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Report on
Geotechnical Investigation at
36 Marshall Street, Hyden WA

For
Hyden Progress Association

Reference: GI862725PG_Rev0
Date: 31 December 2025

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Quality Information

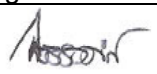
Document Geotechnical Investigation for 36 Marshall Street, Hyden WA

Project Ref GI862725PG_Rev0

Date 31 December 2025

Prepared for Hyden Progress Association

Revision History

Rev.	Date	Details	Prepared by	Authorised	
				Name/Position	Signature
0	31/12/2025	Final Issue	HA	Mohammad Amzad Hossain Sr Geotechnical Engineer	

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1.0 INTRODUCTION

Perth Geotechnics (PG) has carried out a geotechnical investigation at 36 Marshall Street, Hyden WA in order to provide a site investigation report in accordance with AS 1726-2017. The project was engaged by Mr. Tyron Utley on behalf of Hyden Progress Association (the client).

The total site area is 3,938m^2 and the proposed development at the site will be multifunctional community and visitor centre.

The site location map is shown is below figure.

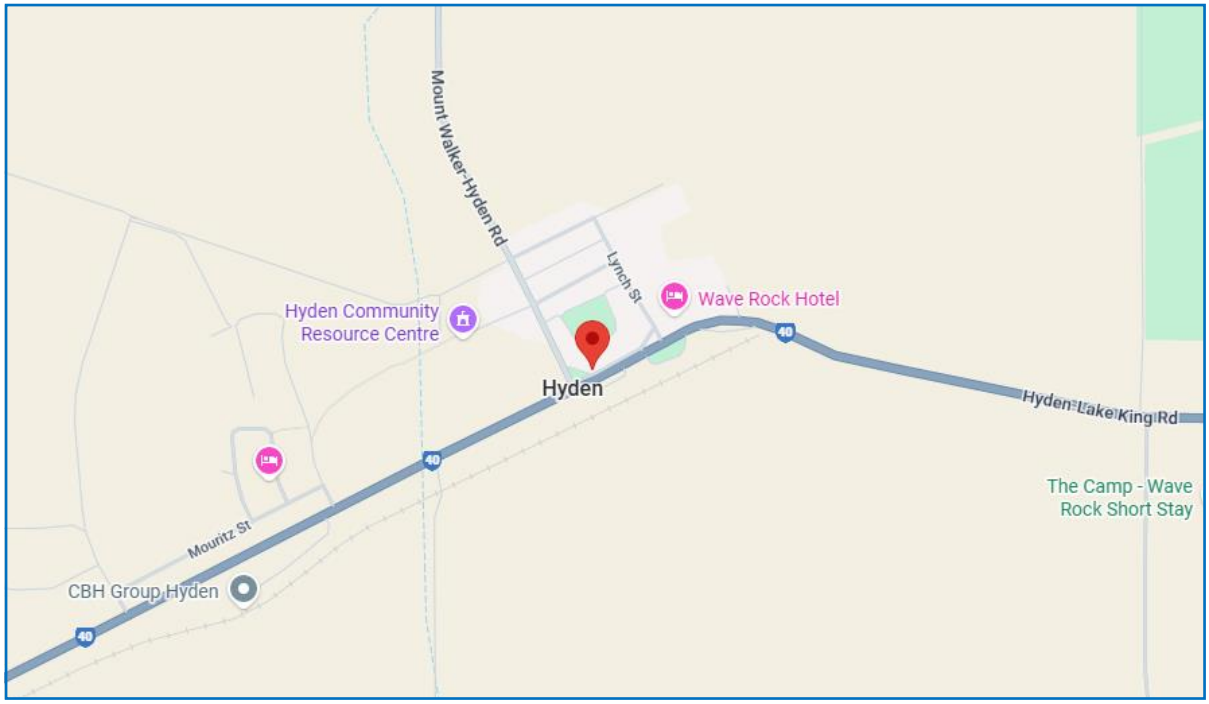

Figure 1: The site location map (source: Google map).

This report has to read or implement in full. No partial implementation of this report is allowed. It should be noted that our investigation is not includes environmental and acid sulphate assessment.

The geotechnical investigation consisted of a desktop study, site investigation, site classification, stormwater drainage recommendation, earthworks recommendation, bearing capacity, design parameters, site sub-soil class assignment and earthquake hazard factor.

2.0 OBJECTIVES

The objectives of the investigation are following:

- Desktop study and available information.
- The factual data (field test results), including borehole logs as per AS1726.
- Interpretation of the subsurface conditions across the site.
- Groundwater table information if it is encountered.
- Site classification in accordance with AS2870-2011,
- Recommendation on stormwater drainage disposal.
- Recommendations on remedial works including earthworks, site preparations and compaction requirements.
- Recommendation on geotechnical design parameters.

- Recommendation on design parameters for retaining structure.
- Site sub-soil class and earthquake classifications as per AS1170.
- Recommendation on the type of suitable foundation.
- Recommendation on allowable bearing capacity and settlement analysis.
- Recommendation on design parameters for road pavement.

3.0 DESKTOP STUDY

3.1 Site History

A review of Landgate Information and aerial photography of the site indicates that the site is situated in a mix commercial and residential area.

3.2 Groundwater Information

Groundwater table was not observed at any of the boreholes up to the investigation depth of 1.7m below ground level. There is no record found regarding the depth of groundwater of this property address into department of water map.

4.0 SITE INVESTIVATION

The geotechnical site investigation was undertaken on 12 November 2025 in the full-time presence of a geotechnical engineer from PG. The site investigation comprised of following:

- Site walkover and taking photograph.
- Excavation of six (6) bore holes (BH1 to BH6) by machine auger up to a depth of 2.0 m or refusal.
- Logging of the site soil profile as per AS1726.
- Conducting six (6) Dynamic Cone Penetrometer (DCP1 to DCP6) tests adjacent to boreholes to a depth of 2.0 m or refusal.
- Conduct soil sampling for laboratory testing, which includes:
  - Particle Size Distribution (PSD)
  - Atterberg Limits Test or PI test
- Conducting two (2) Field Permeability Tests (FPT1 and FPT2) by Guelph permeameter.
- Recording of the locations of BH, DCP and FPT by handheld GPS.

A site plan showing the locations of the Bore hole, DCP and Field Permeability Tests are provided in Appendix A.

