

New primary school in Edmondson Park

Buchan Avenue, Edmondson Park NSW 2174



CIVIL ENGINEERING: STATE SIGNIFICANT DEVELOPMENT
APPLICATION DESIGN REPORT

PREPARED FOR
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Civil Engineering Schematic Design Report

Revision Schedule

| Date | Revision | Issue | Prepared By | Approved By |
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| 26.04.21 | 2 | Final | J. Gilligan | J. Gilligan |
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Executive Summary

This report has been prepared to accompany a State Significant Development Application for the development of a new primary school in Edmondson Park, located at Buchan Avenue, Edmondson Park (the site). The legal description of the site is Lot 1 and Lot 2 in DP 1257105. The site comprises a rectangular lot with an area of approximately two hectares.

This State Significant Development Application seeks approval for a new core 35 primary school accommodating 1,012 students *and a **coldshell** 40 place pre-school at the site. The works comprise:*

- Site preparation and excavation;
- Land use for the purpose of a new primary school and pre-school;
- Construction of new buildings including:
 - A three storey building on the western portion of the site primarily addressing Faulkner Way comprising 36 homebases, 4 special support unit teaching spaces, staff room, administration office at the ground floor and library at the first floor addressing the corner of Buchan Avenue and Faulkner Way, and student amenities;
 - A single storey **coldshell** preschool building for educational programs for children the year before they commence kindergarten, accommodating 40 places. The pre-school building will be connected at the southern end of the three storey building; and
 - A single storey building on the eastern portion of the site comprising a communal hall, out of school hours care facility, 8 homebases and covered outdoor learning area.
- Landscaping and public domains works including tree planting, a sports court and creation of various assembly, play and learning zones;
- A drop-off and pick-up zone, and bus zone on Buchan Avenue;
- An at-grade staff carpark in the southern part of the site with ingress and egress provided off Faulkner Way at the south-west corner of the site;
- Primary pedestrian entrance from Buchan Avenue and an additional entrance on Faulkner Way for the ground floor support unit; and
- Other ancillary infrastructure and utilities works and digital signage.

The purpose of this report is to identify and describe the civil engineering design elements required for the proposed development and to respond to Secretary's Environmental Assessment Requirements (SEARs) issued on 10th December 2020.

Specifically, the Schematic Design seeks development consent for the construction and operation of the new primary school in Edmondson Park, a multi-level, educational facility designed to accommodate pre-school and primary school Educational Facilities for Education NSW (the project).

On 9th November 2020, the NSW Government re-announced the delivery and associated funding for the new primary school in Edmondson Park.

The Minister for Planning, or their delegate, is the consent authority for the Schematic Design with an application to be lodged with the NSW Department of Planning, Industry and Environment (NSW DPIE) for assessment.

This report has been prepared in response to the requirements contained within the SEARs issued for the project. Specifically, this report has been prepared to respond to the following SEARs:

| SEARs | Report Section |
|--|--|
| <p>16. Stormwater Drainage</p> <p>Provide:</p> <ul style="list-style-type: none"> - A preliminary stormwater management plan for the development that: <ul style="list-style-type: none"> o Is prepared by a suitably qualified person in consultation with Council and any other relevant drainage authority. o Details the proposed drainage design for the site including on-site detention facilities, water quality measures and the nominated discharge point. o Demonstrates compliance with Council or other drainage authority requirements. - Stormwater plans detailing the proposed methods of drainage without impacting on the downstream properties. <p>Where drainage infrastructure works are required that would be handed over to Council, provide full hydraulic details and detailed plans and specifications of proposed works that have been prepared in consultation with Council and comply with Council's relevant standards.</p> <p><u>Relevant Policies and Guidelines</u></p> <p>Guidelines for developments adjoining land managed by the Office of Environment and Heritage (OEH, 2013)</p> | Refer Section 6.1 and 6.2 |
| <p>17. Flooding</p> <ul style="list-style-type: none"> - Identify any flood risk on-site in consultation with Council and having regard to the most recent flood studies for the project area and the potential effects of climate change, sea level rise and an increase in rainfall intensity. - Assess the impacts of the development, including any changes to flood risk on-site or off-site, and detail design solutions to mitigate flood risk where required. <p><u>Relevant Policies and Guidelines</u></p> <p>NSW Floodplain Development Manual (DIPNR, 2005)</p> | Refer Section 2.7 |
| <p>18. Soil and Water</p> <p>Provide:</p> <ul style="list-style-type: none"> - An assessment of potential impacts on surface and groundwater (quality and quantity), soil, related infrastructure, and watercourse(s) where relevant. - Details of measures and procedures to minimise and manage the generation and off-site transmission of sediment, dust, and fine particles. - An assessment of salinity and acid sulphate soil impacts, including a Salinity Management Plan and / or Acid Sulphate Soils Management Plan, where relevant. | <p>Refer Section 3</p> <p>Note: Groundwater, Salinity and Acid Sulphate Soils are to be addressed by the project Environmental Consultant.</p> |

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1. General

1.1 Introduction

Northrop Consulting Engineers Pty Ltd (Northrop) have been engaged by Richard Crookes Constructions to prepare the Civil Engineering design and documentation in support of a SSDA submission to DPIE for the proposed new primary school in Edmondson Park, in the suburb of Edmondson Park within the Liverpool City Council Local Government Area (LGA).

This report covers the works shown as the Northrop Drawing Package required for the development of the site including:

- Sediment and Soil Erosion Control
- Stormwater Management (Quantity and Quality)

In addition, some commentary has also been provided on bulk earthworks and pavements which will be further developed in the following stages of the project.

1.2 Related Reports and Documents

This report is to be read in conjunction with the following reports and documents:

- Design Standards as provided by Liverpool City Council regarding On-site Stormwater Detention (OSD) and water quality.
- Detailed site survey plan provided by TSS Total Surveying Solutions dated 25th March 2021.
- Edmondson Park South Part 3A Project Plan Application (Stage 1) Water Cycle Management Plan prepared by J. Wyndham Prince (August 2010)
- Edmondson Park Town Centre North Water Cycle Management Strategy Report prepared by J. Wyndham Prince (August 2018)
- Engineering Design Report, Buchan Avenue, Edmondson Park prepared by SMEC (May 2018)

1.3 Design Criteria & Methodology

Our Civil Engineering advice is based on review of the relevant documents and reports provided to date. Our investigations included the following.

- Discussions with Council regarding flooding, stormwater, On-site Stormwater Detention (OSD) and Stormwater Quality.
- Review of all Council's Masterplan Reports provided for the precinct.
- Review of engineering design documents provided by Landcom for the Buchan Avenue extension, South and East Roads and associated precinct earthworks.
- Review of Flood Report prepared by Storm dated June 2014.

The civil engineering design considers the Educational Facilities Standards and Guidelines as well as Local Government / Council requirements appropriate to the development site.

2. Existing Site Conditions

2.1 Subject Site

The new primary school in Edmondson Park is to be in the suburb of Edmondson Park within the Liverpool City Council Local Government Area (LGA). The site is located at the corner of Buchan Avenue and Faulkner Way and legally described as Lot 1 and Lot 2 in Deposited Plan (DP) 1257105. It has an area of approximately two hectares (ha) and is bound by the Buchan Avenue to the north, Faulkner Way to the west, a proposed new road to the south and vacant land to the east.

A proposed new primary school is to be in the western portion of the site as shown in Figure 2.

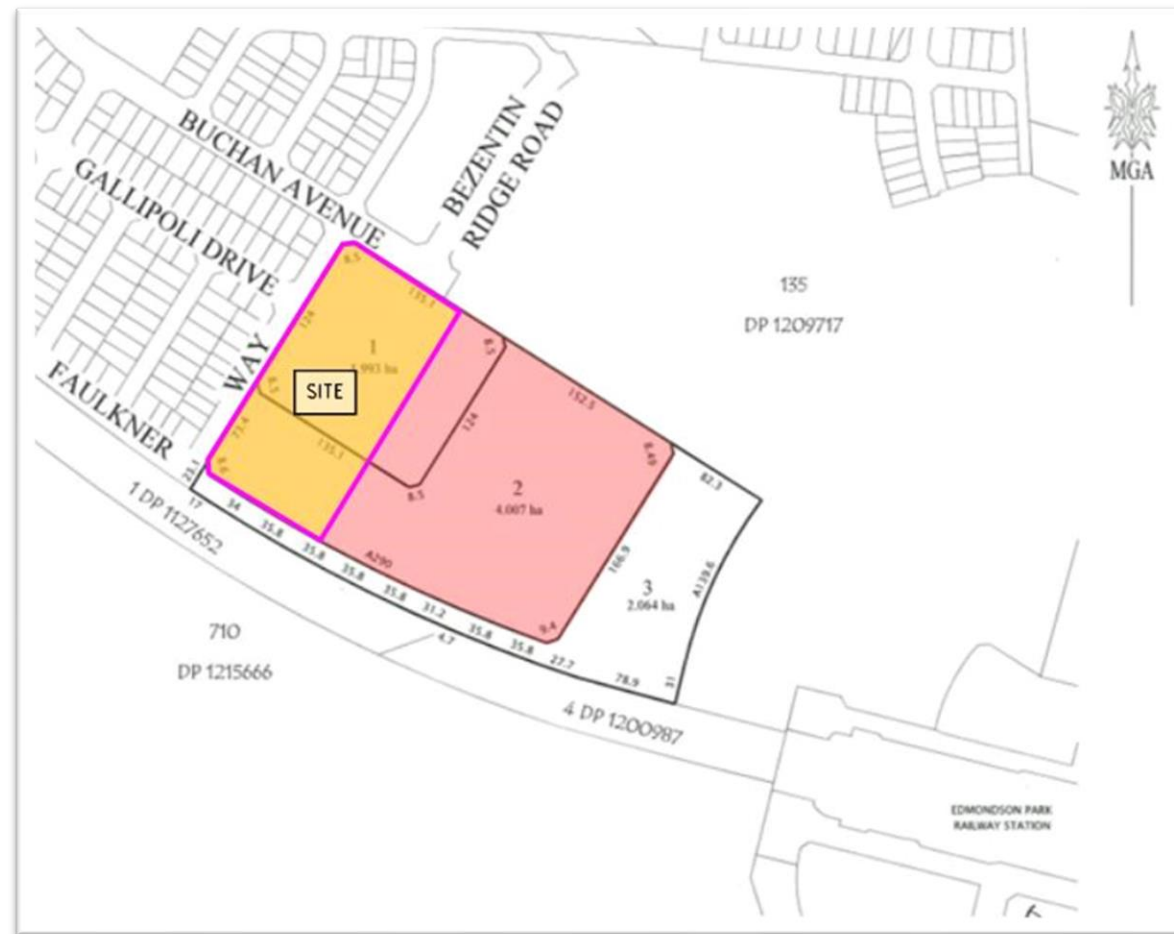


Figure 1 – Existing Lot Boundaries



Figure 2 – Development Location

2.2 Proposed Development

This State Significant Development Application seeks approval for a new core 35 primary school accommodating 1,012 students and a **coldshell** 40 place pre-school at the site. The works comprise:

- Site preparation and excavation;
- Land use for the purpose of a new primary school and pre-school;
- Construction of new buildings including:
 - A three storey building on the western portion of the site primarily addressing Faulkner Way comprising 36 homebases, 4 special support unit teaching spaces, staff room, administration office at the ground floor and library at the first floor addressing the corner of Buchan Avenue and Faulkner Way, and student amenities;
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- Other ancillary infrastructure and utilities works and digital signage.

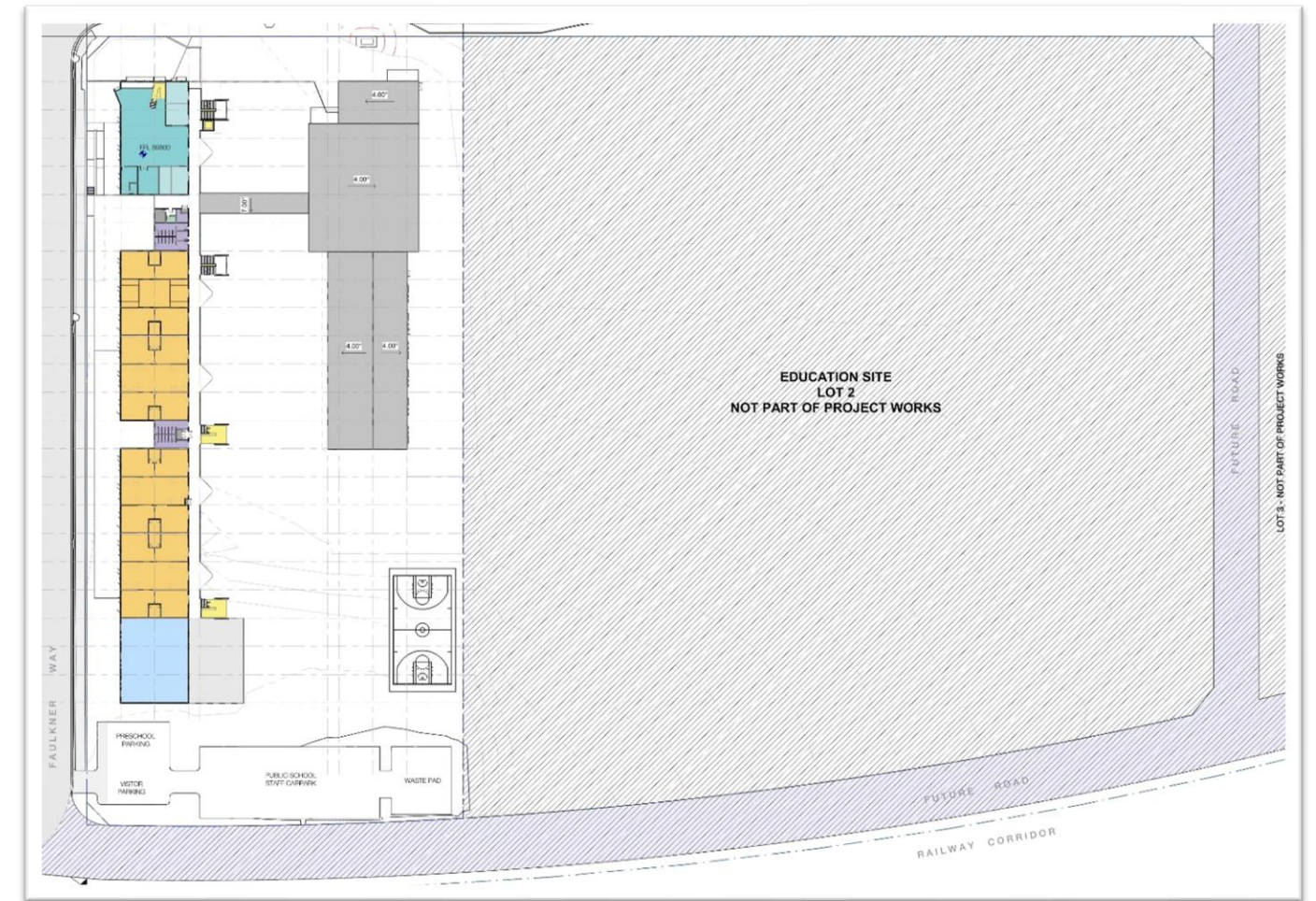


Figure 3 – Proposed Development Layout (TKD Architects, 2021)

2.3 Site Topography

Levels in the south portion of the site are approx. RL 72.00m AHD at a ridge near the existing rail line. They then fall to a depression in the north west to approx. RL 59.50m AHD at an approximate grade of 8%. This corresponds to approximately 12.5m difference in elevation.

2.4 Contamination and Geotechnical Conditions

2.4.1 Geotechnical

A design CBR 3% has been considered for the purposes of new pavement design. Based on review of the Geotechnical Report prepared by JK Geotechnics, very low CBR values (1% and 2.5%) were identified on site indicating that subgrade improvement works will be necessary to achieve a minimum CBR 3%. Further advice will be sought prior to the Crown Certificate from the project Geotechnical Engineer with regards to subgrade improvement methodologies appropriate for this development site.

The anticipated maximum temporary and permanent batter slope angles have been nominated below subject to further review by the Project Geotechnical Engineer.

Table 1 – Batter Slopes

| Unit | Temporary | Permanent |
|--------------------------------|-----------|-----------|
| Engineered Fill / Natural Soil | 1.5H: 1V | 2H: 1V |

2.4.2 Contamination

A detailed Environmental Site Assessment has been undertaken by JBS&G for Precinct 9 School Site, Buchan Avenue, Edmondson Park NSW dated 13 May 2021 (60756/137,554 (Rev A). Findings in the Environmental Site assessment indicate that the site is suitable for residential with accessible soil land uses, including gardens and accessible soil, day care centre, pre-school, primary and secondary school and park, recreational open space, playing fields without the preparation of a RAP.

2.5 Existing Infrastructure

Northrop has undertaken a preliminary investigation of existing infrastructure in the vicinity of the proposed development site. Our assessment has been based on limited survey information as well as publicly available information from Liverpool City Council, and Design Information from Landcom.

2.5.1 Existing stormwater infrastructure

2.6 Stormwater Infrastructure

There is no legal discharge point of discharge as a piped connection available for the existing development. All flows currently drain as sheet flow over land towards an existing natural watercourse to the east. It is noted that as part of the Buchan Avenue extension works, Landcom will be providing a connection point for the site capable of conveying the 1 in 100-year ARI flows to a regional detention basin with water quality treatment functions. This infrastructure is currently under construction.

2.7 Flooding

In 2014, FloodMit was engaged by Liverpool City Council to conduct a flood study, *Design for the Modification of Creeks in Edmondson Park*, to assess the impacts of the creek modifications which were proposed in Storm's 2013 drawings, *Modification of Creeks in Edmondson Park, Concept Design*.

The PMF levels for the developed scenario are shown in the figure below. The approximate site boundary is marked in the lower left corner of the figure, showing that the PMF does not extend within the site boundary and therefore the site is unaffected by flooding from Maxwell's creek.

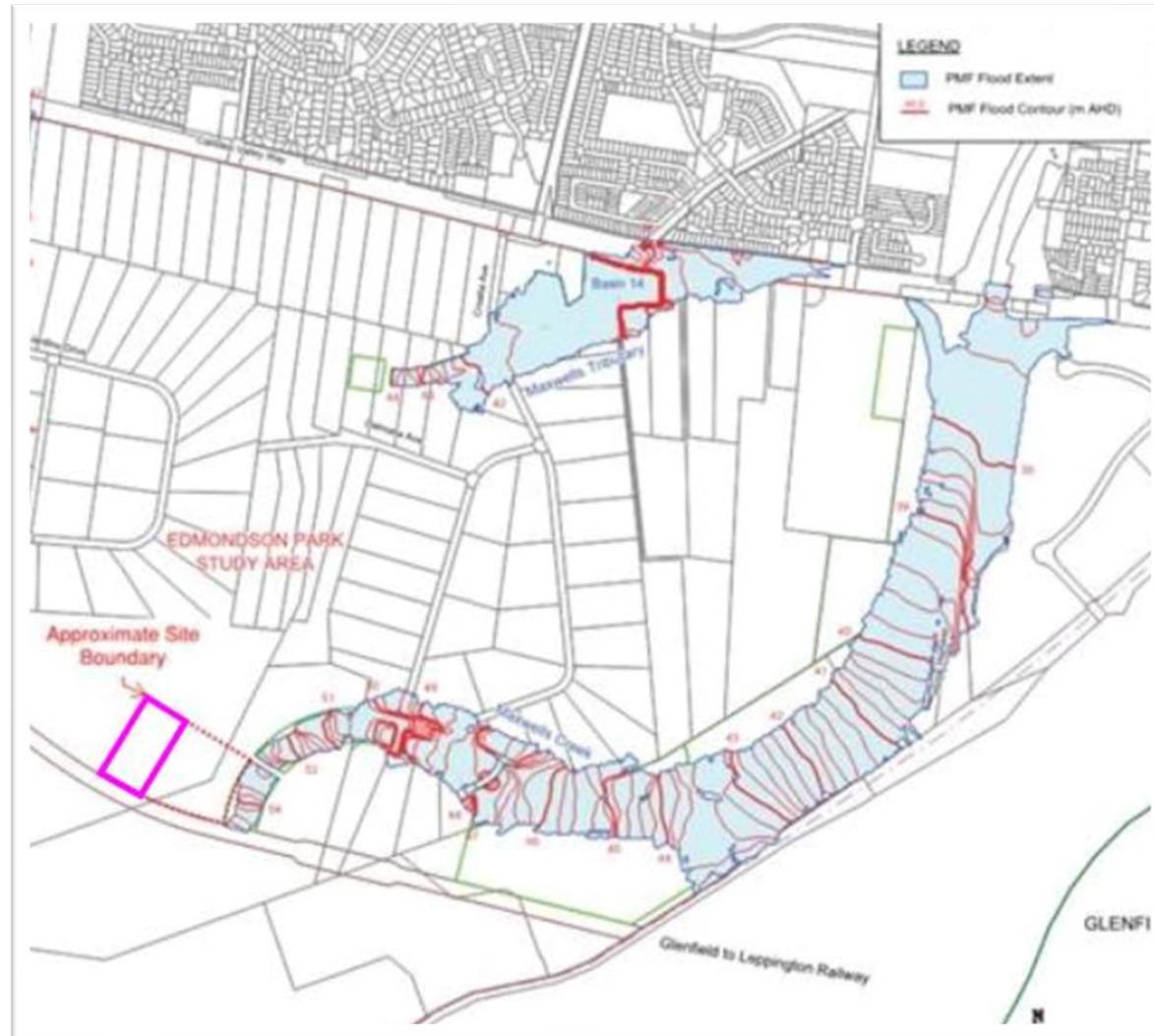


Figure 4 – PMF Flood Extents (FloodMit, 2014).

Furthermore, a qualitative review of SMEC's *Engineering Design Report for Buchan Avenue, Edmondson Park* was undertaken to assess the likelihood of flooding along the north and west boundaries of the site. The site is unlikely to be flood affected along these boundaries as Faulkner Way and Buchan Avenue convey flows away from the site.

The above information is consistent with the Planning Certificate which states that the site is not subjected to flood related controls.

3. Sediment and Soil Erosion Control

3.1 Sediment and Erosion Control

The objectives of the erosion and sediment control for the development site will be to ensure:

- Adequate erosion and sediment control measures are applied prior to the commencement of construction and are maintained throughout construction; and
- Construction site runoff is appropriately treated in accordance with Liverpool City Council's requirements prior to discharge.

As part of the works, the erosion and sedimentation control will need to be provided during the construction phase of the development in accordance with Liverpool City Council's requirements and the NSW Department of Housing Manual, "Managing Urban Stormwater Soil & Construction" 2004 (Blue Book) - prior to any earthworks commencing on site.

3.1.1 Sediment Basin

A temporary sediment basin has been designed to capture site runoff during construction and has been located towards the north eastern side of the site, in the lowest point. The construction of the basin will be undertaken in stages to enable maximum runoff capture assisted by diversion swales and direct runoff to the basin.

Calculations to determine the concept design basin size have been based on available geotechnical information regarding soil types and using the Soils and Construction Volume 1 Manual.

To ensure the sediment basin is working effectively it will be maintained throughout the construction works. Maintenance includes ensuring adequate settlement times or flocculation and pumping of clean water to reach the minimum storage volume at the lower level of the settling zone. The settling zone will be identified by pegs to clearly show the level at which design storage capacity is available.

The pumped water from the sediment basin can be reused for dust control during construction.

Overflow weirs are to be provided to control overflows for rainfall events more than the design criteria which caters for a storm event up to and including the 1% AEP storm event.

The concept sediment basin sizing is summarised in the table below. Detailed sediment basin sizing, configuration and location shall form part of the Construction Certificate application.

The sediment basin has been located for future conversion into the permanent water quality basin.

Table 2 – Sediment Basin Volumes

| | | | |
|------------------------------------|------|-------------------------|--------------------|
| Total Disturbed Area | 2.3 | Settling zone volume | 281m ³ |
| Soil Texture Group | F | Sediment storage volume | 141 m ³ |
| Design rainfall depth (days) | 5 | Total Basin Volume | 422m ³ |
| Design rainfall depth (percentile) | 80 | | |
| x-day, y-percentile rainfall event | 24.4 | | |
| CV | 0.5 | | |

3.1.2 Sediment and Erosion Control Measures

Prior to any earthworks commencing on site, sediment and erosion control measure shall be implemented generally in accordance with the engineering drawings and the "Blue Book". The measures are intended to be a minimum treatment only as the contractor will be required to modify and stage the erosion and sedimentation control measures to suit the construction program, sequencing, and techniques. These measures may include:

- A temporary site security/safety fence is to be constructed around the site, the site office area, and the proposed sediment basin.
- Sediment fencing provided downstream of disturbed areas, including any topsoil stockpiles.
- Dust control measures including covering stockpiles, installing fence hessian and watering exposed areas.
- Placement of hay bales or mesh and gravel inlet filters around and along proposed catch drains and around stormwater inlets pits; and
- The construction of a temporary sediment basin as noted above.
- Stabilised site access at the construction vehicle entry/exits.

Any stockpiled material, including topsoil, shall be located as far away as possible from any associated natural watercourses or temporary overland flow paths. Sediment fences shall be installed to the downstream side of stockpiles and any embankment formation. All stockpiles and embankment formations shall be stabilised by hydroseeding or hydro mulching on formation.



Figure 5 – Sediment Fence

4. Bulk Earthworks

Based on the proposed building layout, preliminary bulk earthworks calculations have been undertaken for the site with consideration to the following Bulk Earthworks set downs:

Table 3 – Earthworks Set downs

| | |
|----------------------------|-------|
| Asphalt Pavement (Carpark) | 550mm |
| Modular Buildings | 750mm |
| Conventional Buildings | 300mm |
| Hardscape (Footpaths) | 250mm |
| Landscape (Planting Areas) | 150mm |
| Landscape (Turfed Areas) | 75mm |
| Games Court | 250mm |

With consideration to the above the following preliminary bulk earthworks cut and fill volumes have been established.

Table 4 – Earthworks Volumes

| | |
|---------|-------------------------------|
| Cut | 831m ³ |
| Fill | 42,865m ³ |
| Balance | 42,034m ³ (Import) |

Based on outcomes of preliminary surface modelling, 42,034m³ of fill material is required to be imported to site to establish bulk earthworks platforms for the proposed development.

Earthworks volumes are to be further refined as the design documentation is developed in the later stages of the project.

4.1 Construction Sequencing

The sequence of work for the bulk earthworks will generally include:

- Provision of site establishment erosion and sediment control measures typically outlined in this report's section Erosion & Sediment Control.
- Clearing of vegetation from the proposed development site and either removal or mulching.
- Stripping and stockpiling of topsoil suitable for reuse.
- Inspection of exposed natural material to ensure conformity with design assumptions and requirements.
- Placement of cut to fill layers not greater than 200mm in thickness and compacted to not less than 98% Standard Maximum Dry Density (SMDD) in accordance with the geotechnical report; and
- Spread topsoil to a maximum depth of 200mm and hydroseed or hydro mulch disturbed areas.

5. Pavements

For the purposes of the concept design, with consideration to traffic loading specified in the Educational Facilities Guidelines and Standards (5×10^5 ESAs) and an assumed CBR 3%, a proposed flexible pavement profile may be as follows:

- 40mm AC10 Wearing Course (Polymer Modified)
- 150mm DGB20 Base Course Material compacted to 98% MMDD
- 330mm DGS40 Subbase Material compacted to 98% MMDD
- Existing Subgrade compacted to 100% SMDD

Should the existing subgrade achieve less than CBR 3%, ground improvement may be required such as lime stabilisation or replacement with a select fill layer such as crushed sandstone, subject to further discussion with the project Geotechnical Engineer.

