WATER SENSITIVE URBAN DESIGN (WSUD) AND STORMWATER REPORT

PROPOSED HEALTH CARE FACILITY

Planning Proposal Submission
November 2021

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1. INTRODUCTION

1.1 General

This report has been prepared to support the Planning Proposal for the proposed Health Care Development at 61-71 Goulburn Street, Liverpool, NSW. This report has been prepared in accordance with Liverpool Council DCP and flood requirements. DRAINS modelling has been undertaken to demonstrate that the proposed Heath Care Development's stormwater system is in accordance with Council's OSD requirements, as well as to ensure adequate capacity for the pipes within the stormwater easement. Additionally, HEC-RAS modelling was utilized to determine the post developed 100yr ARI flood levels and extent in order to demonstrate that the development is in accordance with Council's flooding and freeboard requirements.

MUSIC modelling has been undertaken to ensure compliance with Council's water quality requirements. The intended water quality treatment will ensure there any impacts on downstream ecosystems are minimised as much as possible.

1.2 Background

The development site is located on 61-71 Goulburn Street, Liverpool, and is approximately 4670 sqm, refer Figure 1. The development site is bordered by residential houses on the Northern, Western and Southern sides and has a general fall from the North Western boundary to the South Eastern boundary with levels that range from RL11.91 in the North Western corner of the site to RL11.31in the South Eastern corner of the site.

Currently the site consists of 5 residential buildings with vehicular access from Goulburn Street and Goulburn Service Way. Furthermore a main stormwater line runs through the site in lot 20 DP113807 within an easement of 108.2 sqm as indicated in Figure 1. The site also includes an upstream catchment which discharges overland through the site as seen in Figure 2.1.

Figure 1 - Site location *(Source: Nearmaps), Red indicating boundary lines, Blue indicating easement lines*

1.3 PROPOSED DEVELOPMENT

The proposed building structure will encompass a large portion of the site. It consists of a health care facility that will have 11 levels including 3 basement levels for parking, a ground floor and 7 upper levels. Additionally a drop off bay is included that is accessible from Goulburn Street.

1.4 Council Policies

The civil engineering component of the aforementioned project has been designed in accordance with the following council codes and policies.

Liverpool City Council – Development Control Plan 2008
Liverpool City Council – Handbook for drainage design
Liverpool City Council – On-Site Stormwater Detention Technical Specification

2. UPSTREAM CATCHMENT

2.1 Catchment plan

As discussed previously, in addition to the 450mm diameter stormwater pipe, there is an upstream catchment which discharges overland through the proposed site, the total area being 6423 sqm as shown in figure 2.1.

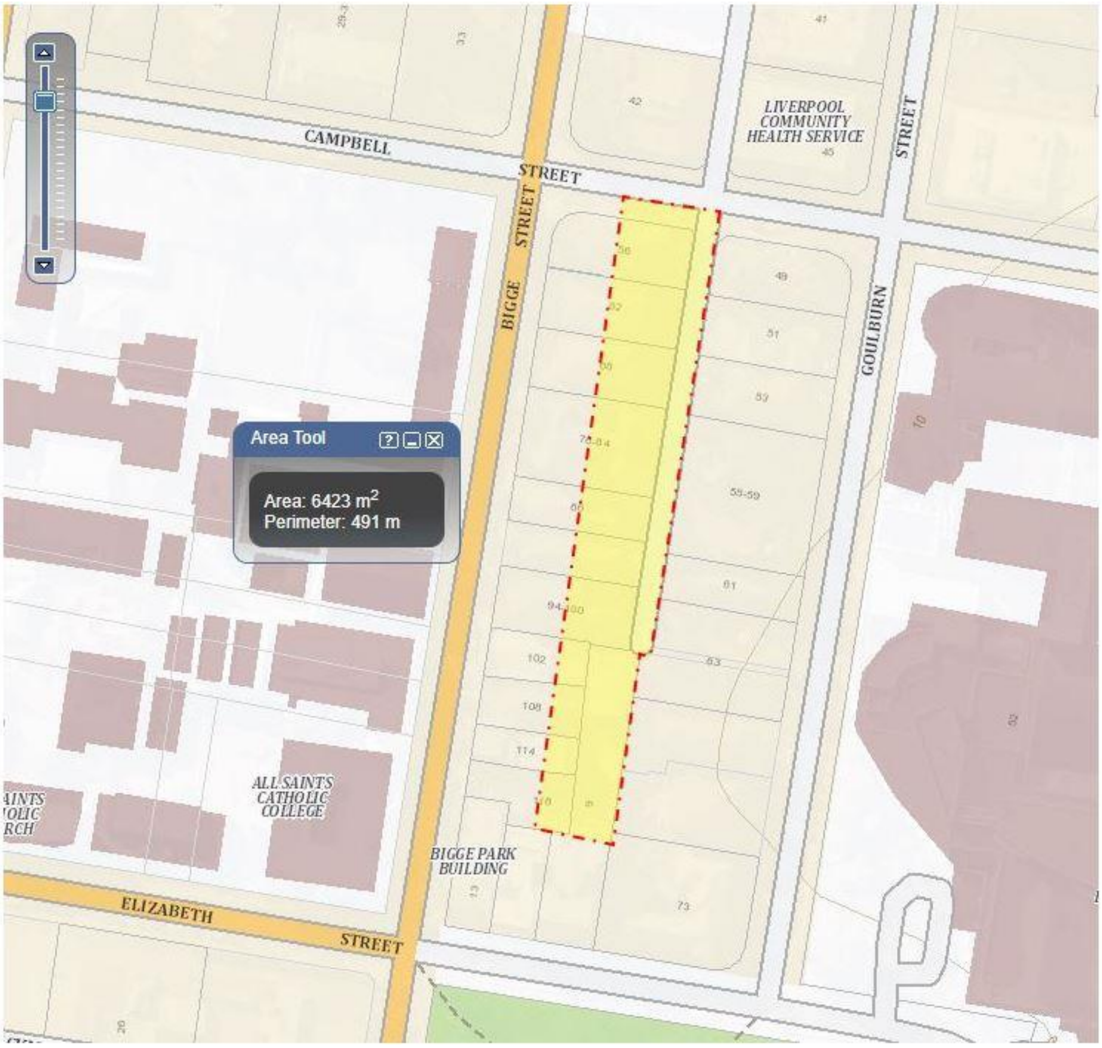

Figure 2.1 Catchment Plan

2.2 Calculated 100 yr flows

Refer to the DRAINS model titled “26442 Liverpool Hospital Planning Proposal- Above Ground OSD” which has been included as part of this submission. The 100 yr flow was calculated based off the following parameters:

- 0.6423 ha catchment
- 70% impervious
- 30% pervious
- Local rainfall data

Based on the results of the DRAINS model, the 100yr ARI flow rate of the upstream catchment was calculated to be 0.307m3/s

3. PROPOSED PIPE AND CHANNEL

There is an existing stormwater easement through the centre of the existing site, conveying both piped and overland upstream flows through the site. The proposed building encroaches on this existing easement, therefore it is proposed to relocate the stormwater easement to the northern boundary and to ensure all structures (including the basement levels) are kept clear of the easement. Refer to Figure 3.1. As such, overland flow from the catchment shown in figure 2.1 is redirected around the proposed building footprint. The proposed easement will have an increased 525mm diameter stormwater pipe to ensure no loss of pipe capacity and a 3m wide vegetated swale over in order to ensure the overland flows can be directed through the site without impacting on the proposed or neighbouring buildings.

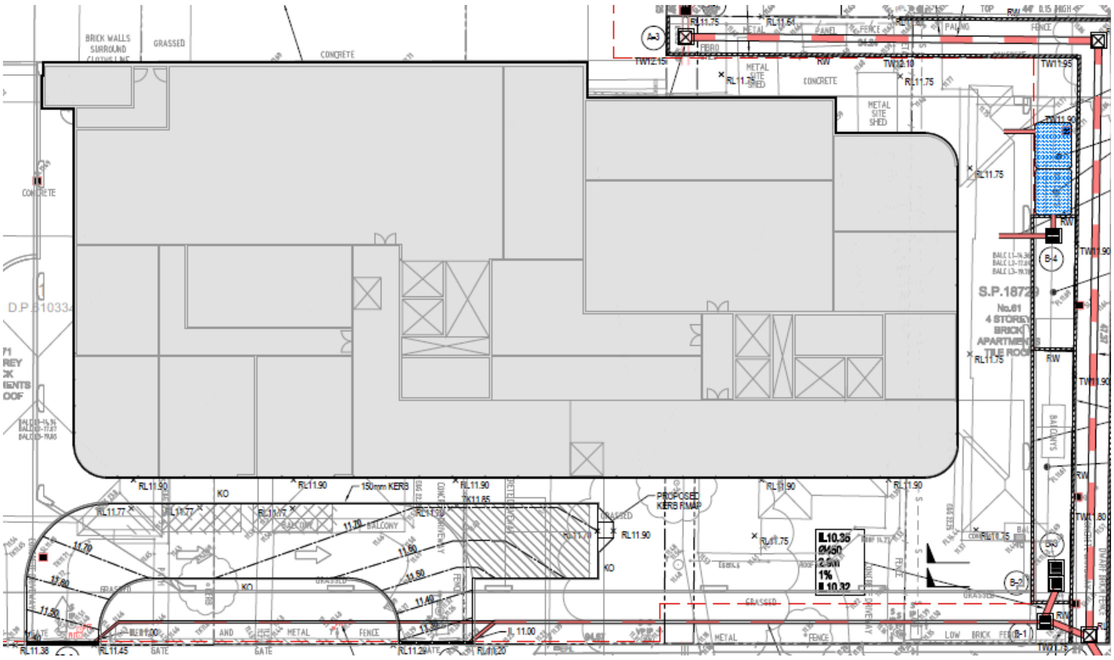

Figure 3.1 Proposed Stormwater System and adjustment of easement

To provide effective freeboard to the finished floor level of the health care facility (set at FFL 11.90), retaining walls are proposed within the stormwater easement, with a top of wall level set a minimum 300mm above the top water surface level, as calculated in HECRAS. This ensure that the design is compliant with Council's freeboard requirements (300mm freeboard to habitable floor levels for overland flow). As shown in figure 3.2 overland flow from in a 100-year storm is contained within the stormwater easement and as a result the risk of flood damage to the proposed health care facility is minimised.

