

# Caddens Hill Subdivision Stages 8 to 10 Pre-Construction Concept Design Road Safety Audit

Prepared for:

Legacy Property

11 November 2021

The Transport Planning Partnership



# Caddens Hill Subdivision Stages 8 to 10 Pre-Construction Concept Design Road Safety Audit

Client: Legacy Property

Version: 02

Date: 11 November 2021

TTPP Reference: 21449

#### **Quality Record**

Version	Date	Prepared by	Reviewed by	Approved by	Signature
01	9/11/21	S.Read	D.Lee	W.Johnson	
02	11/11/21	D.Lee	S.Read	W.Johnson	



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## **APPENDICES**

A. DESIGN DRAWINGS



# 1 Road Safety Audit Summary

Audited project:	Caddens Hill Subdivision Stages 8 to 10
Client:	Legacy Property
Project manager:	Thomas Kent
MINE I I TAPELL SHE SHE SHE SHE SHE	
Telephone:	+61 2 9252 1111
Audit Team:	Stephen Read (level 3 lead road safety auditor)  Doris Lee (level 3 road safety auditor)
Audit type:	Detailed Design (Pre-Construction)
Commencement meeting:	N/A
Audit date:	9 November 2021
Completion meeting:	Not required

The objective of this road safety audit is to examine and identify road safety concerns regarding the Caddens Hill Subdivision Stages 8 to 10.

The findings of the road safety audit have been detailed in Section 4.3 of this report.

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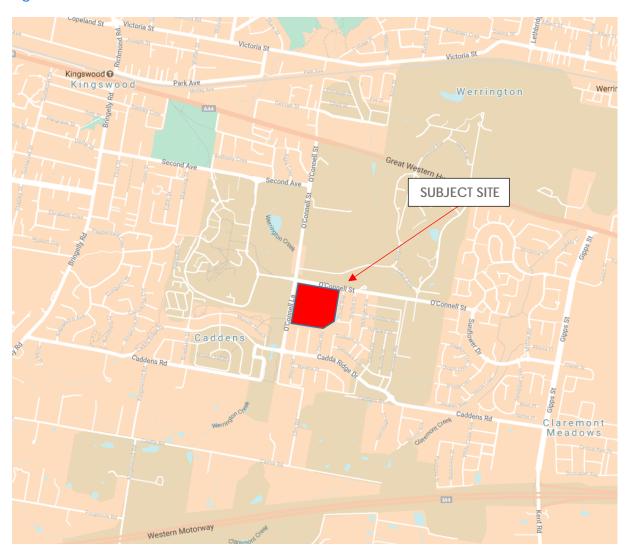


# 2 Introduction

## 2.1 Background

This report has been prepared on behalf of Legacy Property to present road safety audit findings that have been identified for the subdivision of Caddens Hill Subdivision 8 to 10. The subdivision is for a low-density residential subdivision. The audit has considered the design of the internal roads, connections with the external road network and access for properties within the subdivision.

Figure 2.1: Site Location





### 2.2 Audit Objective

The objective of this Audit was to ensure that there are no fundamental flaws in the geometric layout in relation to road safety that will be costly to fix at a later date both in terms of cost and time.

#### 2.3 Procedures and Reference Material

The procedures used are described in the following guidelines:

- Roads and Maritime Services' 2011 Guidelines for Road Safety Audit Practices
- Austroads Guide to Road Safety 2019: Part 6 Managing Road Safety Audits
- Austroads Guide to Road Safety 2019: Part 6A Implementing Road Safety Audits.

Austroads checklist was used by the audit team as a reference in this road safety audit. Key elements examined included:

- general topics drainage, type and degree of access to development
- design issues
- intersections
- lighting, signs and delineation
- physical objects
- environmental constraints
- other matters including over size vehicles.