6. Stormwater Management Strategy

6.1 Stormwater Quantity Management

6.1.1 Stormwater Drainage

Northrop has performed a desktop investigation to determine a conceptual stormwater management strategy for the proposed development scenario, and the requirements for the development. This has relied on Liverpool City Council's current stormwater management requirements and previous correspondence provided by Landcom.

Previous advice from Landcom indicated that On Site Stormwater Detention is not required for the proposed development. We have previously been advised that this element is catered for as part of the regional stormwater detention strategy down-stream of the proposed development site.

At present, this regional stormwater infrastructure has not been constructed. It is critical that the construction programme for the new primary school in Edmondson Park is considered with respect to this infrastructure being provided, to avoid installing interim measures for Onsite stormwater detention and water quality purposes that may become redundant in the future.

Based on the precinct masterplan, Buchan Avenue is to extend along the northern extent of the site. Landcom have provided preliminary design plans for the Buchan Avenue upgrade which shows a new stormwater connection for the school. The legal point of site stormwater discharge would be at the north-eastern corner on Buchan Avenue upgrade extension, which discharges into the creek. Similar to the items above, it is critical that the construction programme of the Buchan Avenue upgrade works is considered to avoid temporary connections to the creek.

From review of advice provided by Landcom, it is understood that the legal point of discharge / stormwater infrastructure in Buchan Avenue will be complete prior to operation of the project commencing and sized to cater for flows generated from the proposed development site up to the 1 in 100-year ARI storm event in a combination of the pit and pipe network and overland flow in the road reserve. This suggests that the local drainage system (in-ground pit and pipe network) within the site should be sized accordingly to direct all flows to the connection point in Buchan Avenue.

Based on the advice provided by Landcom, the proposed method of stormwater drainage will not impact on downstream properties.

6.1.2 Proposed System

A 12d drainage Model for the proposed site is to be developed utilising the following methodology:

- The site pit and pipe network will be designed to discharge directly to existing infrastructure in Buchan Avenue.
- An indicative pit and pipe network will be developed for the proposed siteworks (refer civil engineering plans for details).
- Tailwater conditions will be based on the Hydraulic Grade Line of the proposed stormwater drainage infrastructure in Buchan Avenue.
- Part of the roof catchment from the new buildings is to drain directly to rainwater harvesting tank for the 1:100-year storm event which then overflows to the piped network.
- Designs for roof drainage shall be undertaken as either conventional or siphonic drainage by a certified Hydraulic Engineer during the detail design stage of the works.
- For the purposes of modelling, the rainwater tanks are to be considered full during simulation.
- All paved areas are to be collected within grated pits and drains.
- 20yr and 100yr ARI events are to be considered for all standard durations; and
- For the major system (100yr ARI storm event), a conservative blockage factor of 30% will be applied to all stormwater pits.

6.2 Stormwater Quality Management

Northrop has designed a water quality treatment system for the proposed development subject to confirmation from Landcom on the construction of downstream regional detention / raingardens.

The stormwater management system has been designed to comply with Liverpool City Council's Water Sensitive Urban Design Policy. Council's policy requires improved water quality of the stormwater flow from the developed site prior to discharge into the authority's drainage system.

Council also requires the removal of target pollutants from the site during the construction phase as vehicles that may enter or exit could generate various pollutants such as silt, oil and grease. These target pollutants can be identified into five major groups of stormwater pollutants:

- Gross Pollutants
- Coarse, medium, and fine sediments
- Oil and grease
- Heavy Metals and
- Nutrients

6.2.1 Water Quality Objectives

In accordance with Liverpool City Council's Water Sensitive Urban Design Policy, we note the following targets have been set in relation to stormwater quality

Table 5 – Pollutant Reduction Targets

| | |
|---|-----|
| Reduction in annual average suspended solids (SS) export load | 85% |
| Reduction in annual average total phosphorus (TP) export load | 65% |
| Reduction in annual average total nitrogen (TN) export load | 45% |
| Reduction in annual average gross pollutants (GP) export load | 90% |

To demonstrate compliance with Liverpool City Council's Water Sensitive Urban Design requirements, treatment removal loads will be analysed from pre-to post development scenarios using MUSIC (Model for Urban Stormwater Improvement Conceptualisation) for the main building works.

Model development and results will be provided in subsequent reports and documentation for further review incorporating a combination of various treatment devices as described below.

6.2.2 Proposed Treatments

Possible stormwater quality treatment devices such as StormFilter Cartridges, Ocean Guard Pit Inserts and Rainwater Tanks are discussed below.

6.2.2.1 Rainwater Tank

Currently a 20 kL Rainwater Tank is proposed for this development subject to further review with the project Hydraulic Engineer.

The rainwater collected could be utilised for flushing of the 22 toilets in the buildings at a rate of 0.1kL / toilet / day, and for irrigation of approximately 2,500m² of landscaping at a rate of 0.4kL / year / m².

| | Flow (ML/yr) | TSS (kg/yr) | TP (kg/yr) | TN (kg/yr) | GP (kg/yr) |
|------------------------------|--------------|-------------|------------|------------|------------|
| Flow In | 3.31 | 85.17 | 0.50 | 7.25 | 91.00 |
| ET Loss | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Infiltration Loss | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Low Flow Bypass Out | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| High Flow Bypass Out | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Pipe Out | 2.55 | 61.60 | 0.38 | 5.53 | 0.00 |
| Weir Out | 0.04 | 0.95 | 0.01 | 0.09 | 0.00 |
| Transfer Function Out | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Reuse Supplied | 0.72 | 11.90 | 0.10 | 1.49 | 0.00 |
| Reuse Requested | 1.81 | 0.00 | 0.00 | 0.00 | 0.00 |
| % Reuse Demand Met | 39.99 | 0.00 | 0.00 | 0.00 | 0.00 |
| % Load Reduction | 21.79 | 26.56 | 22.83 | 22.39 | 100.00 |

Decimal Places: 2

Figure 6 – Node Water Balance Results

6.2.2.2 Stormfilter Cartridges

Filtration cartridges in the form of Stormfilters are to be provided as an end of line treatment device to treat stormwater runoff from the proposed development. The Stormfilter system targets a full range of pollutants including total suspended solids, soluble heavy metals, oil and grease and total nutrients. Each cartridge has a treatable flow rate of 1~1.6L/s and is designed to capture and treat the first flush volume of a rainfall event.

In developing the MUSIC model for the proposed works, an offline 15 x 690mm cartridge system by Ocean Protect has been proposed as an end of line treatment prior to discharge. The position of the Stormfilter units have been proposed to maximise flows and allow easy access for maintenance.

6.2.2.3 Ocean Guard Pit Inserts

Surface Inlet Pits within the development area have been designed to be provided with Ocean Guard Pit Inserts including oil absorbent media. The pit inserts will sit beneath the stormwater pit grates and will collect gross pollutants and larger sediments prior to treatment by the Stormfilter cartridges.

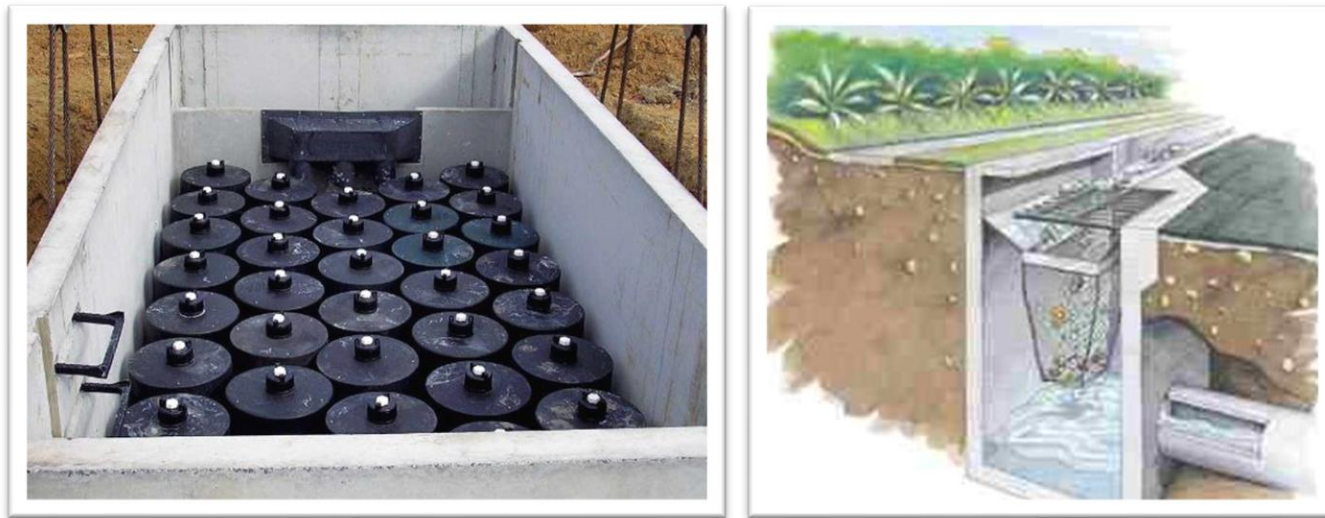


Figure 7 – Stormfilter Cartridge System (Left), Stormwater Pit Litter Basket Insert (Right)

6.2.3 Water Quality Modelling – MUSIC Model, Parameters and Methodology

A water quality modelling tool, MUSIC was utilised to simulate urban stormwater systems operating at a range of temporal and spatial scales. MUSIC Models the total amount of gross pollutants and nutrients produced within various types of catchments. It allows the user to simulate the removal rates expected with implementing removal filters to reduce the increased gross pollutant and nutrient levels created by the proposed development.

The following methodology and parameters were incorporated in the MUSIC Modelling

- The MUSIC model was created to assess the effectiveness of water quality nodes which are to be constructed as part of the proposed development
- In accordance with Council's requirements MUSIC link and standard nodes have been used in the model.
- A Music Model was established to represent the post-developed site. From architectural plans, the site was then categorized into the following areas
 - Roof
 - Road
 - Hardstand
 - Landscape

A treatment train was designed to incorporate a series of treatment nodes including a Rainwater Tank, Stormfilter Cartridges, Ocean Guard Pit Inserts. The effectiveness of the proposed treatments is summarised below.

6.2.4 Results

The following results were achieved in the model

Table 6 – Ocean Guard MUSIC Input Parameters (upstream of Stormfilter)

| Pollutant | Post-Development with no WSUD measures (kg/yr.) | Post-Development with WSUD measures (kg/yr.) | Removal Rate (%) | Target Removal Rate (%) |
|--------------------------|---|--|------------------|-------------------------|
| Suspended Solids (mg/L) | 1140 | 171 | 85 | 85.4 |
| Phosphorus (mg/L) | 2.41 | 0.832 | 65.5 | 65 |
| Nitrogen (mg/L) | 20.5 | 10 | 51.2 | 49.4 |
| Gross Pollutants (kg/ML) | 207 | 3.76 | 98.2 | 95.6 |

Results of the MUSIC analysis indicate that the proposed treatment train consisting of a 20kL Rainwater Tank, 15 x Stormfilter Cartridges and 35 x Ocean Guard Pit Inserts generally satisfies Council's statutory requirements for target pollutant removal rates.

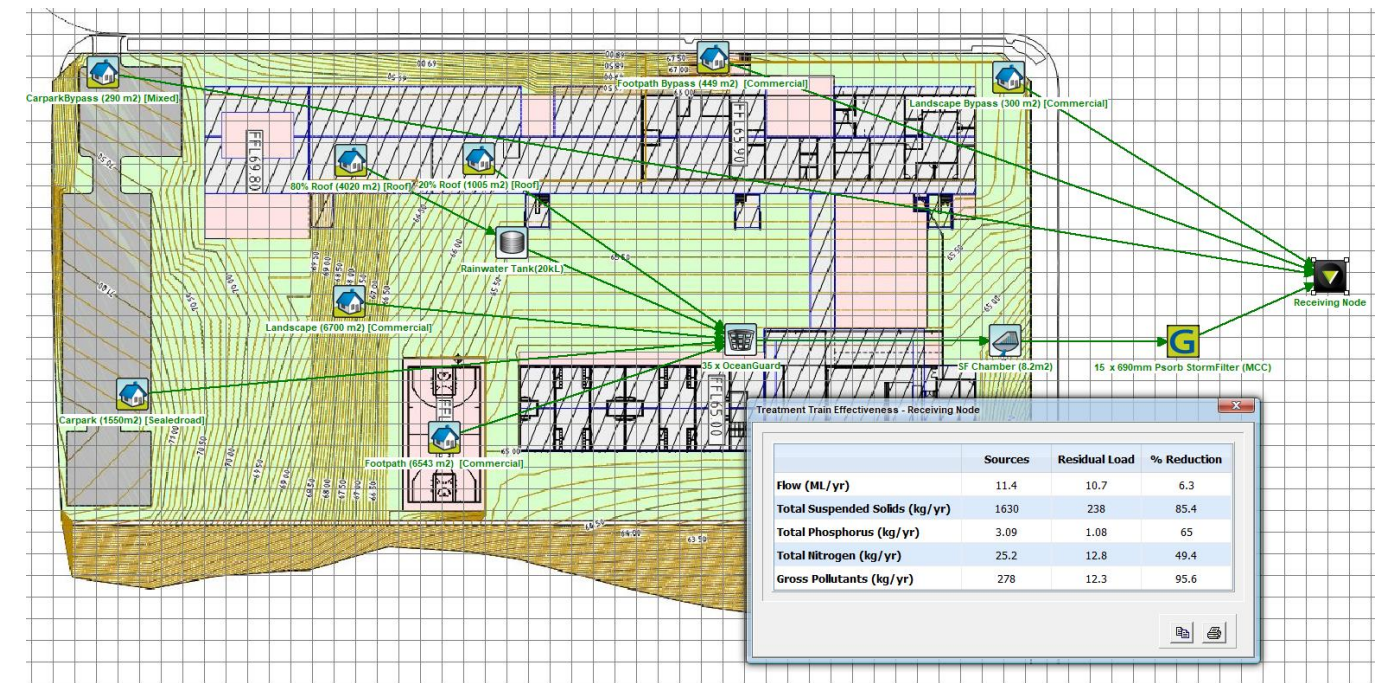
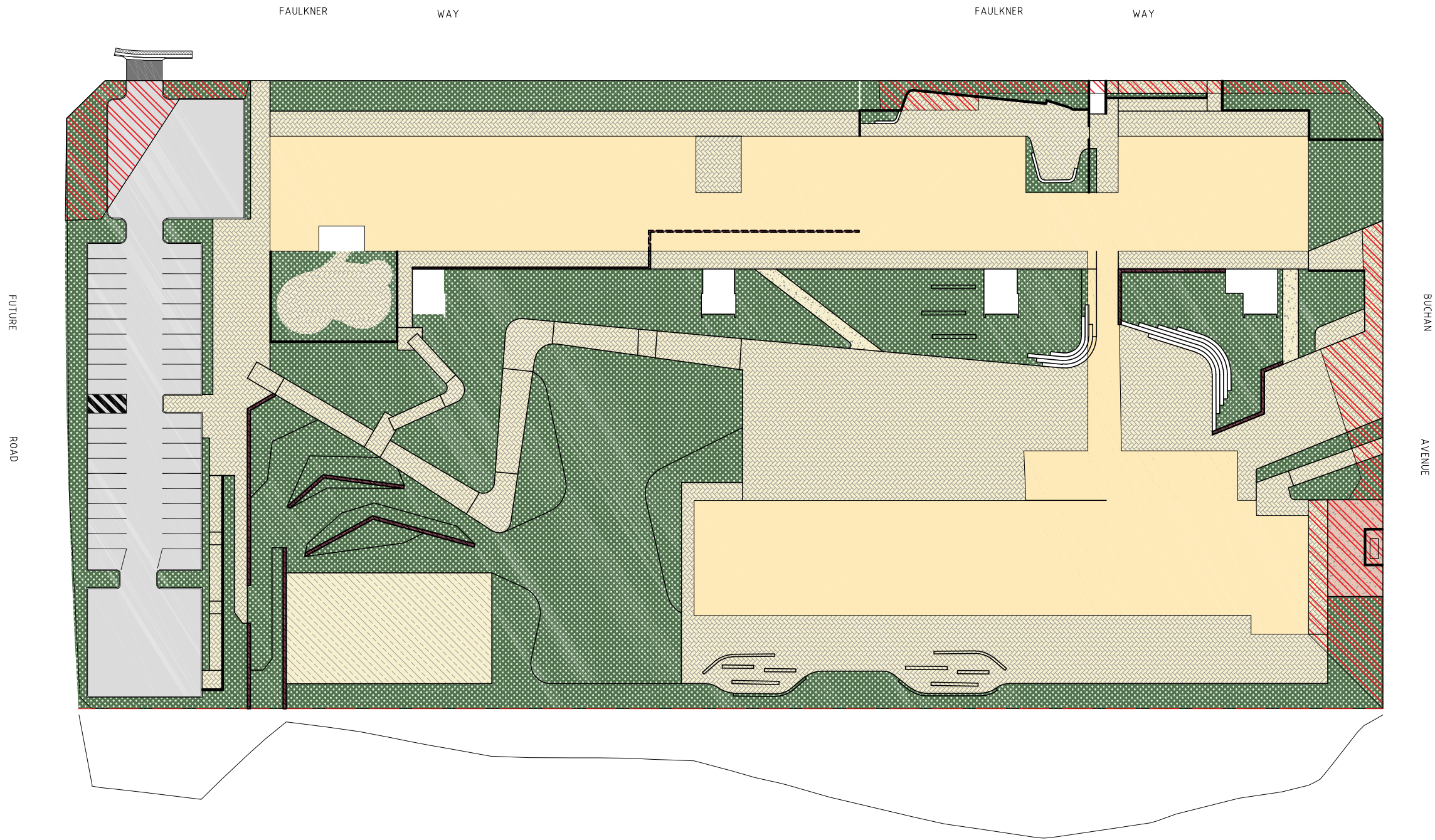


Figure 8 – MUSIC Model and Results

Appendix A – MUSIC Catchment Plan



| LEGEND | |
|--------|--|
| | CARPARK - 1550m ² |
| | HARDSTAND AREA - 6543 m ³ |
| | ROOF - 5026 m ² |
| | LANDSCAPE - 6700 m ² |
| | CARPARK BYPASS - 290 m ² (50% IMPERVIOUS) |
| | FOOTPATH BYPASS - 449 m ² |
| | LANDSCAPE BYPASS - 300 m ² |

Appendix B – Engineering Plans

NEW PRIMARY SCHOOL IN EDMONDSON PARK

BUCHAN AVENUE, EDMONDSON PARK, NSW 2174
CIVIL ENGINEERING PACKAGE - SCHEMATIC DESIGN



LOCALITY PLAN

SOURCE: GOOGLEMAPS (2021)

| CIVIL DRAWING SCHEDULE | |
|------------------------|---|
| DRAWING No. | DRAWING TITLE |
| 0101 | COVER SHEET, DRAWING SCHEDULE AND LOCALITY PLAN |
| 0111 | SPECIFICATION NOTES - SHEET 01 |
| 0112 | SPECIFICATION NOTES - SHEET 02 |
| 0121 | GENERAL ARRANGEMENT PLAN |
| 0201 | SEDIMENT AND SOIL EROSION CONTROL PLAN |
| 0211 | SEDIMENT AND SOIL EROSION CONTROL DETAILS |
| 0301 | BULK EARTHWORKS CUT TO FILL PLAN |
| 0401 | SITEWORKS AND STORMWATER MANAGEMENT PLAN - SHEET 01 |
| 0402 | SITEWORKS AND STORMWATER MANAGEMENT PLAN - SHEET 02 |
| 0421 | STORMWATER LONGITUDINAL SECTIONS - SHEET 01 |
| 0422 | STORMWATER LONGITUDINAL SECTIONS - SHEET 02 |
| 0423 | STORMWATER LONGITUDINAL SECTIONS - SHEET 03 |
| 0424 | STORMWATER LONGITUDINAL SECTIONS - SHEET 04 |
| 0425 | STORMWATER LONGITUDINAL SECTIONS - SHEET 05 |
| 0426 | STORMWATER LONGITUDINAL SECTIONS - SHEET 06 |
| 0427 | STORMWATER LONGITUDINAL SECTIONS - SHEET 07 |
| 0701 | DETAIL SHEET 01 |
| 0702 | DETAIL SHEET 02 |
| 0703 | DETAIL SHEET 03 |
| 0704 | DETAIL SHEET 04 |
| 0705 | DETAIL SHEET 05 |

DRAWN: J.O
DESIGNED: T. BUGAEV
JOB MANAGER: J. GILLIGAN
VERIFIER: .

| REVISION | DESCRIPTION | ISSUED | VER'D | APP'D | DATE |
|----------|-----------------|--------|-------|-------|----------|
| A | ISSUED FOR SSDA | CP | | JG | 18.05.21 |
| | | | | | |
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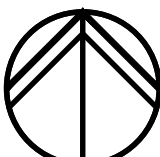
RICHARD CROOKES
CONSTRUCTIONS

DRAWING NOT TO BE USED FOR CONSTRUCTION UNLESS
VERIFICATION SIGNATURE HAS BEEN ADDED

ARCHITECT


**TKDArchitects**
Tanner Kibble Denton

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PROJECT

**NEW PRIMARY SCHOOL IN
EDMONDSON PARK**

**BUCHAN AVENUE,
EDMONDSON PARK, NSW 2174**

DRAWING TITLE

**CIVIL ENGINEERING PACKAGE
- SCHEMATIC DESIGN**

**COVER SHEET, DRAWING
SCHEDULE AND LOCALITY PLAN**

JOB NUMBER

210040

DRAWING NUMBER




0101

REVISION

A

DRAWING SHEET SIZE = A1

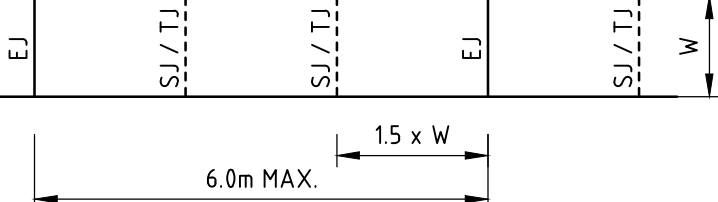
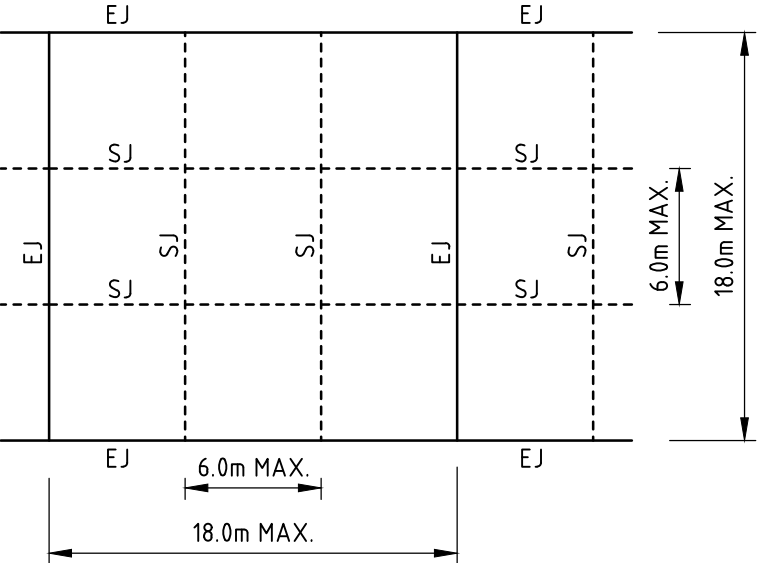
NOT FOR CONSTRUCTION

| REVISION | DESCRIPTION | ISSUED | VER'D | APP'D | DATE | CLIENT | ARCHITECT | | PROJECT | DRAWING TITLE | JOB NUMBER |
|-------------------------|------------------|--------|-------|----------|--|--|--|--|---|--|--|
| A | ISSUED FOR \$SDA | CP | JG | 18.05.21 |  RICHARD CROOKES CONSTRUCTIONS |  TKD Architects Tanner Kibble Denton | ALL DIMENSIONS TO BE VERIFIED ON SITE BEFORE COMMENCING WORK. NORTHROP ACCEPTS NO RESPONSIBILITY FOR THE USABILITY, COMPLETENESS OR SCALE OF DRAWINGS TRANSFERRED ELECTRONICALLY. THIS DRAWING MAY HAVE BEEN PREPARED USING COLOUR, AND MAY BE INCOMPLETE IF COPIED TO BLACK & WHITE |  NORTHROP Sydney Level 11 345 George Street, Sydney NSW 2000 Ph (02) 9241 4188 Fax (02) 9241 4324 Email sydney@northrop.com.au ABN 81 094 433 100 | NEW PRIMARY SCHOOL IN EDMONDSON PARK BUCHAN AVENUE, EDMONDSON PARK, NSW 2174 | CIVIL ENGINEERING PACKAGE - SCHEMATIC DESIGN SPECIFICATION NOTES - SHEET 01 | 210040 DRAWING NUMBER 0111 REVISION A |
| | | | | | | DRAWING NOT TO BE USED FOR CONSTRUCTION UNLESS VERIFICATION SIGNATURE HAS BEEN ADDED | THE COPYRIGHT OF THIS DRAWING REMAINS WITH NORTHROP CONSULTING ENGINEERS PTY LTD | | | | |
| DRAWING SHEET SIZE = A1 | | | | | | | | | | | |

DRAWN: J.O
DESIGNED: T. BUCAEV
JOB MANAGER: J. GILLIGAN
VERIFIER: .