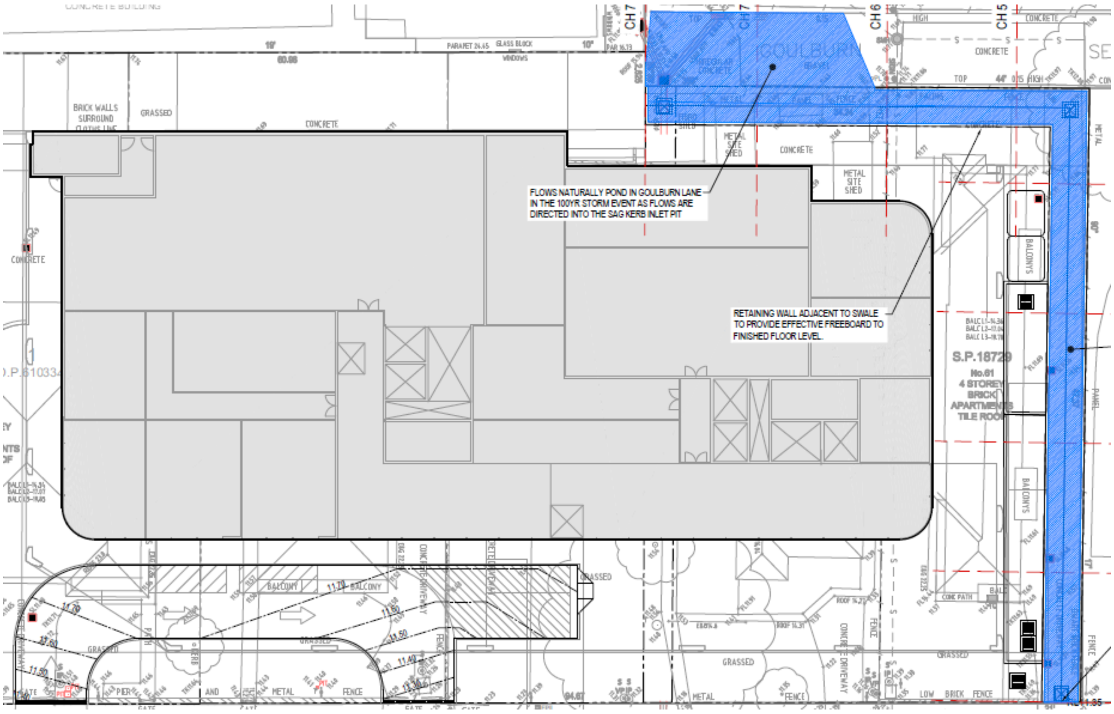

Figure 3.2- Stormwater overflow contained in 100yr storm

4. HEC-RAS MODELLING

4.1 Post-developed Model

A post-developed HEC-RAS model has been generated in order to ascertain the post-developed flood levels and to ensure that the development can accommodate the flows through the site without increasing the flood level within neighbouring properties. Given that the flooding is proposed to be completely contained within the proposed swale/easement, no pre-development HECRAS model has been prepared.

A manning's n value of 0.03 has been adopted for the HEC-RAS sections within the site that form part of the swale.

The boundary conditions have been input as a normal depth of S=0.01 for both upstream and downstream conditions.

Flow rates have been input as calculated in Section 2.2 of this report:

- 0.307m^3/s at chainage 78.61

Refer to the HEC-RAS model and drawings within Appendix A for further details.

4.2 HECRAS Model Parameters

Manning's n value = 0.013 (impervious surfaces)
Manning's n value = 0.03 (pervious/grassed surfaces)
Boundary Conditions > Normal depth of S=0.01
Flow Rates

- 0.307m^3/s at chainage 78.61

4.3 Results

Refer to drawing C121 within Appendix A showing the flood extent in the post-developed condition.

Refer to the tables below for a full summary of the 100-year post flood levels at each chainage.

Chainage (m)	**POST-developed 100yr WSL**
78.61	**11.75**
70	**11.71**
60	**11.67**
50	**11.63**
40	**11.59**
30	**11.56**
20	**11.52**
10	**11.49**
00	**11.43**

Table 4.3 HEC-RAS 100yr pre-developed flood levels

The results summarised in Table 4.3 have been used to ensure that the required freeboard of 300mm can be provided to protect the proposed building. The top of wall levels for the retaining structure within the easement has been set at a minimum of 300mm above the calculated 100yr water surface level, providing an effective freeboard to the building. The HEC-RAS modelling also shows that the overland flows from the upstream catchment can be completely contained within the stormwater easement. Refer to the drawings within Appendix A and the attached HEC-RAS model for further details.

5. STORMWATER MANAGEMENT

Stormwater controls are proposed to be introduced to control the altered water quality and flow of stormwater as a result of the implementation of the proposed Liverpool healthcare facility.

Key Issues

The key issues and the proposed mitigation measures to be implemented as part of the proposed development are:

- Stormwater Quantity- The implementation of the proposed Healthcare facility will result in an increased impervious surface area including surfaces such as the drop off bay and roof. As a result an increase in peak stormwater flows will be noticeable during storm events as lesser amounts of stormwater are being absorbed into the ground. Therefore it is appropriate that an OSD system is introduced to manage this increase runoff, in accordance with Liverpool Council Standards. A discussion of the DRAINS modelling of the stormwater system, the associated OSD design and other controls is further described in section 5.1.

- Water quality- Urban developments have the potential to increase gross pollutants, sediments, hydrocarbons and nutrient concentrations in stormwater runoff. As a result, stormwater has to be treated to meet certain controls as per Liverpool Council's DCP, limiting the impact of contaminants on downstream stormwater systems. The details of the water quality treatment methodology and calculations is expanded upon in section 5.2.

5.1 Stormwater quantity

As per the Liverpool City Council's DCP and engineering guidelines, on-site detention will be required for the site to ensure peak flow rates at any point within the downstream drainage system do not increase as a result of the development during a 5-year, 10 year and 100-year ARI storm event.

An above-ground on-site detention basin has been proposed, the dimensions of which are shown below:

- Above Ground OSD- 50 sqm with maximum of 300mm ponding (total 15m^3 of volume)

Refer to the table below for a summary of the pre and post developed flows for the subject site for the relevant storm events.

Storm Event	Pre-developed Flows	Post-developed Flows
5 year ARI	0.133	0.132
10 year ARI	0.153	0.150
100 year ARI	0.219	0.194

Table 5.1- Pre-developed and Post-developed flows (from subject site)

As demonstrated by the above table, and the attached DRAINS model, the post-developed flows have been reduced to below the calculated pre-developed values through the proposal of a 50sqm above ground basin and dual orifice outlet system (360mm diameter orifice for the minor events, and 300x100mm orifice for the major events). Refer to the civil engineering plans for further details on the proposed OSD system.

In addition to the site stormwater, the design of the stormwater easement has also been considered within the DRAINS modelling. The existing 450mm diameter stormwater pipe has been upsized to a 525mm pipe to ensure no loss of capacity. The attached DRAINS model shows that in the 100yr ARI storm event, the pipe has an increased capacity in the post-developed scenario from 0.214m^3/s (pre-developed) to 0.236m^3/s (post-developed). The management of the overland flows through the site is detailed within section 4 of this report.

5.2 Water Quality

Council's DCP requires that stormwater be treated before being discharged from the site, pollutants will need to be reduced by the following percentages according to Liverpool City Council:

- Total Nitrogen to be reduced by 45%
- Total Phosphorus to be reduced by 65%
- Total Suspended Solids to be reduced by 85%
- Gross Pollutants to be reduced by 90%

A music model has been undertaken in order to design the stormwater quality system. A combination of ocean guard pit baskets, a rainwater tank and a bio-retention basin have been proposed. Refer to the civil drawing included within Appendix A for more details. The results from the MUSIC model have been summarised in Table 5.2 and Figure 5.2 below.