4.1 Site Location and General Description

The site is located at 36 Marshall Street, Hyden WA. Currently there are two sheds at eastern side of the site which will be demolished before construction commence. Rest of the site currently using as a hardstand area. There are few medium size trees at the site and site level is found mostly flat. The site is bounded by McPherson Street at western side, Marshall Street at southern side and other two sides commercial properties. The site photograph was taken during the field investigation are shown in Appendix D.

4.2 Bore Hole Logs

A total of six (6) Bore holes (BH1 to BH6) were excavated across the site by using machine auger to a depth of 2.0 m or refusal.

Boreholes BH1 to BH6 revealed similar soil profile and consists of
0.0 - 0.2 m: Sandy Gravelly CLAY- low plasticity, yellowish brown, brown, dry, very stiff to hard, fine to coarse grained gravel, fine to medium grained sand, overlying
0.2 – 1.7 m Gravelly Sandy CLAY- medium plasticity, yellowish brown, pale grey, brown, dry to moist, stiff to hard, fine to medium grained sand, fine to coarse grained gravel.

Groundwater table was not observed at any of the boreholes up to the investigation depth of 1.7m below ground level. Boreholes BH1 to BH6 were terminated at a depth of 1.5 m, 1.7 m, 1.7 m, 1.5 m, 1.5 m and 1.6 m respectively due to auger refusal on hard clay layer. Bore Hole logs are attached in Appendix B to this report.

4.3 Dynamic Cone Penetrometers (DCP) Test

Six (6) Dynamic Cone Penetrometer tests (DCP1 to DCP6) were conducted adjacent to borehole locations. All DCP tests were conducted to a depth of 2.0 m or refusal. The tests were conducted in accordance with test method AS1289.6.3.2, Ref Table 6.4.6.1 (A) & (B) HB 160-2006. DCP tests revealed that the site is in stiff to hard condition.

The DCP test certificates are attached to this report in Appendix B.

4.4 Field Permeability Test

Two (2) Field permeability tests (FPT1 and FPT2) were conducting by using Guelph permeameter as per ASTM D 5126 – 90 at two locations. The tests were conducted to a depth of 1.0 m below ground level. The Guelph Permeameter is a constant head device that operates on the Mariotte siphon principle. It provides a straightforward way of determining the field saturated hydraulic conductivity, matrix flux potential and the soil sorptivity in the field.

Field Permeability tests report is attached in Appendix B and summary is presented in Table 1.

Table 1. Summary of Field Permeability Test Results

Permeability Test ID	Co-ordinates (GDA94)		Permeability Rate		Soil Description	Test Depth (m)
	Easting	Northing	cm/sec	m/day		
FPT1	50 675 132	6 408 216	5.4×10^{-5}	0.047	Gravelly Sandy Clay	1.0
FPT2	50 675 181	6 408 200	8.0×10^{-5}	0.070	Gravelly Sandy Clay	1.0

The coefficient of permeability or hydraulic conductivity of the site varies from 0.047 to 0.07 m/day.

5.0 GEOTECHNICAL LABORATORY TEST

Laboratory tests were conducted at 'Western Geotechnical Laboratory Services, a NATA accredited soil testing laboratory located at Welshpool WA. The following geotechnical laboratory tests were undertaken:

- Particle Size Distribution (PSD, Test Method: AS 1289 3.6.1)
- Atterberg Limits Test or PI test (Test Method AS1289. 3.9.2, 3.2.1, 3.3.1, 3.4.1)

The laboratory test results are summarised in Table 2. Laboratory test certificates are included in Appendix C.

Table 2. Summary of Laboratory Test Results

Soil Sample Location	BH2 (0.2 – 1.3) m
Particle Size Distribution (PSD)	
Sand (%)	-
Percent Fines < 75µm (%)	40
Atterberg Limit Test or PI Test	
Liquid Limit (%)	31
Plastic Limit (%)	14
Plasticity Index (%)	17
Linear Shrinkage (%)	9

It was observed from the laboratory test results that the medium reactive clay has 40 percent (%) fines or clay material.

6.0 ENGINEERING CONSIDERATIONS AND RECOMMENDATIONS

6.1 Inferred Subsurface Conditions

The following generalised subsurface profile can be inferred based on the site investigation data:

Sandy Gravelly CLAY (CL)/ Gravelly Sandy CLAY (Cl)

The dominant clay layer consists of low to medium plasticity, yellowish brown, brown, pale grey, dry to moist, stiff to hard, fine to medium grained sand, fine to coarse grained gravel, extending from the surface to the depth up to 1.7 m, terminated depth.

6.2 Groundwater Level

Groundwater table was not observed at any of the boreholes up to the investigation depth of 1.7m below ground level. There is no record found regarding the depth of groundwater of this property address into department of water map.

6.3 Inferred Geotechnical Design Parameters

Geotechnical design parameters for the site were inferred on the basis of the site investigation data, generalised subsoil units and are presented in Table 3.

Table 3. Inferred Geotechnical Design Parameters for Generalised Subsoil Model

Depth (m)	Soil Layer Description	γ (kN/m^3)	ϕ' (°)	E' (MPa)	cu/c' (kN/m^3)	ν'
0.0 – 1.8	Gravelly Sandy CLAY (CL-Cl) Stiff to hard	18	25	30	100/5	0.3

Notes:

γ = Bulk unit weight of soil, ϕ' = Effective friction angle, E' = Drained Young's Modulus, cu = Undrained shear strength, c' = Drained cohesion, ν' = Drained Poisson's Ratio.

Depth and thickness provided in the table should be considered as valid for a generalised subsoil model only. Bore hole logs can be reviewed for better understanding.

6.4 Geotechnical Design Parameters for Retaining Structures

Earth pressure parameters for the design of retaining structures are presented in Table 4. These parameters should be considered as preliminary.

Table 4. Geotechnical Design Parameters for Retaining Structures

Material type	γ (kN/m^3)	ϕ' (degrees)	K_0	Wall friction, δ = 0°	
				K_a	K_p
Loose Sand	16	28	0.51	0.34	2.85
Medium Dense to Dense Sand	18	35	0.44	0.28	3.54

Notes: γ = Bulk unit weight, ϕ'= Effective friction angle, K_0 = Coefficient of earth pressure at rest, K_a = Coefficient of drained active earth pressure, K_p = Coefficient of drained passive earth pressure.