NOTE: ALL CIVIL ENGINEERING CONSTRUCTION WORKS TO BE CARRIED OUT IN ACCORDANCE WITH LIVERPOOL CITY COUNCIL DEVELOPMENT GUIDELINES. READ IN CONJUNCTION WITH THE NOTES PROVIDED BELOW.
IF CONFLICT ARISE, LIVERPOOL CITY COUNCIL GUIDELINES AND SPECIFICATIONS TAKE PRECEDENCE. WHERE LIVERPOOL CITY COUNCIL GUIDELINES AND SPECIFICATIONS ARE SILENT, THE SPECIFICATION NOTES BELOW TAKE PRECEDENCE.

| ENGINEERING CERTIFICATION | |
|--|---|
| 1. | TO CERTIFY THE CONSTRUCTED CIVIL WORKS, A QUALIFIED EXPERIENCED ENGINEER IS TO VISIT THE SITE TO OBSERVE CONSTRUCTION TECHNIQUES AND VARIOUS ELEMENTS THAT MAY BE CONCEALED WHEN THE WORKS ARE COMPLETE. |
| 2. | THIS SPECIFICATION ALLOWS FOR CERTIFICATION OF WORKS CONTROLLED BY A PRIVATE CERTIFIER FOR LAND DEVELOPMENT WORKS. THIS SPECIFICATION DOES NOT COVER CERTIFICATION REQUIREMENTS FOR AUTHORITIES SUCH AS COUNCIL, RMS OR OFFICE OF WATER. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO DETERMINE AND PROVIDE ALL PROJECT SPECIFIC CONSTRUCTION COMPLIANCE (WORKS AS EXECUTED) INFORMATION TO THE SATISFACTION OF THE STAKEHOLDER / AUTHORITY. DISCREPANCIES BETWEEN THIS SPECIFICATION AND SPECIFICATIONS OF OTHER EXTERNAL STAKEHOLDERS / AUTHORITIES IS TO BE REPORTED TO THE SUPERINTENDENT FOR CLARIFICATION. |
| 3. | THE CONTRACTOR IS TO AGREE WITH THE ENGINEER AN APPROPRIATE SITE VISIT SCHEDULE AND FEE ARRANGEMENT PRIOR TO COMMENCEMENT OF THE WORKS. THE CONTRACTOR SHALL ENSURE THAT THE ENGINEER CAN SAFELY ACCESS ALL CIVIL ELEMENTS TO BE REVIEWED. SITE VISITS ARE CONDUCTED DURING NORMAL BUSINESS HOURS. WE REQUIRE TWO (2) WORKING DAY NOTICE FOR ANY SITE VISIT. |
| 4. | TO PROVIDE CERTIFICATION THE ENGINEER MUST VISIT THE SITE TO OBSERVE. 4.1. PAVEMENTS 4.1.1. POOR SUBGRADE CONDITIONS 4.1.2. PROOF ROLLING OF SUB-GRADE 4.1.3. PLACEMENT OF SUB-BASE COURSE, BASE COURSE AND WEARING COURSE. 4.1.4. PLACEMENT OF STEEL REINFORCEMENT / DOWELS AND JOINT CRADLES PRIOR TO POURING OF CONCRETE 4.2. EARTHWORKS 4.2.1. TOPSOIL STRIP 4.2.2. EARTHWORKS BATTER 4.2.3. FILLING 4.3. STORMWATER DRAINAGE 4.3.1. DRAINAGE TRENCHES PRIOR TO BACKFILLING 4.3.2. LEGAL POINT OF CONNECTION PRIOR TO BACKFILLING 4.3.3. ANY OTHER DRAINAGE STRUCTURE THAT MAY BE CONCEALED DURING THE COURSE OF THE WORKS 4.4. CONCRETE STRUCTURES 4.4.1. PLACEMENT OF ANY STEEL REINFORCEMENT PRIOR TO CONSTRUCTION. |
| 5. | THE CONTRACTOR SHALL PROVIDE SURVEYED LEVELS, PREPARED BY A QUALIFIED SURVEYOR FOR SUBGRADE, SUB-BASE COURSE, BASE COURSE AND WEARING COURSE. |
| 6. | THE CONTRACTOR SHALL PROVIDE WORKS AS EXECUTED (WAE) DOCUMENTATION PREPARED BY A QUALIFIED PRACTISING SURVEYOR. THE WAE DRAWINGS SHALL CLEARLY SHOW, STORMWATER GRATE/ COVER LEVELS, STORMWATER PIT INVERT LEVELS AND CORRESPONDING INVERT LEVELS OF ANY INCOMING OR OUTGOING PIPES, DIAMETER OF ALL PIPES, DIMENSIONS AND VOLUME OF ON-SITE DETENTION FACILITIES, INVERT LEVELS OF ORIFICE PLATES, OVERFLOW WEIRS, BASE OF TANK FINISHED LEVELS OF PAVEMENTS. THE WAE SHALL SHOW WHERE THE SIZE OR ALIGNMENT OF CIVIL ENGINEERING ELEMENTS WHEN THEY DEViate FROM THE DESIGN DOCUMENTATION. |
| 7. | THE WAE DRAWINGS SHALL BE STAMPED WITH THE FOLLOWING STATEMENT "THESE WAE DRAWINGS HAVE BEEN PREPARED BY [COMPANY NAME] AND ARE A TRUE AND ACCURATE REPRESENTATION OF THE CONSTRUCTED WORKS". EACH DRAWING SHALL BE SIGNED AND DATED BY THE SURVEYOR WHO PREPARED THE DRAWINGS. |
| THESE WAE DRAWINGS HAVE BEEN PREPARED BY [COMPANY NAME] AND ARE A TRUE AND ACCURATE REPRESENTATION OF THE CONSTRUCTED WORKS. | |
| SIGNED..... DATE..... | |
| NAME..... | |
| POSITION..... | |
| 8. | WAE SHALL BE PROVIDED IN BOTH AUTOCAD AND PDF FORMAT. NORTHROP CONSULTING ENGINEERS WILL PROVIDE ENGINEERING PLANS TO THE CONTRACTOR IN AUTOCAD FORMAT TO AID PREPARATION OF WAE DOCUMENTATION. |
| 9. | CONTRACTOR IS TO UNDERTAKE A CCTV INSPECTION OF ALL STORMWATER DRAINAGE PIPELINES AND PROVIDE TO THE ENGINEER FOR APPROVAL. |
| 10. | THE CONTRACTOR SHALL PROVIDE ALL RELEVANT TEST CERTIFICATES PROGRESSIVELY THROUGHOUT THE DURATION OF THE WORKS. ALL TEST CERTIFICATES SHALL BE PREPARED BY A NATA REGISTERED LABORATORY. TEST CERTIFICATES ARE REQUIRED FOR PROOF ROLLING, SUBGRADE COMPACTION, COMPACTION OF PAVEMENT LAYERS, COMPACTION OF FILLING OPERATIONS, CONCRETE SLUMP TEST, AND CONCRETE STRENGTH TESTS. THE CONTRACT SHALL PROVIDE ALL RELEVANT VALIDATIONS BY A GEOTECHNICAL ENGINEER FOR ALL IMPORTED FILL. |
| 11. | EACH TEST CERTIFICATE WILL NOMINATE THE DATE AND TIME OF THE TEST AND PROVIDE A LOCATION OF WHERE THE TEST SAMPLE WAS TAKEN FROM. |
| 12. | THE CONTRACTOR SHALL ARRANGE FOR THE ENGINEER TO CONDUCT A FINAL VISIT TO REVIEW OF THE CONSTRUCTED WORKS. THIS WILL REVIEW WILL NOT TAKE PLACE UNTIL THE WAE DOCUMENTATION AND RELEVANT TEST CERTIFICATES HAVE BEEN RECEIVED. |
| 13. | IF DEFECTIVE OR INCOMPLETE WORK IS FOUND DURING THE FINAL INSPECTION ANOTHER INSPECTION MAY BE REQUIRED AT THE CONTRACTORS EXPENSE TO VERIFY THE RECTIFICATION WORKS HAVE BEEN COMPLETED. |

| PAVEMENT JOINTS | |
|-----------------|--|
| 1. | PROVIDE 10mm ABLEFLEX BETWEEN NEW CONCRETE WORKS AND EXISTING STRUCTURES. |
| 2. | LOCAL AUTHORITY REQUIREMENTS SHALL TAKE PRECEDENCE WITHIN THE PUBLIC ROAD RESERVE. |
| 3. | DOWELS TO BE PLACED ON PROPRIETARY CRADLES TO ENSURE CORRECT SPACING AND ALIGNMENT. |
| 4. | PEDESTRIAN PAVEMENTS ALL PEDESTRIAN PAVEMENTS ARE TO BE JOINTED AS FOLLOWS U.N.O. ON THE DESIGN DRAWINGS. |
| 5. | EXPANSION JOINTS ARE TO BE LOCATED WHERE POSSIBLE AT TANGENT POINTS OF CURVES AND ELSEWHERE AT MAX. 6.0m CENTRES. |
| 6. | WEAKENED PLANE JOINTS (SAWN OR TOOL JOINTS) ARE TO BE LOCATED AT A MAX. SPACING OF 15m x WIDTH OF THE PAVEMENT. |
| 7. | WHERE POSSIBLE JOINTS SHOULD BE LOCATED TO MATCH KERBING AND OR ADJACENT PAVEMENT JOINTS. |
| 8. | TYPICAL PEDESTRIAN PAVEMENT JOINT DETAIL  |
| 9. | VEHICULAR PAVEMENTS ALL VEHICULAR PAVEMENTS TO BE JOINTED AS FOLLOWS U.N.O. ON THE DESIGN DRAWINGS. |
| 10. | TIED KEYED CONSTRUCTION JOINTS SHOULD GENERALLY BE LOCATED LONGITUDINALLY AT A MAX. OF 6.0m CENTRES. |
| 11. | SAWN JOINTS SHOULD GENERALLY BE LOCATED LATERALLY AT A MAX. OF 6.0m CENTRES WITH DOWELED EXPANSION JOINTS AT MAX. 18.0m CENTRES. |
| 12. | TYPICAL VEHICULAR PAVEMENT JOINT DETAIL.  |
| 13. | KERB EXPANSION JOINTS SHALL BE FORMED FROM 10mm ABLEFLEX FOR FULL DEPTH OF SECTION. |
| 14. | KERB EXPANSION JOINTS TO BE LOCATED AT DRAINAGE PITS, TANGENT POINTS OF CURVES / CORNERS AND AT 12m MAX CENTRES. |
| 15. | KERB TOOLED JOINTS TO BE MIN 3mm WIDE AND LOCATED AT MAX 3m CENTRES. |
| 16. | INTEGRAL KERB JOINTS SHALL MATCH THE LOCATION OF PAVEMENT JOINTS. |

| CONCRETE SEALING | |
|------------------|---|
| 1. | THE CURING PROCESS FOR NEW CONCRETE IS TO INCORPORATE THE FOLLOWING ASPECTS, GENERALLY AS ORDERED; 1.1. SPRAY CURING COMPOUND 1.2. SAWCUT JOINTS AS LOCATED AND SPECIFIED AS SOON AS CURING PERMITS. 1.3. COVER NEW PAVING WITH HESSIAN AND BLACK PLASTIC SHEETS TAPED AT JOINTS ON COMPLETION OF SAWCUTTING. NOTE COVERING IS TO EXTEND MIN 5m BEYOND PAVEMENT BEING CURED, OVER ADJOINING (EXISTING) PAVEMENT AREAS, MAINTAIN CURING AS SPECIFIED. |

CONCRETE PAVEMENTS

1. THIS SECTION REFERS TO CIVIL CONCRETE WORKS AND DOES NOT INCLUDE STRUCTURAL ELEMENTS SUCH AS BUILDINGS, BELOW GROUND STRUCTURES OR RETAINING WALLS.

2. ALL WORKMANSHIP AND MATERIALS SHALL BE IN ACCORDANCE WITH AS3600 CURRENT EDITION WITH AMENDMENTS, EXCEPT WHERE VARIED BY THE CONTRACT DOCUMENTS.

3. **CONCRETE QUALITY AND REINFORCING COVER**
ALL REQUIREMENTS OF THE CURRENT ACSE CONCRETE SPECIFICATION DOCUMENT 1 SHALL APPLY TO THE FORMWORK, REINFORCEMENT AND CONCRETE UNLESS NOTED OTHERWISE.

| ELEMENT | CONCRETE STRENGTH f'c (MPa) | SPECIFIED SLUMP | NOMINAL AGGREGATE SIZE | MAX. 56 DAY DRYING SHRINKAGE | COVER (mm) |
|------------------------------|-----------------------------|-----------------|------------------------|------------------------------|------------|
| KERBS AND PATHS | 25 | 60 | 20 | 650microns | TOP 40 |
| PITS AND VEHICULAR PAVEMENTS | 32 | 80 | 20 | 650microns | TOP 40 |

4. CONCRETE PROPERTIES SHALL BE VARIED FROM NORMAL CLASS AS FOLLOWS

4.1. MINIMUM CEMENT CONTENT 250 kg/m³

4.2. MAXIMUM 56 DAY SHRINKAGE STRAIN = AS NOMINATED ABOVE

4.3. PRIOR TO COMMENCEMENT CONCRETE SUPPLIER TO PROVIDE DRYING SHRINKAGE TEST RESULTS FROM PRODUCTION ASSESSMENT AS EVIDENCE THAT SPECIFIED DRYING SHRINKAGE LIMITS CAN BE ACHIEVED USING NORMAL MIX DESIGN.

5. ALL REINFORCEMENT SHALL BE FIRMLY SUPPORTED ON MILD STEEL PLASTIC TIPPED CHAIRS. PLASTIC CHAIRS OR CONCRETE CHAIRS AT NOT GREATER THAN 1m CENTRES BOTH WAYS. BARS SHALL BE TIED AT ALTERNATE INTERSECTIONS.

6. CEMENT TYPE SHALL BE (ACSE SPECIFICATION) TYPE SL.

7. PROJECT CONTROL TESTING SHALL BE CARRIED OUT IN ACCORDANCE WITH AS 1379. TEST CYLINDERS ARE TO BE KEPT ON SITE.

8. ALL COMPRESSIVE STRENGTH TEST REPORTS SHALL BE SUBMITTED TO THE CIVIL ENGINEER FOR REVIEW.

9. ALL CONCRETE IS TO BE CONTINUOUSLY CURED FOR A MINIMUM PERIOD OF 10 DAYS AFTER PLACING. CURING TO COMMENCE IMMEDIATELY AFTER FINISHING. SPRAY ON CURING COMPOUNDS TO COMPLY WITH AS3799.

10. PLACE CONCRETE CONTINUOUSLY BETWEEN CONSTRUCTION JOINTS SHOWN ON PLAN. DO NOT BREAK OR INTERRUPT SUCCESSIVE POURS SUCH THAT COLD JOINTS OCCUR. ANY REVISIONS OR ADDITIONS TO CONSTRUCTION JOINTS SHOWN ON PLAN REQUIRE APPROVAL FROM THE CIVIL ENGINEER.

11. FALLS IN SLAB AS SHOWN ON PLAN MAINTAIN MINIMUM SLAB THICKNESS AS SHOWN.

12. NO ADMIXTURES SHALL BE USED IN CONCRETE UNLESS APPROVED IN WRITING BY THE DESIGN ENGINEER.

13. THE FINISHED CONCRETE SHALL BE A DENSE HOMOGENOUS MASS, COMPLETELY FILLING THE FORMWORK, THOROUGHLY EMBEDDING THE REINFORCEMENT AND FREE OF STONE POCKETS.

14. FABRIC SHALL BE LAPPED IN ACCORDANCE WITH THE FOLLOWING DETAIL:

<

CONCRETE

1.

CARRY OUT ALL CONCRETE WORK IN ACCORDANCE WITH AS3600 AND NATSPEC CONCRETE STANDARDS.

2.

CONCRETE PROPERTIES AND COVER TO REINFORCING:

| ELEMENT | CONCRETE STRENGTH f'c (MPa) | MAX. 56 DAY DRYING SHRINKAGE | COVER (mm) |
|-----------------|-----------------------------|------------------------------|---------------|
| SLABS ON GROUND | 32 | 650microns | TOP 40 BTM 40 |
| TANK LID | 40 | 700microns | TOP 40 BTM 40 |

MAXIMUM AGGREGATE SIZE

= 20mm U.N.O.

SLUMP DURING PLACING

= 75mm

EXPOSURE CLASSIFICATION

= B1

NO ADMIXTURES SHALL BE USED IN CONCRETE MIX UNLESS APPROVED BY STRUCTURAL ENGINEER IN WRITING.

3.

CONCRETE PROPERTIES FOR SLABS AND BEAMS SHALL BE VARIED FROM NORMAL CLASS AS FOLLOWS:

- MINIMUM CEMENT CONTENT 250kg/cu.m.

- PRIOR TO COMMENCEMENT CONCRETE SUPPLIER TO PROVIDE DRYING SHRINKAGE TEST RESULTS FROM PRODUCTION ASSESSMENT AS EVIDENCE THAT SPECIFIED DRYING SHRINKAGE LIMITS CAN BE ACHIEVED USING NORMAL MIX DESIGN.

4.

SUBMIT FOR APPROVAL THE FOLLOWING TO THE STRUCTURAL ENGINEER:

- CURING PROCEDURE (PVA MEMBRANES NOT PERMITTED)

- STRIPPING PROCEDURE

- DETAILS AND LOCATION OF CAST IN SERVICES

- CONDUITS, PENETRATIONS AND CONSTRUCTION JOINT LOCATIONS

5.

ALL CONCRETE MIXES SHALL BE DESIGNED BY A RECOGNISED TESTING LAB AND SUBMITTED FOR REVIEW BY THE STRUCTURAL ENGINEER.

6.

ALL COMPRESSIVE STRENGTH TEST REPORTS SHALL BE SUBMITTED TO THE STRUCTURAL ENGINEER FOR REVIEW.

7.

PROJECT CONTROL TESTING SHALL BE CARRIED OUT ON ALL CONCRETE IN ACCORDANCE WITH AS1379. TEST CYLINDERS ARE TO BE KEPT ON SITE.

8.

ALL CONCRETE IS TO BE CONTINUOUSLY CURED FOR A MINIMUM PERIOD OF 10 DAYS AFTER PLACING. CURING TO COMMENCE IMMEDIATELY AFTER FINISHING. SPRAY ON CURING COMPOUNDS TO COMPLY WITH AS3799.

9.

FOR TENDER PURPOSES ASSUME MINIMUM STRIPPING TIMES AND EXTENT OF BACK PROPPING AS PER AS3610-1995 SECTION 5.0 AND AS PER GENERAL NOTES FOR FORMWORK AND PROPPING.

10.

FORMWORK FINISH CLASSIFICATION TO AS3600:

| ELEMENT | CLASS |
|---------------------|----------------|
| - INGROUND FOOTINGS | 5 |
| - RETAINING WALLS | 5 EARTH FACE |
| - RETAINING WALLS | 3 EXPOSED FACE |
| - COLUMNS | 2 |
| - BEAMS AND SLABS | 2 |

11.

SURFACE FINISHES:

- COLUMNS AND WALLS OFF FORM

12.

COMPACT ALL CONCRETE INCLUDING FOOTINGS AND SLABS, USING MECHANICAL VIBRATORS.

13.

PLACE CONCRETE CONTINUOUSLY BETWEEN CONSTRUCTION JOINTS SHOWN ON PLAN. DO NOT BREAK OR INTERRUPT SUCCESSIVE POURS SUCH THAT COLD JOINTS OCCUR. ANY REVISIONS OR ADDITIONS TO CONSTRUCTION JOINTS SHOWN ON PLAN REQUIRE APPROVAL FROM THE STRUCTURAL ENGINEER.

14.

CONCRETE PROFILES:

- BEAM DEPTHS ARE WRITTEN FIRST AND INCLUDE THE SLAB THICKNESS.

- SIZES OF CONCRETE ELEMENTS DO NOT INCLUDE THICKNESS OF APPLIED FINISHES.

- NO HOLES, CHASES OR EMBEDMENT OF PIPES OTHER THAN SHOWN IN THE STRUCTURAL DRAWINGS SHALL BE MADE IN CONCRETE MEMBERS WITHOUT THE PRIOR WRITTEN APPROVAL OF THE STRUCTURAL ENGINEER.

- PROVIDE DRIP GROOVES AT ALL EXPOSED EDGES, CHAMFERS, DRIP GROOVES, REGLETS ETC TO BE TO ARCHITECTS DETAILS.

15.

ALL PENETRATIONS TO HAVE 2-N16 TRIMMER BARS TOP AND BOTTOM TO EACH FACE U.N.O. EXTEND TRIMMERS 600 BEYOND PENETRATION.

16.

SETDOWNS OR FALLS IN FLOOR SURFACES ARE NOT PERMITTED UNLESS SHOWN ON DRAWINGS. MAINTAIN MINIMUM SLAB THICKNESS SHOWN ON PLAN WHERE FALLS OCCUR.

CONCRETE (cont)

17. REINFORCEMENT GRADE AND NOTATION:

| SYMBOL | BAR SHAPE | STRENGTH GRADE (MPa) | DUCTILITY CLASS | TO COMPLY WITH AUST. STANDARD |
|--------|--------------------------------------|----------------------|-----------------|-------------------------------|
| N | DEFORMED RIB BAR | 500 | NORMAL | AS4671 |
| R | PLAIN ROUND BAR | 250 | NORMAL | AS4671 |
| RL | RECTANGULAR MESH OF DEFORMED RIB BAR | 500 | LOW | AS4671 |
| SL | SQUARE MESH OF DEFORMED RIB BAR | 500 | LOW | AS4671 |
| L-TM | TRENCH MESH | 500 | LOW | AS4671 |

ALL REINFORCING BARS SHALL BE GRADE D500N TO AS4671 AND ALL MESH SHALL BE GRADE 500L TO AS4671 U.N.O. CLASS L REINFORCEMENT SHALL NOT BE USED U.N.O.

REINFORCEMENT LABELS:

N12-300

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| THE 12D DESIGN FILE SHALL BE VERIFIED BY THE CONTRACTOR PRIOR TO USE IN THE CONSTRUCTION WORKS. | |
| HARDCOPY/PDF PLANS AND DOCUMENTS TAKE PRECEDENCE OVER THE SUPPLIED ELECTRONIC INFORMATION AND ANY INCONSISTENCIES SHOULD IMMEDIATELY BE REPORTED TO NORTHROP CONSULTING ENGINEERS FOR VERIFICATION PRIOR TO USE BY THE CONTRACTOR. | |
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| THE USE OF THE 3D MODEL INFORMATION SHALL CONSTITUTE ACKNOWLEDGMENT AND ACCEPTANCE OF THE ABOVE STATEMENTS BY THE RECIPIENT. | |

| SAFETY IN DESIGN | |
|---|---|
|  | THE FOLLOWING ITEMS HAVE BEEN IDENTIFIED AS SAFETY RISKS  ELECTRICAL OVERHEAD |

| SEDIMENT BASIN MANAGEMENT | |
|---------------------------|--|
| 1. | PRIOR TO ANY FORECAST WEATHER EVENT, LIKELY TO RESULT IN SEDIMENT LADEN RUNOFF ON THE SITE, ANY EXISTING DETENTION BASINS/TRAPS SHALL BE DEWATERED TO PROVIDE SUFFICIENT CAPACITY TO CAPTURE SEDIMENT LADEN WATER FROM THE SITE. |
| 2. | ANY SEDIMENT LADEN WATER CAPTURED ON-SITE MUST BE TREATED TO ENSURE IT WILL ACHIEVE COUNCIL'S WATER QUALITY OBJECTIVES PRIOR TO ITS RELEASE FROM SITE. A SAMPLE OF THE RELEASED TREATED WATER MUST BE KEPT ON-SITE IN A CLEAR CONTAINER WITH THE SAMPLE DATE RECORDED. |
| 3. | NO ALUMINIUM BASED PRODUCTS MAY BE USED TO TREAT TURBID WATER (FLOCCULATING/COAGULANTS) ON-SITE WITHOUT THE PRIOR WRITTEN PERMISSION FROM AN APPROPRIATE COUNCIL OFFICER. THE APPLICANT MUST HAVE DEMONSTRATED ABILITY TO USE SUCH PRODUCTS CORRECTLY AND WITHOUT ENVIRONMENTAL HARM PRIOR TO ANY APPROVAL. |
| 4. | THE CHEMICAL/AGENT (FLOCCULATING/COAGULANTS) USED IN TYPE D AND TYPE F BASINS TO TREAT TURBID WATER CAPTURED IN THE BASIN MUST BE APPLIED IN CONCENTRATIONS SUFFICIENT TO ACHIEVE COUNCIL'S WATER QUALITY OBJECTIVES (TSS < 50mg/L, TURBIDITY < 60 NTU, 6.5 < pH < 8.5) WITHIN THE 5-DAY RAINFALL DEPTH USED TO CALCULATE THE CAPACITY OF THE BASIN, AFTER A RAINFALL EVENT. |
| 5. | ALL MANUFACTURERS INSTRUCTIONS MUST BE FOLLOWED FOR THE USE OF ANY CHEMICALS/AGENTS USED ON-SITE, EXCEPT WHERE APPROVED BY THE RESPONSIBLE PERSON OR AN APPROPRIATE COUNCIL OFFICER. |
| 6. | SUFFICIENT QUANTITIES OF CHEMICALS/AGENTS TO TREAT TURBID WATER (FLOCCULATING/COAGULANTS) MUST BE PLACED SUCH THAT WATER ENTERING THE BASINS/SEDIMENT TRAP MIXES WITH THE CHEMICALS/AGENTS AND IS CARRIED INTO THE BASIN/TRAP. |
| 7. | ANY BASIN MUST BE DEWATERED AS SOON AS PRACTICAL, ONCE WATER CAPTURED IN THE BASIN ACHIEVES COUNCIL'S WATER QUALITY OBJECTIVES. |
| 8. | INSPECT THE SEDIMENT BASINS AFTER EACH RAINFALL EVENT AND/OR WEEKLY. ENSURE THAT ALL SEDIMENT IS REMOVED ONCE THE SEDIMENT STORAGE ZONE IS FULL. ENSURE THAT OUTLET AND EMERGENCY SPILLWAY WORKS ARE MAINTAINED IN A FULLY OPERATIONAL CONDITION AT ALL TIMES. |


| SEDIMENT BASIN SIZING | |
|------------------------------------|-------|
| CONSTRAINT | VALUE |
| TOTAL DISTURBED AREA | 2.3 |
| SOIL TEXTURE GROUP | F |
| DESIGN RAINFALL DEPTH (DAYS) | 5 |
| DESIGN RAINFALL DEPTH (PERCENTILE) | 80 |
| X-DAY, Y-PERCENTILE RAINFALL EVENT | 24.4 |
| Cv | 0.5 |
| SETTLING ZONE VOLUME | 281m³ |
| SEDIMENT STORAGE VOLUME | 141m³ |
| TOTAL BASIN VOLUME | 422m³ |

NOT FOR CONSTRUCTION

| REVISION | DESCRIPTION | ISSUED | VER'D | APP'D | DATE |
|----------|-----------------|--------|-------|-------|----------|
| A | ISSUED FOR SSDA | CP | | JG | 18.05.21 |
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RICHARD CROOKES
CONSTRUCTIONS

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Tanner Kibble Denton

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Email sydney@northrop.com.au ABN 81 094 433 100

PROJECT

NEW PRIMARY SCHOOL IN EDMONDSON PARK

BUCHAN AVENUE, EDMONDSON PARK, NSW 2174

DRAWING TITLE

CIVIL ENGINEERING PACKAGE - SCHEMATIC DESIGN

SPECIFICATION NOTES - SHEET 02

JOB NUMBER

210040

DRAWING NUMBER

0112

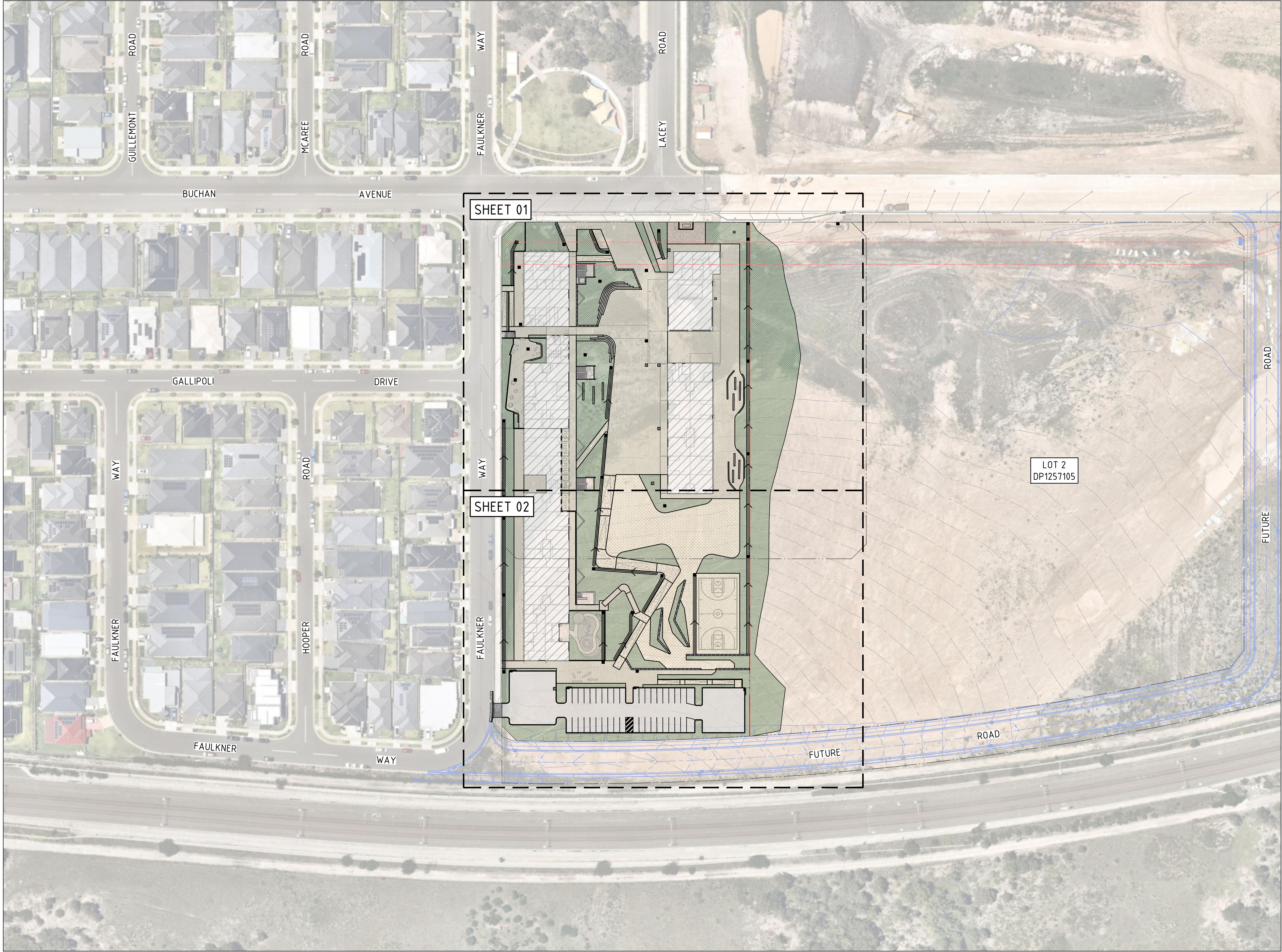
REVISION

A

DRAWING SHEET SIZE = A1

DESIGNED: T. BUGAEV
JOB MANAGER: J. GILLIGAN
VERIFIER: .

