

TOWN OF CLAREMONT
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KHA

St Louis Estate - Albert Street

CIVIL SCHEMATIC DESIGN REPORT

WGA260661

WGA260661-RP-CV-0001_A

22 June 2026



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Revision History

REV	DATE	ISSUE	ORIGINATOR	CHECKER	APPROVER
A	22/06/2026	For Review	BW	MH	LP

CONTENTS



1	PROJECT OVERVIEW	1
1.1	Existing Site	1
2	EXISTING INFORMATION.....	2
3	CODES AND STANDARDS	3
4	CIVIL DESIGN DEVELOPMENT.....	4
4.1	General	4
4.2	Flood Immunity.....	4
4.3	Earthworks	4
4.4	Stormwater Design.....	4
4.4.1	Design Development	4
4.5	Parking	5
5	SAFETY IN DESIGN	6

Appendices

Appendix A Schematic Design Markups

Appendix B Safety In Design

1 PROJECT OVERVIEW

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St Louis Estate (SLE) is redeveloping part of the existing SLE in Claremont to provide a high quality Independent Living Unit Development. This project follows the next phase of development after the delivery of the Kiora Apartments adjacent to the site.

The project will comprise of a 3, 4 & 5 storey apartment buildings that share a common basement.

The objectives of the civil design solution proposed are as follows:

- Review existing geotechnical information to assess site conditions and suitability of infiltration techniques for managing stormwater.
- Provide effective stormwater management techniques that are compliant with The City of Claremont Standards and relevant Australian Standards and Guidelines.
- Earthworks, drainage infrastructure, and the use of retaining walls are to minimise impacts to existing services where possible and optimise cut/fill during the basement excavation that is proposed to reach depths in excess of 3m.
- If required, complete vehicle swept paths to confirm safe vehicle movements in and out of the new development.
- If required, a new crossover will be designed in line with the City of Claremont design guidance.
- Design of new on-street car parking bays.

1.1 Existing Site

The site is approximately 3200m² in area. While this site does form part of a broader site boundary, specific to these works the site is bound by a shared property boundary to the north, east and south in which access will need to be maintained. Albert Street runs north to south along the western boundary of the site and will be the main point of access for pedestrians and vehicles to the site.

The current area comprises existing accommodation units and offices of SLE. There is a fall across the site from approximately 32.9m AHD in the south to 29.6m AHD in the northwest. Significant construction works were undertaken across the site between 1971-1989 where existing school buildings were demolished and replaced with those now present.

A geotechnical investigation report was issued by Galt Geotechnics report WAG200143-02 002 R Rev0 dated 26th May 2026. The site is classified as “Class P” in accordance with AS 2870-2011. Groundwater was not encountered at the time of inspection and is expected to be at least 20m below natural ground level.

The site was noted to have an upper layer of fill comprised of gravelly and loose sand about 0.4m to 1.0m below ground, beyond this the ground stratigraphy is loose and very loose sands up to a depth 8.8m. On-site disposal of stormwater by infiltration using soakwells or similar is permitted, with a permeability rate of 2m/day recommended for adoption during the design. It is noted that the infiltration rate provided by the Geotechnical investigation is relatively low and simulates a worst case scenario. This value would require a significantly greater amount of below ground cells to accommodate and infiltrate the 1% AEP event.

Our design approach has been to adopt a value more representative of typical infiltration rates for these kind of soils that incorporates a level of conservatism without simulating absolute worst scenarios. We have adopted an infiltration rate of 4m/day, this value should be validated during the next phase of geotechnical investigations close to the intended locations of the below ground stormwater cells.

2 EXISTING INFORMATION

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The existing relevant information received to date includes:

- Galt Geotechnics report WAG200143-02 002 R Rev0 (dated May 2026).
- Architectural drawings for the current scheme provided by KHA.
- Feature survey undertaken by MNG dated 08/06/2026. Drawing reference 107800DE-001-A.

3 CODES AND STANDARDS

All new works will be designed to comply with the National Construction Code (NCC) and the relevant Australian Standards. The Principal Australian Standards relevant to the civil engineering design include the following:

The Principal Australian Standards relevant to the civil engineering design include the following:

- AS 1428.1 (2021) Design for Access and Mobility
- AS/NZS 2890.1 (2004) Off-Street Car Parking
- AS/NZS 2890.6 (2022) Off Street Parking for People with Disabilities
- AS/NZS 3500.3 (2021) Plumbing and Drainage – Stormwater Drainage
- Austroads Guide to Pavement Technology Part 2 (2018) – Pavement Structural Design
- Australian Rainfall and Runoff (ARR 2019) – A Guide to Flood Estimation
- Austroads Guide to Road Design Part 5: Drainage – General and Hydrology Considerations
- Austroads Guide to Road Design Part 5: Drainage – Road Surface Networks, Basins and Subsurface
- Local Government Guidelines applicable to the City of Claremont

4 CIVIL DESIGN DEVELOPMENT

4.1 General

The existing topography slopes gradually from the south to the northwest, with an approximate fall of 3m, noting this fall is not uniform across the site. WGA's intention is to utilise below ground infiltration cells in the basement to capture roof runoff and promote on site infiltration.