6.5 Site Classification

Based on the subsurface surrounding site conditions observed during the field investigation, and the laboratory test results the site is classified as **'M'** site classification in accordance with the definitions provided in Australian Standard AS2870-2011. The characteristic surface movement can be considered 20< Ys ≤ 40 mm. The soil suction change of 2.5 m is considering in this case.

The site can be reclassified to **'S'** classification by conducting the remedial measures or site preparation as describe at *Section 6.7.* The characteristic surface movement can be considered up to (0 < Ys ≤ 20 mm) in accordance with the definitions provided in Australian Standard AS2870-2011.

General definition of 'Site Class' is shown in Table 5 (Source: AS 2870-2011).

Table 5. General Definition of Site Class (Source: AS 2870-2011)

Site Class	Soil Description	Characteristic Surface Movement, Ys (mm)
A	Most SAND and ROCK sites with little or no ground movement due to moisture content variation	little or no ground movement
S	Slightly reactive clayey or silty SAND, which will cause slight ground movement due to moisture content variation	0< Ys ≤ 20
M	Moderately reactive clayey or silty soil which will cause moderate ground movement due to moisture content variation	20< Ys ≤ 40
H1	Highly reactive clayey or silty soil which will cause high ground moved due to moisture content variation	40< Ys ≤ 60
H2	Highly reactive clayey or silty soil which will cause high ground moved due to moisture content variation	60< Ys ≤ 75
E	Extremely reactive clayey or silty soil which will cause extreme ground movement due to moisture content variation	Ys >75
P	Problematic sites, consisted of soft soils, soft clay or silt or loose sand; landfills, mine subsidence, collapsing soils, very reactive soils, subjected to erosion and sites which cannot be classified as A to E.	-

6.6 Earthquake Design Factor and Sub-Soil Class

Australian Standard AS1170.4-2007 Structural Design Actions Part 4 "Earthquake actions in Australia" is recommended for earthquake consideration. AS1170.4-2007 outlines the design criteria required for a structure in consideration of the risk of being subjected to earthquake loads. Earthquake design factors for the site are summarized in Table 6.

Table 6. Earthquake Design Factors

Factor/Class	Value/Name	Ref. AS1170.4- 2007
Hazard Factor (z), Hyden Zone	0.07 – 0.08	Section 3 Table 3.2
Site sub-soil class	Class C_e – Shallow Soil	Section 4 Clause 4.1

6.7 Earthworks

This section discusses the recommended remedial measures with procedures and site preparation across the site.

6.7.1 Structural Fill or Non Reactive Fill

Suitable materials for structural fill shall be a clean sand fill. The fill material at compaction should comprise sand that is free from oversized material (i.e. material > 75 mm in any dimension), contains less than 5% fines (material passing 0.075 mm sieve), free from foreign material, organic material or other deleterious material. It should also be free from industrial waste, solid waste, or construction and demolition debris.

6.7.2 Recommended Remedial Measures

Earthworks should be carried out in general accordance with the Australian Standard AS 3798-2007 "Guidelines on Earthworks for Commercial and Residential Developments". The following are the recommended remedial measures to be followed during preparation of the site areas within the proposed development footprints:

- Remove and grab all trees from the site, including root masses and tree stumps.
- Clear uncontrolled fill, grasses, paved materials, demolition debris, concrete slabs, strip footings, pond lining, soft clay or other deleterious and organic material and stockpile separately and then remove from the site.
- **For site class 'S',** prepare a sand pad of **700mm** over reactive clay and compact as per AS 3798.
- Compact /proof roll the exposed surface, with required number of passes (a minimum of 6 passes) of a vibratory roller to a dense state, i.e., to 95% of MMDD in accordance with AS1289.5.2.1. Add moisture as needed during the compaction. Compaction must not be attempted if the exposed ground is saturated or groundwater is at excavation level.
- Backfill the site with clean sand (select fill). Place the sand material in lifts not exceeding 300 mm in loose thickness and compact the lift using a vibratory compactor to 95% of its modified maximum dry density in accordance with AS1289.5.2.1. The material at compaction should be moisture conditioned within -1% to +2% of its optimum moisture content. Follow the same procedure of lift and compaction up to the finished ground level.
- Subgrade (or backfill lifts/layers) at carpark, driveway, hardstand area, access road areas shall be compacted to 98% of MMDD in accordance with AS1289.5.2.1. Add moisture as needed during the compaction.
- Undertake necessary excavation to the required depth for the proposed shallow foundation, raft, pad and strip footing. Footing bases should be comprised of a minimum of 700 mm thick sand pad. Temporary excavation up to 1 m depth can be conducted with a maximum dry slope angle of 1V: 1.5H. It is highly recommended to undertake a series of DCP tests at each footing base to ensure that the ground beneath the footing, at least to 1 m depth, does not comprise loose sands or other deleterious, clay or weak materials. Hand held compactor can be used if the base ground is not in dense state.
- Care will need to be taken when compacting in the vicinity of existing structures to avoid damage from excessive vibrations.

- The Owner needs attention regarding the CSIRO publication in Building Technology File Number 18 from “Guide to Home Owners on Foundation Maintenance and Footing Performance”.

It is highly recommended that during the course of construction to verify site preparation and compaction prior to pouring of concrete checked by a geotechnical engineer.

6.8 Bearing Capacity

As discussed in Section 6.7.2, all footing bases should be comprised of a minimum of 300 mm thick sand pad overlies on dense or stiff to very stiff material, to a minimum depth of 1 m below the footing excavation level.

The allowable bearing pressures are estimated (Table 7) to limit settlements to less than or equal to 25 mm and provide a minimum factor of safety of 2.0 against general bearing capacity failure. These bearing pressures do not consider eccentric and inclined loading conditions and interaction effects (i.e., loadings from adjacent foundations). Furthermore, the calculations assume that the areas beneath the pad and strip foundations have been compacted to a density ratio of 95% modified compaction, MMDD, and are founded at least 0.5 m to 1.0 m below final ground level.

Table 7. Allowable Bearing Pressures for Typical Strip and Pad Footings

Embedment Depth (m)	Footing Type	Footing Width (m)	Allowable Bearing Pressure (kPa)	Estimated Settlement (mm)
0.5	Strip	0.5	80	20
		1	100	20
		1.5	120	25
0.5	Pad	1	100	20
		2	130	20
		3	160	25

6.9 Excavatability

The stiff to hard states of the in-situ soils suggest that the materials should be excavatable with standard earthmoving equipment (e.g. 8 to 20 tonne excavator). Temporary excavation up to 1 m depth can be conducted with a maximum dry slope angle of 2H:1V.

