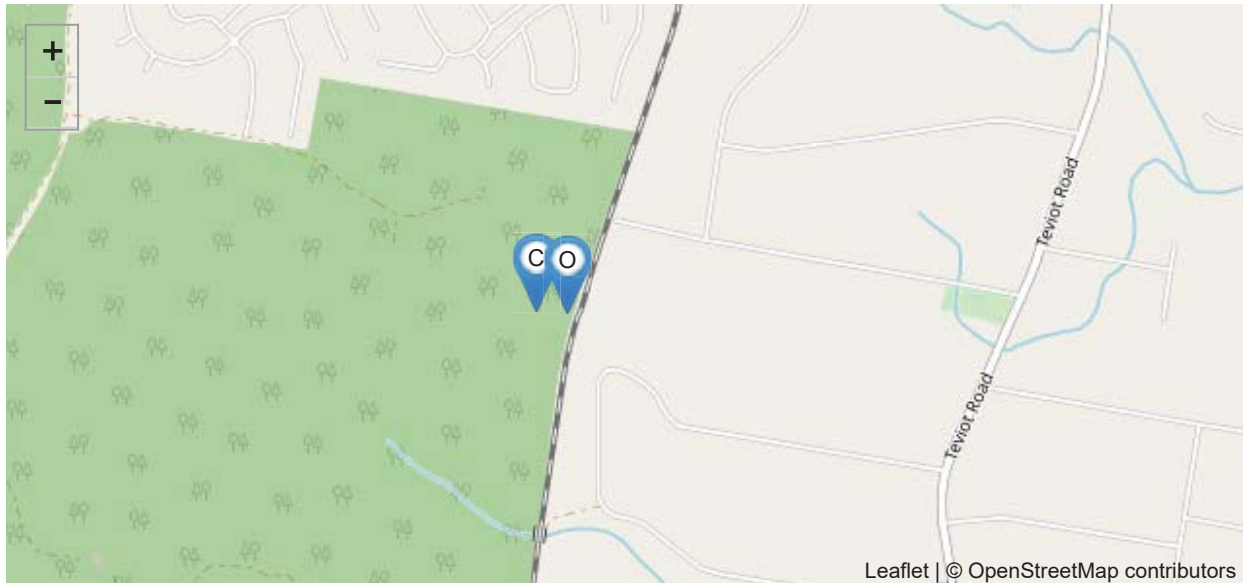
Input Data

Date/Time	2018-12-10 04:58
Catchment Name	Catchment1
Latitude (Outlet)	-27.768
Longitude (Outlet)	152.964
Latitude (Centroid)	-27.76794
Longitude (Centroid)	152.96265
Catchment Area (km ²)	0.057*
Distance to Nearest Gauged Catchment (km)	4.45
50% AEP 6 Hour Rainfall Intensity (mm/h)	9.705858
2% AEP 6 Hour Rainfall Intensity (mm/h)	23.4826
Rainfall Intensity Source (User/Auto)	Auto
Region	East Coast
Region Version	RFFE Model 2016 v1
Region Source (User/Auto)	Auto
Shape Factor	0.56
Interpolation Method	Natural Neighbour

Input Data

Bias Correction Value

-0.566



Method by Dr Ataur Rahman and Dr Khaled Haddad from Western Sydney University for the Australian Rainfall and Runoff Project. Full description of the project can be found at the project page on the ARR website. Send any questions regarding the method or project here.



APPENDIX D

SPP EXTRACT: STORMWATER MANAGEMENT DESIGN OBJECTIVES



Appendix 2 – Stormwater management design objectives

Table A: Construction phase – stormwater management design objectives

Application:

- Applies to all climatic regions.