At the time of writing, it is assumed that the basement roof and therefore ground floor podium levels will be constructed as a concrete slab. This therefore means any stormwater within the footpaths and landscaping will also need to be redirected to the below ground infiltrations cells located in the basement. Interconnected stormwater pits and below ground cells will be provided to allow the hydraulics engineer to tie in downpipes to the system. Co-ordination will be required to ensure surface water drains to designated low spots within the slab.

To assess appropriate drainage measures for the site, area specific rainfall data from the online Data Hub from Australian Rainfall and Runoff 2019 (ARR 2019) has been obtained.

Guide to Road Design Part 5: Drainage – General and Hydrology Considerations (2023), Rational Method for WA Rural Hydrology method has been used to determine design flows up to an including the 1% Annual Exceedance Probability (AEP) event.

4.2 Flood Immunity

There are no watercourses adjacent to or within the site. In general, footpaths should be graded away from buildings to designated low points or areas within the landscaping and it is assumed that building entrances will have thresholds to prevent stormwater ingress. Buildings will have immunity to surface water flooding without the need for hydrological modelling or other similar methods based on the above.

4.3 Earthworks

Following the demolition of existing buildings, earthworks will be limited to levelling of the site and cut works associated with the construction of the basement. Cut volumes will be provided during detailed design once the basement layout and level is finalised. The use of retaining walls to enable the earthworks design is not expected.

The project may require some perimeter ground stabilisation works due to the site classification noted in the Galt Geotechnical Report. This will be coordinated with the structural team during the detailed design phase.

4.4 Stormwater Design

4.4.1 Design Development

WGA propose that runoff from the roofs of buildings and ultimately footpaths and landscaping are directed to below ground infiltration cells via downpipes. These cells will be located within the basement with interconnected grated gully stormwater pits that will facilitate a greater degree of flexibility when designing the connection of downpipes. The provision of grated gully stormwater pits also allows for conveyance of flows from sprinkler systems installed in the basement.

These cells have been sized to cater for the 1% AEP event. The arrangement and final configuration of these cells is flexible and can be adjusted during the design to suit new basement layouts, adjusted structural footing positions and preferential locations for downpipes.

Typically, a pit providing an overflow point during larger events to the surrounding landscaping would be provided. With the current design levels, the surface level of this pit would need to be lower than the basement level (currently 29.8mAHD at the time of writing) to ensure that there is no water in the basement in the event the system backs up. Given the location of this level is unlikely to be achieved within the ground floor level of the development, this may mean no overflow point can be provided within the site footprint and this will be explored further during detailed design. The cells have therefore been designed to allow for 100mm freeboard from the 1% AEP water level to the top of cells. This equates to a redundancy volume of 11.5m³ and will reduce the risk of ponding and minor flooding in the basement.

4.5 Parking

On-street parking bays/drop off areas will be designed to comply with AS 2890 and appropriate kerbing and grading to facilitate drainage. The current grade of Albert Street will be extended into the new on street parking area with no works proposed to adjust the existing road. It is proposed surface water will run hard up against the kerb and flow south to north where it will be conveyed to the existing stormwater network.

In this area WGA propose a typical pavement buildup of 200mm crushed rock basecourse with a 30mm asphalt finish will be sufficient for the operation of this car park. WGA will take guidance from KHA if an alternative pavement build-up such as trafficable brick pavers is preferred for the design.

A concrete crossover will be constructed to provide access to vehicles from Albert Street to the site. It is assumed that the location of the crossover has been driven by findings from the Transport Impact Statement or Traffic Consultant for the project and provides a location safe access for vehicles accessing the site, considering sight lines and distances from the existing road. The crossover configuration will be compliant with City of Claremont typical details.

5 SAFETY IN DESIGN

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WGA is dedicated to adopting Safety in Design (SiD) in accordance with the designer's responsibilities under State and National Occupational Health, Safety and Welfare Acts and Regulations.

WGA considers safety through the lifecycle of the plant and structures and integrates a Hazard Identification and Risk Assessment early in the design process to achieve a safe design for the intended use, fabrication and construction of the project.

A SiD for the project is attached as Appendix B.

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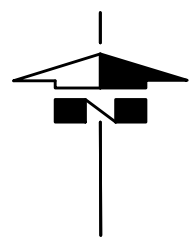
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APPENDIX A

SCHEMATIC DESIGN MARKUPS

West





KINGSMILL STREET

ALBERT STREET

ACO POWERDRAIN S200K WITH GALVANISED CLASS C HEELSAFE ANTISLIP GRATE AND SLOPING CHANNEL TOWARDS OUTFLOW PIPE (OR SIMILAR APPROVED)

BASEMENT
(FFL 29.600)

SITE PLAN - BASEMENT LEVEL

SCALE 1:200

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NOTES

- ALL DIMENSIONS IN METRES UNLESS NOTED OTHERWISE
- FOR BASEMENT FINISHED PAVEMENT LEVELS REFER ARCHITECTURAL DRAWINGS

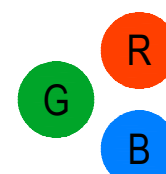
LEGEND

- PROPOSED ASPHALT PAVEMENT
REFER CIVIL DETAILS
- UPSTREAM INVERT LEVEL
PIPE DIA/ PIPE GRADE
PIPE LENGTH
DOWNSTREAM INVERT LEVEL
- PVC STORMWATER DRAINAGE PIPE
- STORMWATER GRATED GULLY
- LID LEVEL
PROPOSED PIT TYPE
PROPOSED PIT ID
PIT DIAMETER
- BASE INVERT LEVEL / TOP OF TANK RL.
No. ECOBLOC CELLS PER LAYER/No. LAYERS
TANK BASE AREA m²
MINIMUM STORAGE VOLUME m³
- PROPOSED "GRAF ECOBLOC MAXX" UNDERGROUND STORAGE TANK OR APPROVED EQUIVALENT
- TRENCH GRATE