6.10 Stormwater Drainage

The site is generally comprising of gravelly sandy clay up to the investigation depth. Groundwater table was not observed at any of the boreholes up to the investigation depth of 1.7m below ground level. It is found from field permeability test that the coefficient of permeability or hydraulic conductivity of the site varies from 0.047 to 0.07 m/day.

Onsite disposal of stormwater via soakwell is not appropriate for this site. We recommend to disposal of stormwater or roof runoff to offsite of the property or to the council drain. The drainage system has to fulfil the requirements of local shire.

6.11 California Bearing Ratio (CBR)

The subgrade of the driveway/ access road areas shall be prepared as per the general guidelines set out in Section 6.7.2 and compacted to a density ratio of **98% MMDD**.

We recommend a design CBR value of 5% can be considered for this project.

7.0 REFERENCES

Australian Standard AS1170.4-2007, “Earthquake Actions in Australia”.

Australian Standard AS 1726-1993, "Geotechnical Site Investigations".

Australian Standard AS 2870-2011, "Residential Slabs and Footings".

Australian Standard AS 3798-2007, "Guidelines on Earthworks for Commercial and Residential Developments".

Standards Australia, Hand Book HB 160-2006 "Soil Testing".

Perth Ground Atlas onlineversion, https://maps.water.wa.gov.au/#/webmap/gwm, Department of Environment, WA.

CSIRO publication *“Guide to Home Owners on Foundation Maintenance and Footing Performance”* in Building Technology File Number 18.

Slavin Architects architectural drawings, Hyden Visitor's Centre Plan - REV 4.

Perth Geotechnics

APPENDIX – A

SITE PLAN AND SITE LAYOUT PLAN

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Project: Geotechnical Investigation
Location: 36 Marshall Street, Hyden WA

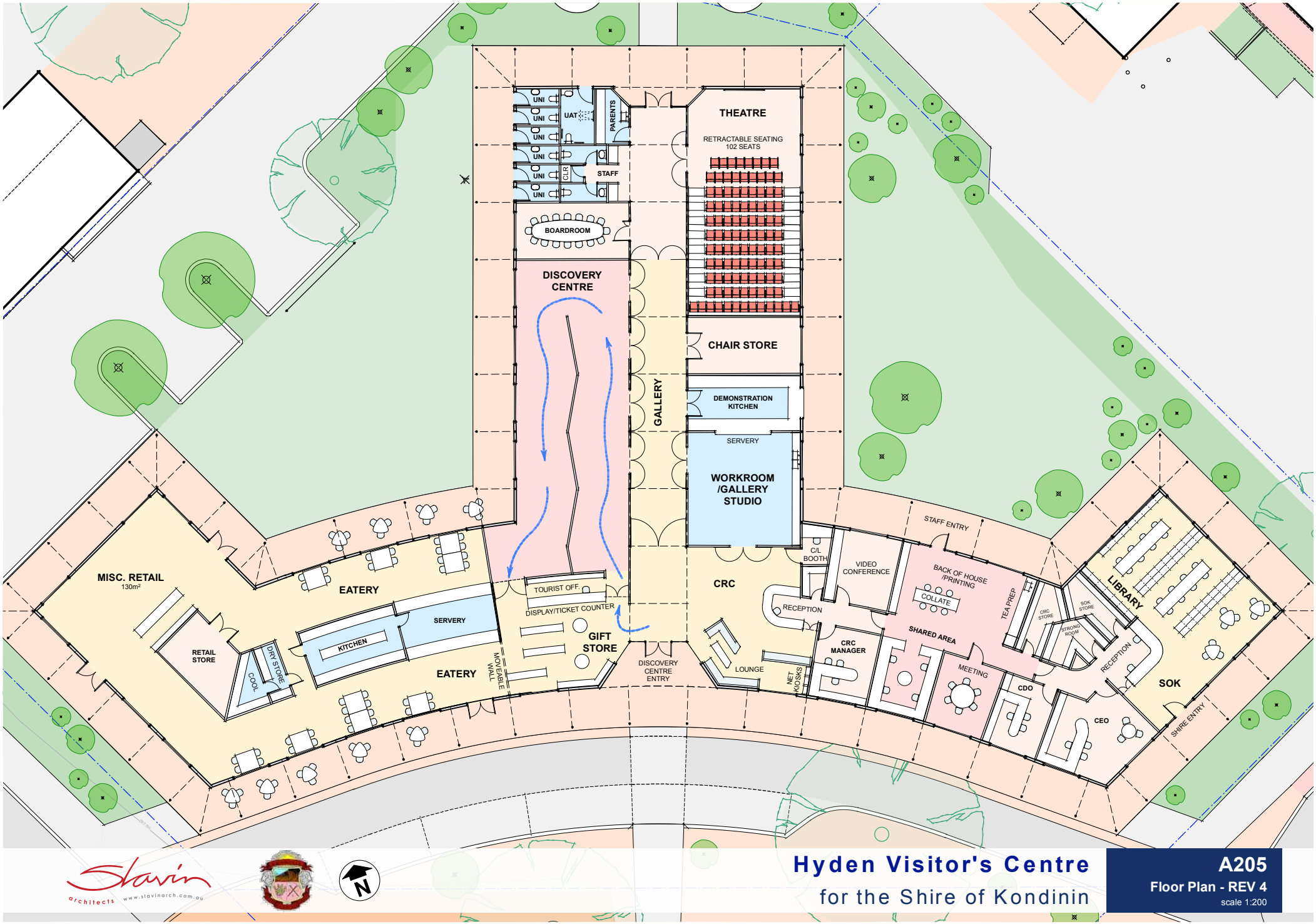
Client: Hyden Progress Association

Reference: GI862725PG | **Scale:** N.T.S.