Pollutant	Pre-Developed Pollutant loads (kg/year)	Post-Developed Pollutant loads (kg/year)	Target Reduction	Pollutant Reduction
Phosphorus	0.979	0.262	65%	73.2%
Nitrogen	6.14	3.25	45%	47.0%
Suspended Solids	499	40.2	85%	91.9%

Table 5.2 - Catchment Pollutant loads

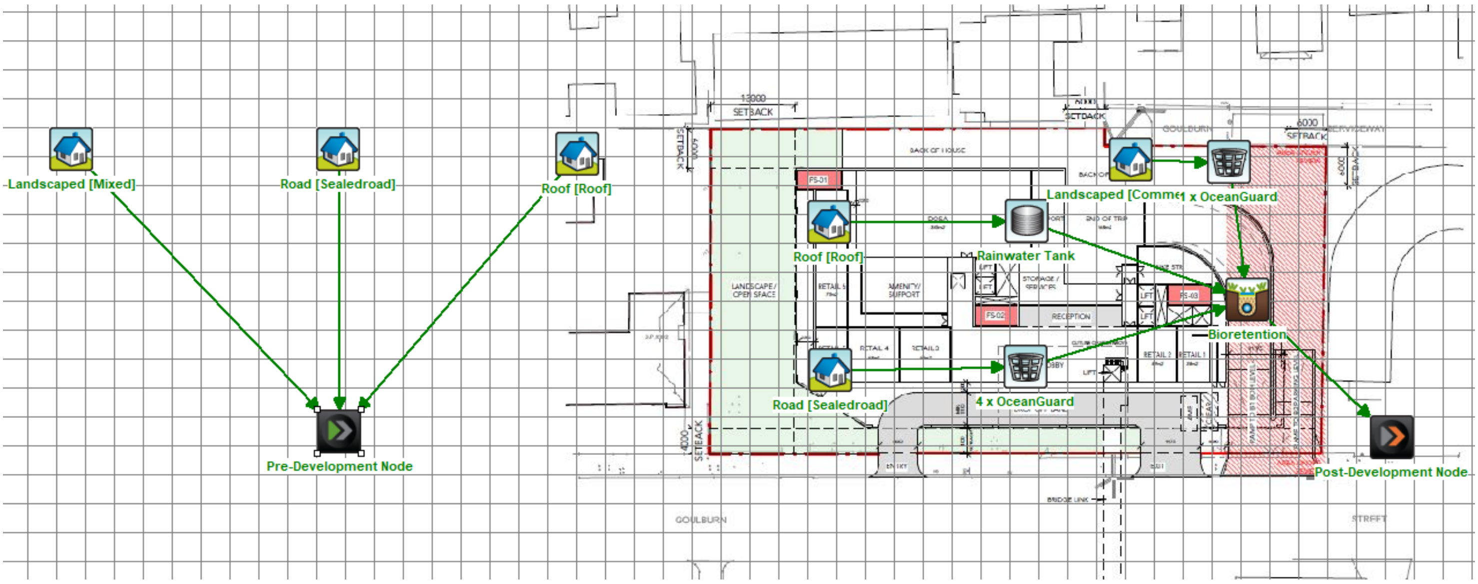

Figure 5.2 – MUSIC Modelling Water Quality Screenshot

6. CONCLUSION

Catchment mapping, MUSIC modelling, DRAINS modelling and HEC-RAS flood modelling has been undertaken to assess the proposed Liverpool Health Care development and its management of the site stormwater (water quality and quantity) and the upstream catchment (overland flows and piped flow in a 100yr ARI storm event). The proposed design consists of the relocation of the existing easement, such that it diverts upstream stormwater around the building footprint as well as the implementation of an above ground OSD basin, bio-retention system and rainwater tank.

As per Liverpool City Council's DCP water quality standards, measures including the bio-retention system have been implemented such that stormwater pollutants such as Nitrogen, Phosphorus and Suspended Solids have been reduced by more than 45%, 65% and 85% respectively. Furthermore the proposed stormwater system has satisfied all council OSD requirements as shown in section 5.1. As a result, it is evident that the proposed design is in accordance with Liverpool Council standards as well as engineering best practice principles.

APPENDIX A – CIVIL ENGINEERING PLANS

PROPOSED HEALTH CARE FACILITY
61-71 GOULBURN STREET, LIVERPOOL NSW
CIVIL ENGINEERING WORKS

GENERAL NOTES:

1. ALL WORK TO BE CARRIED OUT IN ACCORDANCE WITH LIVERPOOL CITY COUNCIL SPECIFICATION. CONTRACTOR TO OBTAIN AND RETAIN A COPY ON SITE DURING THE COURSE OF THE WORKS.
2. ALL NEW WORKS ARE TO MAKE A SMOOTH JUNCTION WITH EXISTING CONDITIONS AND MARRY IN A 'WORKMANLIKE' MANNER.
3. THE CONTRACTOR IS TO VERIFY THE LOCATION OF ALL SERVICES WITH EACH RELEVANT AUTHORITY. ANY DAMAGE TO SERVICES SHALL BE RECTIFIED BY THE CONTRACTOR OR THE RELEVANT AUTHORITY AT THE CONTRACTOR'S EXPENSE. SERVICES SHOWN ON THESE PLANS ARE ONLY THOSE EVIDENT AT THE TIME OF SURVEY OR AS DETERMINED FROM SERVICE DIAGRAMS. H & H CONSULTING ENGINEERS PTY. LTD CANNOT GUARANTEE THE INFORMATION SHOWN NOR ACCEPT ANY RESPONSIBILITY FOR INACCURACIES OR INCOMPLETE DATA.
4. SERVICES & ACCESSES TO THE EXISTING PROPERTIES ARE TO BE MAINTAINED IN WORKING ORDER AT ALL TIMES DURING CONSTRUCTION.
5. ADJUST EXISTING SERVICE COVERS TO SUIT NEW FINISHED LEVELS TO RELEVANT AUTHORITY REQUIREMENTS WHERE NECESSARY.
6. REINSTATE AND STABILISE ALL DISTURBED LANDSCAPED AREAS.
7. MINIMUM GRADE OF SUBSOIL SHALL BE 0.5% (1:200) FALL TO OUTLETS.
8. ALL TEMPORARY SEDIMENT AND EROSION CONTROL DEVICES ARE TO BE CONSTRUCTED, PLACED AND MAINTAINED IN ACCORDANCE WITH THE TECHNICAL SPECIFICATIONS, EROSION AND SEDIMENTATION CONTROL PLAN AND LIVERPOOL CITY COUNCIL REQUIREMENTS WHERE APPLICABLE.
9. CONTRACTOR TO CHECK AND CONFIRM SITE DRAINAGE CONNECTIONS ACROSS THE VERGE PRIOR TO COMMENCEMENT OF SITE DRAINAGE WORKS.
10. PROPERTIES AFFECTED BY THE WORKS ARE TO BE NOTIFIED IN ADVANCE WHERE DISRUPTION TO EXISTING ACCESS IS LIKELY.

EXISTING SERVICES & FEATURES

- THE CONTRACTOR SHALL ALLOW FOR THE CAPPING OFF, EXCAVATION AND REMOVAL (IF REQUIRED) OF ALL EXISTING SERVICES IN AREAS AFFECTED BY WORKS WITHIN THE CONTRACT AREA OR AS SHOWN ON THE DRAWINGS UNLESS DIRECTED OTHERWISE BY THE SUPERINTENDENT.
- THE CONTRACTOR SHALL ENSURE THAT AT ALL TIMES SERVICES TO ALL BUILDINGS NOT AFFECTED BY THE WORKS ARE NOT DISRUPTED.
- PRIOR TO COMMENCEMENT OF ANY WORKS THE CONTRACTOR SHALL GAIN APPROVAL OF HIS PROGRAM FOR THE RELOCATION/ CONSTRUCTION OF TEMPORARY SERVICES.
- CONTRACTOR SHALL CONSTRUCT TEMPORARY SERVICES TO MAINTAIN SUPPLY TO EXISTING BUILDING REMAINING IN OPERATION DURING WORKS TO THE SATISFACTION AND APPROVAL OF THE SUPERINTENDENT. ONCE DIVERSION IS COMPLETE AND COMMISSIONED, THE CONTRACTOR SHALL REMOVE ALL SUCH TEMPORARY SERVICES AND MAKE GOOD TO THE SATISFACTION OF THE SUPERINTENDENT.
- INTERRUPTION TO SUPPLY OF EXISTING SERVICES SHALL BE DONE SO AS NOT TO CAUSE ANY INCONVENIENCE TO THE PRINCIPAL. CONTRACTOR TO GAIN APPROVAL FROM THE SUPERINTENDENT FOR TIME OF INTERRUPTION.
- EXISTING SERVICES, BUILDINGS, EXTERNAL STRUCTURES AND TREES SHOWN ON THESE DRAWINGS ARE EXISTING FEATURES PRIOR TO ANY DEMOLITION WORKS.
- EXISTING SERVICES UNLESS SHOWN ON SURVEY PLAN HAVE BEEN PLOTTED FROM SERVICES SEARCH PLANS AND AS SUCH THEIR ACCURACY CANNOT BE GUARANTEED. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO COMPLETE A 'DIAL BEFORE YOU DIG' SEARCH AND TO ESTABLISH THE LOCATION AND LEVEL OF ALL EXISTING SERVICES PRIOR TO THE COMMENCEMENT OF ANY WORK. ANY DISCREPANCIES SHALL BE REPORTED TO THE SUPERINTENDENT. CLEARANCES SHALL BE OBTAINED FROM THE RELEVANT SERVICE AUTHORITY.
- ALL BRANCH GAS AND WATER SERVICES UNDER DRIVEWAYS AND BRICK PAVING SHALL BE LOCATED IN Ø80 uPVC SEWER GRADE CONDUITS EXTENDING A MINIMUM OF 500mm BEYOND EDGE OF PAVING.

LOCALITY SKETCH

SCALE: N.T.S.