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SCALE BAR (m)
1:200



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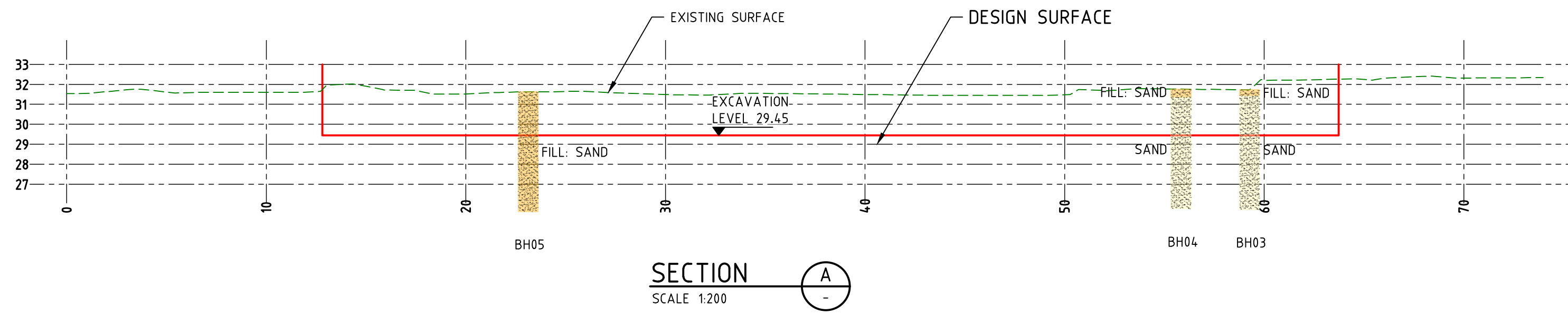
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WGA

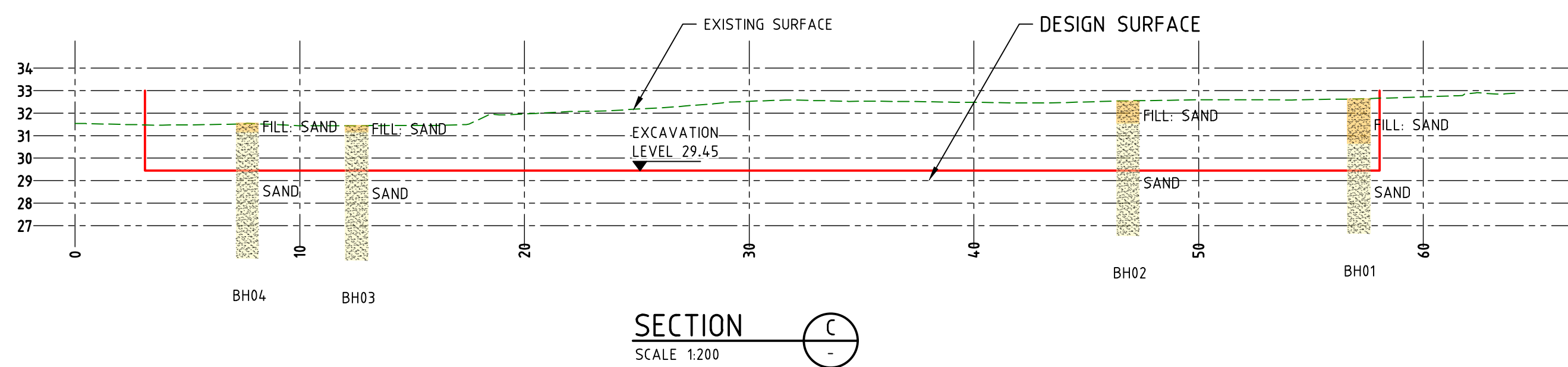
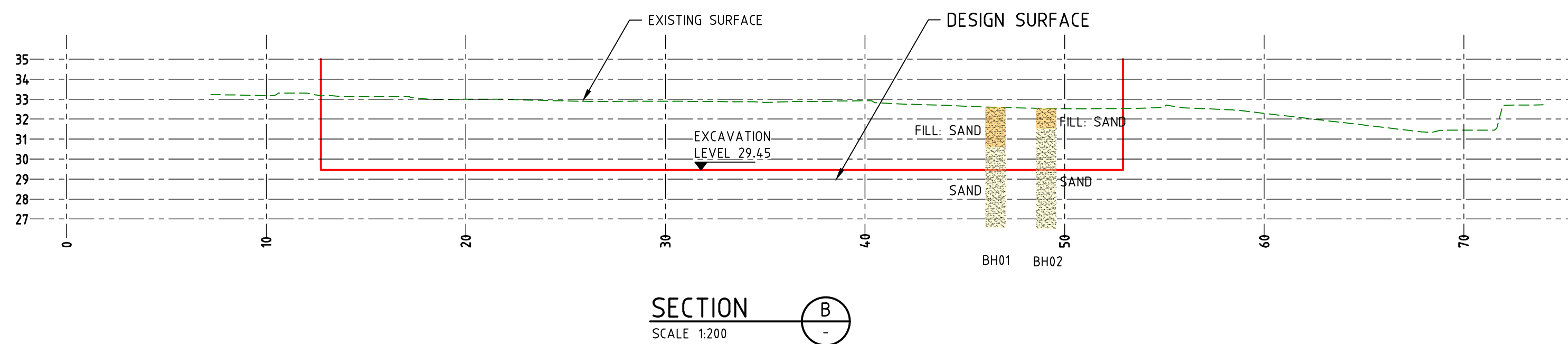
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BASEMENT LAYOUT