Date: 31/12/2025 | **Drawn By:** MH

Site Plan:
Bore Hole (BH), Dynamic Cone Penetrometer (DCP) and Permeability (FPT) Test Locations

Drawing No: 862725_Rev0



Slavin architects www.slavinarch.com.au

Hyden Visitor's Centre

for the Shire of Kondinin

A205

Floor Plan - REV 4

scale 1:200


TOILETS
51m²
GATHERING
33m²
THEATRE
102m²
BOARDROOM
25m²
CHAIR STORE
25m²
DISCOVERY CENTRE
147m²
GALLERY
63m²
KITCHEN
25m²
STUDIO
50m²
BOOTH
6m²
STORE
3m²
VIDEO CONFERENCE
19m²
REC'TN
8m²
CIRC.
6m²
PRINT / STAFF / TEA
51m²
STORE
8m²
STORE
8m²
STORE
8m²
LIBRARY
77m²
REC'TN
10m²
CIRC.
9m²
FOYER
11m²
CDO
16m²
CEO
30m²
MEETING
18m²
OPEN PLAN
18m²
MANAGER
18m²
CRC/LOUNGE
58m²
FOYER
20m²
GIFT STORE
56m²
EATERY
127m²
SERVERY
21m²
KITCH
21m²
KITCH STORE
12m²
RETAIL
17m²
RETAIL
113m²

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APPENDIX – B

BORE HOLE LOGS, DCP & FIELD PERMEABILITY TEST CERTIFICATES

BORE HOLE LOG

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Reference:	GI862725PG	**Client:**	Hyden Progress Association
Project:	Geotechnical Investigation	**Bore Hole ID:**	BH1
Location:	36 Marshall Street, Hyden WA	**Date Commenced:**	12/11/2025
Easting:	50 675 160	**Equipment Type**	Machine Auger
Northing:	6 408 242	**Logged By:**	HA
Sampling Type:	B - Bulk Sample	**Checked By:**	MH

Scale (m)	Depth (m)	GWT (m)	Sampling Type/Depth	Graphic Log	UCS Symbol	Sample ID	Soil Description	Moisture Condition	Density	Remarks/Field observations
					CL		**Sandy Gravelly CLAY**- low plasticity, yellowish brown, brown, fine to coarse grained gravel, fine to medium grained sand	D	H-VSt	
	0.2									
					Cl		**Gravelly Sandy CLAY**- medium plasticity, yellowish brown, pale grey, brown, fine to medium grained sand, fine to coarse grained gravel	D	St-VSt	
	0.5									
1.0								SM	St-VSt	
	1.5							SM	H	
							Terminated at a depth of 1.5m due to auger refusal on hard clay			
2.0										
3.0										
4.0										
5.0										

Remarks:
Sampling Type:
B - Bulk Sample (/Disturbed),
U - Undisturbed Sample

Moisture Condition:
D - Dry, **M** - Moist, **W** - Wet
SM- Slightly Moist
= Water Table

Density:
VL = Very Loose, **L** = Loose,
MD = Medium Dense
D = Dense, **VD** = Very Dense

VS = Very Soft
F = Firm
St = Stiff

VSt = Very Stiff
H = Hard
R = Refusal

BORE HOLE LOG

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Reference:	GI862725PG	**Client:**	Hyden Progress Association
Project:	Geotechnical Investigation	**Bore Hole ID:**	BH2
Location:	36 Marshall Street, Hyden WA	**Date Commenced:**	12/11/2025
Easting:	50 675 152	**Equipment Type**	Machine Auger
Northing:	6 408 204	**Logged By:**	HA
Sampling Type:	B - Bulk Sample	**Checked By:**	MH

Scale (m)	Depth (m)	GWT (m)	Sampling Type/Depth	Graphic Log	UCS Symbol	Sample ID	Soil Description	Moisture Condition	Density	Remarks/Field observations
					CL		**Sandy Gravelly CLAY**- low plasticity, yellowish brown, brown, fine to coarse grained gravel, fine to medium grained sand	D-M	H-VSt	
	0.2									
					CI		**Gravelly Sandy CLAY**- medium plasticity, grey, brown, dark grey, fine to coarse grained gravel, fine to medium grained sand	M	St-VSt	
	0.5		BH2							
1.0								M	St-VSt	
	1.3									
	1.5							M	VSt-H	
	1.7						**Terminated at a depth of 1.7m due to auger refusal on hard clay**			
2.0										
3.0										
4.0										
5.0										

Remarks:
Sampling Type:
B - Bulk Sample (/Disturbed),
U - Undisturbed Sample

Moisture Condition:
D - Dry, **M** - Moist, **W** - Wet
SM- Slightly Moist
= Water Table

Density:
VL = Very Loose, **L** = Loose,
MD = Medium Dense
D = Dense, **VD** = Very Dense

VS = Very Soft
F = Firm
St = Stiff

VSt = Very Stiff
H = Hard
R = Refusal

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Reference:	GI862725PG	**Client:**	Hyden Progress Association
Project:	Geotechnical Investigation	**Bore Hole ID:**	BH3
Location:	36 Marshall Street, Hyden WA	**Date Commenced:**	12/11/2025
Easting:	50 675 129	**Equipment Type**	Machine Auger
Northing:	6 408 222	**Logged By:**	HA
Sampling Type:	B - Bulk Sample	**Checked By:**	MH

Scale (m)	Depth (m)	GWT (m)	Sampling Type/Depth	Graphic Log	UCS Symbol	Sample ID	Soil Description	Moisture Condition	Density	Remarks/Field observations
	0.2				CL		**Sandy Gravelly CLAY**- low plasticity, yellowish brown, brown, fine to coarse grained gravel, fine to medium grained sand	D-M	H-VSt	
	0.5				Cl		**Gravelly Sandy CLAY**- medium plasticity, grey, brown, dark grey, fine to coarse grained gravel, fine to medium grained sand	M	St-VSt	
1.0								M	St-VSt	
	1.5							M	VSt-H	
	1.7						**Terminated at a depth of 1.7m due to auger refusal on hard clay**			
2.0										
3.0										
4.0										
5.0										

Remarks:
Sampling Type:
B - Bulk Sample (/Disturbed),
U - Undisturbed Sample

Moisture Condition:
D - Dry, **M** - Moist, **W** - Wet
SM- Slightly Moist
= Water Table

Density:
VL = Very Loose, **L** = Loose,
MD = Medium Dense
D = Dense, **VD** = Very Dense

VS = Very Soft
F = Firm
St = Stiff

VSt = Very Stiff
H = Hard
R = Refusal

BORE HOLE LOG

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Reference:	GI862725PG	**Client:**	Hyden Progress Association
Project:	Geotechnical Investigation	**Bore Hole ID:**	BH4
Location:	36 Marshall Street, Hyden WA	**Date Commenced:**	12/11/2025
Easting:	50 675 160	**Equipment Type**	Machine Auger
Northing:	6 408 221	**Logged By:**	HA
Sampling Type:	B - Bulk Sample	**Checked By:**	MH