SITEWORKS NOTES

- DATUM : A.H.D.
- ORIGIN OF LEVELS : REFER TO BENCH OR STATE SURVEY MARKS WHERE SHOWN ON PLAN.
- CONTRACTOR MUST VERIFY ALL DIMENSIONS AND EXISTING LEVELS ON SITE PRIOR TO THE COMMENCEMENT OF WORK.
- ALL WORKS TO BE UNDERTAKEN IN ACCORDANCE WITH THE DETAILS SHOWN ON THE DRAWINGS & THE DIRECTIONS OF THE SUPERINTENDENT.
- EXISTING SERVICES UNLESS SHOWN ON THE SURVEY PLAN HAVE BEEN PLOTTED FROM SERVICES SEARCH PLANS AND AS SUCH THEIR ACCURACY CANNOT BE GUARANTEED. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO ESTABLISH THE LOCATION AND LEVEL OF ALL EXISTING SERVICES PRIOR TO THE COMMENCEMENT OF ANY WORK. ANY DISCREPANCIES SHALL BE REPORTED TO THE SUPERINTENDENT. CLEARANCES SHALL BE OBTAINED FROM THE RELEVANT SERVICE AUTHORITY.
- WHERE NEW WORKS ABUT EXISTING THE CONTRACTOR SHALL ENSURE THAT A SMOOTH EVEN PROFILE, FREE FROM ABRUPT CHANGES IS ACHIEVED.
- THE CONTRACTOR SHALL ARRANGE ALL SURVEY SETOUT TO BE CARRIED OUT BY A REGISTERED SURVEYOR.
- CARE IS TO BE TAKEN WHEN EXCAVATING NEAR EXISTING SERVICES. NO MECHANICAL EXCAVATION IS TO BE UNDERTAKEN OVER TELSTRA OR ELECTRICAL SERVICES. HAND EXCAVATE IN THESE AREAS.
- CONTRACTOR TO OBTAIN AUTHORITY APPROVALS WHERE APPLICABLE.
- MAKE SMOOTH TRANSITION TO EXISTING SURFACES AND MAKE GOOD.
- THESE PLANS SHALL BE READ IN CONJUNCTION WITH APPROVED LANDSCAPE, ARCHITECTURAL, STRUCTURAL, HYDRAULIC AND MECHANICAL DRAWINGS AND SPECIFICATIONS OR WRITTEN INSTRUCTIONS THAT MAY BE ISSUED RELATING TO DEVELOPMENT AT THE SITE.
- TRENCHES THROUGH EXISTING ROAD AND CONCRETE PAVEMENTS SHALL BE SAWCUT TO FULL DEPTH OF CONCRETE AND A MINIMUM OF 50mm IN BITUMINOUS PAVING.
- ALL BRANCH GAS AND WATER SERVICES UNDER DRIVEWAYS AND BRICK PAVING SHALL BE LOCATED IN Ø80 uPVC SEWER GRADE CONDUITS EXTENDING A MINIMUM OF 500mm BEYOND EDGE OF PAVING.
- GRADES TO PAVEMENTS TO BE AS IMPLIED BY RL'S ON PLAN . GRADE EVENLY BETWEEN NOMINATED RL'S. AREAS EXHIBITING PONDING GREATER THAN 5mm DEPTH WILL NOT BE ACCEPTED UNLESS IN A DESIGNATED SAG POINT.
- ALL COVERS AND GRATES ETC TO EXISTING SERVICE UTILITIES ARE TO BE ADJUSTED TO SUIT NEW FINISHED SURFACE LEVELS WHERE APPLICABLE.

SURVEY NOTES

THE EXISTING SITE CONDITIONS SHOWN ON THE FOLLOWING DRAWINGS HAVE BEEN INVESTIGATED BY THE SURVEYOR SPECIFIED IN THE TITLE BLOCK.
THE INFORMATION IS SHOWN TO PROVIDE A BASIS FOR DESIGN. HENRY AND HYMAS PTY. LTD. DOES NOT GUARANTEE THE ACCURACY OR COMPLETENESS OF THE SURVEY BASE OR ITS SUITABILITY AS A BASIS FOR CONSTRUCTION DRAWINGS.
SHOULD DISCREPANCIES BE ENCOUNTERED DURING CONSTRUCTION BETWEEN THE SURVEY DATA AND ACTUAL FIELD DATA, CONTACT HENRY AND HYMAS PTY. LTD. THE FOLLOWING NOTES HAVE BEEN TAKEN DIRECTLY FROM ORIGINAL SURVEY DOCUMENTS.

DRAWING SCHEDULE

20442_PP_C000	COVER SHEET, DRAWING SCHEDULE, NOTES AND LOCALITY SKETCH
20442_PP_C101	GENERAL ARRANGEMENT PLAN
20442_PP_C110	SITE SECTIONS
20442_PP_C121	POST-DEVELOPED FLOOD EXTENT PLAN
20442_PP_C200	STORMWATER MISCELLANEOUS DETAILS AND PIT LID SCHEDULE
20442_PP_C250	STORMWATER CATCHMENT PLAN

FOR PLANNING PROPOSAL

SURVEY INFORMATION
SURVEYED BY:
CRAIG & RHODES
DATUM: AHD

REVISION	AMENDMENT	DRAWN	DESIGNED	DATE	REVISION	AMENDMENT	DRAWN	DESIGNED	DATE
01	FOR PLANNING PROPOSAL	NH	NH	09.11.2021					

Client: SACCO BUILDING GROUP PTY LTD
Architect: TEAM 2 ARCHITECTS

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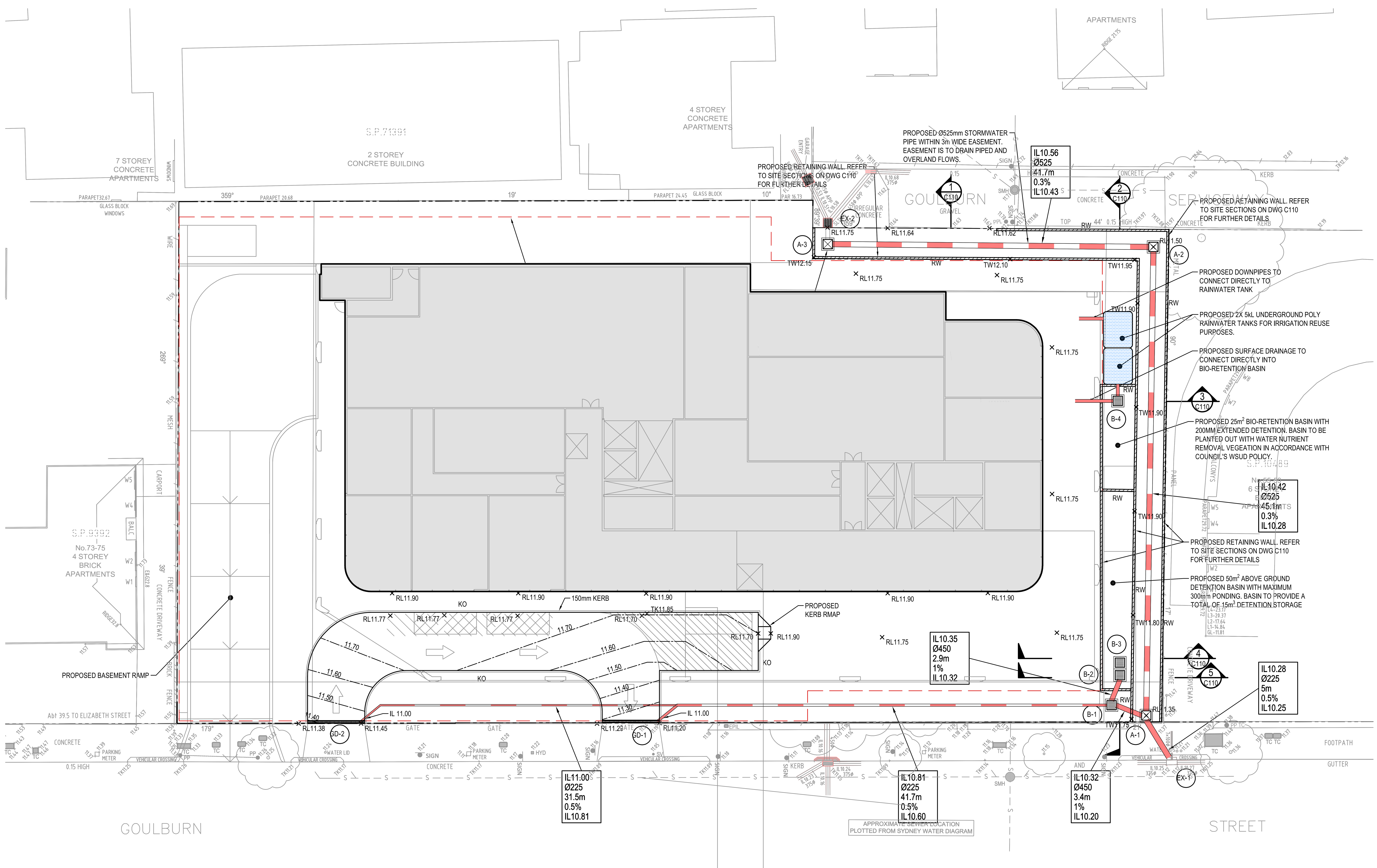
Project: PROPOSED HEALTH CARE FACILITY
61-71 GOULBURN STREET, LIVERPOOL NSW
Title: COVER SHEET, DRAWING SCHEDULE, NOTES AND LOCALITY SKETCH

Drawn	Designed	Date
M.Stimova	N.Heazlewood	OCT 2021
Checked	Approved	Scale @A1
N.Heazlewood	A.Francis	NTS

Drawing number: 20442_PP_C000 Revision: 01



SITE DETAIL PLAN

SCALE: 1:200

SCALE 1:200 (0 4 8 12 16 20m)

LEGEND

- EXISTING BOUNDARY
- PROPOSED JUNCTION PITS
- PROPOSED SURFACE INLET PITS
- PROPOSED PIT TAG (A-1: LINE LETTER, PIT NUMBER)
- IL10.42 — STORMWATER UPSTREAM INVERT RL.
- Ø525 — STORMWATER PIPE DIAMETER & CLASS
- 45.1m — STORMWATER PIPE LENGTH
- 0.3% — STORMWATER PIPE GRADE
- IL10.28 — STORMWATER DOWNSTREAM INVERT RL.
- PROPOSED GRATED DRAIN
- PROPOSED STORMWATER PIPE
- 72.50 — PROPOSED CONTOURS
- RL72.50 — PROPOSED SPOT LEVEL
- KO — PROPOSED KERB ONLY
- RW — PROPOSED RETAINING WALL
- EXISTING STORMWATER PIPE

NOTE:

ALL EXTERNAL STORMWATER PITS TO BE FITTED WITH OCEAN PROTECT PIT BASKETS OR EQUIVALENT TO MEET WATER QUALITY REQUIREMENTS.