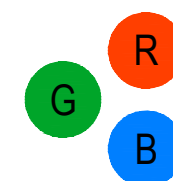
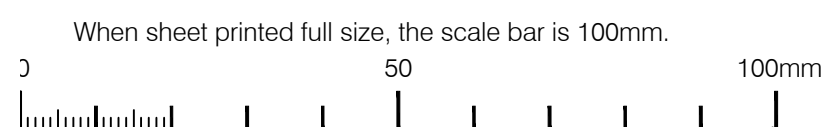
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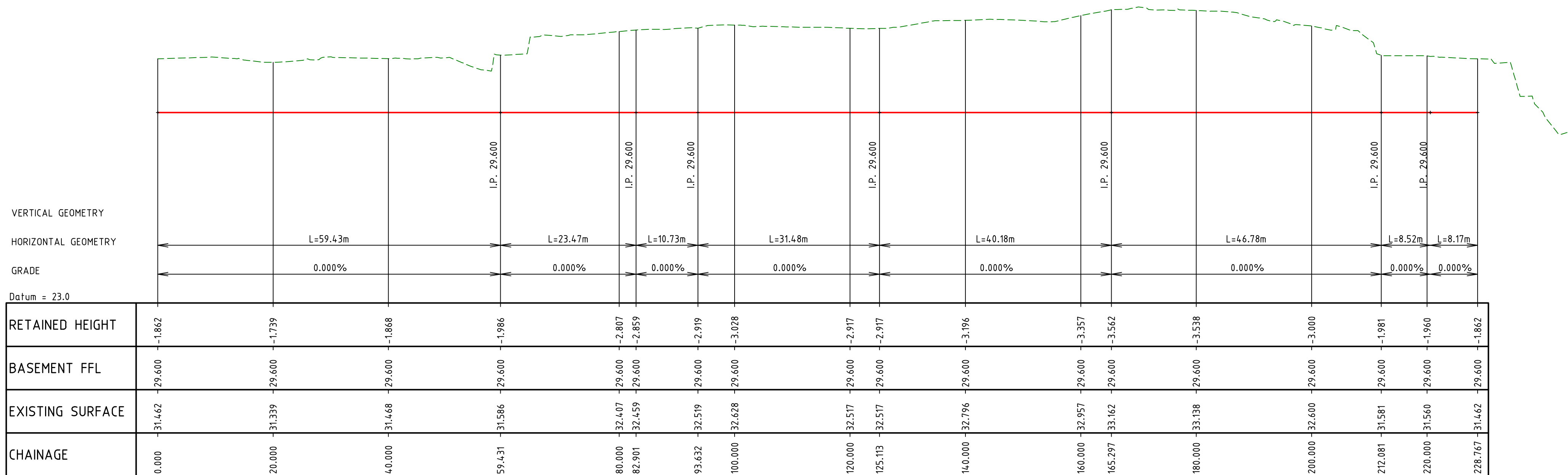
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BASEMENT SECTIONS

A1 DOCUMENT NUMBER
Project Number Sheet No. Rev.
Design Drawn
EN EN WGA260661-SK-CV-0002 A



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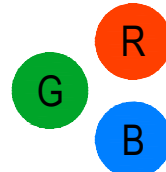
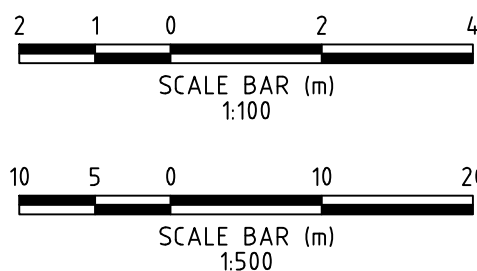
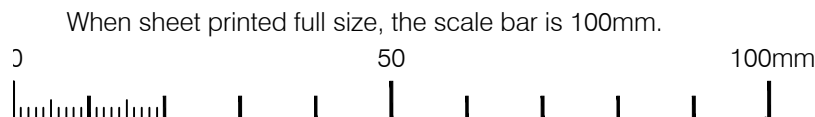


LONGITUDINAL SECTION BU FLR BASEMENT

Horizontal scale 1:500

Vertical scale 1:100

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PERIMETER WALL LONG SECTION

A1	DOCUMENT NUMBER	Sheet No.	Rev.
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APPENDIX B SAFETY IN DESIGN



SAFETY IN DESIGN

Project Title	SLE Albert Street
Principal Client	TPM
Limitations	1. Only hazards reasonably foreseeable at the time of design, and that could result from design aspects of the project that WGA are responsible for, have been considered. 2. Only hazards that are associated with the particular design, and not with other designs of the same type of product, have been considered. 3. Any hazards arising due to normal site construction, maintenance or operation as covered by Australian codes and standards, local codes and guidelines etc. have not been considered in this assessment 4. It has been assumed that the contractor and owner will undertake their own risk assessments to appropriately consider construction and operational risks.