DRAWN: J.O



| LEGEND | |
|--------|-------------------------|
| | PROPOSED BOUNDARY LINE |
| | EXISTING BOUNDARY LINE |
| | EASEMENT LINE |
| | ROAD DESIGN (BY OTHERS) |
| | SITEWORKS SHEET EXTENTS |

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SCALE 1:800@A1

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PROJECT

NEW PRIMARY SCHOOL IN EDMONDSON PARK
BUCHAN AVENUE, EDMONDSON PARK, NSW 2174

DRAWING TITLE

CIVIL ENGINEERING PACKAGE - SCHEMATIC DESIGN
GENERAL ARRANGEMENT PLAN

JOB NUMBER

210040

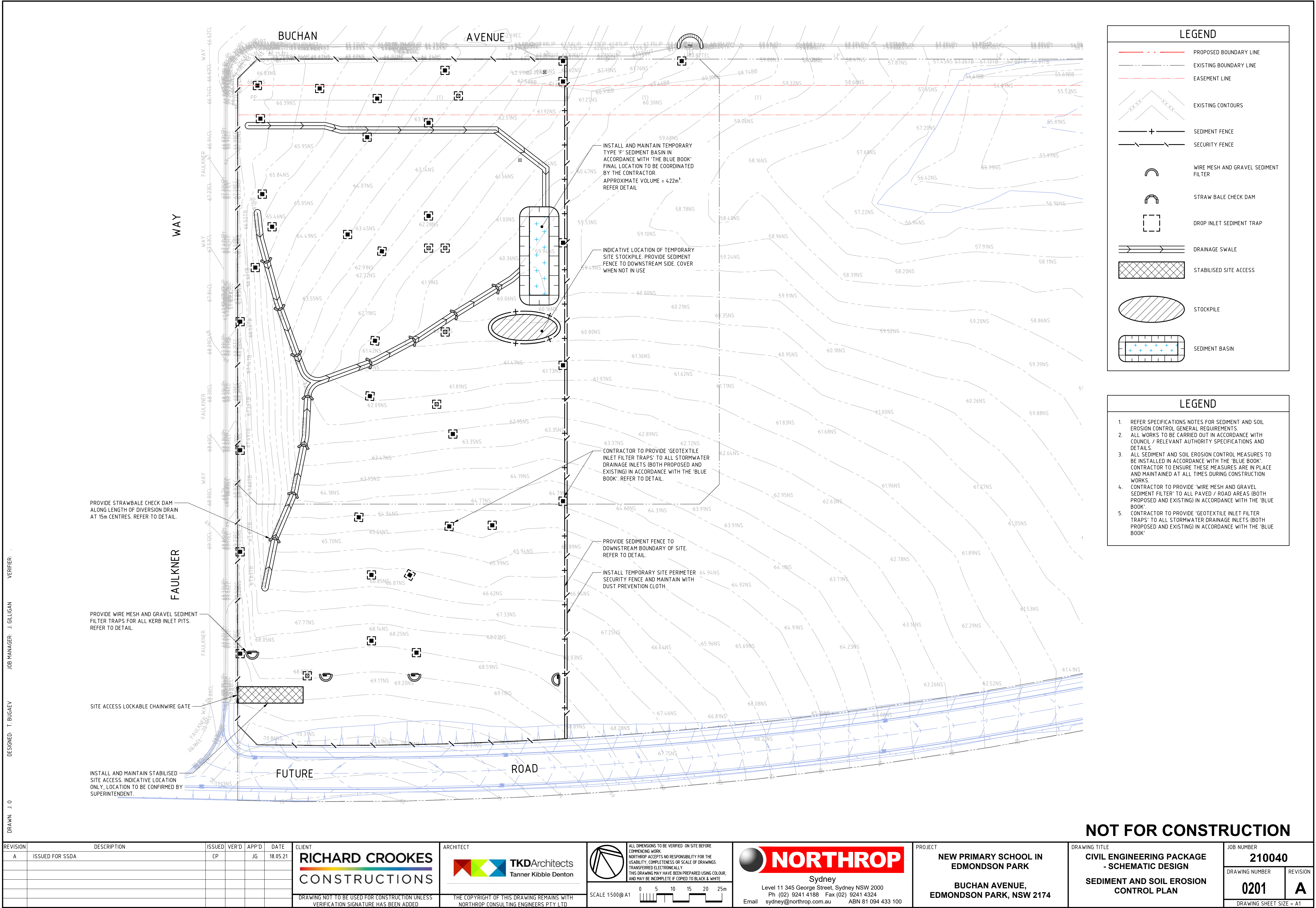
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0121

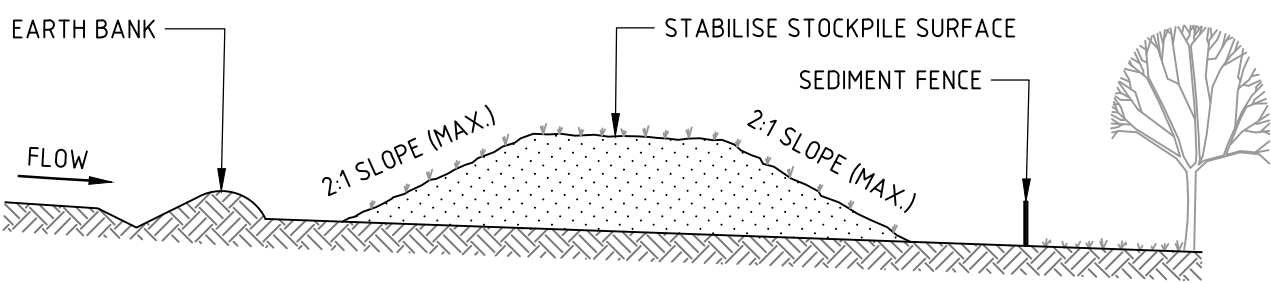
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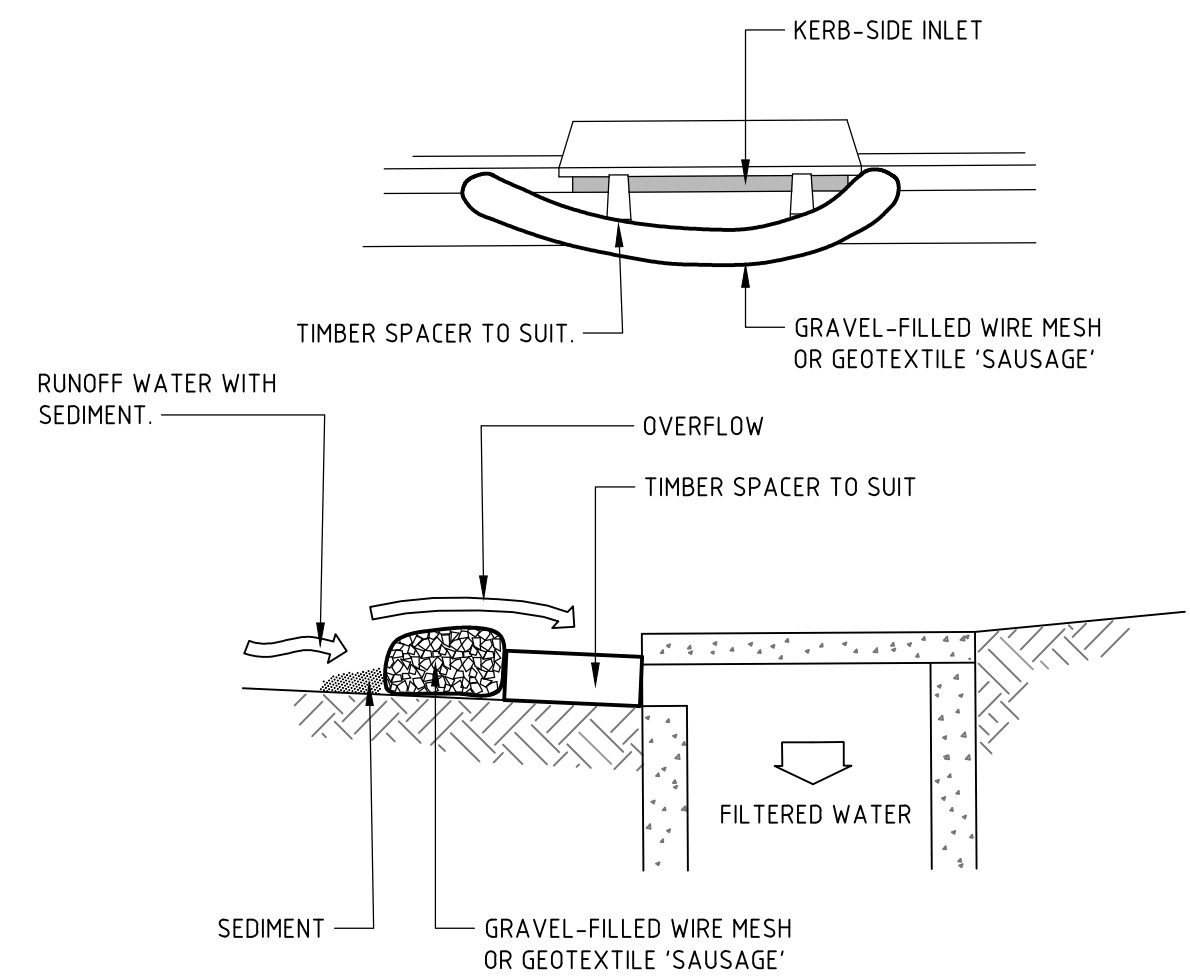
DESIGNED: T. BUAEV
JOB MANAGER: J. GILLIGAN
VERIFIER: J. GILLIGAN
DRAWN: J. O



CONSTRUCTION NOTES

1. PLACE STOCKPILES MORE THAN 2m (PREFERABLY 5m) FROM EXISTING VEGETATION, CONCENTRATED WATER FLOW, ROADS AND HAZARD AREAS.
2. CONSTRUCT ON THE CONTOUR AS LOW, FLAT, ELONGATED MOUNDS.
3. WHERE THERE IS SUFFICIENT AREA, TOPSOIL STOCKPILES SHALL BE LESS THAN 2m IN HEIGHT.
4. WHERE THEY ARE TO BE IN PLACE FOR MORE THAN 10 DAYS, STABILISE FOLLOWING THE APPROVED ESCP OR SWMP TO REDUCE THE C-FACTOR TO LESS THAN 0.10.
5. CONSTRUCT EARTH BANKS (STANDARO DRAWING 5-5) ON THE UPSLOPE SIDE TO DIVERT WATER AROUND STOCKPILES AND SEDIMENT FENCES (STANDARD DRAWING 6-8) 1 TO 2m DOWNSLOPE.

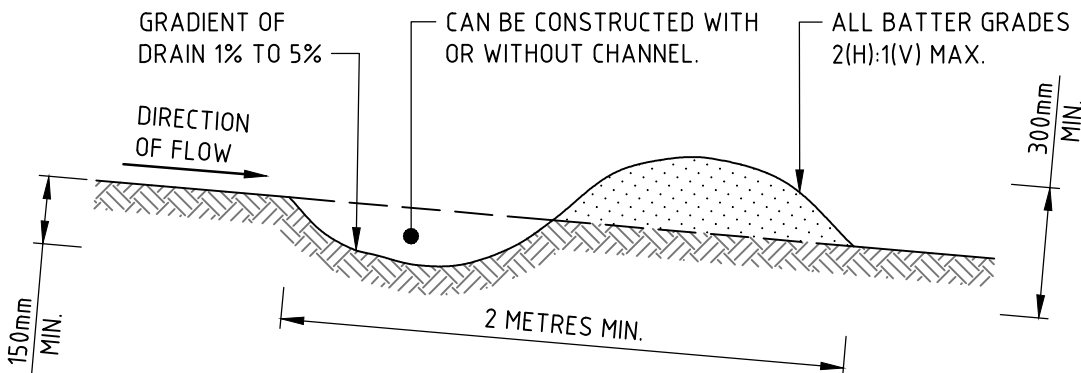
STOCKPILE



CONSTRUCTION NOTES

1. INSTALL FILTERS TO KERB INLETS ONLY AT SAG POINTS.
2. FABRICATE A SLEEVE MADE FROM GEOTEXTILE OR WIRE MESH LONGER THAN THE LENGTH OF THE INLET PIT AND FILL IT WITH 25mm TO 50mm GRAVEL.
3. FORM AN ELLIPTICAL CROSS-SECTION ABOUT 150mm HIGH x 400mm WIDE.
4. PLACE THE FILTER AT THE OPENING LEAVING AT LEAST A 100mm SPACE BETWEEN IT AND THE KERB INLET. MAINTAIN THE OPENING WITH SPACER BLOCKS.
5. FORM A SEAL WITH THE KERB TO PREVENT SEDIMENT BYPASSING THE FILTER.
6. SANDBAGS FILLED WITH GRAVEL CAN SUBSTITUTE FOR THE MESH OR GEOTEXTILE PROVIDING THEY ARE PLACED SO THAT THEY FIRMLY ABUT EACH OTHER AND SEDIMENT-LADEN WATERS CANNOT PASS BETWEEN.

WIRE MESH AND GRAVEL SEDIMENT FILTER

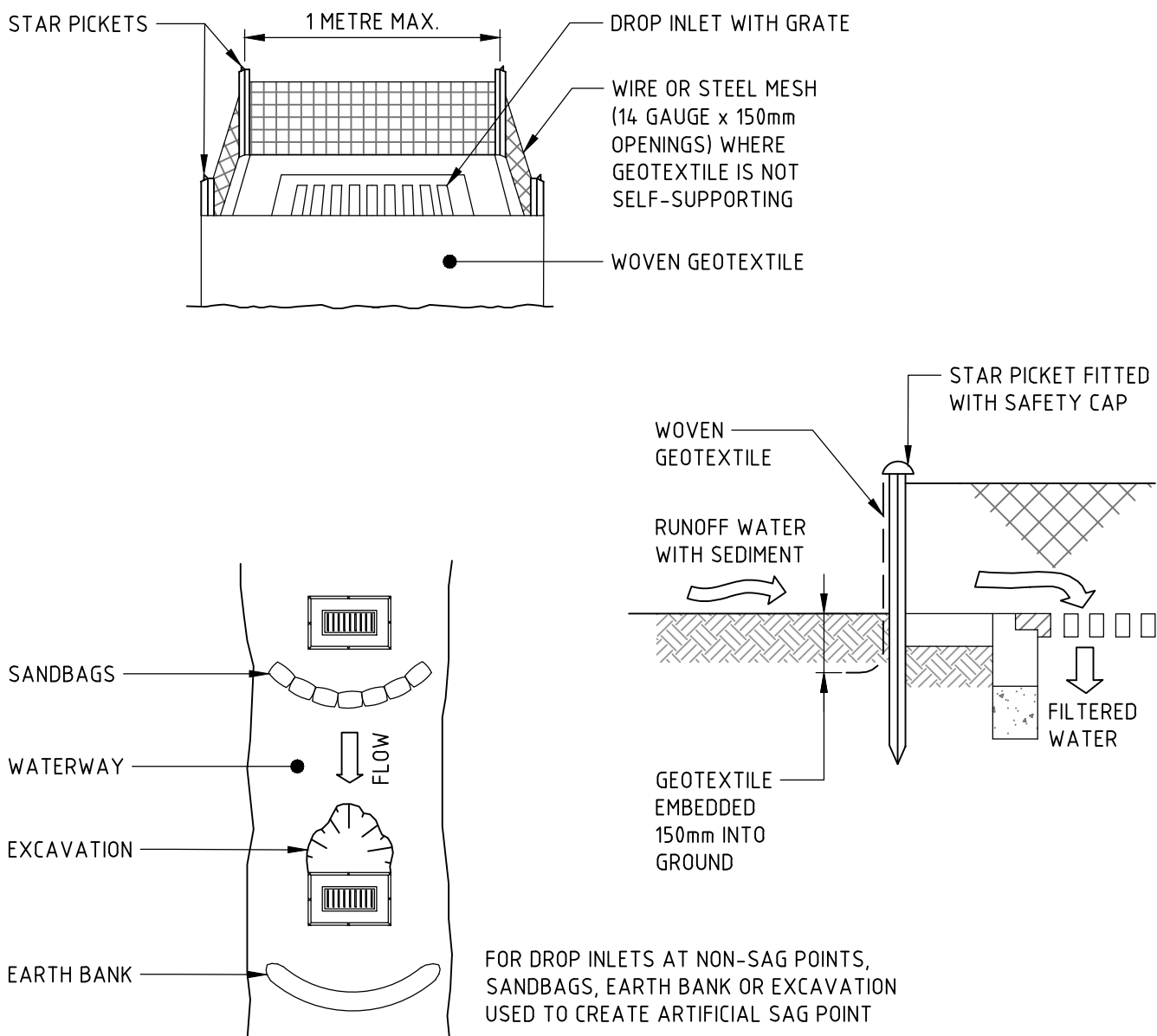


CONSTRUCTION NOTES

1. BUILD WITH GRADIENTS BETWEEN 1 AND 5 PERCENT.
2. AVOID REMOVING TREES AND SHRUBS IF POSSIBLE - WORK AROUND THEM.
3. ENSURE THE STRUCTURES ARE FREE OF PROJECTIONS OR OTHER IRREGULARITIES THAT COULD IMPEDE WATER FLOW.
4. BUILD THE DRAINS WITH CIRCULAR, PARABOLIC OR TRAPEZOIDAL CROSS SECTIONS, NOT V SHAPED.
5. ENSURE THE BANKS ARE PROPERLY COMPACTED TO PREVENT FAILURE.
6. COMPLETE PERMANENT OR TEMPORARY STABILISATION WITHIN 10 DAYS OF CONSTRUCTION.

NOTE: ONLY TO BE USED AS TEMPORARY BANK WHERE MAXIMUM UPSLOPE LENGTH IS 80 METRES.

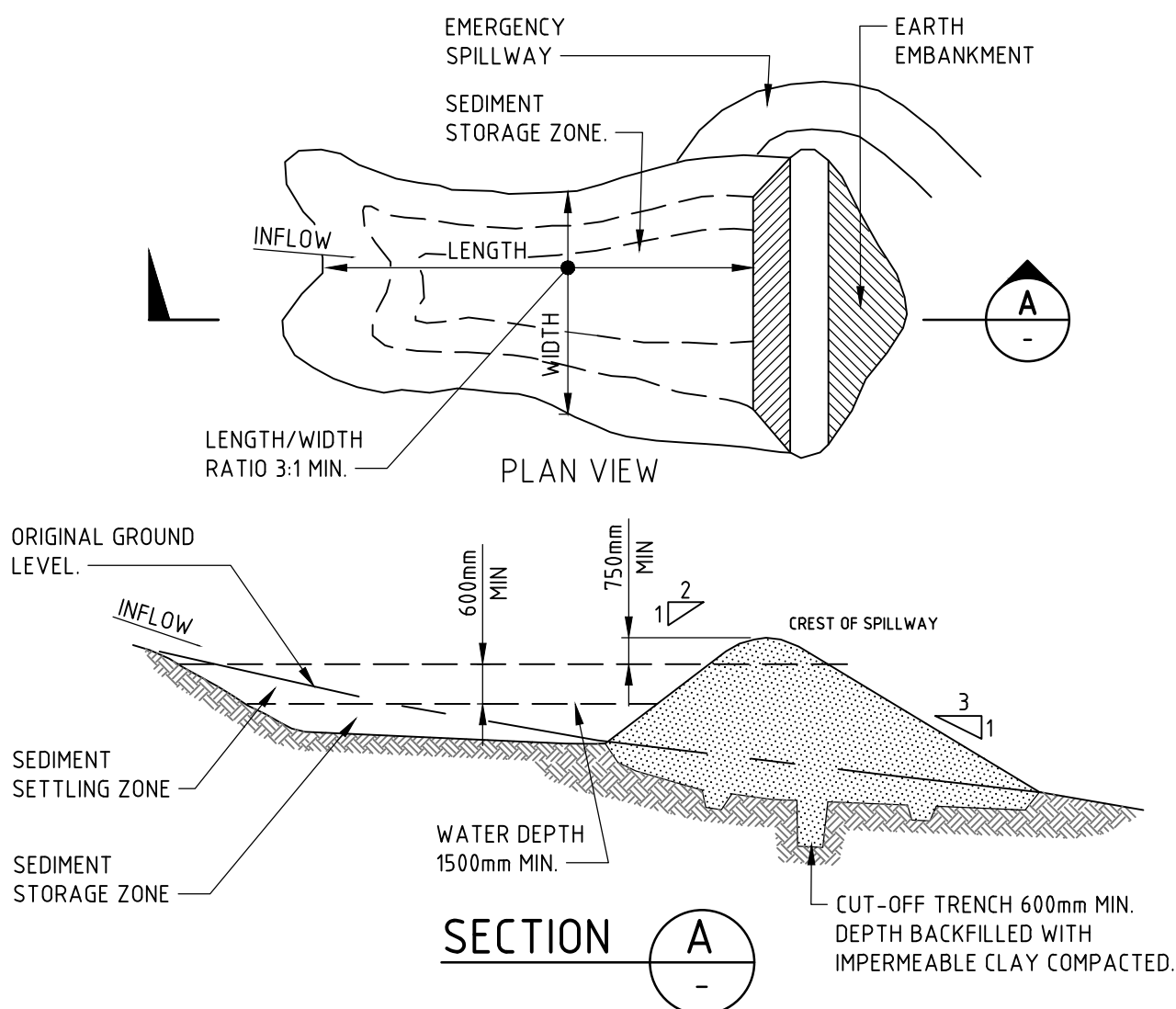
DRAINAGE SWALE



CONSTRUCTION NOTES

1. FABRICATE A SEDIMENT BARRIER MADE FROM GEOTEXTILE OR STRAW BALES.
2. FOLLOW STANDARD DRAWING 6-7 AND STANDARD DRAWING 6-8 FOR INSTALLATION PROCEDURES FOR THE STRAW BALES OR GEOFABRIC. REDUCE THE PICKET SPACING TO 1 METRE CENTRES.
3. IN WATERWAYS, ARTIFICIAL SAG POINTS CAN BE CREATED WITH SANDBAGS OR EARTH BANKS AS SHOWN IN THE DRAWING.
4. DO NOT COVER THE INLET WITH GEOTEXTILE UNLESS THE DESIGN IS ADEQUATE TO ALLOW FOR ALL WATERS TO BYPASS IT.

GEOTEXTILE INLET FILTER TRAPS

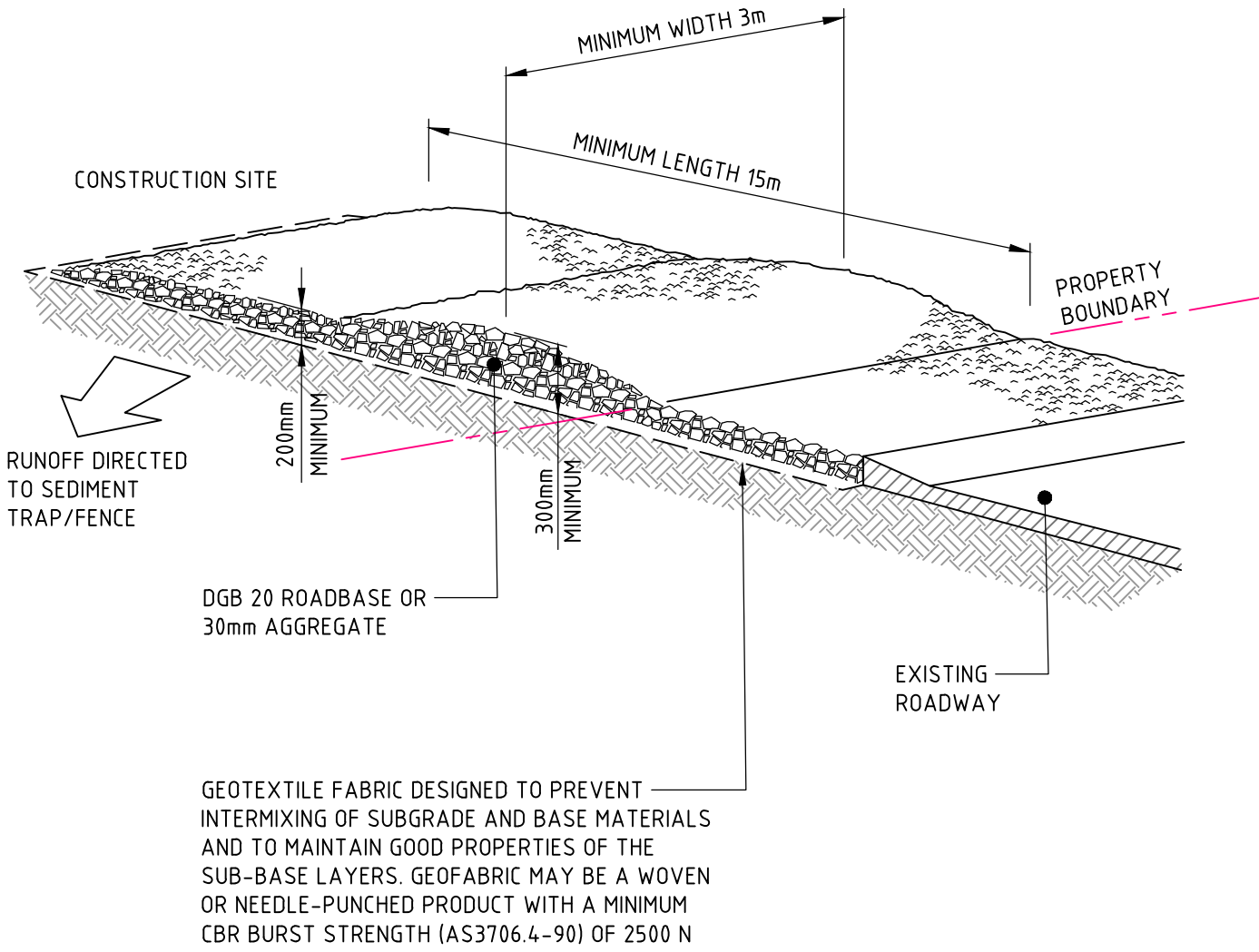


CONSTRUCTION NOTES

1. REMOVE ALL VEGETATION AND TOPSOIL FROM UNDER THE DAM WALL AND FROM WITHIN THE STORAGE AREA.
2. CONSTRUCT A CUT-OFF TRENCH 500mm DEEP AND 1200mm WIDE ALONG THE CENTRELINE OF THE EMBANKMENT EXTENDING TO A POINT ON THE GULLY WALL LEVEL WITH THE RISER CREST.
3. MAINTAIN THE TRENCH FREE OF WATER AND RECOMPACT THE MATERIALS WITH EQUIPMENT AS SPECIFIED IN THE SWMP TO 95 PER CENT STANDARD PROCTOR DENSITY.
4. SELECT FILL FOLLOWING THE SWMP THAT IS FREE OF ROOTS, WOOD, ROCK, LARGE STONE OR FOREIGN MATERIAL.
5. PREPARE THE SITE UNDER THE EMBANKMENT BY RIPPING TO AT LEAST 100mm TO HELP BOND COMPACTED FILL TO THE EXISTING SUBSTRATE.
6. SPREAD THE FILL IN 100mm TO 150mm LAYERS AND COMPACT IT AT OPTIMUM MOISTURE CONTENT FOLLOWING THE SWMP.
7. CONSTRUCT THE EMERGENCY SPILLWAY.
8. REHABILITATE THE STRUCTURE FOLLOWING THE SWMP.