FOR PLANNING PROPOSAL

SURVEY INFORMATION
SURVEYED BY: CRAIG & RHODES
DATUM: AHD

REVISION	AMENDMENT	DRAWN	DESIGNED	DATE
03	FOR PLANNING PROPOSAL	NH	NH	09.11.2021
02	FOR CO-ORDINATION	NH	NH	21.10.2021
01	PRELIMINARY	NH	NH	27.09.2021

Client: SACCO BUILDING GROUP PTY LTD
Architect: TEAM 2 ARCHITECTS

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Project: PROPOSED HEALTH CARE FACILITY
61-71 GOULBURN STREET, LIVERPOOL NSW
Title: SITE DETAIL PLAN

Drawn	Designed	Date
J.Knight	N.Heazlewood	SEPT 2021
Checked	Approved	Scale @A1
N.Heazlewood	A.Francis	1:200

Drawing number: 20442_PP_C100 Revision: 03

FOR PLANNING PROPOSAL

SURVEY INFORMATION
SURVEYED BY:
CRAIG & RHODES
DATUM: AHD

REVISION	AMENDMENT	DRAWN	DESIGNED	DATE
03	FOR PLANNING PROPOSAL	NH	NH	09.11.2021
02	FOR CO-ORDINATION	NH	NH	21.10.2021
01	PRELIMINARY	JK	NH	27.09.2021

Client
SACCO BUILDING GROUP PTY LTD

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TEAM 2 ARCHITECTS

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Project
PROPOSED HEALTH CARE FACILITY
61-71 GOULBURN STREET, LIVERPOOL NSW

Title
SITE SECTIONS

Drawn	Designed	Date
J.Knight	N.Heazlewood	SEPT 2021
Checked	Approved	Scale @A1
N.Heazlewood	A.Francis	1:200

Drawing number: 20442_PP_C110
Revision: 03

POST-DEVELOPED FLOOD EXTENT PLAN

SCALE: 1:200

0 4 8 12 16 20m

SCALE 1:200

FOR PLANNING PROPOSAL

SURVEY INFORMATION

SURVEYED BY:
CRAIG & RHODES
DATUM: AHD

REVISION	AMENDMENT	DRAWN	DESIGNED	DATE
02	FOR PLANNING PROPOSAL	NH	NH	09.11.2021
01	CO-ORDINATION	NH	NH	21.10.2021

Client
SACCO BUILDING GROUP PTY LTD

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henry&hymas

Project
PROPOSED HEALTH CARE FACILITY
61-71 GOULBURN STREET, LIVERPOOL NSW

Title
POST-DEVELOPED FLOOD EXTENT PLAN

Drawn	Designed	Date
M.Stimova	N.Heazlewood	SEPT 2021
Checked	Approved	Scale @A1
N.Heazlewood	A.Francis	1:200

Drawing number: 20442_PP_C121
Revision: 02

TYPICAL PIT CHAMBER SIZES

IT IS THE CONTRACTORS RESPONSIBILITY TO SELECT PIT CHAMBER SIZE WITH REGARDS TO PIPE SIZE, DEPTH TO INVERT AND SKEW ANGLE. REFER SKETCHES BELOW.

1. SELECT PIT CHAMBER USING THE STEPS BELOW:
   SELECT PIT CHAMBER SIZE DEPENDING ON THE PIPE DIAMETERS.
2. CHECK PIT CHAMBER SIZE TO SATISFY DEPTH TO INVERT REQUIREMENTS.
3. CHECK PIT CHAMBER DIMENSIONS TO SATISFY THE SKEW ANGLE IN THE TABLE.

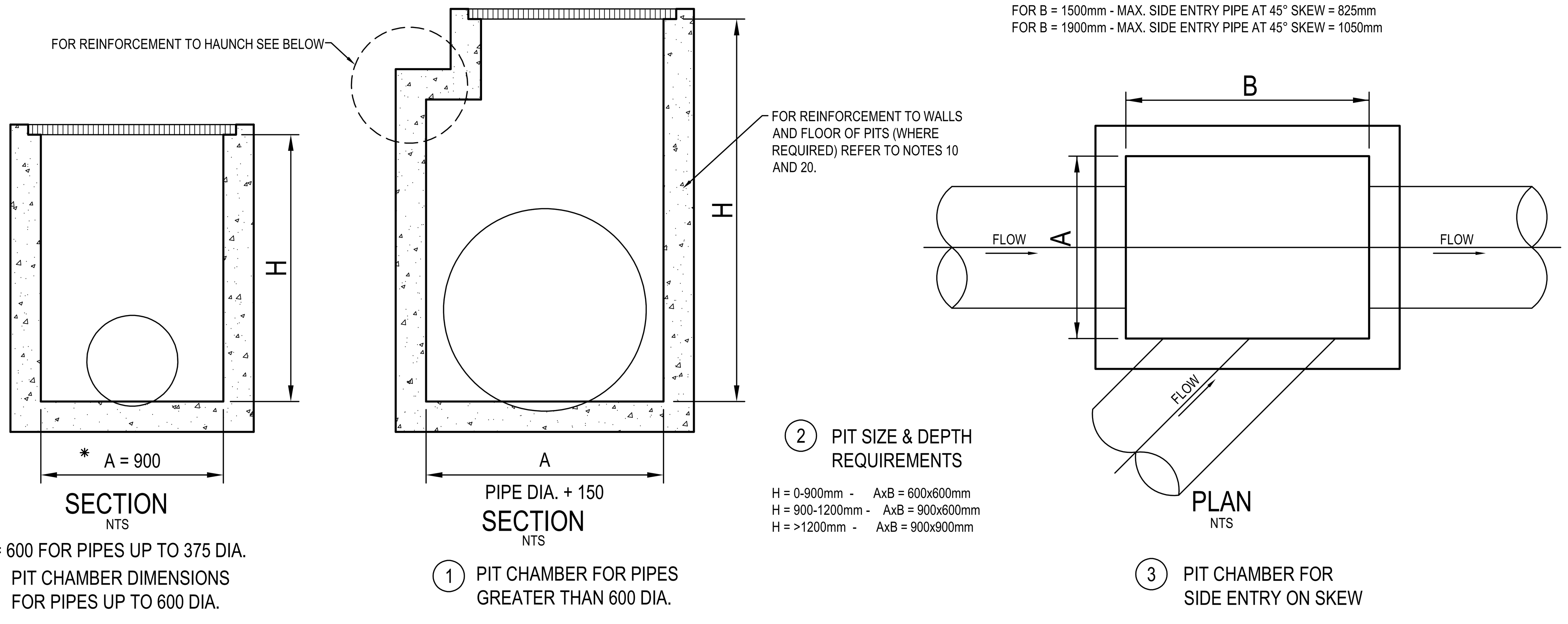


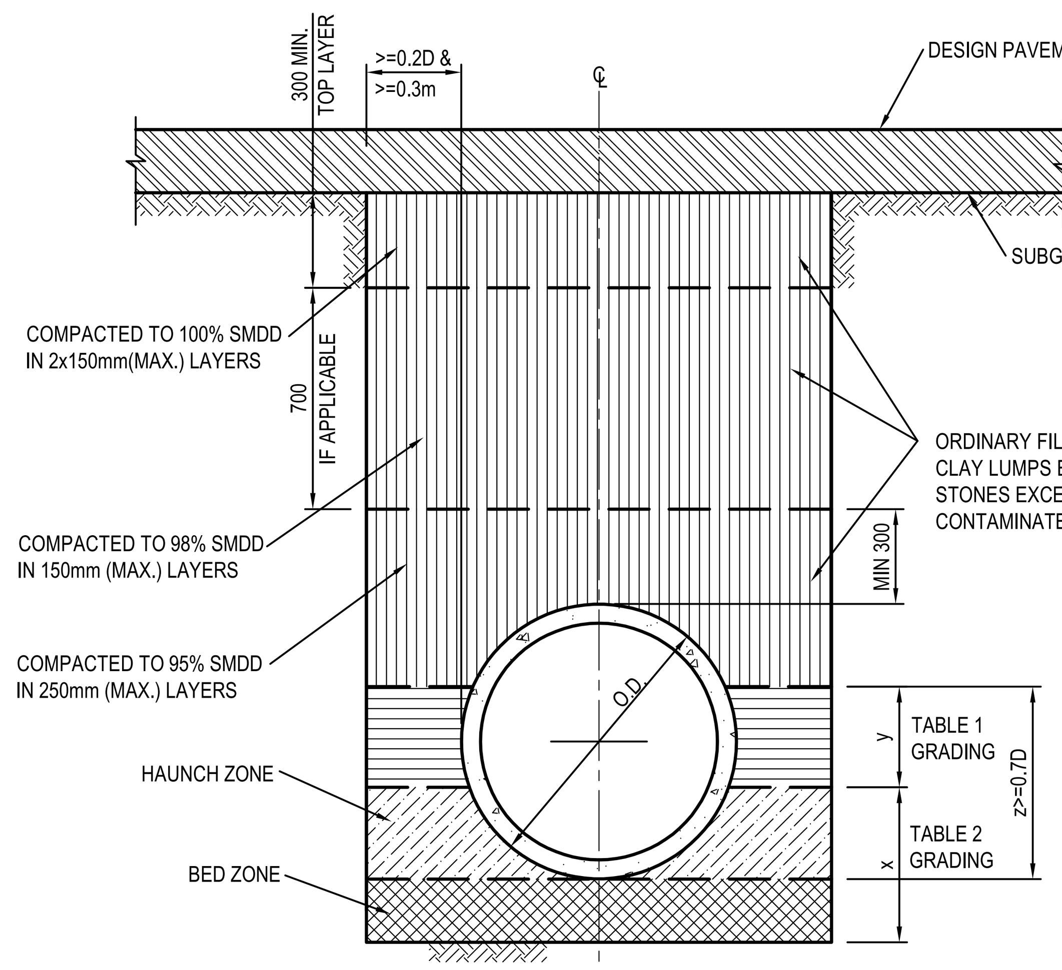
TABLE 1	
SIEVE SIZE (MM)	WEIGHT PASISNG (%)
75.0	100
9.5	100 TO 50
2.36	100 TO 30
0.60	50 TO 15
0.075	25 TO 0