Scale (m)	Depth (m)	GWT (m)	Sampling Type/Depth	Graphic Log	UCS Symbol	Sample ID	Soil Description	Moisture Condition	Density	Remarks/Field observations
					CL		**Sandy Gravelly CLAY**- low plasticity, yellowish brown, brown, fine to coarse grained gravel, fine to medium grained sand	D	H-VSt	
	0.2									
					CI		**Gravelly Sandy CLAY**- medium plasticity, yellowish brown, grey, brown, fine to medium grained sand, fine to coarse grained gravel,	D	St-VSt	
	0.5									
1.0								SM	St-VSt	
	1.5							SM	H	
							Terminated at a depth of 1.5m due to auger refusal on hard clay			
2.0										
3.0										
4.0										
5.0										

Remarks:
Sampling Type:
B - Bulk Sample (/Disturbed),
U - Undisturbed Sample

Moisture Condition:
D - Dry, **M** - Moist, **W** - Wet
SM- Slightly Moist
= Water Table

Density:
VL = Very Loose, **L** = Loose,
MD = Medium Dense
D = Dense, **VD** = Very Dense

VS = Very Soft
F = Firm
St = Stiff

VSt = Very Stiff
H = Hard
R = Refusal

BORE HOLE LOG

Perth Geotechnics
ABN: 74 660 182 061
Tel: 08 6396 2675; M: 0430 130 677
PO Box 165, Gosnells WA 6990
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www.perthgeotechnics.com.au

Reference:	GI862725PG	**Client:**	Hyden Progress Association
Project:	Geotechnical Investigation	**Bore Hole ID:**	BH5
Location:	36 Marshall Street, Hyden WA	**Date Commenced:**	12/11/2025
Easting:	50 675 171	**Equipment Type**	Machine Auger
Northing:	6 408 232	**Logged By:**	HA
Sampling Type:	B - Bulk Sample	**Checked By:**	MH

Scale (m)	Depth (m)	GWT (m)	Sampling Type/Depth	Graphic Log	UCS Symbol	Sample ID	Soil Description	Moisture Condition	Density	Remarks/Field observations
					CL		**Sandy Gravelly CLAY**- low plasticity, yellowish brown, brown, fine to coarse grained gravel, fine to medium grained sand	D	H-VSt	
	0.2									
					Cl		**Gravelly Sandy CLAY**- medium plasticity, yellowish brown, pale grey, brown, fine to medium grained sand, fine to coarse grained gravel	D	St-VSt	
	0.5									
1.0								SM	St-VSt	
	1.5							SM	VSt-H	
							Terminated at a depth of 1.5m due to auger refusal on hard clay			
2.0										
3.0										
4.0										
5.0										

Remarks:
Sampling Type:
B - Bulk Sample (/Disturbed),
U - Undisturbed Sample

Moisture Condition:
D - Dry, **M** - Moist, **W** - Wet
SM- Slightly Moist
= Water Table

Density:
VL = Very Loose, **L** = Loose,
MD = Medium Dense
D = Dense, **VD** = Very Dense

VS = Very Soft
F = Firm
St = Stiff

VSt = Very Stiff
H = Hard
R = Refusal

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Reference:	GI862725PG	**Client:**	Hyden Progress Association
Project:	Geotechnical Investigation	**Bore Hole ID:**	BH6
Location:	36 Marshall Street, Hyden WA	**Date Commenced:**	12/11/2025
Easting:	50 675 187	**Equipment Type**	Machine Auger
Northing:	6 408 192	**Logged By:**	HA
Sampling Type:	B - Bulk Sample	**Checked By:**	MH

Scale (m)	Depth (m)	GWT (m)	Sampling Type/Depth	Graphic Log	UCS Symbol	Sample ID	Soil Description	Moisture Condition	Density	Remarks/Field observations
	0.2				CL		**Sandy Gravelly CLAY**- low plasticity, yellowish brown, brown, fine to coarse grained gravel, fine to medium grained sand	D-M	H-VSt	
	0.5				Cl		**Gravelly Sandy CLAY**- medium plasticity, grey, brown, fine to medium grained sand, fine to coarse grained gravel	M	St-VSt	
1.0								M	St-VSt	
	1.5							M	VSt-H	
	1.6						**Terminated at a depth of 1.6m due to auger refusal on hard clay**			
2.0										
3.0										
4.0										
5.0										

Remarks:
Sampling Type:
B - Bulk Sample (/Disturbed),
U - Undisturbed Sample

Moisture Condition:
D - Dry, **M** - Moist, **W** - Wet
SM- Slightly Moist
= Water Table

Density:
VL = Very Loose, **L** = Loose,
MD = Medium Dense
D = Dense, **VD** = Very Dense

VS = Very Soft
F = Firm
St = Stiff

VSt = Very Stiff
H = Hard
R = Refusal

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DYNAMIC CONE PENETROMETER (DCP)
TEST CERTIFICATE

(AS 1289.6.3.2)
Correlation of Sand Density - Table 6.4.6.1 (A) & (B) HB 160-2006

Client	Hyden Progress Association	Project	Geotechnical Investigation
Reference	GI862725PG	Location	36 Marshall Street, Hyden WA
Date Tested	12/11/2025	Tested By	HA

References:	DCP1	DCP2	DCP3	DCP4	DCP5
Depth below ground level test commenced	Penetration Resistance - Blows/100mm & Density Classification				
0-100	15 (H)	12 (H)	12 (H)	12 (H)	13 (H)
100-200	14 (H)	10 (VSt)	10 (VSt)	10 (VSt)	12 (H)
200-300	10 (VSt)	12 (H)	9 (VSt)	10 (VSt)	10 (VSt)
300-400	8 (VSt)	7 (VSt)	9 (VSt)	9 (VSt)	8 (VSt)
400-500	8 (VSt)	6 (VSt)	6 (VSt)	6 (VSt)	7 (VSt)
500-600	5 (VSt)	6 (VSt)	4 (St)	5 (VSt)	6 (VSt)
600-700	7 (VSt)	5 (VSt)	4 (St)	4 (St)	7 (VSt)
700-800	6 (VSt)	5 (VSt)	5 (VSt)	5 (VSt)	5 (VSt)
800-900	4 (St)	4 (St)	4 (St)	4 (St)	5 (VSt)
900-1000	5 (VSt)	4 (St)	5 (VSt)	5 (VSt)	4 (St)
1000-1100	4 (St)	5 (VSt)	4 (St)	4 (St)	5 (VSt)
1100-1200	5 (VSt)	4 (St)	3 (St)	5 (VSt)	5 (VSt)
1200-1300	4 (St)	3 (St)	4 (St)	6 (VSt)	4 (St)
1300-1400	4 (St)	5 (VSt)	5 (VSt)	8 (VSt)	6 (VSt)
1400-1500	11 (H)	5 (VSt)	6 (VSt)	11 (H)	10 (VSt)
1500-1600	-	6 (VSt)	8 (VSt)	-	-
1600-1700	-	10 (VSt)	11 (H)	-	-
1700-1800	-	-	-	-	-
1800-1900	-	-	-	-	-
1900-2000	-	-	-	-	-