(APPLIES TO 'TYPE D' AND 'TYPE F' SOILS ONLY)

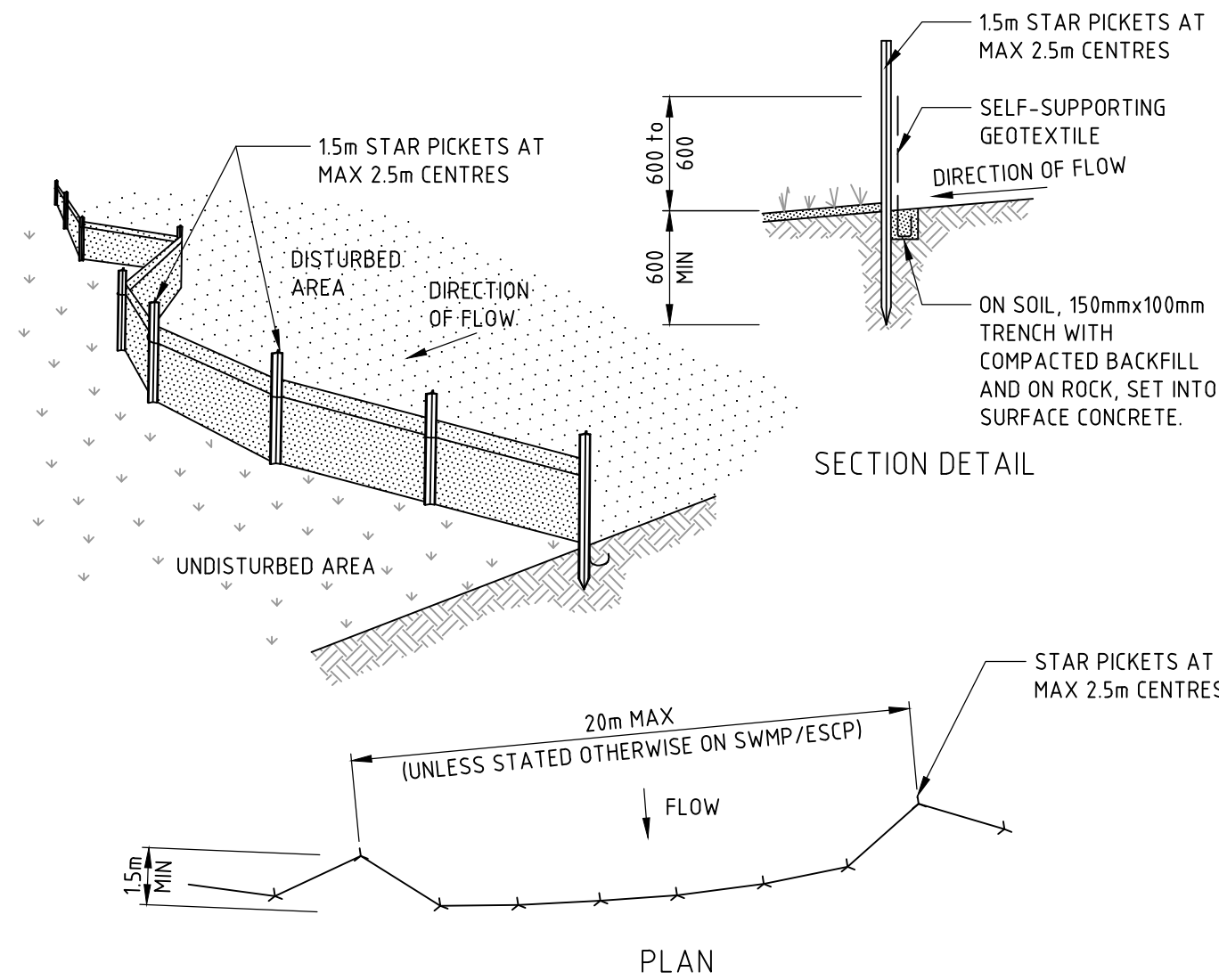
SEDIMENT BASIN



CONSTRUCTION NOTES

1. STRIP THE TOPSOIL, LEVEL THE SITE AND COMPACT THE SUBGRADE.
2. COVER THE AREA WITH NEEDLE-PUNCHED GEOTEXTILE.
3. CONSTRUCT A 200mm THICK PAD OVER THE GEOTEXTILE USING ROAD BASE OR 30mm AGGREGATE.
4. ENSURE THE STRUCTURE IS AT LEAST 15 METRES LONG OR TO BUILDING ALIGNMENT AND AT LEAST 3 METRES WIDE.
5. WHERE A SEDIMENT FENCE JOINS ONTO THE STABILISED ACCESS, CONSTRUCT A HUMPS IN THE STABILISED ACCESS TO DIVERT WATER TO THE SEDIMENT FENCE.

STABILISED SITE ACCESS



CONSTRUCTION NOTES

1. CONSTRUCT SEDIMENT FENCES AS CLOSE AS POSSIBLE TO BEING PARALLEL TO THE CONTOURS OF THE SITE, BUT WITH SMALL RETURNS AS SHOWN IN THE DRAWING TO LIMIT THE CATCHMENT AREA OF ANY ONE SECTION. THE CATCHMENT AREA SHOULD BE SMALL ENOUGH TO LIMIT WATER FLOW IF CONCENTRATED AT ONE POINT TO 50 LITRES PER SECOND IN THE DESIGN STORM EVENT, USUALLY THE 10-YEAR EVENT.
2. CUT A 150mm DEEP TRENCH ALONG THE UPSLOPE LINE OF THE FENCE FOR THE BOTTOM OF THE FABRIC TO BE ENTRENCHED.
3. DRIVE 15 METRE LONG STAR PICKETS INTO GROUND AT 2.5 METRE INTERVALS (MAX) AT THE DOWNSLOPE EDGE OF THE TRENCH. ENSURE ANY STAR PICKETS ARE FITTED WITH SAFETY CAPS.
4. FIX SELF-SUPPORTING GEOTEXTILE TO THE UPSLOPE SIDE OF THE POSTS ENSURING IT GOES TO THE BASE OF THE TRENCH. FIX THE GEOTEXTILE WITH WIRE TIES OR AS RECOMMENDED BY THE MANUFACTURER. ONLY USE GEOTEXTILE SPECIFICALLY PRODUCED FOR SEDIMENT FENCING. THE USE OF SHADE CLOTH FOR THIS PURPOSE IS NOT SATISFACTORY.
5. JOIN SECTIONS OF FABRIC AT A SUPPORT POST WITH A 150mm OVERLAP.
6. BACKFILL THE TRENCH OVER THE BASE OF THE FABRIC AND COMPACT IT THOROUGHLY OVER THE GEOTEXTILE.

SEDIMENT FENCE

| REVISION | DESCRIPTION | ISSUED | VER'D | APP'D | DATE |
|----------|-----------------|--------|-------|-------|----------|
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Sydney
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Ph (02) 9241 4188 Fax (02) 9241 4324
Email sydney@northrop.com.au ABN 81 094 433 100

PROJECT

NEW PRIMARY SCHOOL IN EDMONDSON PARK

BUCHAN AVENUE, EDMONDSON PARK, NSW 2174

DRAWING TITLE

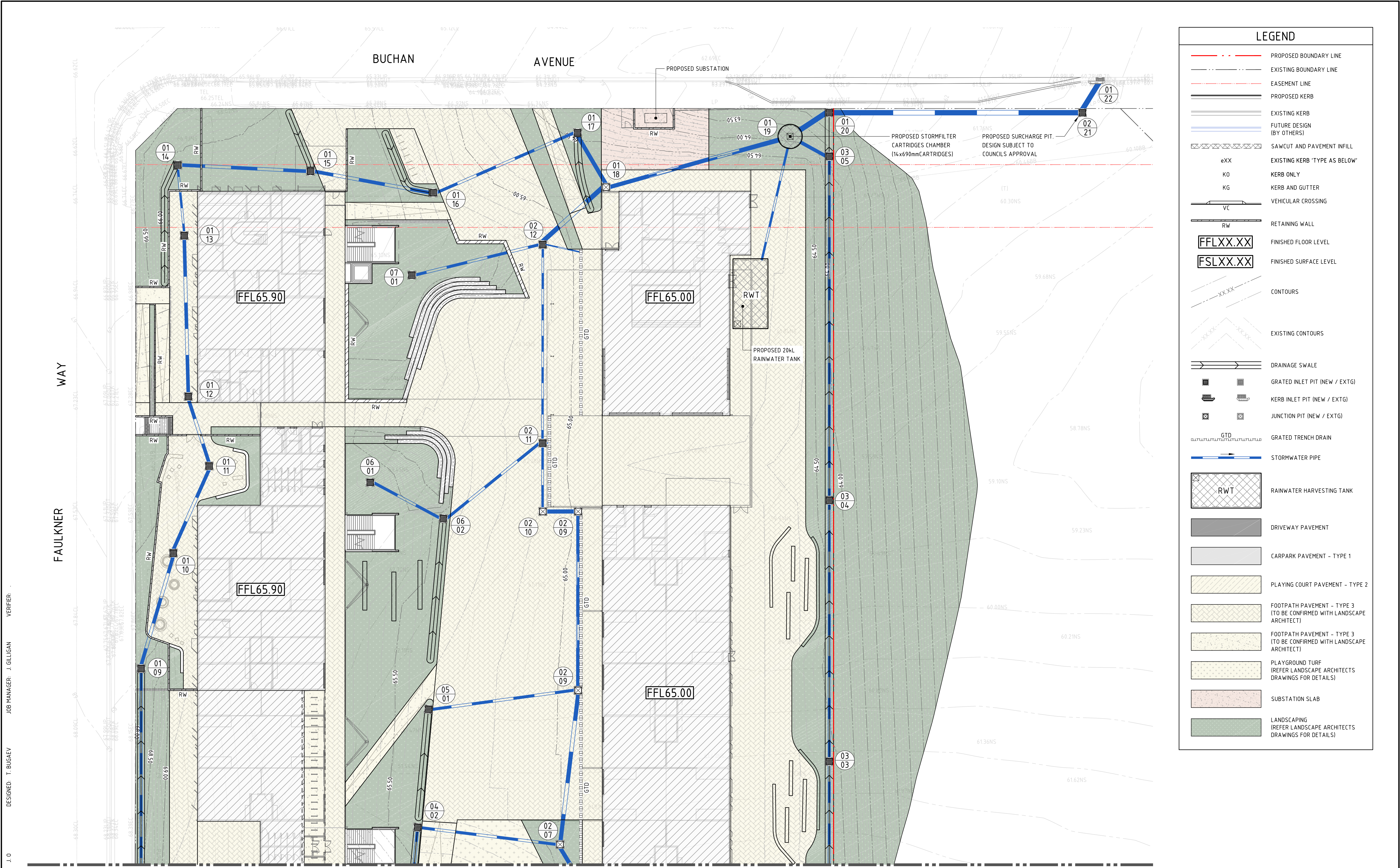
CIVIL ENGINEERING PACKAGE - SCHEMATIC DESIGN

SEDIMENT AND SOIL EROSION CONTROL DETAILS

DRAWING NUMBER

JOB NUMBER
210040

DRAWING SHEET SIZE = A1



| LEGEND | |
|--------|---|
| | PROPOSED BOUNDARY LINE |
| | EXISTING BOUNDARY LINE |
| | EASEMENT LINE |
| | PROPOSED KERB |
| | EXISTING KERB |
| | FUTURE DESIGN (BY OTHERS) |
| | SAWCUT AND PAVEMENT INFILL |
| | EXISTING KERB 'TYPE AS BELOW' |
| | KERB ONLY |
| | KERB AND GUTTER |
| | VEHICULAR CROSSING |
| | RETAINING WALL |
| | FINISHED FLOOR LEVEL |
| | FINISHED SURFACE LEVEL |
| | CONTOURS |
| | EXISTING CONTOURS |
| | DRAINAGE SWALE |
| | GRATED INLET PIT (NEW / EXTG) |
| | KERB INLET PIT (NEW / EXTG) |
| | JUNCTION PIT (NEW / EXTG) |
| | GRATED TRENCH DRAIN |
| | STORMWATER PIPE |
| | RAINWATER HARVESTING TANK |
| | DRIVEWAY PAVEMENT |
| | CARPARK PAVEMENT - TYPE 1 |
| | PLAYING COURT PAVEMENT - TYPE 2 |
| | FOOTPATH PAVEMENT - TYPE 3 (TO BE CONFIRMED WITH LANDSCAPE ARCHITECT) |
| | FOOTPATH PAVEMENT - TYPE 3 (TO BE CONFIRMED WITH LANDSCAPE ARCHITECT) |
| | PLAYGROUND TURF (REFER LANDSCAPE ARCHITECTS DRAWINGS FOR DETAILS) |
| | SUBSTATION SLAB |
| | LANDSCAPING (REFER LANDSCAPE ARCHITECTS DRAWINGS FOR DETAILS) |

DRAWN: J.O

DESIGNED: T. BUCAEV

JOB MANAGER: J. GILLIGAN

VERIFIER:

FOR CONTINUATION REFER TO SHEET 02

REVISION

| | | | | | |
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PROJECT

NEW PRIMARY SCHOOL IN EDMONDSON PARK
BUCHAN AVENUE, EDMONDSON PARK, NSW 2174

DRAWING TITLE

CIVIL ENGINEERING PACKAGE - SCHEMATIC DESIGN
SITWORKS AND STORMWATER MANAGEMENT PLAN - SHEET 01

JOB NUMBER

210040

DRAWING NUMBER

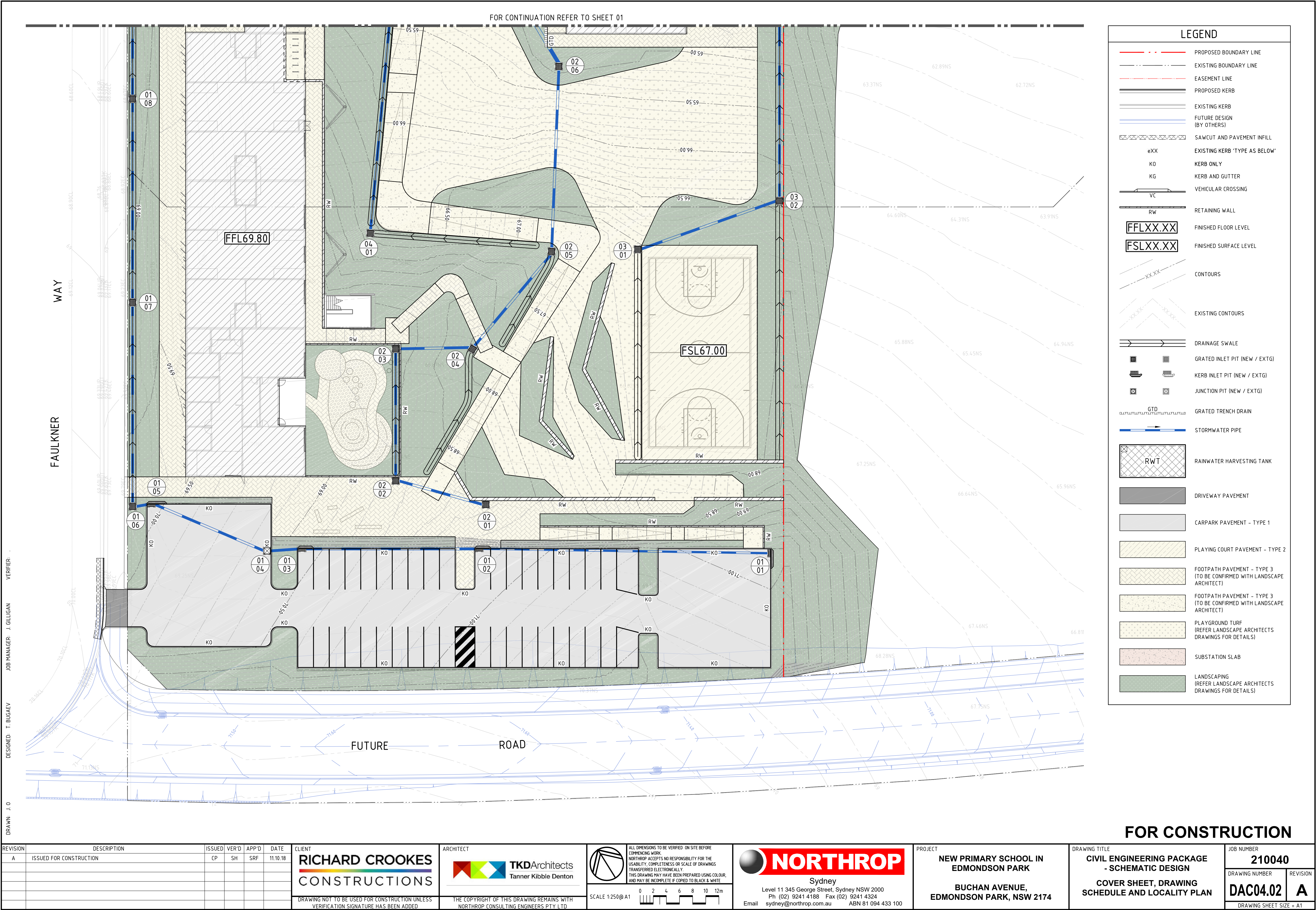
0401

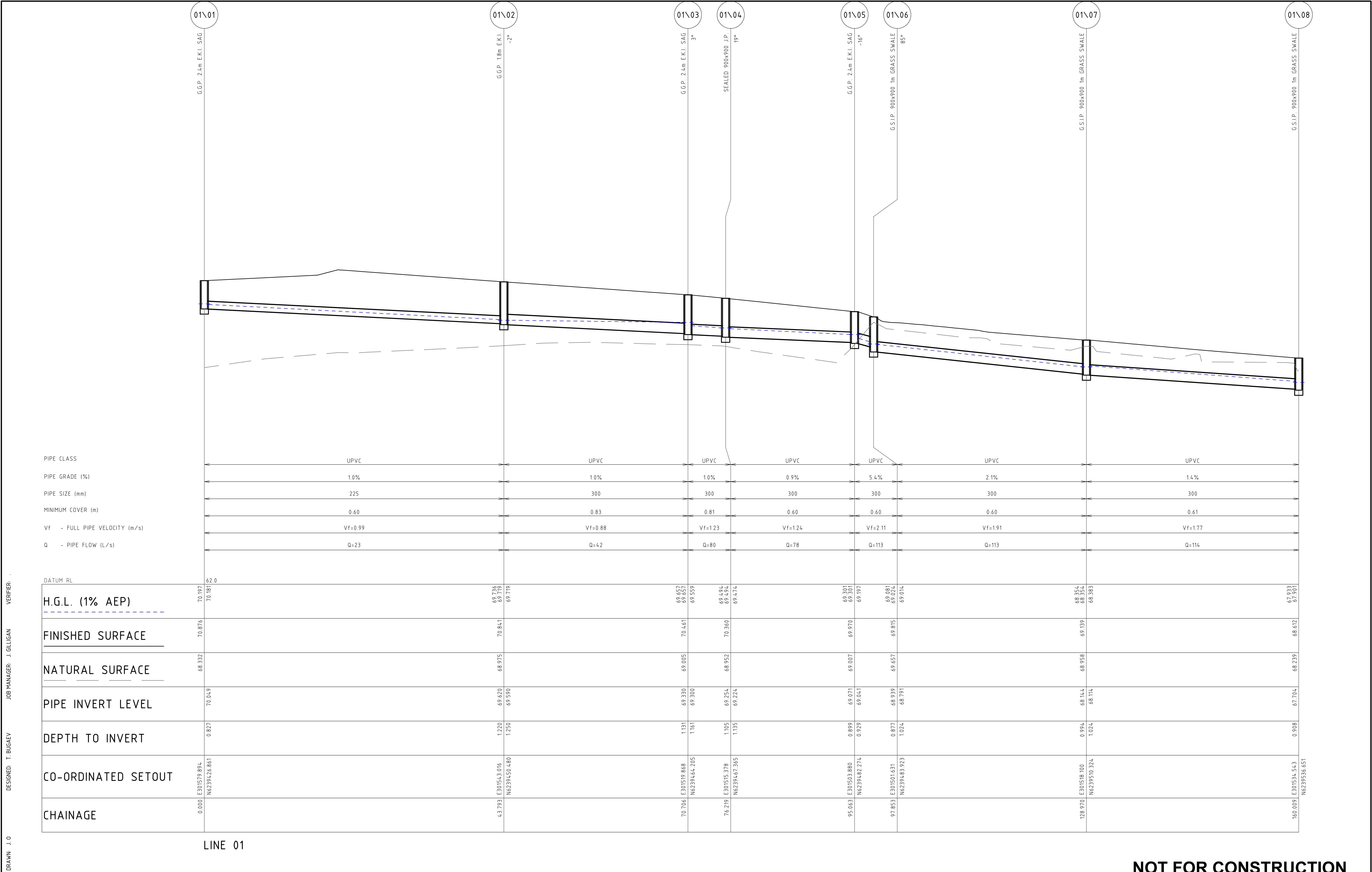
REVISION

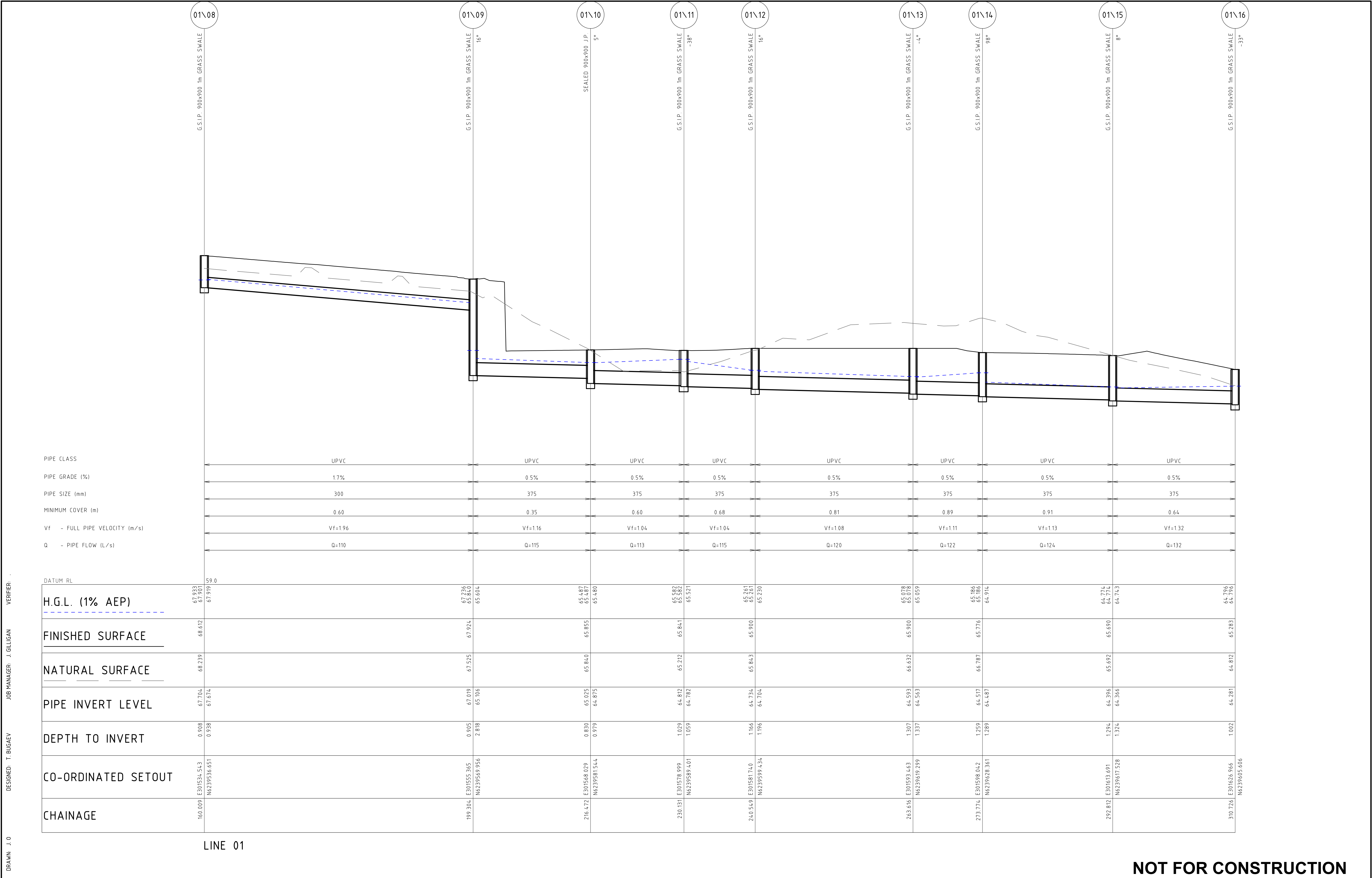
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DRAWING SHEET SIZE = A1