TABLE 2	
SIEVE SIZE (MM)	WEIGHT PASISNG (%)
19.0	100
2.36	100 TO 50
0.60	90 TO 20
0.30	60 TO 10
0.15	25 TO 0
0.075	10 TO 0

TABLE 3				
SUPPORT TYPE	BED ZONE X	HAUNCH ZONE Y	BED AND HAUNCH ZONES COMPACTION	MAX BEDDING FACTOR
HS1	100 IF D<=1500, OR 150 IF D>=1500	0.1D	50	2.0
HS2		0.3D	60	2.5
HS3		0.3D	70	4.0

PIT LID SCHEDULE

PIT/STRUCTURE NUMBER	DESCRIPTION
SD-1 SD-2	PROPOSED 200mm WIDE HEAVY DUTY ACO DRAIN WITH CLASS 'D' IN ACCORDANCE WITH LIVERPOOL CITY COUNCIL'S REQUIREMENTS.
B-1 B-2 B-3 B-4	PROPOSED SURFACE INLET PIT WITH 900x900 HINGED HEAVY DUTY GRATED LID CLASS 'D' IN ACCORDANCE WITH LIVERPOOL CITY COUNCIL'S REQUIREMENTS.
A-1 A-2 A-3	PROPOSED SEALED JUNCTION PIT WITH 900x900 HEAVY DUTY GRATED LID CLASS 'D' IN ACCORDANCE WITH LIVERPOOL CITY COUNCIL'S REQUIREMENTS.
EX-1 EX-2	EXISTING PIT

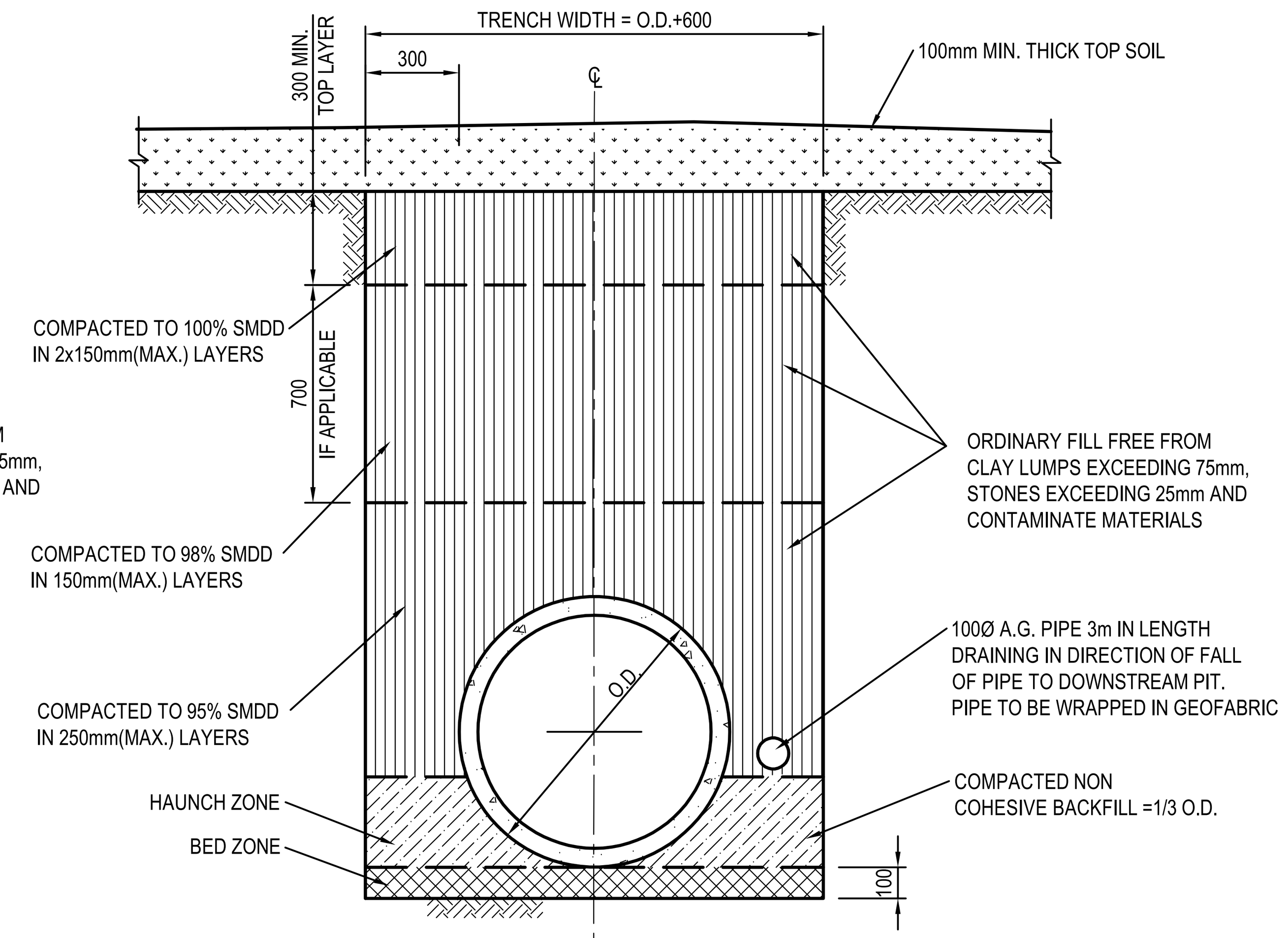


PIPE TRENCH INSTALLATION BENEATH PAVEMENT

(HS SUPPORT TO BE USED UNDER ROADWAY)

SCALE 1:20

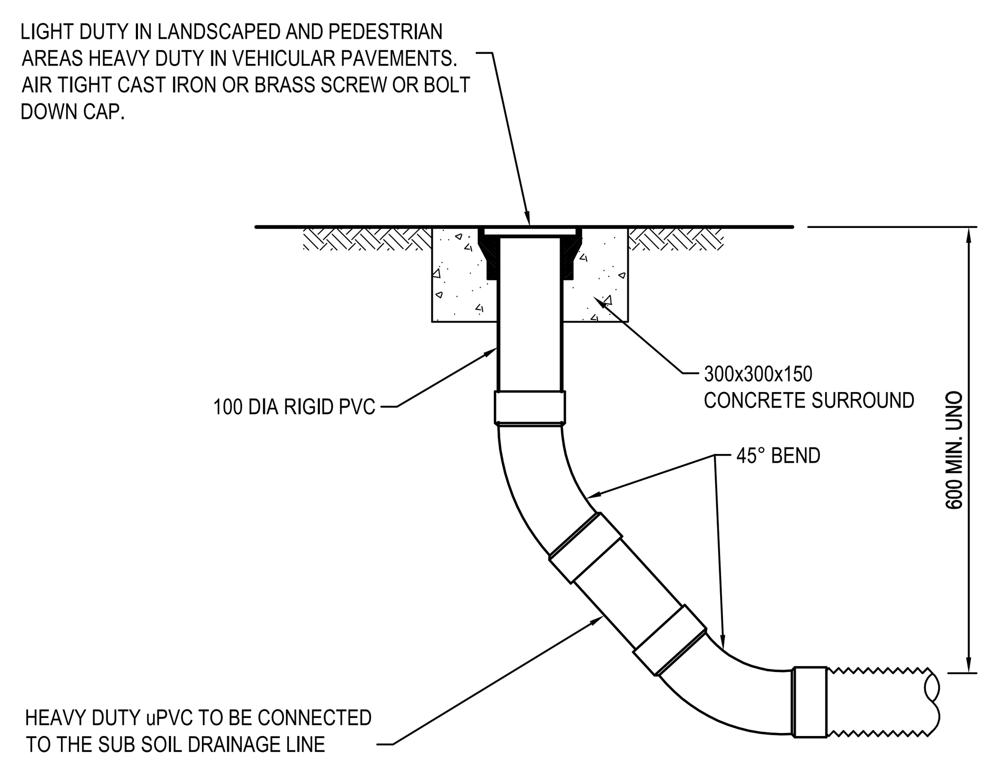
NOTE:
TYPE HS2 TO BE USED AS A TYPICAL SUPPORT FOR TRENCHES UNDER ROADWAY UNLESS SPECIFIED SEPERATELY



PIPE TRENCH INSTALLATION IN LANDSCAPE AREAS

(H1 & H2 SUPPORT)