Remarks: R= Refusal/ Hard

Table A: H = Hard >10, VSt = Very Stiff, 5 – 10, St = Stiff, 3 – 4, F = Firm, 1 – 2, S = Soft, 0 - 1, VS = Very Soft < 1

Table B: VD = Very Dense > 8, D = Dense, 4 – 8, MD = Medium Dense, 2 – 3, L = Loose, 1 – 2, VL = Very Loose < 1

DYNAMIC CONE PENETROMETER (DCP)
TEST CERTIFICATE

Perth Geotechnics

(AS 1289.6.3.2)
Correlation of Sand Density - Table 6.4.6.1 (A) & (B) HB 160-2006

Client	Hyden Progress Association	Project	Geotechnical Investigation
Reference	GI862725PG	Location	36 Marshall Street, Hyden WA
Date Tested	12/11/2025	Tested By	HA

References:	DCP6	DCP7	DCP8	DCP9	DCP10
Depth below ground level test commenced	Penetration Resistance - Blows/100mm & Density Classification				
0-100	11 (H)				
100-200	10 (VSt)				
200-300	9 (VSt)				
300-400	8 (VSt)				
400-500	7 (VSt)				
500-600	6 (VSt)				
600-700	5 (VSt)				
700-800	4 (St)				
800-900	4 (St)				
900-1000	5 (VSt)				
1000-1100	5 (VSt)				
1100-1200	6 (VSt)				
1200-1300	4 (St)				
1300-1400	7 (VSt)				
1400-1500	8 (VSt)				
1500-1600	11 (H)				
1600-1700	-				
1700-1800	-				
1800-1900	-				
1900-2000	-				

Remarks: R= Refusal/ Hard

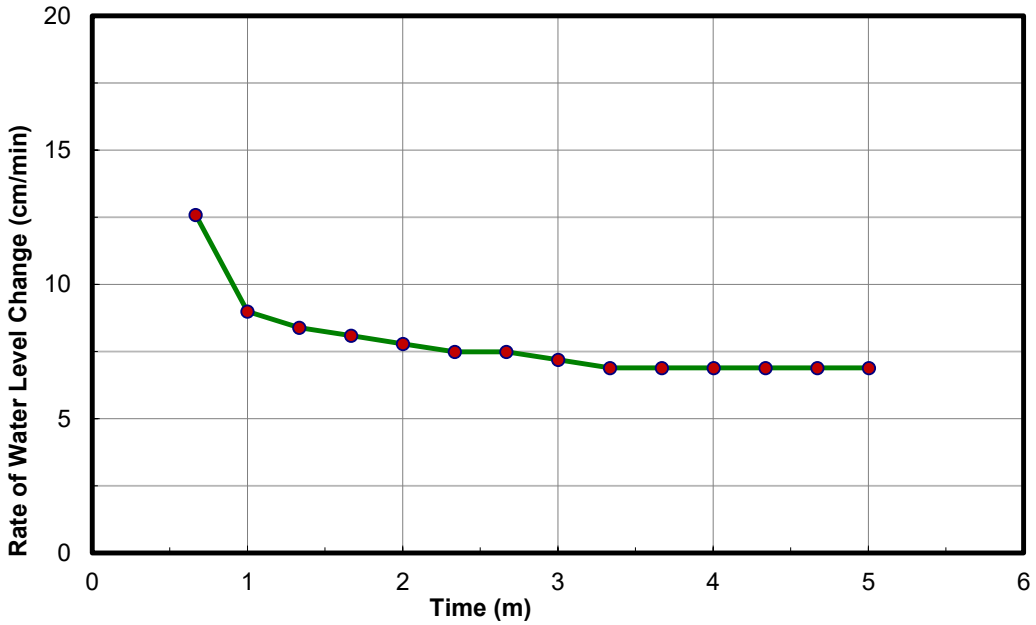
Table A: H = Hard >10, VSt = Very Stiff, 5 – 10, St = Stiff, 3 – 4, F = Firm, 1 – 2, S = Soft, 0 - 1, VS = Very Soft < 1

Table B: VD = Very Dense > 8, D = Dense, 4 – 8, MD = Medium Dense, 2 – 3, L = Loose, 1 – 2, VL = Very Loose < 1

PERTH GEOTECHNICS

Test ID	FPT1	Reference	GI862725PG
Project	Geotechnical Investigation	Client	Hyden Progress Association
Location	36 Marshall Street, Hyden WA	Soil Type	Gravelly Sandy Clay
Co-ordinates	Easting: 50 675 132 Northing: 6 408 216	Test Depth	1.0 m below ground level
Instrument Name	Guelph Permeameter	Date Tested	12/11/2025

PERMEABILITY TEST CERTIFICATES
(ASTM D 5126-90)