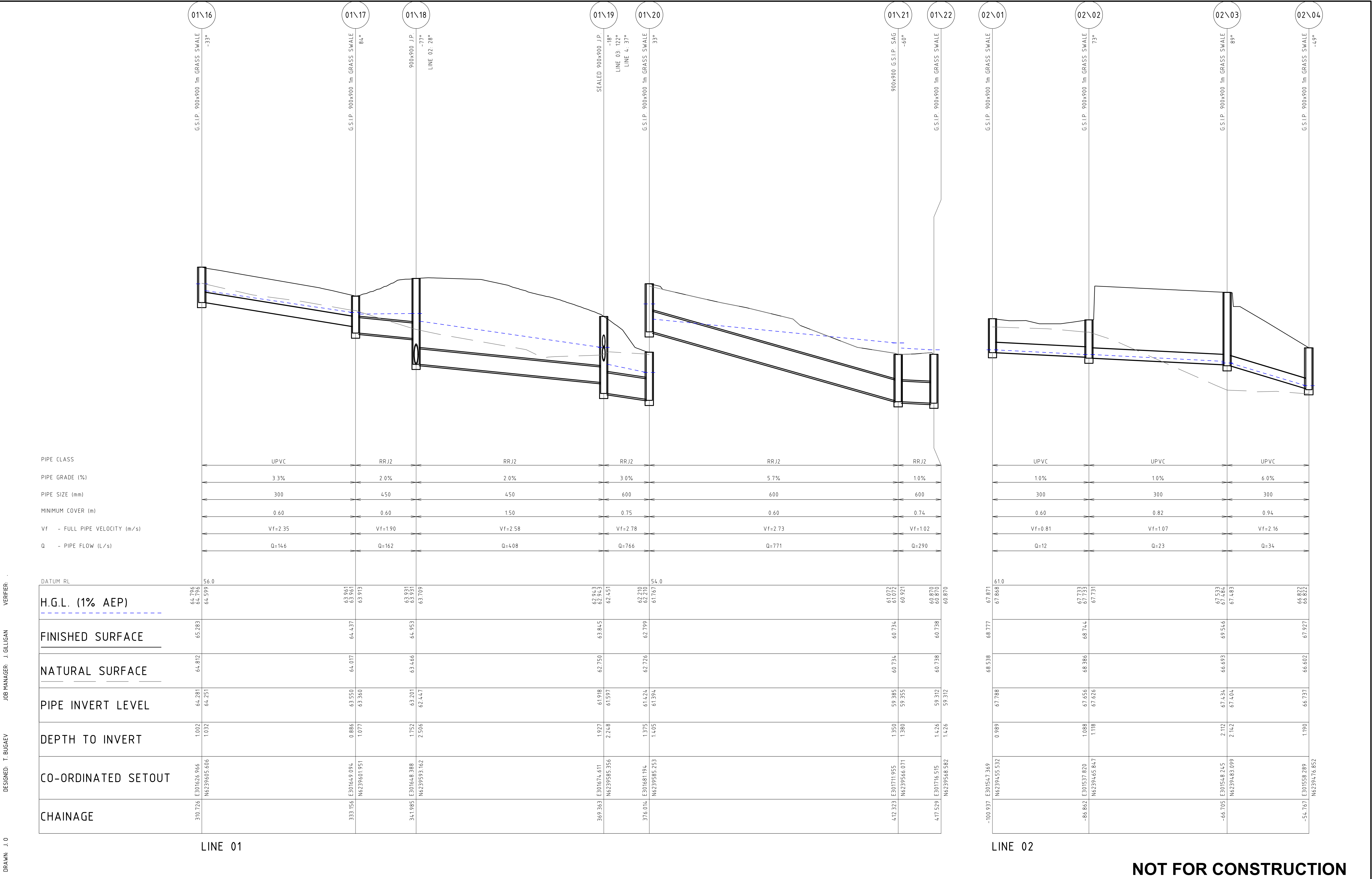
NOT FOR CONSTRUCTION

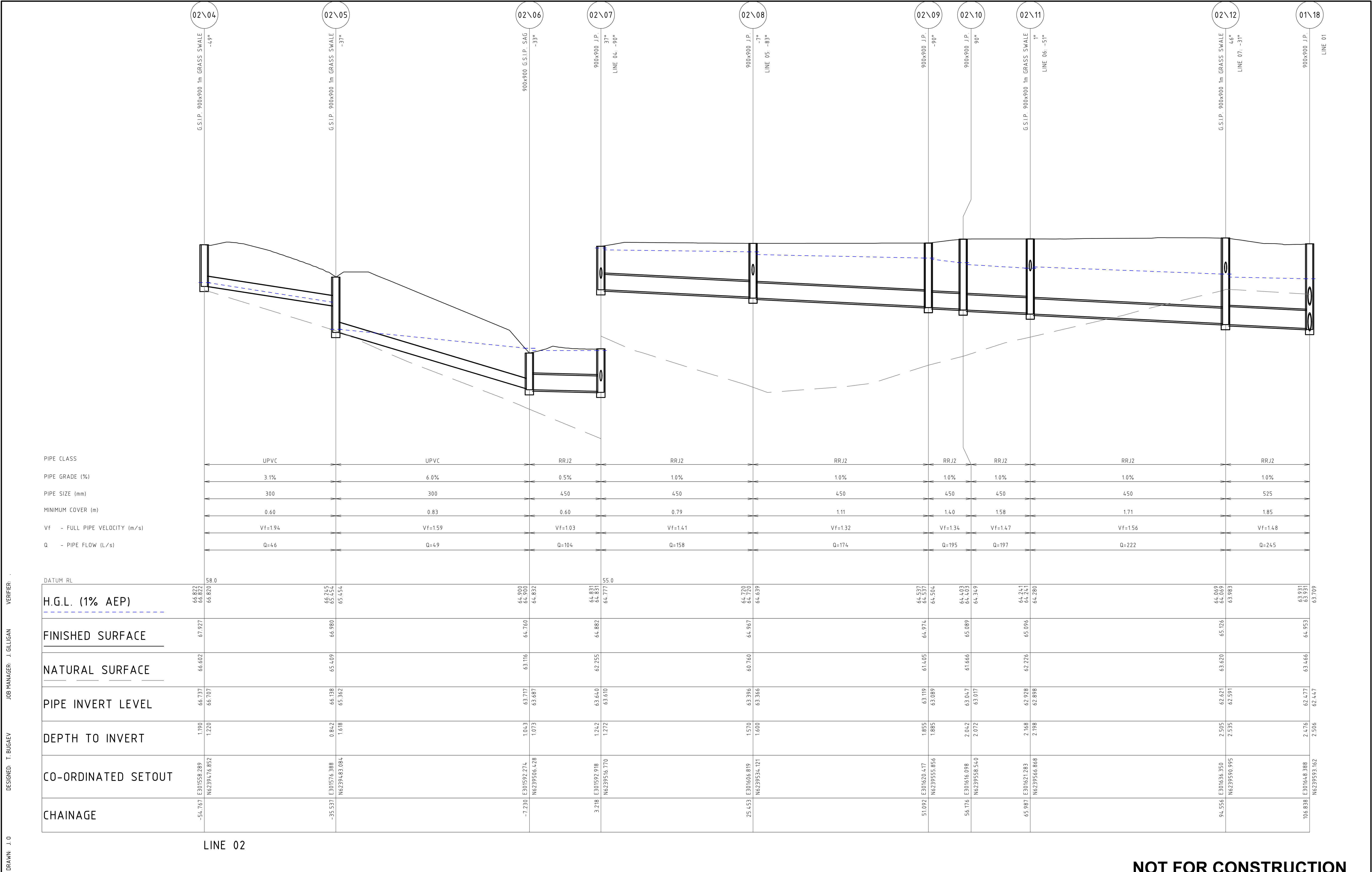


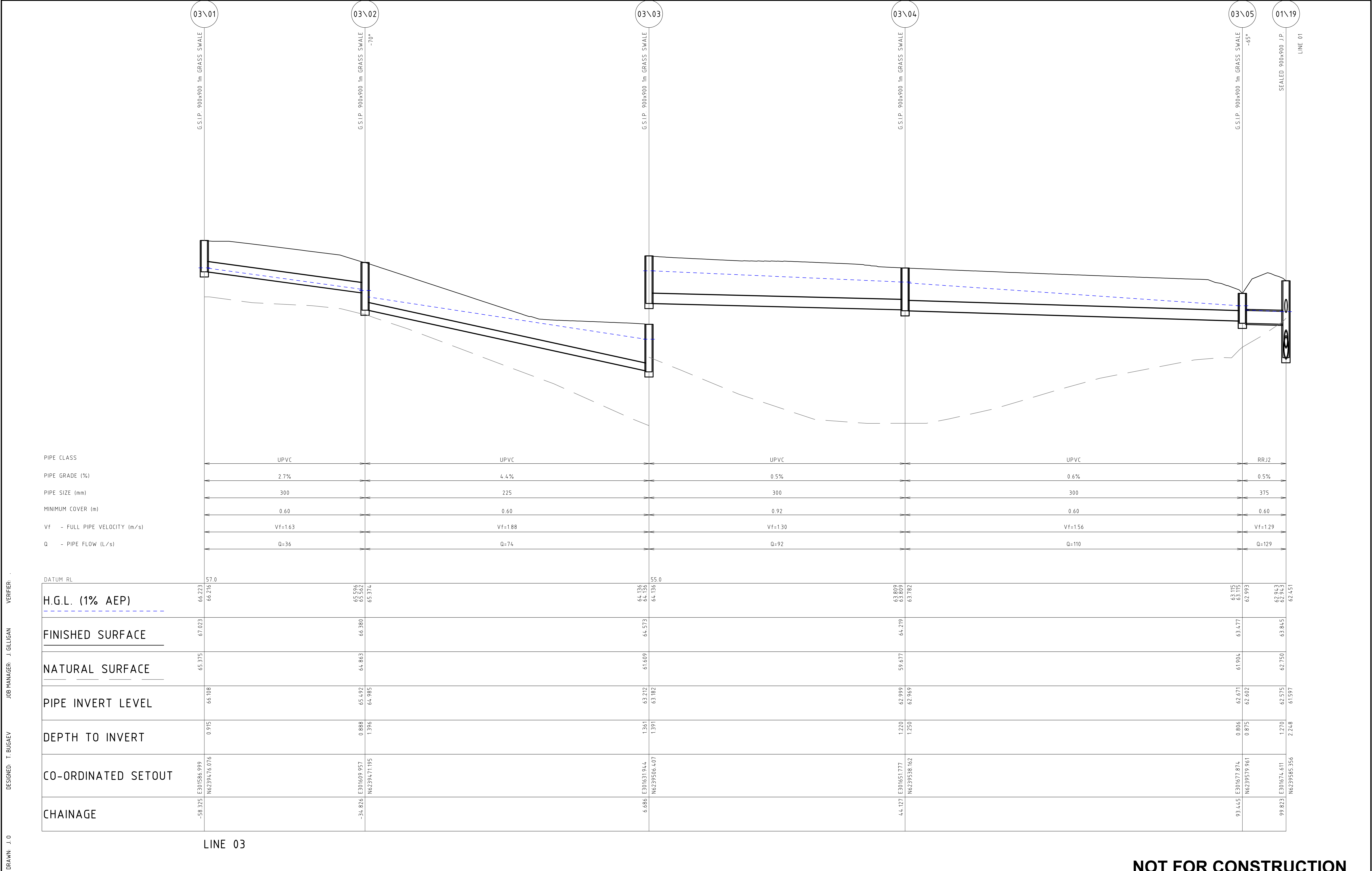


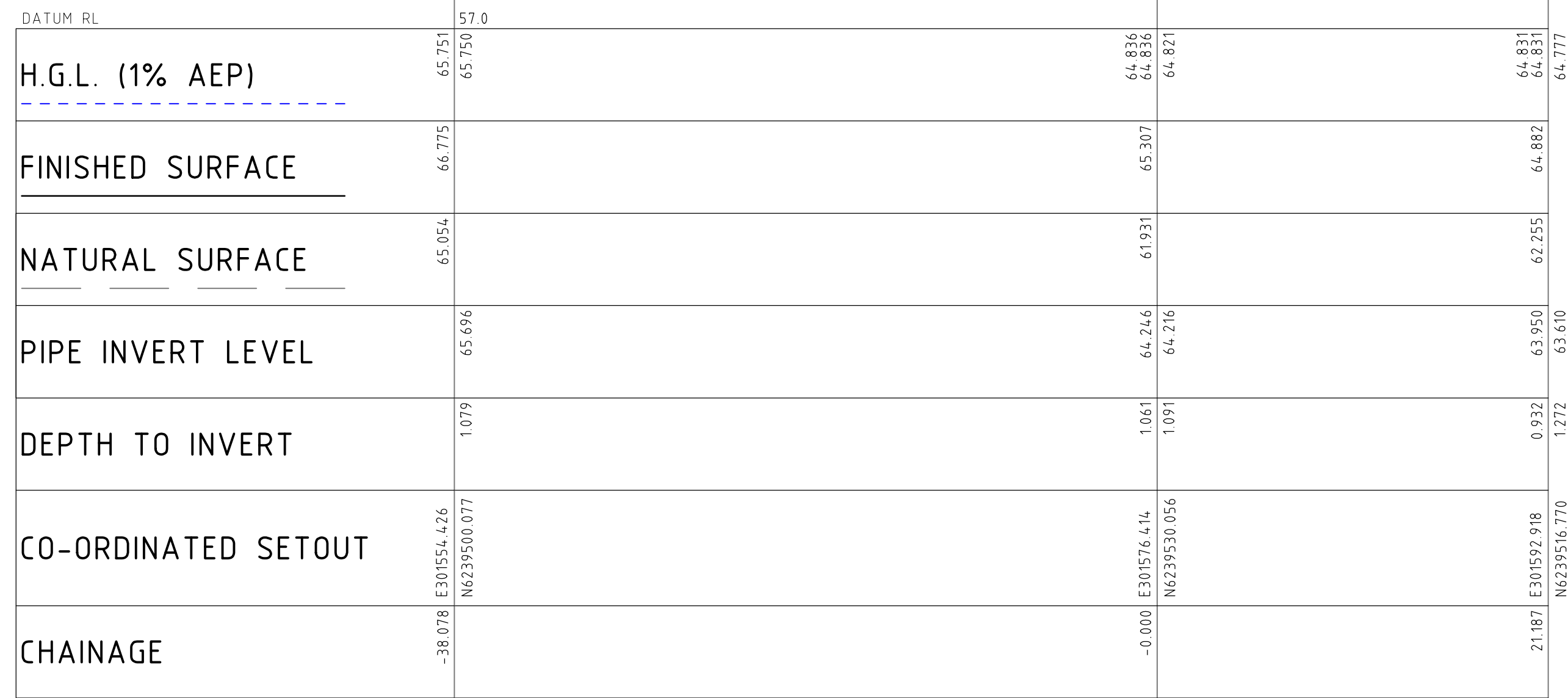


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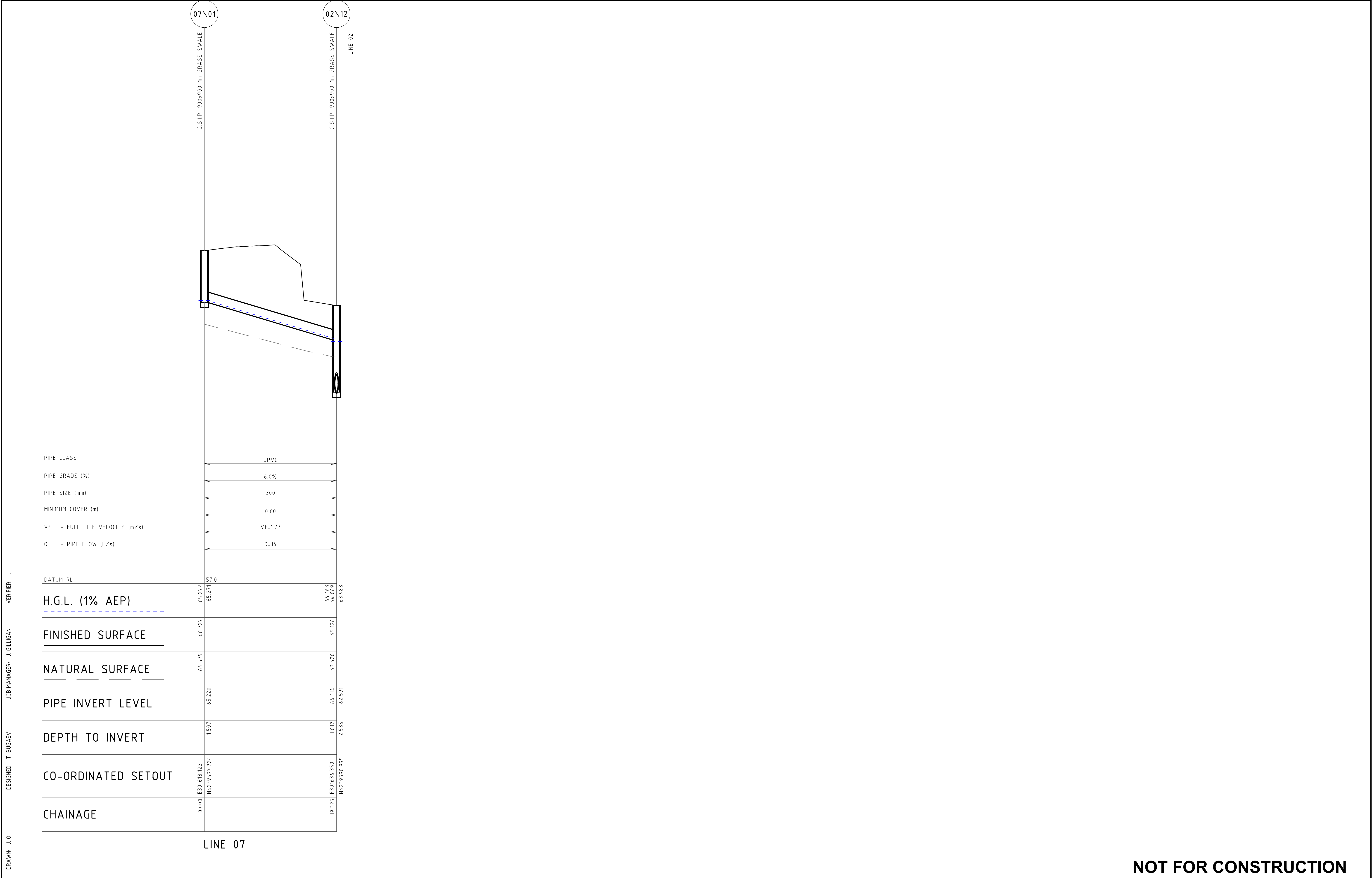




LINE 06



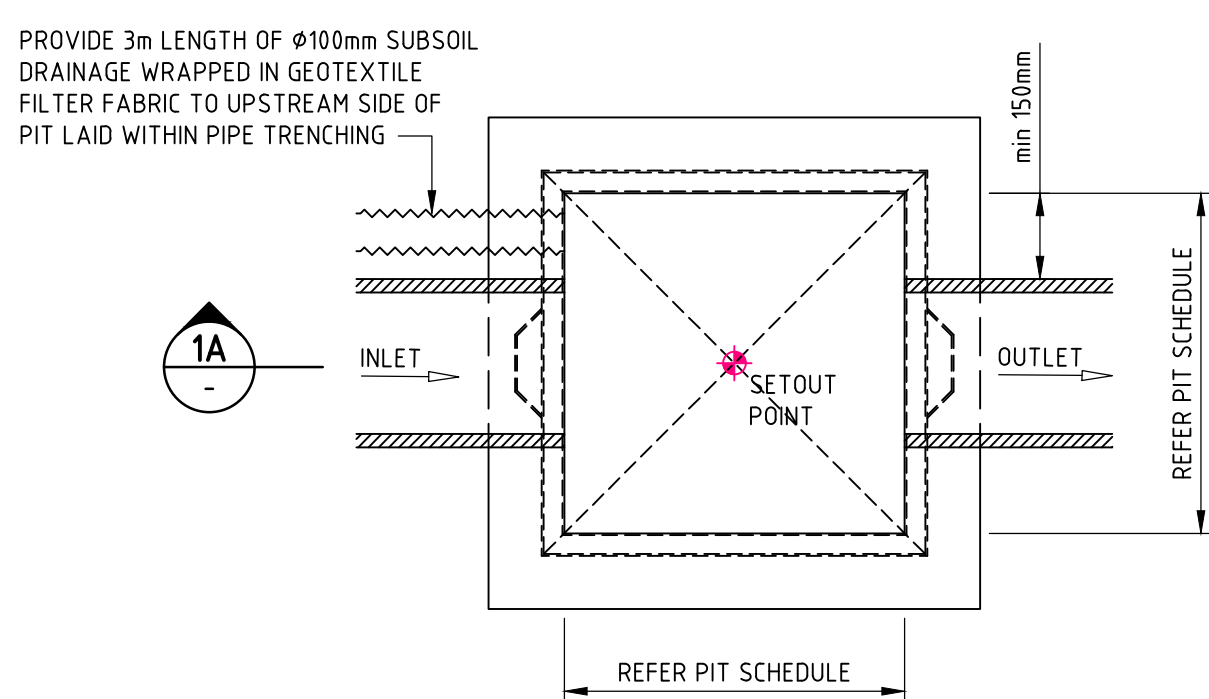
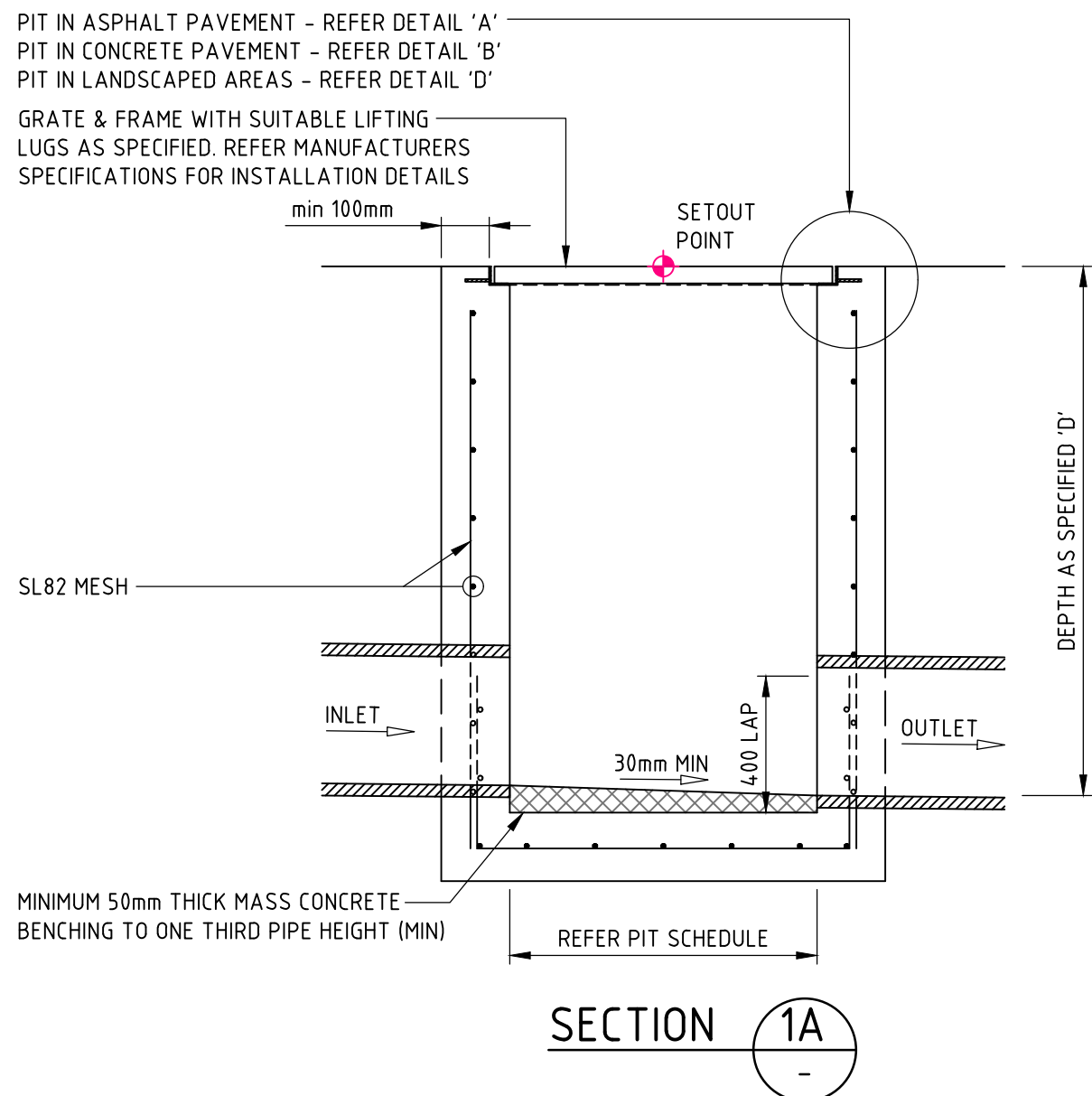
| REVISION | DESCRIPTION | ISSUED | VER'D | APP'D | DATE | CLIENT | ARCHITECT | PROJECT | DRAWING TITLE | JOB NUMBER | |
|----------|-----------------|--------|-------|-------|----------|--|--|--|---|---|--|
| A | ISSUED FOR SSDA | CP | | JG | 18.05.21 |  RICHARD CROOKES CONSTRUCTIONS |  TKD Architects Tanner Kibble Denton |  NORTHROP Sydney Level 11 345 George Street, Sydney NSW 2000 Ph (02) 9241 4188 Fax (02) 9241 4324 Email sydney@northrop.com.au ABN 81 094 433 100 | NEW PRIMARY SCHOOL IN EDMONDSON PARK BUCHAN AVENUE, EDMONDSON PARK, NSW 2174 | CIVIL ENGINEERING PACKAGE - SCHEMATIC DESIGN STORMWATER LONGITUDINAL SECTIONS - SHEET 06 | 210040 DRAWING NUMBER 0426 REVISION A |
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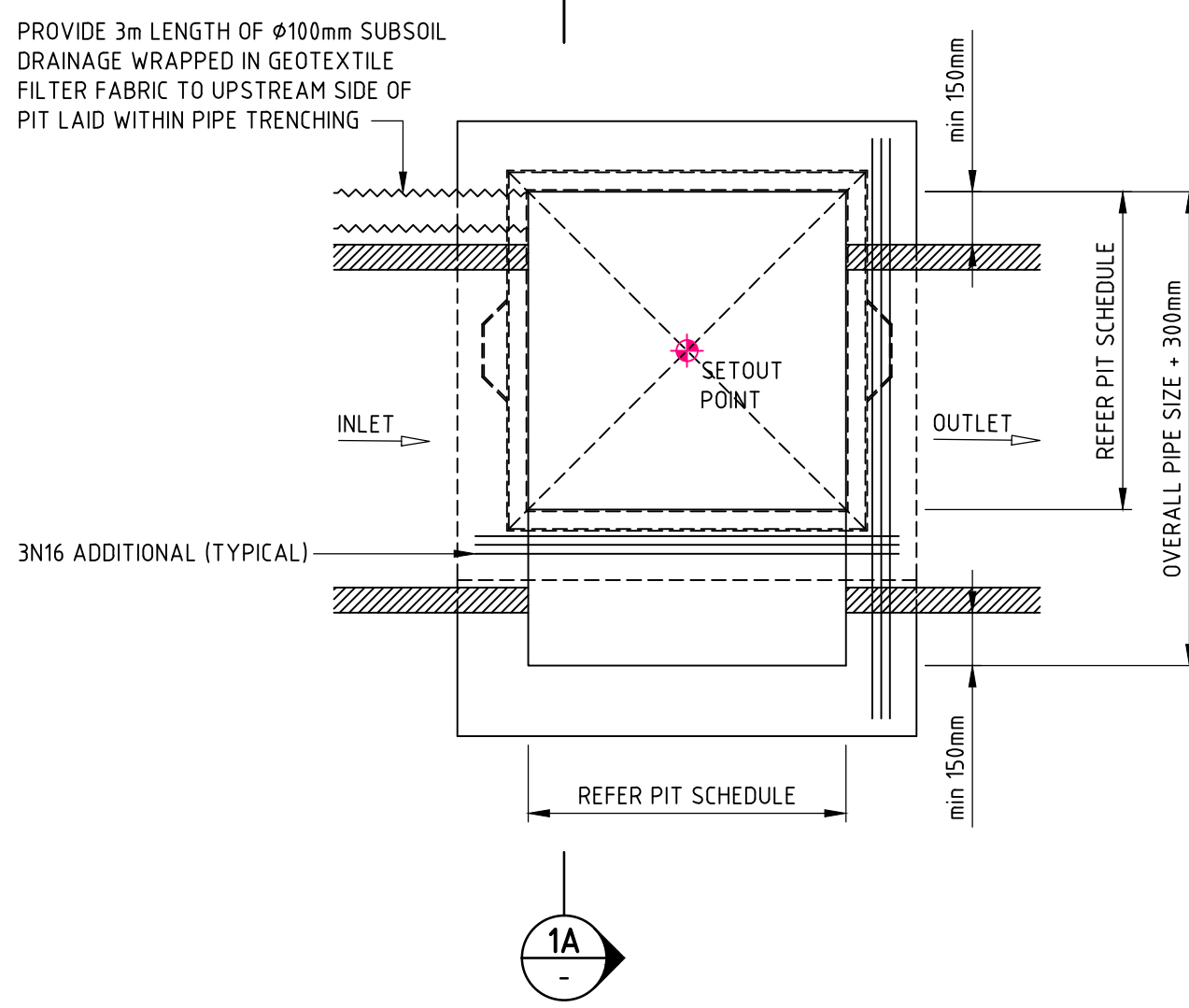
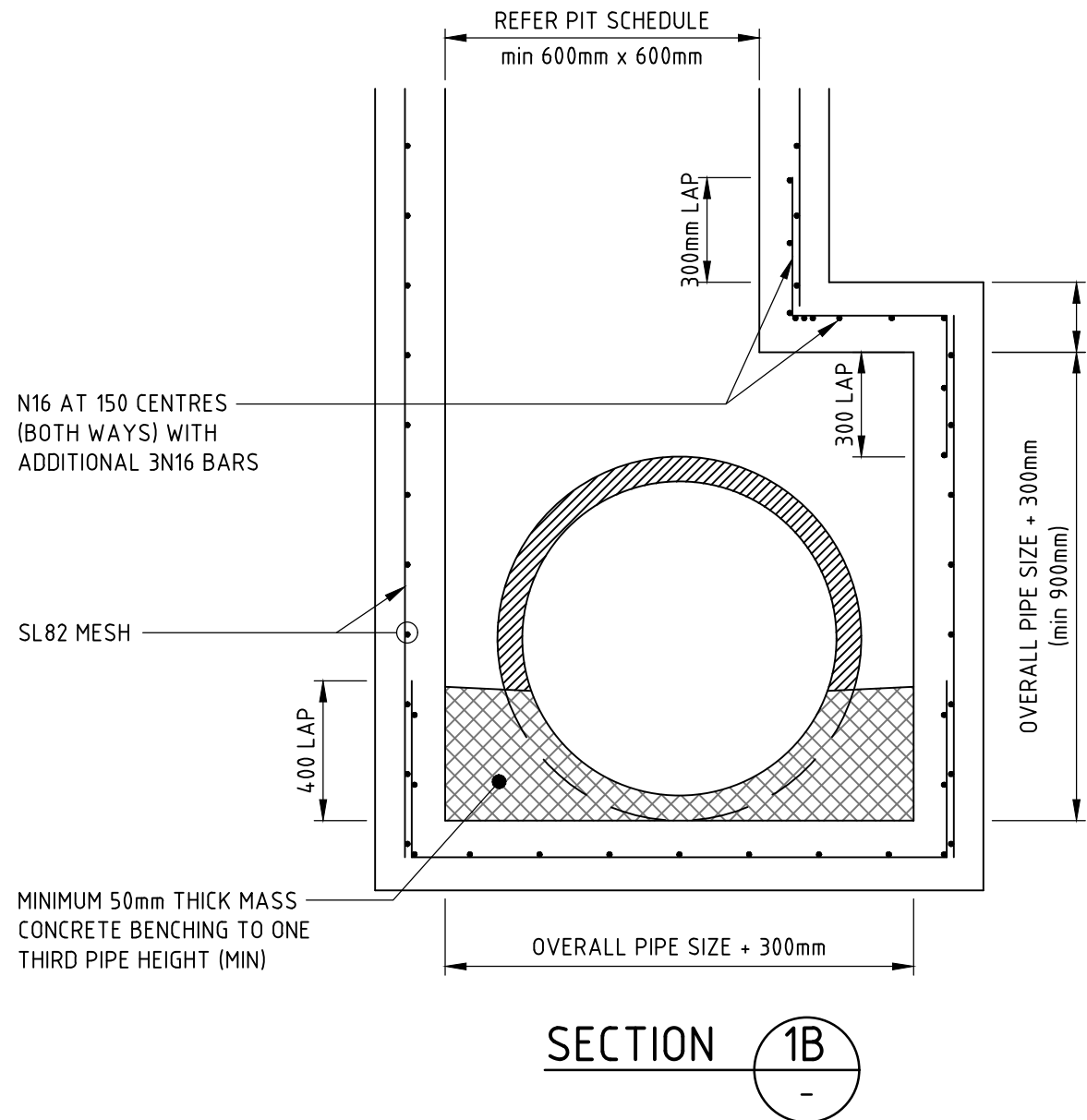
| | |
|-------------------------|----------|
| JOB NUMBER | |
| 210040 | |
| DRAWING NUMBER | REVISION |
| 0701 | A |
| DRAWING SHEET SIZE = A1 | |