Part 1 Construction phase – stormwater management design objectives¹²

Issue	Desired outcomes
Drainage control	1. Manage stormwater flows around or through areas of exposed soil to avoid contamination. 2. Manage sheet flows in order to avoid or minimise the generation of rill or gully erosion. 3. Provide stable concentrated flow paths to achieve the construction phase stormwater management design objectives for temporary drainage works (part 2). 4. Provide emergency spillways for sediment basins to achieve the construction phase stormwater management design objectives for emergency spillways on temporary sediment basins (part 3).
Erosion control	1. Stage clearing and construction works to minimise the area of exposed soil at any one time. 2. Effectively cover or stabilise exposed soils prior to predicted rainfall. 3. Prior to completion of works for the development, and prior to removal of sediment controls, all site surfaces must be effectively stabilised¹³ using methods which will achieve effective short-term stabilisation.
Sediment control	1. Direct runoff from exposed site soils to sediment controls that are appropriate to the extent of disturbance and level of erosion risk. 2. All exposed areas greater than 2500 metres² must be provided with sediment controls which are designed, implemented and maintained to a standard which would achieve at least 80% of the average annual runoff volume of the contributing catchment treated (i.e. 80% hydrological effectiveness) to 50mg/L Total Suspended Solids (TSS) or less, and pH in the range (6.5–8.5).
Litter, hydrocarbons and other contaminants	1. Remove gross pollutants and litter. 2. Avoid the release of oil or visible sheen to released waters. 3. Dispose of waste containing contaminants at authorised facilities.
Waterway stability and flood flow management	1. Where measures are required to meet post-construction waterway stability objectives (specified in table B), these are either installed prior to land disturbance and are integrated with erosion and sediment controls, or equivalent alternative measures are implemented during construction. 2. Earthworks and the implementation of erosion and sediment controls are undertaken in ways which ensure flooding characteristics (including stormwater quantity characteristics) external to the development site are not worsened during construction for all events up to and including the 1 in 100 year ARI (1% AEP).

¹² Note: Drainage, erosion and sediment controls should be appropriate to the risk posed by the activity for the relevant climatic region e.g. considering the potential soil loss rate, monthly erosivity or average monthly rainfall.

¹³ Note: An effectively stabilised surface is defined as one that does not, or is not likely to result in visible evidence of soil loss caused by sheet, rill or gully erosion or lead to sedimentation water contamination.

Source: Department of Infrastructure, Local Government and Planning, Queensland Government¹, July 2017, p.80

Part 2: Construction phase – stormwater management design objectives for temporary drainage works

Temporary drainage works	Anticipated operation design life and minimum design storm event		
	< 12 months	12–24 months	> 24 months
Drainage structure	1 in 2 year ARI/39% AEP	1 in 5 year ARI/18% AEP	1 in 10 year ARI/10% AEP
Where located immediately up-slope of an occupied property that would be adversely affected by the failure or overtopping of the structure	1 in 10 year ARI/10% AEP		
Culvert crossing	1 in 1 year ARI/63% AEP		

Part 3: Construction phase – stormwater management design objectives for emergency spillways on temporary sediment basins

Drainage structure	Anticipated operation design life and minimum design storm event		
	< 3 months	3–12 months	> 12 months
Emergency spillways on temporary sediment basins	1 in 10 year ARI/10% AEP	1 in 20 year ARI/5% AEP	1 in 50 year ARI/2% AEP

Note: Refer to IECA 2008 Best Practice Erosion and Sediment Control (as amended) for details on the application of the Construction Phase requirements. Advice should be obtained from a suitably qualified person e.g. Certified Practitioner in Erosion and Sediment Control, or Registered Professional Engineer Queensland, with appropriate knowledge and experience in erosion and sediment control design and implementation.

Source: Department of Infrastructure, Local Government and Planning, Queensland Government¹, July 2017, p.81

Assessment benchmarks – water quality

These performance outcomes apply to the following development applications, to the extent the SPP has not been identified in a local planning instrument as being appropriately integrated.

For receiving waters, a development application for:

- (1) a material change of use for an urban purpose that involves premises 2500 metres² or greater in size and;
 - (a) will result in six or more dwellings; or
 - (b) will result in an impervious area greater than 25 per cent of the net developable area; or
- (2) reconfiguring a lot for an urban purpose that involves premises 2500 metres² or greater in size and will result in six or more lots; or
- (3) operational works for an urban purpose that involves disturbing a land area 2500 metres² or greater in size.

For water supply buffer areas, a development application:

- (4) located wholly outside an urban area and relating to premises that is within, or partly within, a water supply buffer area, that involves:
 - (a) a material change of use for the intensive animal industry, medium and high-impact industry, noxious and hazardous industry, extractive industry, utility installation that involves sewerage services, drainage or stormwater services, waste management facilities, or motor sport facility; or
 - (b) reconfiguring a lot to create five or more additional lots if any resultant lot is less than 16 hectares in size, and any of the lots created will rely on on-site wastewater treatment.

The following requirements are assessment benchmarks for the development:

- (1) Development is located, designed, constructed and operated to avoid or minimise adverse impacts on environmental values arising from:
 - (a) altered stormwater quality and hydrology
 - (b) waste water
 - (c) the creation or expansion of non-tidal artificial waterways
 - (d) the release and mobilisation of nutrients and sediments.
- (2) Development achieves the applicable stormwater management design objectives outlined in tables A and B (appendix 2)
- (3) Development in a water supply buffer area avoids adverse impacts on drinking water supply environmental values.

Further information in relation to these requirements is detailed in the water quality guidance material.

Source: Department of Infrastructure, Local Government and Planning, Queensland Government¹, July 2017, p.46