Job Number:	WGA260661	Author(s) /	BW
Creation Date:	10/Jun/26	Attendees:	

REVISION CONTROL			
Date	Revision	Project Phase	Author
10/06/2026	A	☒ Concept ☐ Detailed Design	BW
		☐ Concept ☒ Detailed Design	

SUMMARY

Residual Risk Score	Item No.	Risk Description	Control Measures	Action Owner (s)
Medium	2-4	Personnel impacted by construction equipment.	Properly zone off construction and pedestrian access areas.	Contractor and client
Medium	2-5	Damage to existing services during construction	Contractor to locate existing services prior to construction and protect services during construction. Contractor to seek relevant authority approvals for isolation of existing live services	Contractor
Low	2-1	Infiltration cells overload and cause flooding and ponding issues.	The design of the stormwater cells has been undertaken using conservative assumptions given the existing ground infiltration rates. Freeboard has been provided to the top level of the cells to give the system extra redundancy. Targeted geotechnical investigations will be undertaken at the location of the cells to confirm infiltration rates prior to design finalisation	Client
Low	2-2	Ponding/Surface Water issues	All rooftops and landscape areas to be designed with compliant falls and grades to ensure stormwater is conveyed to designated low points and minimise the risk of ponding. These low points will likely require connections into the basement cells to allow infiltration	WGA
Low	2-3	Restricted and limited downstream drainage network capacity	Any over land flows from site should be directed to Albert Street which has sufficient longitudinal fall that flows will be conveyed safely away from the site to respective external drainage infrastructure.	WGA
Low	2-6	Discovery of unknown stormwater drainage pipes that have not been redirected.	Contractor to advise WGA of any instances of discovery of unknown pipes.	Contractor/WGA

1.0	Pre-design phase	Complete	Designer comments
1.1	What is the project scope that WGA is responsible for?		Structural and civil engineering, this SiD is limited to Civil Items only
1.2	Which disciplines are involved the project scope?	☒ Structural ☒ Civil ☐ Geotech ☐ Mechanical ☐ Electrical ☐ Process ☐ Other	
1.3	Who will be involved in the Safety in Design process?	☒ Designer (WGA) ☐ Designer (External) ☐ Client ☐ Contractors ☐ Other	
1.4	Is an external risk assessment workshop required?	☐ Yes ☐ No	

Complete section 1

2.0	Concept design phase	Complete	Designer comments
2.1	Are there unusual or site specific design related hazards associated with the following?		
	- Electrical	☐ Yes ☒ No	
	- Fire and Explosion	☐ Yes ☒ No	
	- Access, Egress and Movement	☐ Yes ☒ No	
	- Slipping Tripping and Falling	☐ Yes ☒ No	
	- Manual Tasks and Ergonomics	☐ Yes ☒ No	
	- Crushing and Entanglement	☐ Yes ☒ No	
	- Cutting, Stabbing or Puncturing	☐ Yes ☒ No	
	- Shearing and Striking	☐ Yes ☒ No	
	- Working Environment and Noise	☐ Yes ☒ No	
	- High Pressure Fluid	☐ Yes ☒ No	
	- Construction Plant	☐ Yes ☒ No	
	- Amenities and Facilities	☐ Yes ☒ No	
	- Earthworks	☐ Yes ☒ No	
	- Groundwater	☐ Yes ☒ No	
	- Structural Safety	☐ Yes ☒ No	

- Hazard Combinations (controls system failure)
- Radiation and Substances
- Stored Energy (temperature, gravitational, chemical, mechanical etc.)
- Other (please specify in comments)

☐ Yes ☒ No
☐ Yes ☒ No
☐ Yes ☒ No
☐ Yes ☒ No

3.0	Detailed design phase	Complete	Designer comments
3.1	Have there been any changes to the design that affect the outcome of Section 2?	☐ Yes ☒ No	
3.2	Does the risk assessment need to be updated?	☐ Yes ☒ No	
Continue to section 4			
4.0	Project close out	Complete	Designer comments
4.1	Provide a copy of Safety in Design report to client	☒ Complete	