DESIGNED: T. BUGAEV
JOB MANAGER: J. GILLIGAN
VERIFIER:
DRAWN: J.O



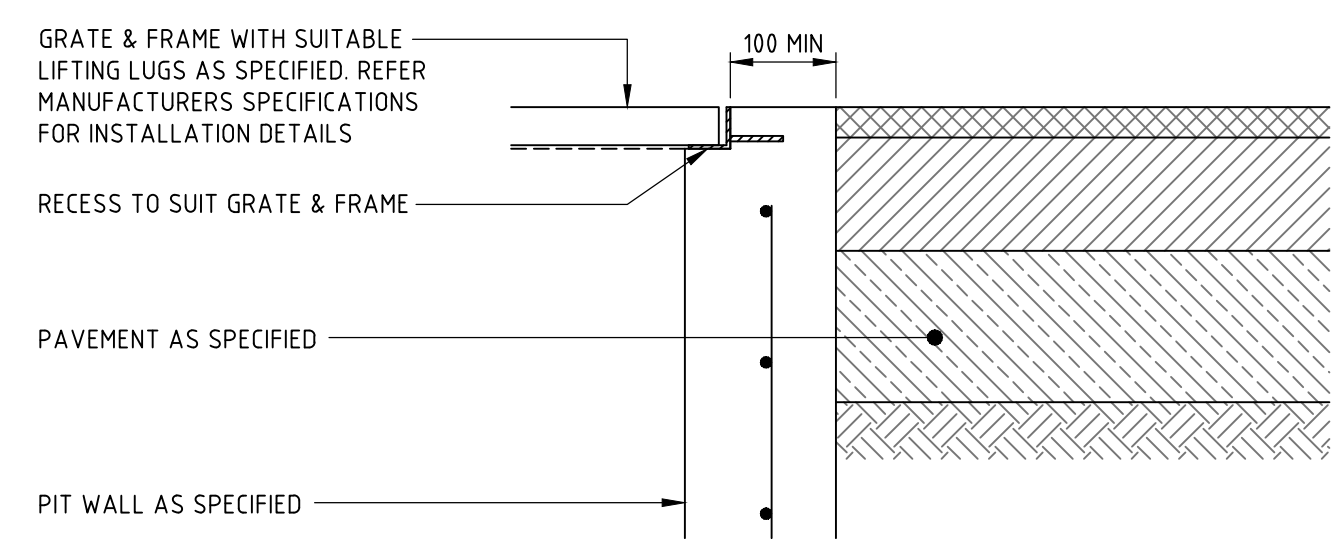
SURFACE INLET 'SIP' / JUNCTION PIT 'JP'

PIT STRUCTURE TO BE 200mm THICK UNLESS SHOWN OTHERWISE. DRILL AND EPOXY PLASTIC PROPRIETARY STEP IRONS IN ACCORDANCE WITH AUSTRALIAN STANDARDS AND MANUFACTURERS SPECIFICATIONS (PITS > 1000mm DEPTH).
REFER PIT INTERFACE DETAIL 'F' FOR CORNER REINFORCEMENT

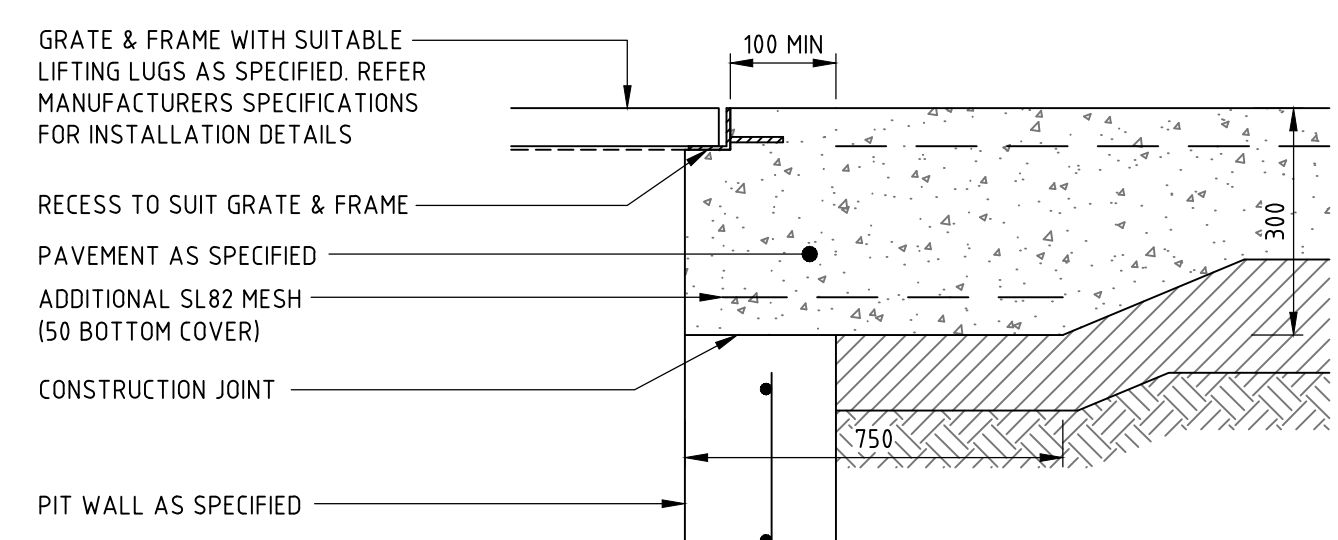


DRAINAGE PIT - EXTENDED CHAMBER

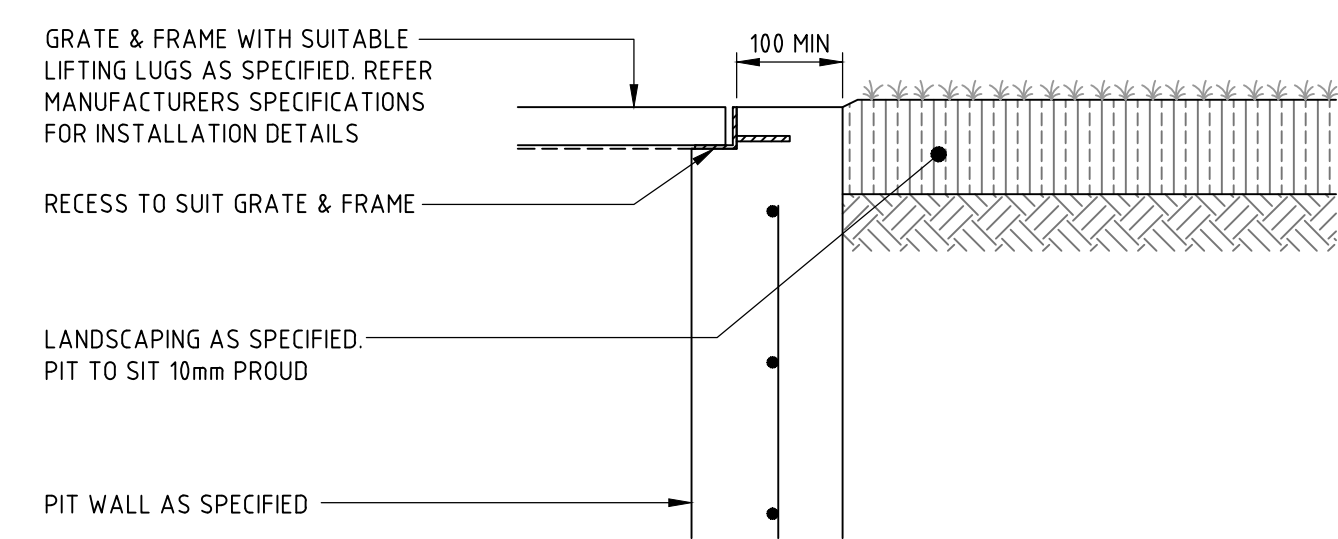
PIT STRUCTURE TO BE 200mm THICK UNLESS SHOWN OTHERWISE. DRILL AND EPOXY PLASTIC PROPRIETARY STEP IRONS IN ACCORDANCE WITH AUSTRALIAN STANDARDS AND MANUFACTURERS SPECIFICATIONS (PITS > 1000mm DEPTH).
REFER PIT INTERFACE DETAIL 'F' FOR CORNER REINFORCEMENT



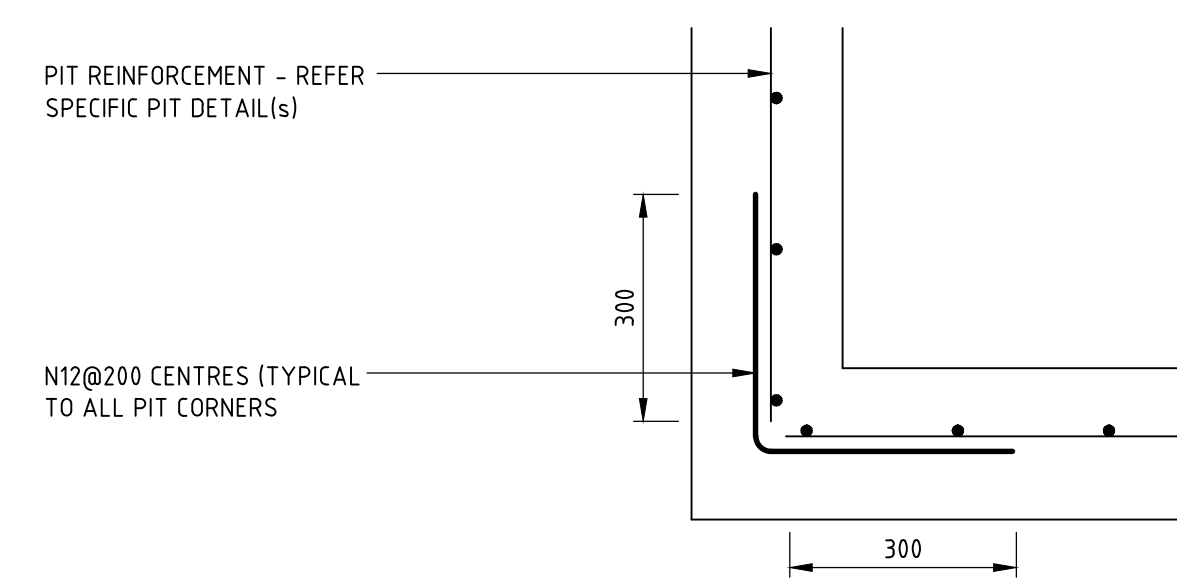
PIT INTERFACE - DETAIL 'A'



PIT INTERFACE - DETAIL 'B'



PIT INTERFACE - DETAIL 'D'



PIT INTERFACE (PLAN VIEW)- DETAIL 'F'
APPLICABLE TO ALL STORMWATER DRAINAGE STRUCTURES

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| REVISION | DESCRIPTION | ISSUED | VER'D | APP'D | DATE |
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PROJECT

NEW PRIMARY SCHOOL IN EDMONDSON PARK

BUCHAN AVENUE, EDMONDSON PARK, NSW 2174

DRAWING TITLE

CIVIL ENGINEERING PACKAGE - SCHEMATIC DESIGN

DETAIL SHEET 02

JOB NUMBER

210040

| | |
|----------------|----------|
| DRAWING NUMBER | REVISION |
| 0702 | A |

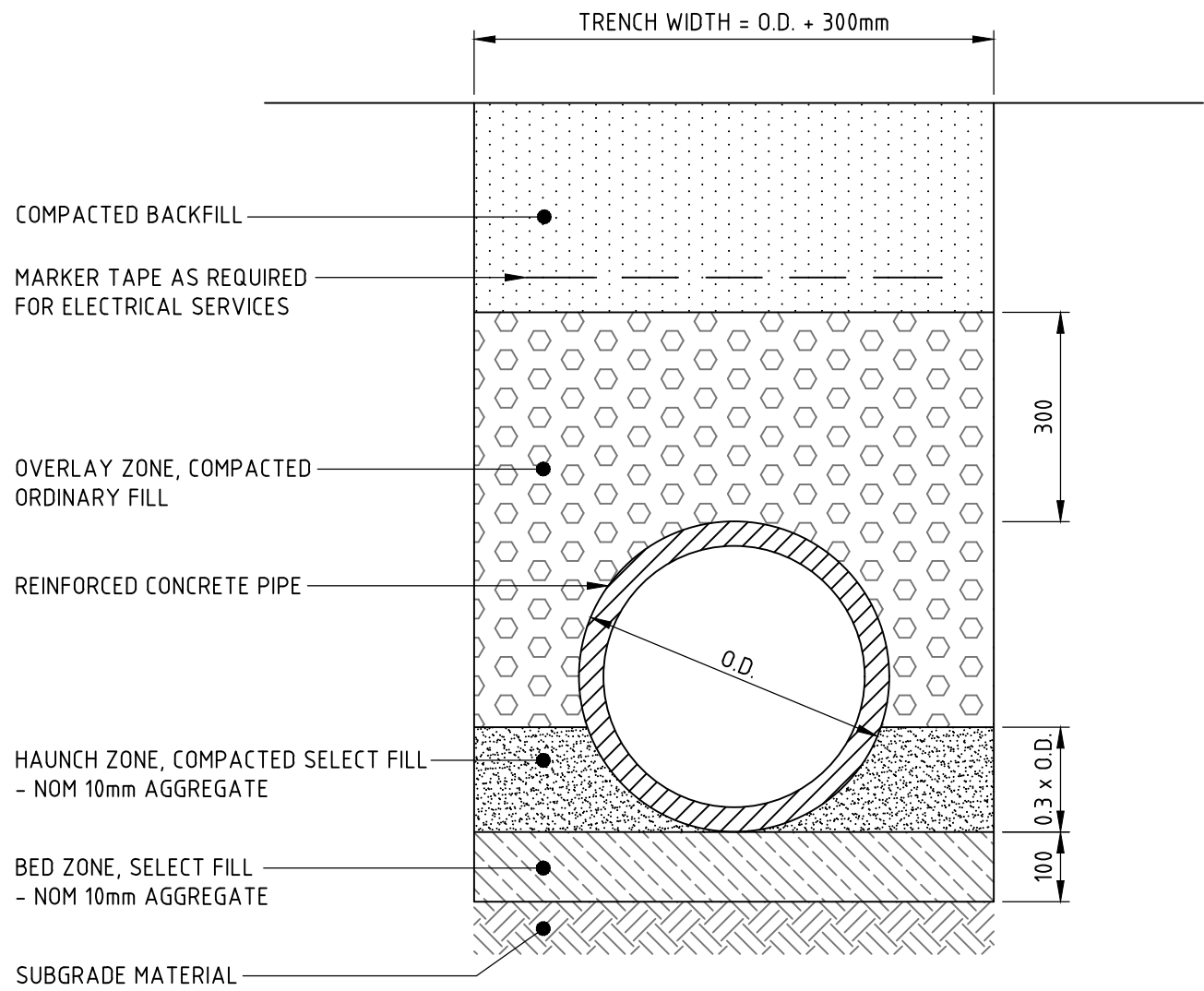
DRAWING SHEET SIZE = A1

VERIFIER: .

JOB MANAGER: J. GILLIGAN

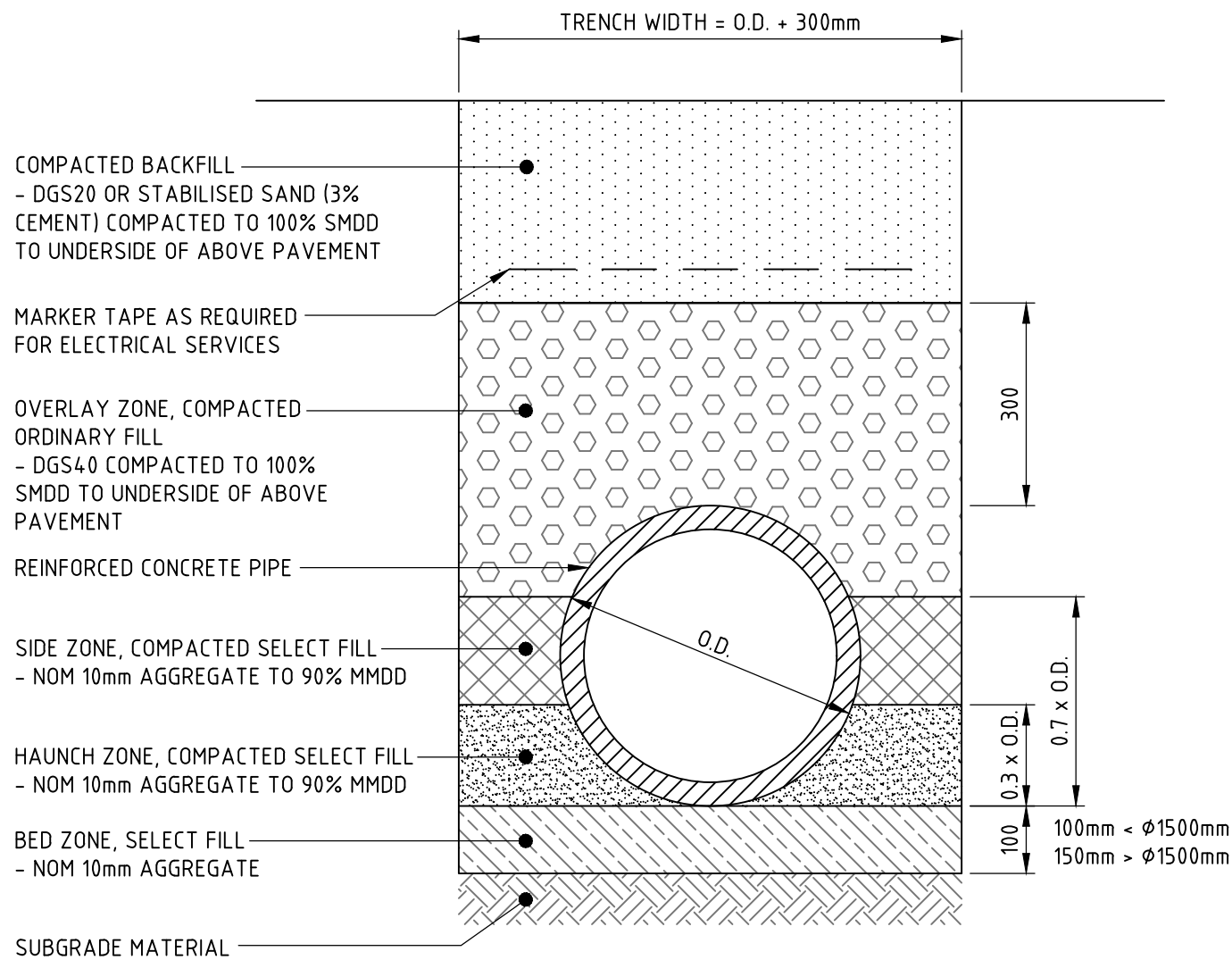
DESIGNED: T. BUGAEV

DRAWN: J.O



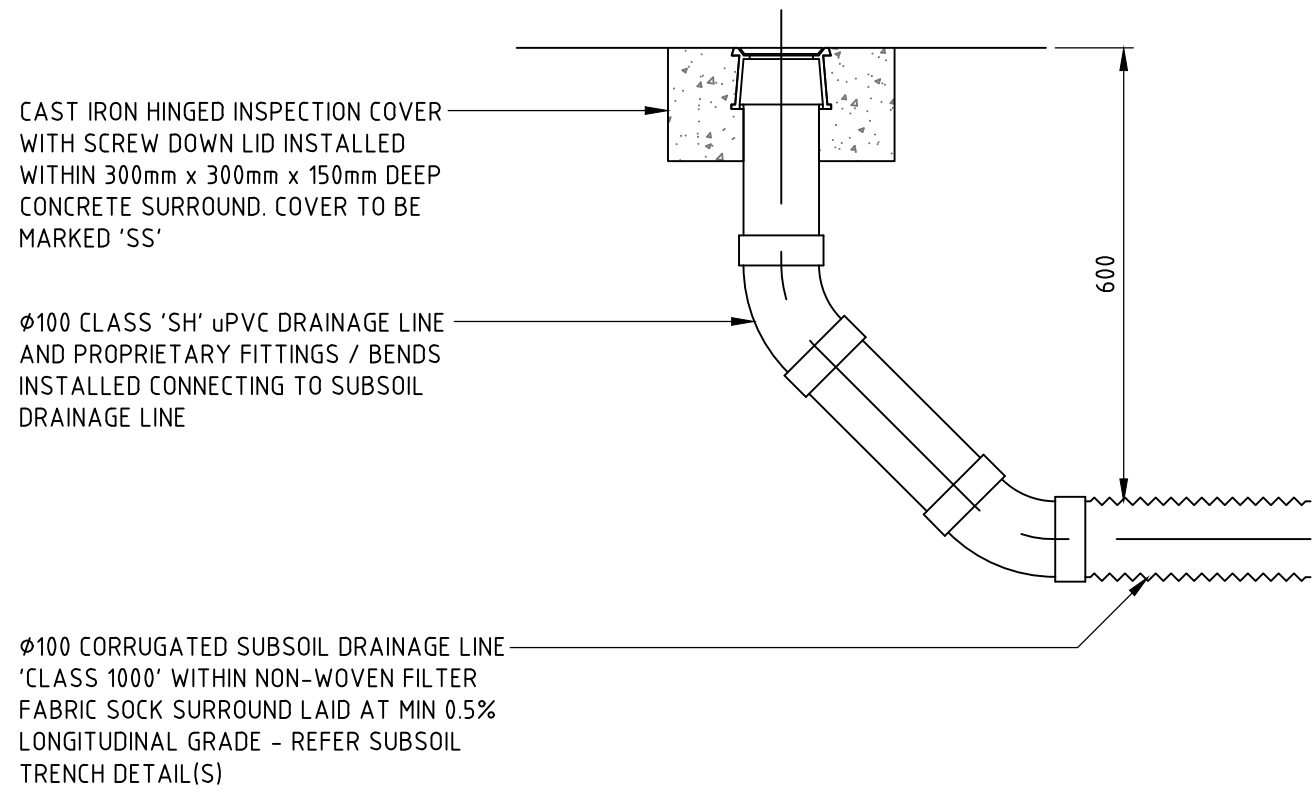
TYPICAL PIPE TRENCH - GENERAL AREAS

- TRENCH WIDTH MAY NEED TO BE INCREASED SUBJECT TO ACHIEVING COMPACTION. ENSURE MINIMUM 300mm CLEARANCE BETWEEN, WHEN USING MULTIPLE PIPES TO ACHIEVE ADEQUATE COMPACTION.
- MINIMUM PIPE COVER NOT UNDER ROADS TO BE 300mm U.N.O.
- THE CONTRACTOR SHALL ENSURE THAT SHORING OF TRENCHES IS INSTALLED AS REQUIRED BY STATUTORY REQUIREMENTS.
- ENSURE BACKFILLING COMPACTION MEETS THE FOLLOWING STANDARDS;
 - TRENCHES UNDER PAVED AREAS / BUILDING - 100% SMDD
 - TRENCHES NOT UNDER PAVEMENTS - 95% SMDD