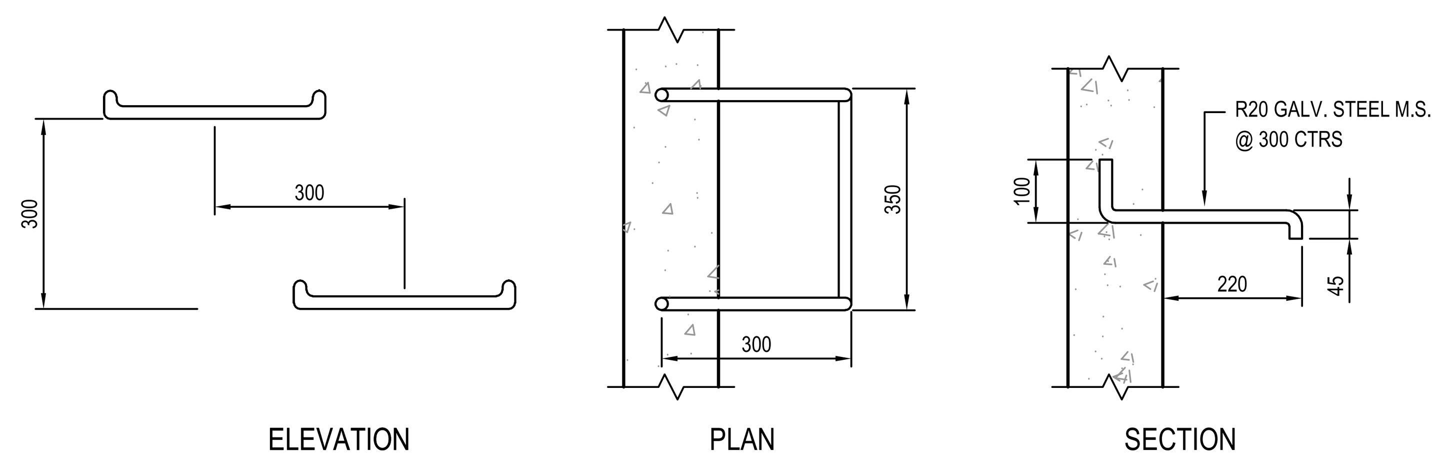
SCALE 1:20



FLUSHING POINT (FP)

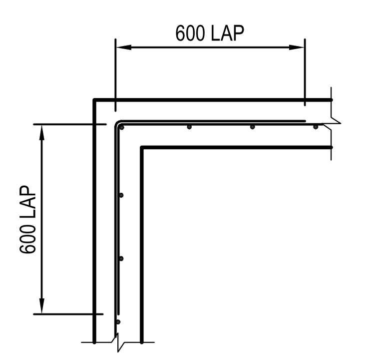
SCALE 1:10

NOTE: SLOTTED RIGID PVC PIPE AND FITTINGS MAY BE USED



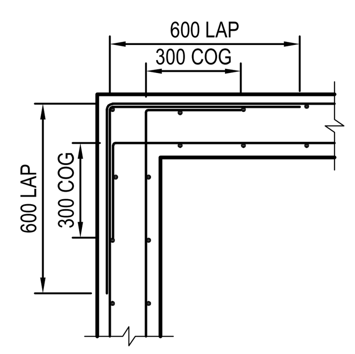
TYPICAL STEP IRON DETAIL

SCALE 1:10



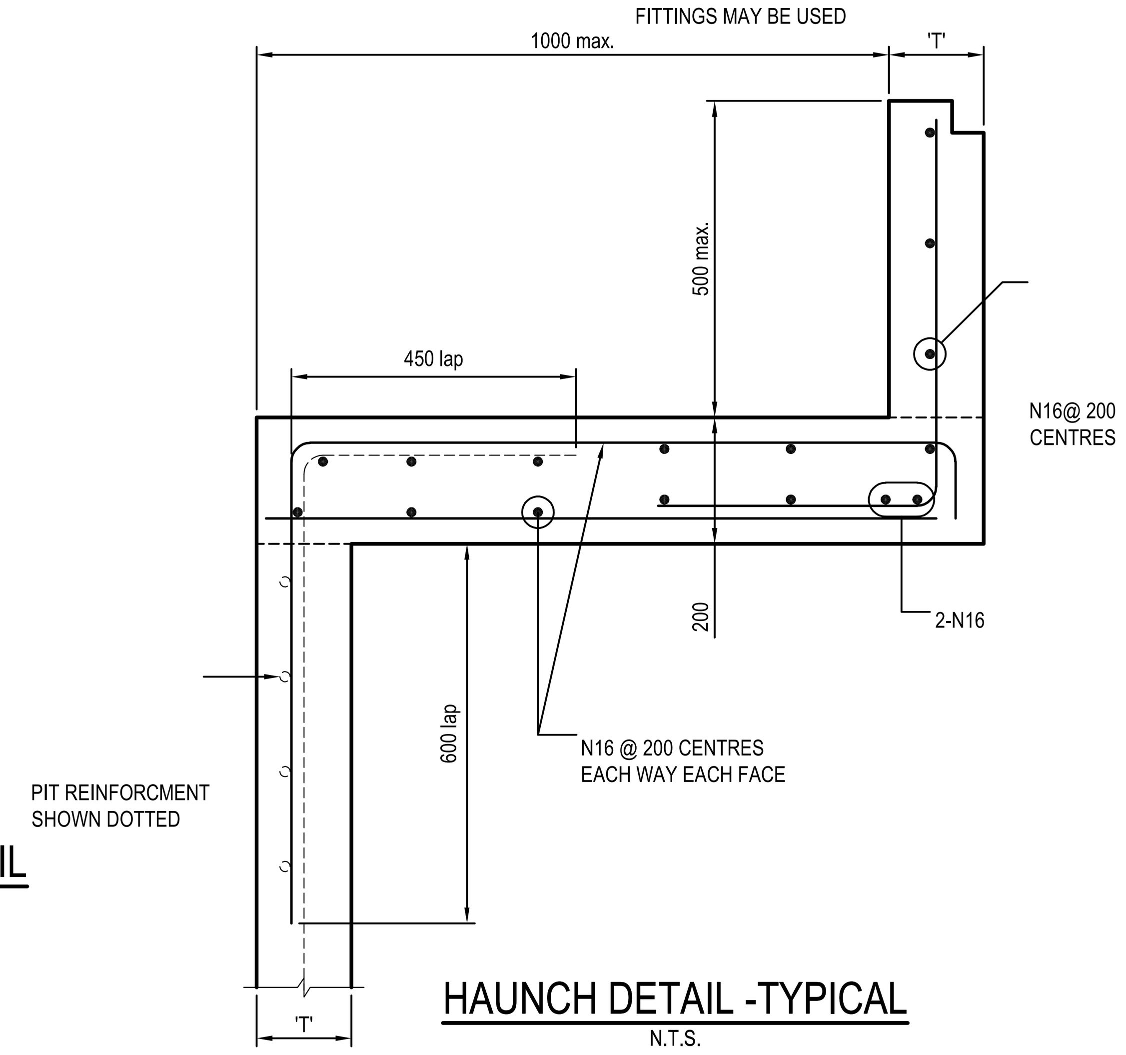
150 WALL - CORNER DETAIL

SCALE 1:20



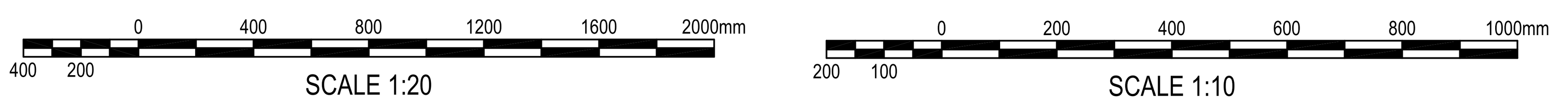
200 WALL - CORNER DETAIL

SCALE 1:20



HAUNCH DETAIL -TYPICAL

N.T.S.



DRAINAGE NOTES:

1. ALL STORMWATER WORK TO COMPLY WITH AS 3500 PART 3.
2. CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING THE MINIMUM COVER OF 600mm ON ALL PIPES.
3. PROTECTION OF PIPES DUE TO LOADS EXCEEDING W7 WHEEL LOAD SHALL BE THE CONTRACTOR'S RESPONSIBILITY.
4. BEDDING TYPE SHALL BE TYPE H2 FOR RCP. WHERE NECESSARY THE OVERLAY ZONE SHALL BE REDUCED TO ACCOMMODATE PAVEMENT REQUIREMENTS. REFER TO THIS DRAWING FOR DETAILS.
5. MINIMUM COVER OVER EXISTING PIPES FOR PROTECTION DURING CONSTRUCTION SHALL BE 800mm.
6. NO CONSTRUCTION LOADS SHALL BE APPLIED TO PLASTIC PIPES.
7. FINISHED SURFACE LEVELS SHOWN ON LAYOUT PLAN DRGS TAKE PRECEDENCE OVER DESIGN DRAINAGE SURFACE LEVELS.
8. ALL PIPES UP TO AND INCLUDING 300 DIA. SHALL BE SOLVENT OR RUBBER RING JOINTED PVC CLASS SH PIPE TO AS1260. ALL OTHER PIPES TO BE RCP USING CLASS 2 RUBBER RING JOINTED PIPE. HARDIES FRC PIPE MAY BE USED IN LIEU OF RCP IF DESIRED IN GROUND. ALL AERIAL PIPES TO BE PVC CLASS SH.
9. ALL PITS IN NON TRAFFICABLE AREAS TO BE PREFABRICATED POLYESTER CONCRETE "POLYCRETE" WITH "LIGHT DUTY" CLASS B GALV. MILD STEEL GRATING AND FRAME.
ALL PITS IN TRAFFICABLE AREAS (CLASS "D" LOADING MAX) TO HAVE 150mm THICK CONCRETE WALLS AND BASE CAST IN-SITU f'c=32 MPa, REINFORCED WITH N12-200 BOTH LOADING WAYS CENTRALLY PLACE .U.N.O. ON SEPARATE DESIGN DRAWINGS IN THIS SET. GALV.MILD STEEL GRATING AND FRAME TO SUIT DESIGN LOADING. PRECAST PITS, RECTANGULAR OR CIRCULAR IN SHAPE, MAY BE USED IN LIEU AND SHALL COMPLY WITH RELEVANT AUSTRALIAN STANDARDS.
10. ALL PITS, GRATINGS AND FRAMES SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURERS SPECIFICATION AND TO BE IN ACCORDANCE WITH AS3500.3 AND AS3996.
11. PIT CHAMBER DIMENSIONS ARE TO BE SELECTED TO SATISFY THE FOLLOWING:
- PIPE SIZE
- DEPTH TO INVERT
- SKEW ANGLE
REFER TYPICAL PIT CHAMBER DETAILS BELOW
IF PIT LID SIZE IS SMALLER THAN THE PIT CHAMBER SIZE THEN THE PIT LID IS TO BE CONSTRUCTED ON THE CORNER OF THE PIT CHAMBER WITH THE STEP IRONS DIRECTLY BELOW. ALTERNATIVELY THE PIT LID TO BE USED, IS TO BE THE SAME SIZE AS THE PIT CHAMBER.
12. FOR PIPE SIZES GREATER THAN Ø300mm, PIT FLOOR IS TO BE BENCHED TO FACILITATE FLOW.
13. GALVANISED STEP IRONS SHALL BE PROVIDED AT 300 CTS FOR PITS HAVING A DEPTH EXCEEDING 1200mm. SUBSOIL DRAINAGE PIPE SHALL BE PROVIDED IN PIPE TRENCHES ADJACENT TO INLET PIPES. (MINIMUM LENGTH 3m).
14. ALL SUBSOIL PIPES SHALL BE 100mm SLOTTED PVC IN A FILTER SOCK, UNO, WITH 3m INSTALLED UPSTREAM OF ALL PITS.
15. ALL PIPEWORK SHALL HAVE MINIMUM DIAMETER 100.
16. MINIMUM GRADE FOR ROOFWATER DRAINAGE LINES SHALL BE 1%.
17. ALL PIPE JUNCTIONS AND TAPER UP TO AND INCLUDING 300 DIA. SHALL BE VIA PURPOSE MADE FITTINGS.
18. ALL ROOF DRAINAGE TO BE INSTALLED IN ACCORDANCE WITH AS3500, PART 3. TESTING TO BE UNDERTAKEN AND REPORTS PROVIDED TO THE SUPERINTENDENT.
19. LOCATION OF THE DIRECT DOWN PIPE CONNECTIONS MAY VARY ON SITE TO SUIT SITE CONDITIONS, WHERE CONNECTION SHOWN ON LONG SECTIONS CHAINAGES ARE INDICATIVE ONLY.
20. PITS IN EXCESS OF 1.5 m DEEP TO HAVE WALL AND FLOOR THICKNESS INCREASED TO 200mm. REINFORCED WITH N12@200 CTS CENTRALLY PLACED BOTH WAYS THROUGHOUT U.N.O.ON SEPARATE DESIGN DRAWINGS IN THIS SET. IF DEPTH EXCEEDS 5m CONTACT ENGINEER.
21. SUBSOIL DRAINAGE LINES FOR LANDSCAPE AREA NOT SHOWN ON THESE DRAWINGS. REFER TO LANDSCAPING PLANS FOR DETAILS.
22. ALL STORMWATER PITS TO HAVE Ø100 uPVC SLOTTED SUBSOIL PIPES CONNECTED TO THEM. THESE SUBSOILS TO EXTEND 3m UPSTREAM OF THE PIT AT A MINIMUM GRADE.

FOR PLANNING PROPOSAL

SURVEY INFORMATION
SURVEYED BY: SDG
DATUM: AHD
ORIGIN OF LEVELS:
SSM22697
RL123.255

REVISION	AMENDMENT	DRAWN	DESIGNED	DATE	REVISION	AMENDMENT	DRAWN	DESIGNED	DATE
01	FOR PLANNING PROPOSAL	NH	NH	09.11.2021					

Client: SACCO BUILDING GROUP PTY LTD

Architect: TEAM 2 ARCHITECTS

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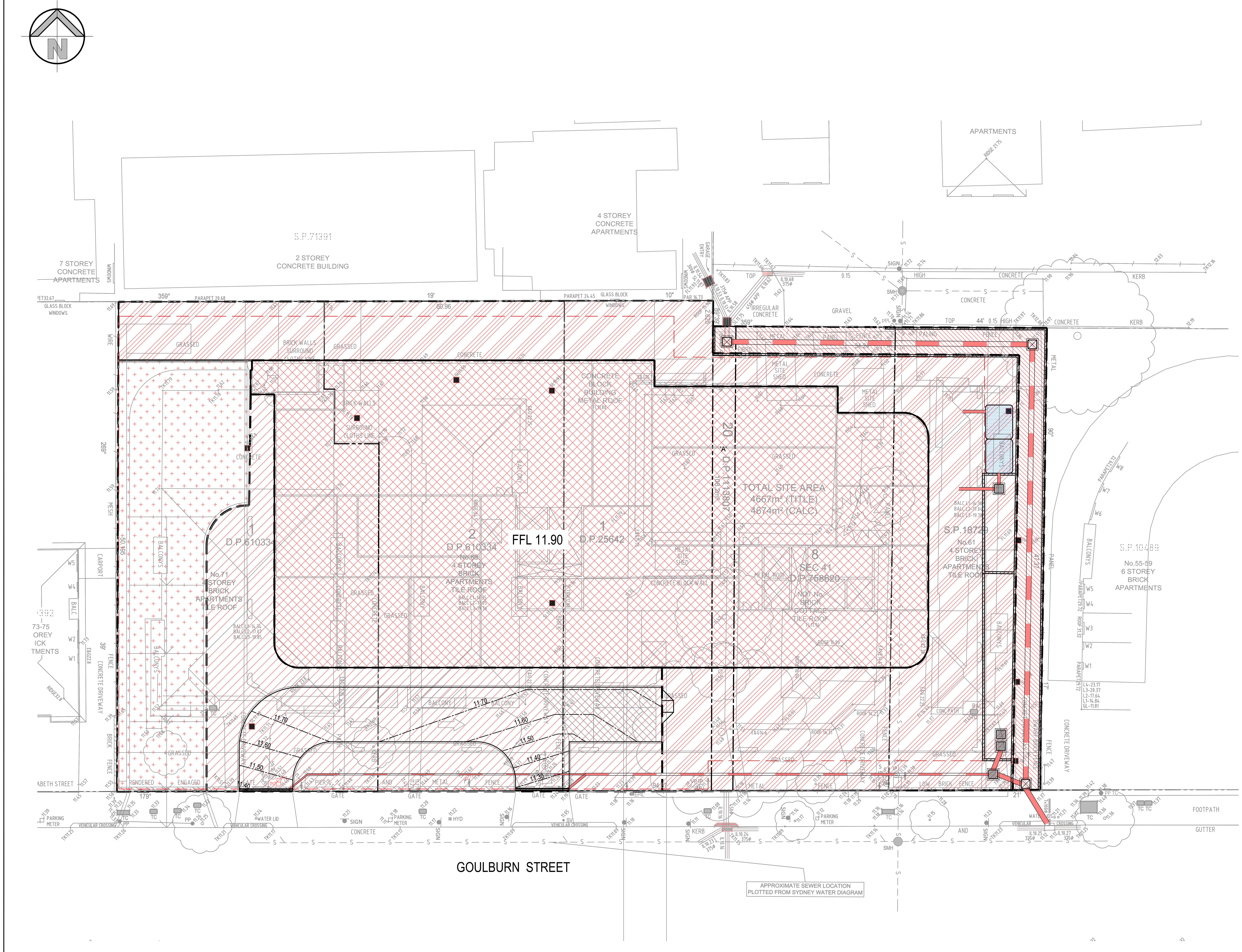
Project: PROPOSED HEALTH CARE FACILITY
61-71 GOULBURN STREET, LIVERPOOL NSW

Title: STORMWATER MISCELLANEOUS DETAILS AND PIT LID SCHEDULE

Drawn	Designed	Date
M.Stimova	N.Heazlewood	OCT 2021
Checked	Approved	Scale @A1
N.Heazlewood	A.Francis	AS NOTED

Drawing number: 20442_PP_C200 Revision: 01



CATCHMENT LEGEND - TOTAL SITE = 4674.19m²

- CATCHMENT AREA 1 - ROOF AREA TO RAINWATER TANK, A = 2016.5m²
- CATCHMENT AREA 2 - EXTERNAL AREAS TO BIO-RETENTION BASIN, A = 1229.5m²
- CATCHMENT AREA 3 - DRIVEWAY TO BYPASS TREATMENT AND DETENTION, A = 473.59m²
- CATCHMENT AREA 4 - COURTYARD AND LANDSCAPING TO BIO-RETENTION BASIN, A = 734.7m²
- CATCHMENT AREA 5 - AREA WITHIN STORMWATER EASEMENT, A = 219.9m²

STORMWATER CATCHMENT PLAN

SCALE: 1:200

SCALE 1:200 (0 4 8 12 16 20m)

FOR PLANNING PROPOSAL

SURVEY INFORMATION
SURVEYED BY:
CRAIG & RHODES
DATUM: AHD

REVISION	AMENDMENT	DRAWN	DESIGNED	DATE	REVISION	AMENDMENT	DRAWN	DESIGNED	DATE
01	FOR PLANNING PROPOSAL	NH	NH	09.11.2021					

Client: SACCO BUILDING GROUP PTY LTD

Architect: TEAM 2 ARCHITECTS

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Project: PROPOSED HEALTH CARE FACILITY
61-71 GOULBURN STREET, LIVERPOOL NSW

Title: STORMWATER CATCHMENT PLAN

Drawn	Designed	Date
M.Stimova	N.Heazlewood	SEPT 2021
Checked	Approved	Scale @A1
N.Heazlewood	A.Francis	1:200

Drawing number: 20442_PP_C250
Revision: 01