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HAZARD REGISTER

HAZARD REGISTER												
Hazard Identification			Initial Risk Rating			Controls		Residual Risk Rating			Status	
Item (No.)	Risk Description	Possible causes	Consequence	Likelihood	Risk score	Control measures	Action owner (s)	Consequence	Likelihood	Risk score	Completion Status	Comments / Follow Up
GUIDANCE	What is the HAZARD and unwanted EVENT?	How could this HAZARD cause or contribute to HARM?	What is the most plausible worst case result WITHOUT controls?	How likely is it that this would occur WITHOUT controls?	Combined score from risk matrix WITHOUT controls	What CONTROLS can be reasonably implemented to reduce risk?	Who is responsible for this CONTROL?	What is the most plausible worst case result WITH the controls?	How likely is it that this would occur WITH the controls?	Combined score from risk matrix WITH controls	Open/Closed (action is implemented)	Is there anything else that needs to be done? Are there any further notes?
1	Design for safe construction											
1-1	Personnel impacted by construction equipment.	Pedestrians walking in or near construction areas as construction areas are adjacent to student access/ traffic	Major (D)	Possible (3)	High	Properly zone off construction and pedestrian access areas.	Contractor and client	Major (D)	Unlikely (2)	Medium	Closed	
1-2	Damage to existing services during construction	Unknown services may exist within the site footprint as a result of past historical construction activities.	Major (D)	Possible (3)	High	Contractor to locate existing services prior to construction and protect services during construction. Contractor to seek relevant authority approvals for isolation of existing live services	Contractor	Major (D)	Unlikely (2)	Medium	Closed	
1-3	Discovery of unknown stormwater drainage pipes that have not been redirected.	Not identified in survey or investigations	Major (D)	Possible (3)	High	Contractor to advise WGA of any instances of discovery of unknown pipes.	Contractor/WGA	Minor (B)	Unlikely (2)	Low	Closed	
1-4					-					-		
2	Design for safe use											
2-1	Infiltration cells overload and cause flooding and ponding issues.	Low infiltration rates	Major (D)	Unlikely (2)	Medium	The design of the stormwater cells has been undertaken using conservative assumptions given the existing ground infiltration rates. Freeboard has been provided to the top level of the cells to give the system extra redundancy. Targeted geotechnical investigations will be undertaken at the location of the cells to confirm infiltration rates prior to design finalisation.	Client	Minor (B)	Very Unlikely (1)	Low	Closed	
2-2	Ponding/Surface Water issues	Low spots/improper grading of footpaths	Minor (B)	Possible (3)	Medium	All footpaths and landscape areas to be designed with compliant falls and grades to ensure stormwater is conveyed to designated low points and minimise the risk of ponding. These low points will likely require connections into the basement cells to allow infiltration.	WGA	Minor (B)	Unlikely (2)	Low	Closed	
2-3	Restricted and limited downstream drainage network capacity	Unknown existing downstream stormwater drainage network capacity	Major (D)	Unlikely (2)	Medium	Any over land flows from site should be directed to Albert Street which has sufficient longitudinal fall that flows will be conveyed safely away from the site to respective external drainage infrastructure.	WGA	Minor (B)	Very Unlikely (1)	Low	Closed	
2-4	Personnel impacted by construction equipment.	Pedestrians walking in or near construction areas as construction areas are adjacent to student access/ traffic	Major (D)	Possible (3)	High	Properly zone off construction and pedestrian access areas.	Contractor and client	Major (D)	Unlikely (2)	Medium	Closed	
2-5	Damage to existing services during construction	Unknown services may exist within the site footprint as a result of past historical construction activities.	Major (D)	Possible (3)	High	Contractor to locate existing services prior to construction and protect services during construction. Contractor to seek relevant authority approvals for isolation of existing live services	Contractor	Major (D)	Unlikely (2)	Medium	Closed	
2-6	Discovery of unknown stormwater drainage pipes that have not been redirected.	Not identified in survey or investigations	Major (D)	Possible (3)	High	Contractor to advise WGA of any instances of discovery of unknown pipes.	Contractor/WGA	Minor (B)	Unlikely (2)	Low	Closed	
3	Design for safe maintenance											
3-1					-					-		
3-2					-					-		
3-3					-					-		
3-4					-					-		

HAZARD REGISTER

HAZARD REGISTER												
Hazard Identification			Initial Risk Rating			Controls		Residual Risk Rating			Status	
Item (No.)	Risk Description	Possible causes	Consequence	Likelihood	Risk score	Control measures	Action owner (s)	Consequence	Likelihood	Risk score	Completion Status	Comments / Follow Up
3-5					-					-		
3-6					-					-		
3-7					-					-		
3-8					-					-		
3-9					-					-		
4	Modification											
4-1					-					-		
4-2					-					-		
4-3					-					-		
4-4					-					-		
4-5					-					-		
4-6					-					-		
4-7					-					-		
4-8					-					-		
4-9					-					-		
4-10					-					-		
5	Demolition and dismantling											
5-1					-					-		
5-2					-					-		
5-3					-					-		
5-4					-					-		
5-5					-					-		
5-6					-					-		
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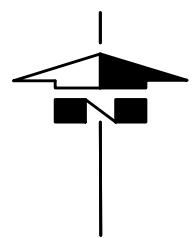
FOR FURTHER INFORMATION CONTACT:

Ben Walton
Civil Engineer

T 08 9336 6528
E bwalton@wga.com.au

WGA.COM.AU
WGANZ.CO.NZ





KINGSMILL STREET

ALBERT STREET

ACO POWERDRAIN S200K WITH GALVANISED CLASS C HEELSAFE ANTISLIP GRATE AND SLOPING CHANNEL TOWARDS OUTFLOW PIPE (OR SIMILAR APPROVED)