Water Hydraulic conductivity K_{fs}: **5.4E-05** **cm/sec**

4.7E-02 **m/day**

Tested By: *Mohammad Amzad Hossain* Date: 31/12/2025

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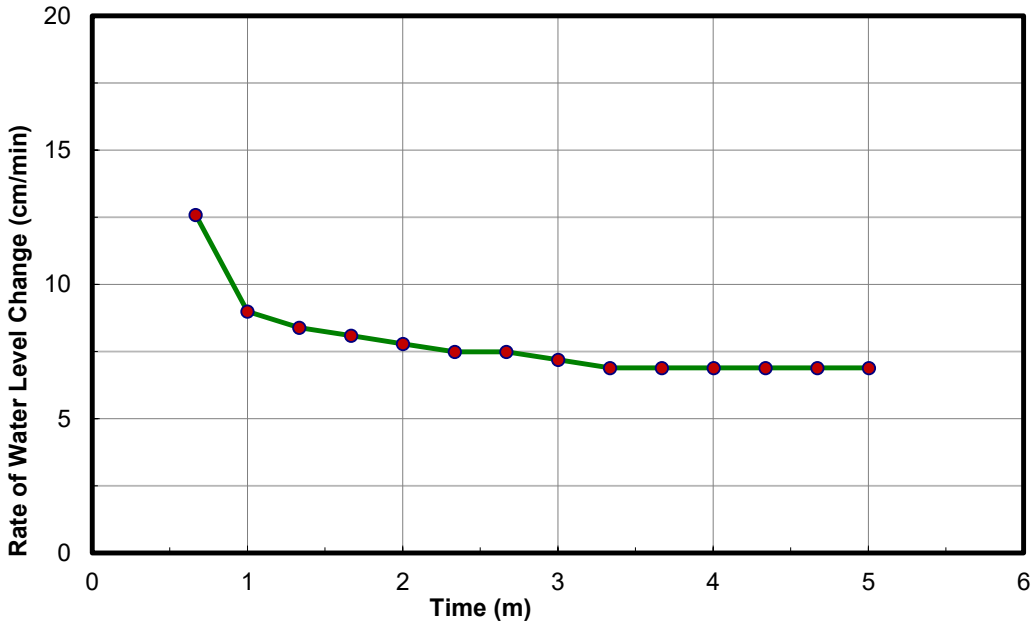
PERTH GEOTECHNICS

Test ID	FPT2	Reference	GI862725PG
Project	Geotechnical Investigation	Client	Hyden Progress Association
Location	36 Marshall Street, Hyden WA	Soil Type	Gravelly Sandy Clay
Co-ordinates	Easting: 50 675 181 Northing: 6 408 200	Test Depth	1.0 m below ground level
Instrument Name	Guelph Permeameter	Date Tested	12/11/2025

PERMEABILITY TEST CERTIFICATES
(ASTM D 5126-90)



Water Hydraulic conductivity K_{fs}: **8.0E-05** **cm/sec**

7.0E-02 **m/day**

Tested By: *Mohammad Amzad Hossain* Date: 31/12/2025

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APPENDIX – C

LABORATORY TEST CERTIFICATES

WESTERN GEOTECHNICAL & Laboratory Services

SOIL | AGGREGATE | CONCRETE | CRUSHING

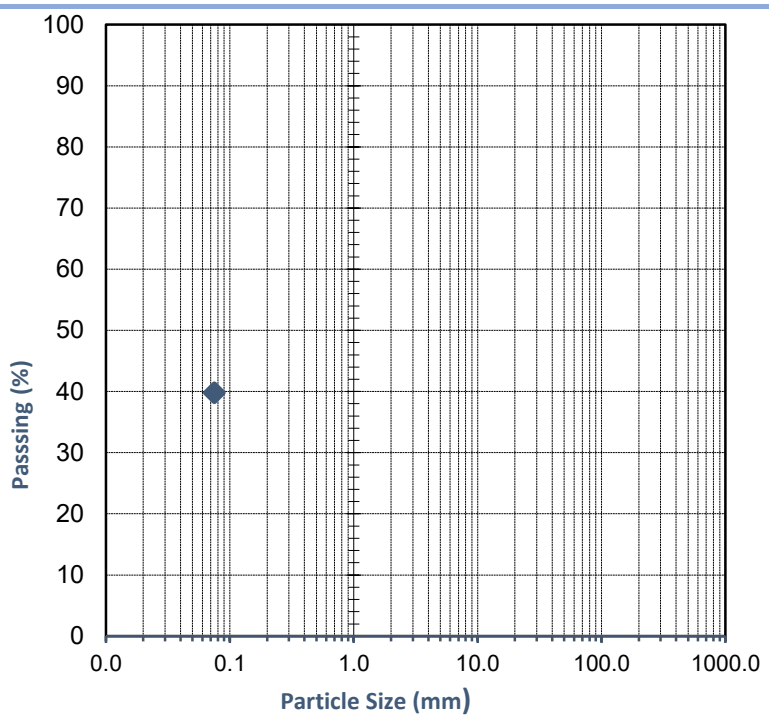
TEST REPORT - AS 1289.3.9.2, 3.2.1, 3.3.2, 3.4.1 & 3.6.1

Client:	Perth Geotechnics	*Ticket No.*	S19538
Client Address:	PO Box 165, Gosnells	*Report No.*	WG25.20400_1_PSDPI
Project:	Material Assessment	*Sample No.*	WG25.20400
Location:	31 Marshall Street, Hyden	*Date Sampled:*	Not Specified
Sample Identification:	BH2 (0.2-1.3m)	*Date Tested:*	19/11 - 20/11/2025

Sampling Method: **Sampled by Client, Tested as Received**

TEST RESULTS - Particle Size Distribution of Soil

Sieve Size (mm)	Percent Passing Sieve (%)
125.0	
75.0	
53.0	
37.5	
19.0	
9.5	
4.75	
2.36	
1.18	
0.600	
0.425	
0.300	
0.150	
0.075	40



TEST RESULTS - Consistency Limits (Casagrande)

AS 1289.3.9.2	AS 1289.3.2.1	AS 1289.3.3.2	AS 1289.3.4.1		
Liquid Limit (%)	Plastic Limit (%)	Plastic Index (%)	Linear Shrinkage (%)	Mould Length (mm)	Condition of Dry Specimen:
31	14	17	9	250	Cracked, Curled

Method of Preparation: Dry Sieved — History of Sample: Oven Dried <50°C

Comments: Clients request for the % fines of material passing 0.075mm only.

Approved Signatory:

Name: Danielle Reynolds

Date: 21/November/2025

NATA WORLD RECOGNISED ACCREDITATION

Accreditation No. 20599
Accredited for compliance with ISO/IEC 17025 - Testing

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APPENDIX – D

SITE PHOTOGRAPH

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Photo 01: Site is looking from McPherson Street, Hyden WA

Photo 02: Subsurface probing by hand auger at Borehole BH6 location

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Photo 03: Subsurface probing by hand auger at Borehole BH2 location

Photo 04: Soil from borehole location BH2

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Photo 05: Soil from Borehole BH3 location

Photo 06: Conducting Dynamic Cone Penetrometer test at DCP1 location