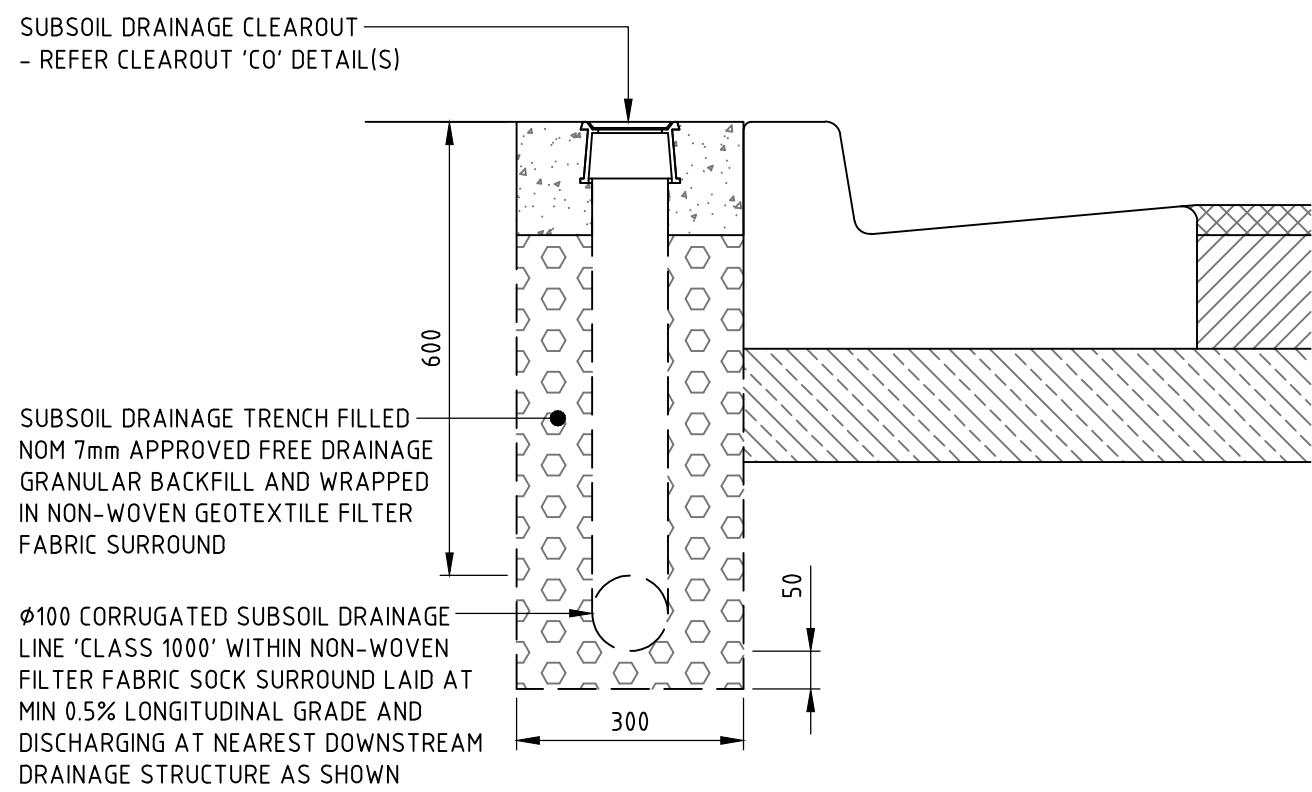
TYPICAL PIPE TRENCH - UNDER ROADS

- TRENCH WIDTH MAY NEED TO BE INCREASED SUBJECT TO ACHIEVING COMPACTION. ENSURE MINIMUM 300mm CLEARANCE BETWEEN, WHEN USING MULTIPLE PIPES TO ACHIEVE ADEQUATE COMPACTION.
- MINIMUM PIPE COVER UNDER ROADS TO BE 600mm U.N.O. FOR CLASS '2' PIPES.
- THE CONTRACTOR SHALL ENSURE THAT SHORING OF TRENCHES IS INSTALLED AS REQUIRED BY STATUTORY REQUIREMENTS.
- ENSURE BACKFILLING COMPACTION MEETS THE FOLLOWING STANDARDS;
 - TRENCHES UNDER PAVED AREAS / BUILDING - 100% SMDD



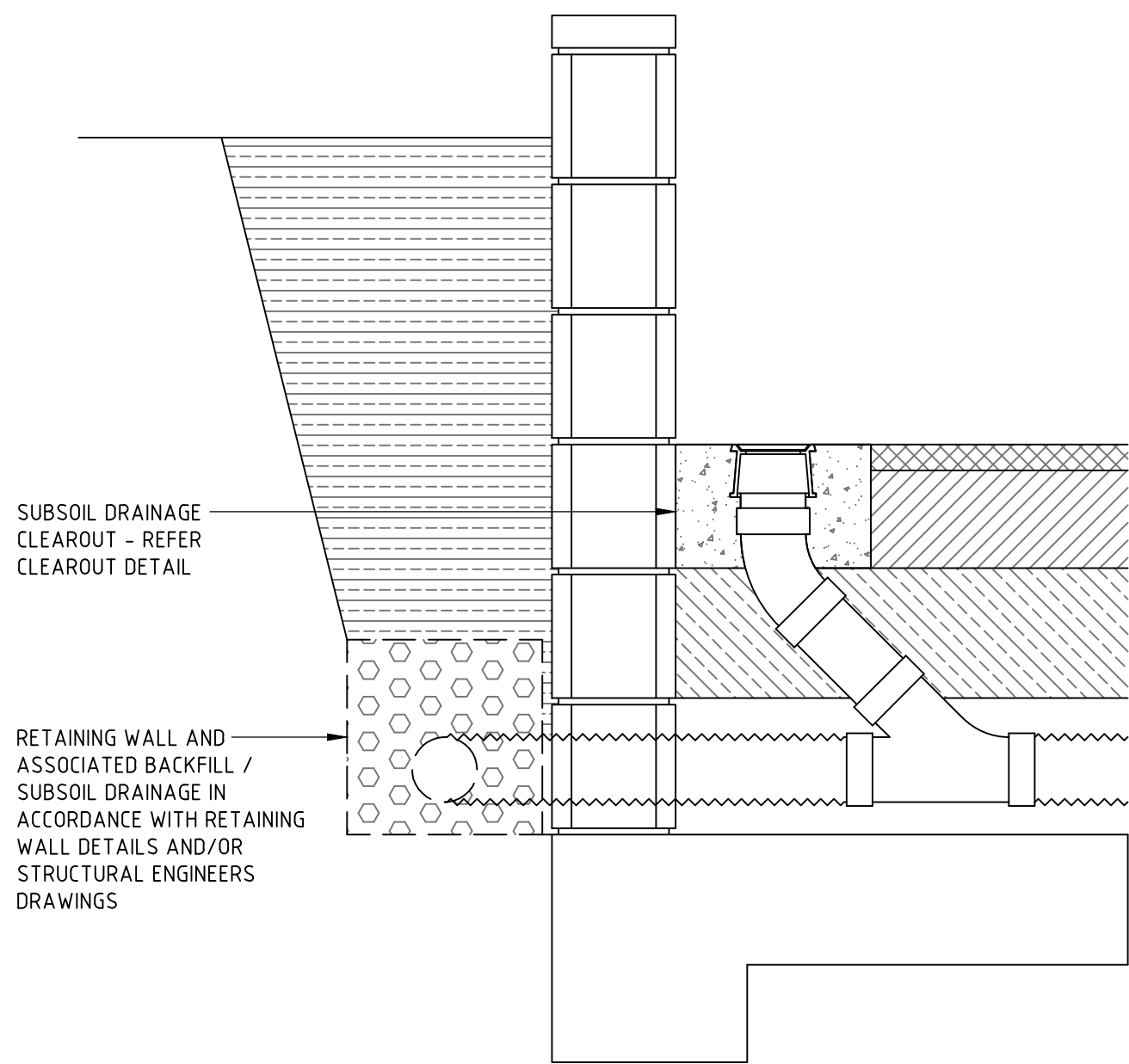
SUBSOIL DRAINAGE CLEAROUT 'CO'

CLEAROUT TO BE INSTALLED AT UPSTREAM POINTS ALONG SUBSOIL DRAINAGE LINES @ MAX 30m CENTRES AND DISCHARGING TO DRAINAGE STRUCTURES @ MAX 60m CENTRES.
SCALE 1:10



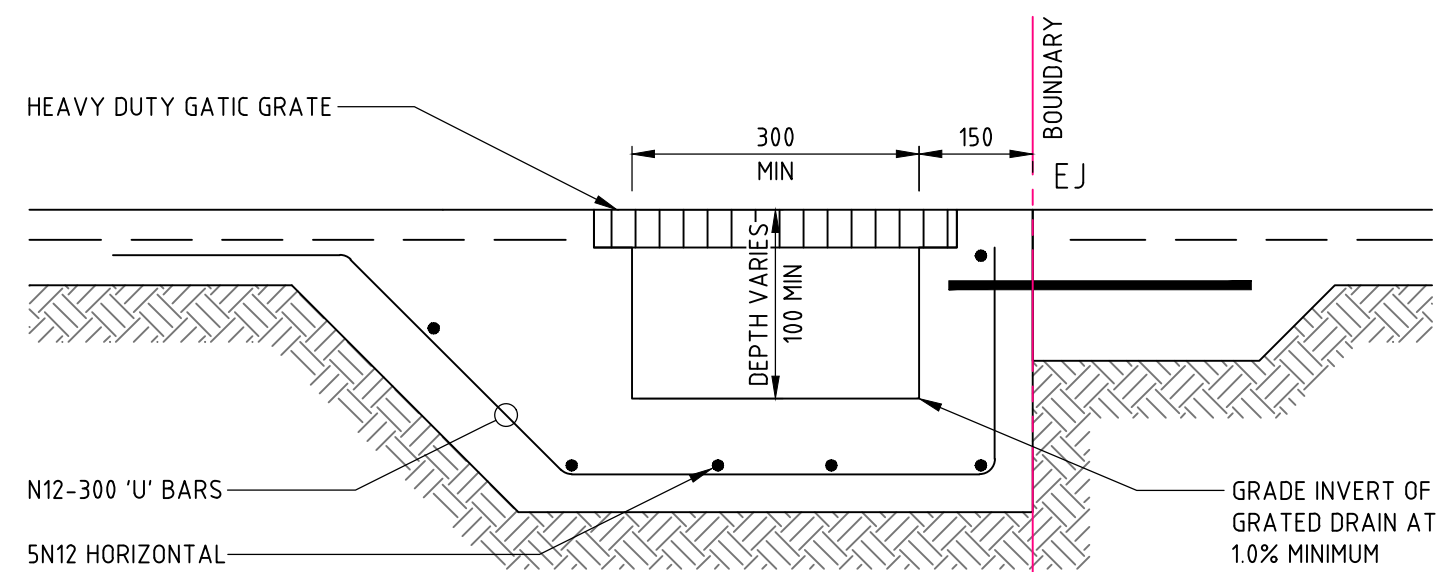
SUBSOIL DRAINAGE TRENCH 'SSD'

CLEAROUT TO BE INSTALLED @ MAX 30m CENTRES AND DISCHARGING TO DRAINAGE STRUCTURES @ MAX 60m CENTRES.
SCALE 1:10



SUBSOIL DRAINAGE CLEAROUT 'CO' - WALL

CLEAROUT TO BE INSTALLED AT INTERMEDIATE POINTS ALONG SUBSOIL DRAINAGE LINES @ MAX 30m CENTRES AND DISCHARGING TO DRAINAGE STRUCTURES @ MAX 60m CENTRES.
SCALE 1:10



GRATED TRENCH DRAIN 'GTD'

GRATED TRENCH DRAIN TO HAVE MINIMUM 150mm CLEARANCE AND 1% LONGITUDINAL FALL. GRATE CLASS TO BE CLASS 'B' HEELSAFE IN PEDESTRIAN AREAS AND CLASS 'D' IN TRAFFICKED AREAS UNLESS NOTED OTHERWISE ON PLAN

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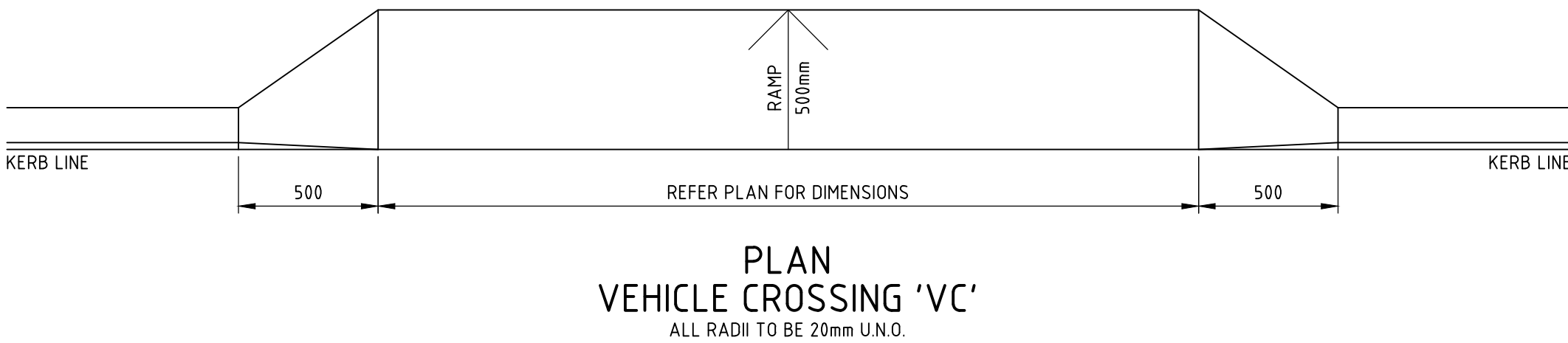
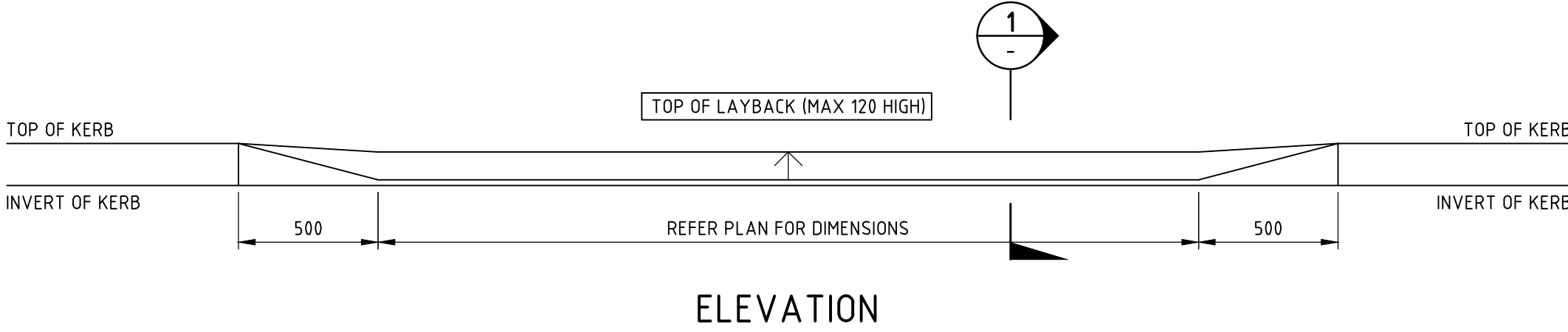
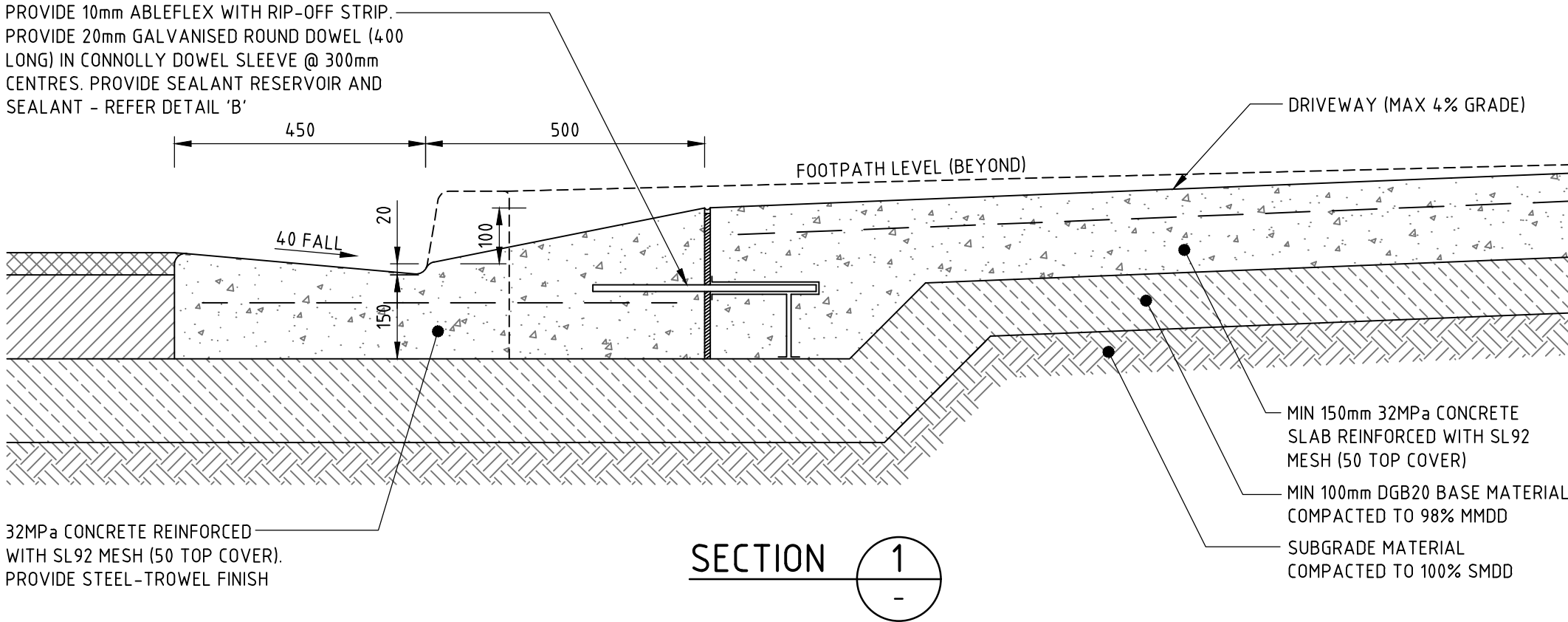
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Sydney
Level 11 345 George Street, Sydney NSW 2000
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Email sydney@northrop.com.au ABN 81 094 433 100

PROJECT
**NEW PRIMARY SCHOOL IN
EDMONDSON PARK**
**BUCHAN AVENUE,
EDMONDSON PARK, NSW 2174**

DRAWING TITLE
**CIVIL ENGINEERING PACKAGE
- SCHEMATIC DESIGN**
DETAIL SHEET 03

| | |
|-------------------------------|----------------------|
| JOB NUMBER 210040 | REVISION A |
| DRAWING NUMBER 0703 | |
| DRAWING SHEET SIZE = A1 | |

DESIGNED: T. BUCAEV
JOB MANAGER: J. GILLIGAN
VERIFIER: .
DRAWN: J.O



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PROJECT

NEW PRIMARY SCHOOL IN EDMONDSON PARK

BUCHAN AVENUE, EDMONDSON PARK, NSW 2174

DRAWING TITLE

CIVIL ENGINEERING PACKAGE - SCHEMATIC DESIGN

DETAIL SHEET 04

JOB NUMBER

210040

DRAWING NUMBER

0704

REVISION

A

DRAWING SHEET SIZE = A1

Appendix C – MUSIC Link Report

MUSIC-*link* Report

| Project Details | | Company Details | |
|---------------------------------|------------------------------------|-----------------|-------------------------------|
| Project: | 210040 | Company: | Northrop Consulting Engineers |
| Report Export Date: | 18/05/2021 | Contact: | Aline Carvalhaes |
| Catchment Name: | 21.05.18 - MUSIC | Address: | L2/3 Horwood Place |
| Catchment Area: | 2.085ha | Phone: | 02 9156 3206 |
| Impervious Area*: | 65.73% | Email: | acarvalhaes@northrop.com.au |
| Rainfall Station: | 67035 LIVERPOOL(WHITLAM | | |
| Modelling Time-step: | 6 Minutes | | |
| Modelling Period: | 1/01/1967 - 31/12/1976 11:54:00 PM | | |
| Mean Annual Rainfall: | 857mm | | |
| Evapotranspiration: | 1171mm | | |
| MUSIC Version: | 6.3.0 | | |
| MUSIC-link data Version: | 6.33 | | |
| Study Area: | Liverpool Clay Soil | | |
| Scenario: | Liverpool Development | | |

* takes into account area from all source nodes that link to the chosen reporting node, excluding Import Data Nodes

| Treatment Train Effectiveness | | Treatment Nodes | | Source Nodes | |
|-------------------------------|-----------|--------------------------|--------|-------------------|--------|
| Node: Receiving Node | Reduction | Node Type | Number | Node Type | Number |
| Flow | 6.32% | Sedimentation Basin Node | 1 | Urban Source Node | 8 |
| TSS | 85.4% | Rain Water Tank Node | 1 | | |
| TP | 65% | Generic Node | 1 | | |
| TN | 49.4% | GPT Node | 1 | | |
| GP | 95.6% | | | | |

Comments

The parameters outside of the expected range are from a proprietary device.

Passing Parameters

| Node Type | Node Name | Parameter | Min | Max | Actual |
|---------------|---------------------------|-------------------------------|------|------|--------|
| GPT | 35 x OceanGuard | Hi-flow bypass rate (cum/sec) | None | 99 | 0.7 |
| Rain | Rainwater Tank(20kL) | % Reuse Demand Met | None | None | 39.98 |
| Receiving | Receiving Node | % Load Reduction | None | None | 6.32 |
| Receiving | Receiving Node | GP % Load Reduction | 90 | None | 95.6 |
| Receiving | Receiving Node | TN % Load Reduction | 45 | None | 49.4 |
| Receiving | Receiving Node | TP % Load Reduction | 65 | None | 65 |
| Receiving | Receiving Node | TSS % Load Reduction | 85 | None | 85.4 |
| Sedimentation | SF Chamber (8.2m2) | % Reuse Demand Met | None | None | 0 |
| Sedimentation | SF Chamber (8.2m2) | Exfiltration Rate (mm/hr) | 0 | 0 | 0 |
| Sedimentation | SF Chamber (8.2m2) | Extended detention depth (m) | 0.25 | 1 | 0.77 |
| Sedimentation | SF Chamber (8.2m2) | High Flow Bypass Out (ML/yr) | None | None | 0 |
| Urban | 20% Roof (1005 m2) | Area Impervious (ha) | None | None | 0.1 |
| Urban | 20% Roof (1005 m2) | Area Pervious (ha) | None | None | 0 |
| Urban | 20% Roof (1005 m2) | Total Area (ha) | None | None | 0.1 |
| Urban | 80% Roof (4020 m2) | Area Impervious (ha) | None | None | 0.402 |
| Urban | 80% Roof (4020 m2) | Area Pervious (ha) | None | None | 0 |
| Urban | 80% Roof (4020 m2) | Total Area (ha) | None | None | 0.402 |
| Urban | Carpark (1550m2) | Area Impervious (ha) | None | None | 0.155 |
| Urban | Carpark (1550m2) | Area Pervious (ha) | None | None | 0 |
| Urban | Carpark (1550m2) | Total Area (ha) | None | None | 0.155 |
| Urban | CarparkBypass (290 m2) | Area Impervious (ha) | None | None | 0.014 |
| Urban | CarparkBypass (290 m2) | Area Pervious (ha) | None | None | 0.014 |
| Urban | CarparkBypass (290 m2) | Total Area (ha) | None | None | 0.029 |
| Urban | Footpath (6543 m2) | Area Impervious (ha) | None | None | 0.654 |
| Urban | Footpath (6543 m2) | Area Pervious (ha) | None | None | 0 |
| Urban | Footpath (6543 m2) | Total Area (ha) | None | None | 0.654 |
| Urban | Footpath Bypass (449 m2) | Area Impervious (ha) | None | None | 0.045 |
| Urban | Footpath Bypass (449 m2) | Area Pervious (ha) | None | None | 0 |
| Urban | Footpath Bypass (449 m2) | Total Area (ha) | None | None | 0.045 |
| Urban | Landscape (6700 m2) | Area Impervious (ha) | None | None | 0 |
| Urban | Landscape (6700 m2) | Area Pervious (ha) | None | None | 0.67 |
| Urban | Landscape (6700 m2) | Total Area (ha) | None | None | 0.67 |
| Urban | Landscape Bypass (300 m2) | Area Impervious (ha) | None | None | 0 |
| Urban | Landscape Bypass (300 m2) | Area Pervious (ha) | None | None | 0.03 |
| Urban | Landscape Bypass (300 m2) | Total Area (ha) | None | None | 0.03 |

Only certain parameters are reported when they pass validation

Failing Parameters

| Node Type | Node Name | Parameter | Min | Max | Actual |
|---------------|--------------------|-----------------------------------|------|------|--------|
| Sedimentation | SF Chamber (8.2m2) | Notional Detention Time (hrs) | 8 | 12 | 0.0695 |
| Sedimentation | SF Chamber (8.2m2) | Total Nitrogen - k (m/yr) | 500 | 500 | 1 |
| Sedimentation | SF Chamber (8.2m2) | Total Phosphorus - k (m/yr) | 6000 | 6000 | 1 |
| Sedimentation | SF Chamber (8.2m2) | Total Suspended Solids - k (m/yr) | 8000 | 8000 | 1 |

Only certain parameters are reported when they pass validation