UNABLE TO ACCESS
Lower ground
private residence

U/S 29.14
150/100
9.1m
D/S 29.03

U/S 28.29
150/100
3.9m
D/S 28.25

28.15/29.20
60/3
38.4m²
40.32m³

U/S 28.29
150/100
3.9m
D/S 28.25

HOUSE
Brick & Tile

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NOTES

- ALL DIMENSIONS IN METRES UNLESS NOTED OTHERWISE
- FOR BASEMENT FINISHED PAVEMENT LEVELS REFER ARCHITECTURAL DRAWINGS

LEGEND

- PROPOSED ASPHALT PAVEMENT
REFER CIVIL DETAILS
- UPSTREAM INVERT LEVEL
PIPE DIA/ PIPE GRADE
PIPE LENGTH
DOWNSTREAM INVERT LEVEL
- PVC STORMWATER DRAINAGE PIPE
- STORMWATER GRATED GULLY
- LID LEVEL
PROPOSED PIT TYPE
PROPOSED PIT ID
PIT DIAMETER
- BASE INVERT LEVEL / TOP OF TANK RL.
No. ECBLOC CELLS PER LAYER/No. LAYERS
TANK BASE AREA m²
MINIMUM STORAGE VOLUME m³
- PROPOSED "GRAF ECBLOC MAXX" UNDERGROUND
STORAGE TANK OR APPROVED EQUIVALENT
- TRENCH GRATE

ALBERT STREET

CH 228.767

CH 10.000

CH 20.000

CH 30.000

CH 40.000

CH 50.000

CH 59.431

CH 220.597

CH 210.000

CH 212.081

CH 200.000

CH 190.000

CH 180.000

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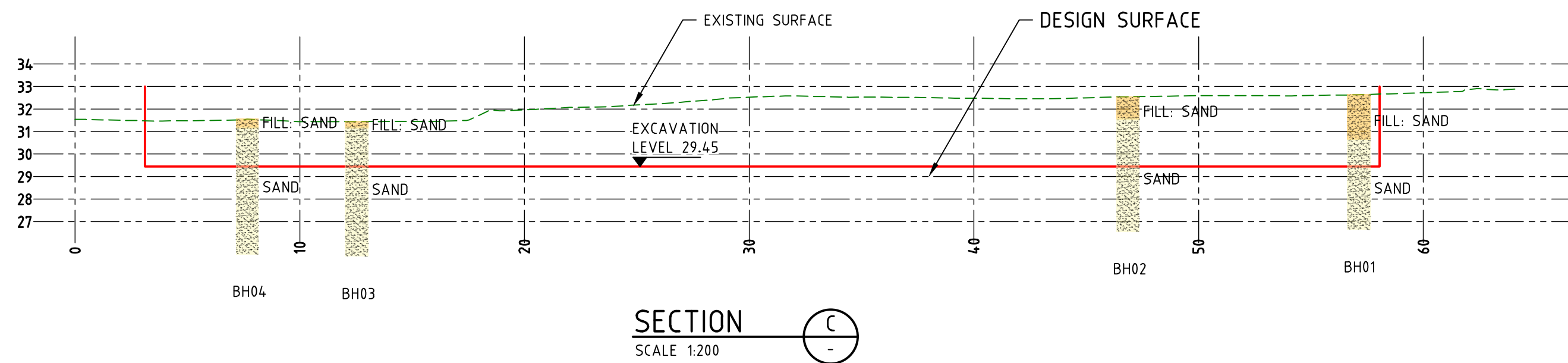
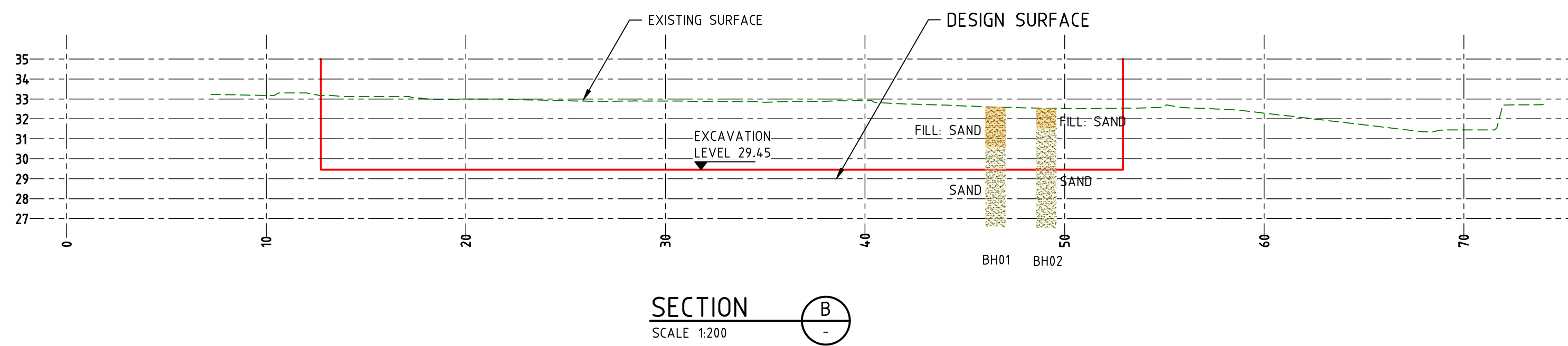
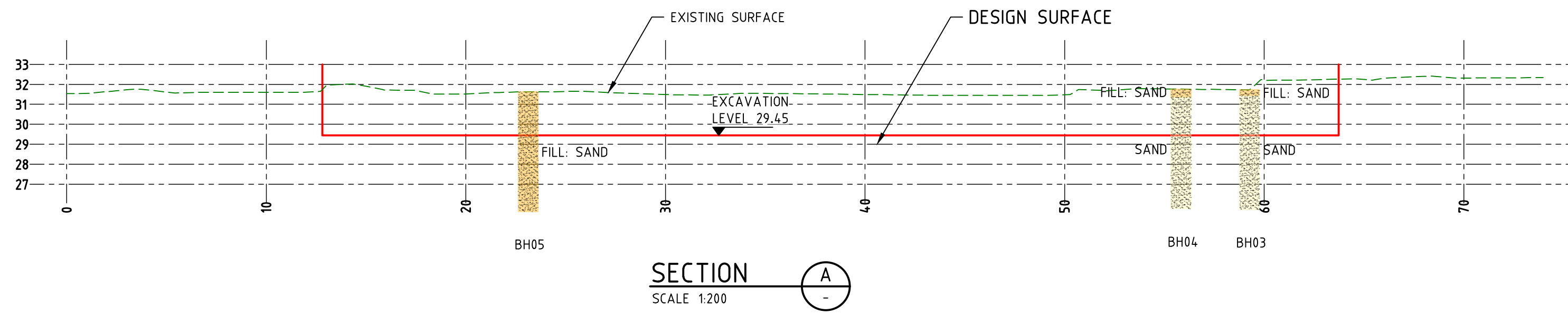
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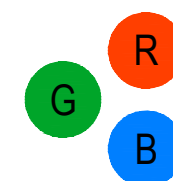
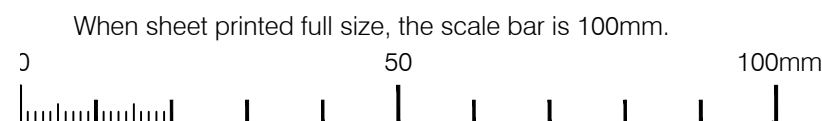
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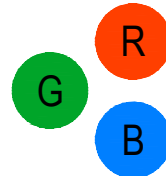
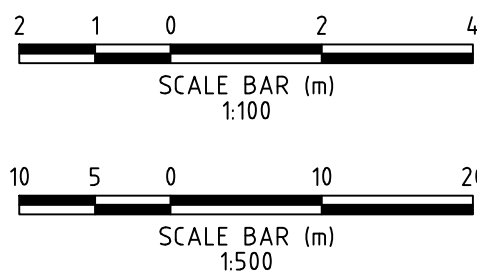
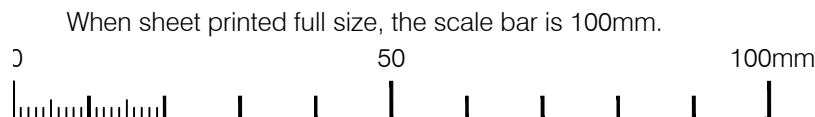
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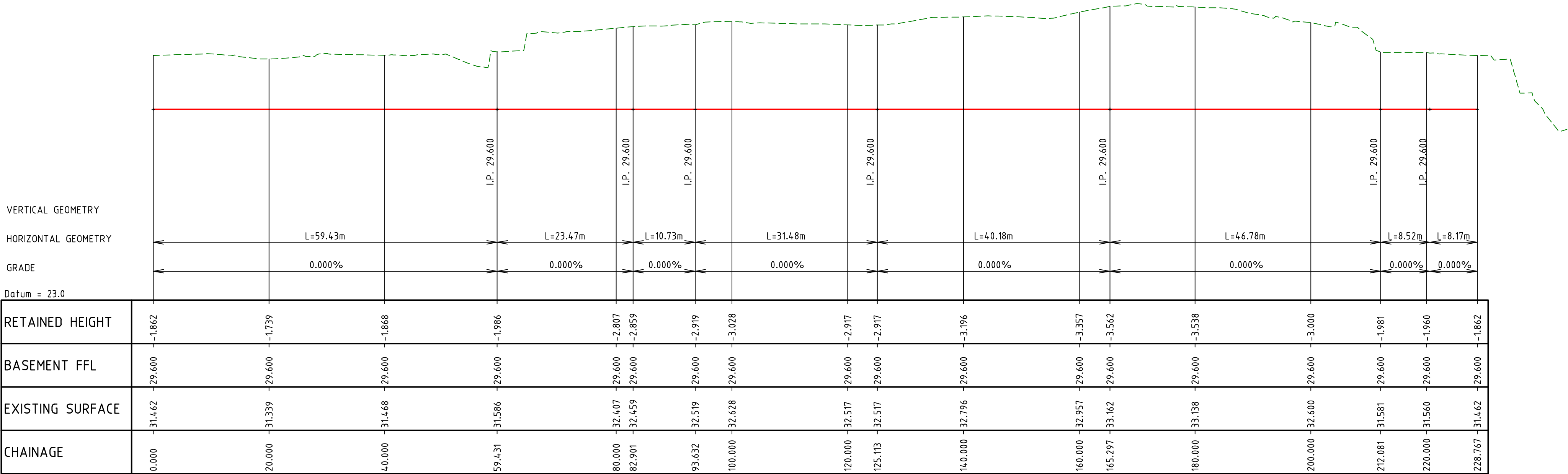
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PERIMETER WALL LONG SECTION

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WGA260661-SK-CV-0003	A	ALBERT REDEVELOPMENT - PERIMETER WALL LONG SECTION