#### 2.4 Audit Team

The RSA was carried out by the following team:

- Stephen Read (RSA-02-0652) level 3 road safety auditor (lead auditor)
- Doris Lee (RSA-02-0128) level 3 road safety auditor (team member)

Stephen and Doris are registered road safety auditors with the NSW Centre for Road Safety and are experienced in traffic engineering and design/ inspection of traffic management schemes.



# 3 Road Safety Audit Program

## 3.1 Commencement Meeting

A formal meeting was not held.

### 3.2 Site and Field Audit

No inspection was undertaken as part of this desktop road safety audit.

## 3.3 Completion Meeting

Not required.



# 4 Road Safety Audit Findings

#### 4.1 Introduction

Table 4.1 provides specific details of the audit findings and a risk rating as high, medium or low. The risk ratings have been based on the risk matrix presented in Table 4.1, which has been adopted from the standard Austroads Risk Matrix.

Table 4.1: Risk Matrix

Likelihood	Highly probable	Occasional	Improbable
Major			Medium
Moderate		Medium	Low
Minor	Medium	Low	Low

The terms in Table 4.1 are described below.

#### Likelihood:

- Highly probable: It is likely that more than one crash of this type could occur within a fiveyear period.
- Occasional: It is likely that less than one crash of this type could occur within a five-year period.
- Improbable: Less than one crash of this type could occur within a 10-year period.

#### Severity:

- Major: The crash is likely to result in a fatality or serious injuries
   For example, high/medium speed vehicle collision, high/medium speed collision with a fixed object, pedestrian struck at high speed, and cyclist hit by car.
- Moderate: The crash is likely to result in minor injuries or large scale of property damage
   For example, some slow speed vehicle collisions, cyclist falls, and rear end crashes.
- Minor: The crash is likely to result in minor property damage or many near miss crash events

For example, some slow speed collisions, pedestrian walks into object (no head injury), and car reverses into post.

#### Priority:

- High: Very important, and needs to be addressed urgently.
- Medium: Important, and needs to be addressed as soon as possible.
- Low: Needs to be considered as part of regular maintenance/planning program.



## 4.2 Responding to the Audit Report

As set out in the road safety audit guidelines, the responsibility for the road rests with the project manager, not with the auditor. The project manager is under no obligation to accept the audit findings. Neither is it the role of the auditor to agree to, or approve the project manager's responses to the audit.

The audit provides the opportunity to highlight potential road safety problems and have them formally considered by the project manager in conjunction with all other project considerations.

## 4.3 Road Safety Audit Findings

The audit findings are documented in Table 4.2 which provides:

- specific details of the road safety issues identified during the audit
- a risk level rating for each of the road safety audit findings.

It should be acknowledged that positive attributes of the audited road section have not been discussed. Deficiencies that do not cause a safety problem are also not listed.

In-line with TfNSW's best practice recommendations have not been included in the road safety audit findings.



Table 4.2: Road Safety Audit Findings

Item No.	Location / type	Descriptions of Findings	Design/ Photo	Likelihood	Severity	Risk Rating	Designer Response
1.	Intersections of Starline Road / Oxen Way and Starline Road / Ghera Road	Closely spaced (about 16m) T- intersections can result in minor crashes as a result of vehicles manoeuvring through the intersections.  Vehicles tend to cut corners crossing centrelines or drivers not sighting vehicles turning from side streets resulting in two car crashes.	Mail   Mail	Occasional	Moderate	Medium	The layout adopted provides limited opportunity to remove this intersection configuration. The number of vehicles (per day) likely to be in conflict is not considered to be high, with only a limited number of dwellings along the northeastern end of Ghera Road and the adjacent road (Lots 860-862, 856-859, and 912-919) likely to make a right turn at this Ghera/Starline intersection. Other users in further along Ghera and the adjacent road are likely to proceed west and then south along Ghera to exit the area. No change in design proposed.

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Item No.	Location / type	Descriptions of Findings	Design/ Photo	Likelihood	Severity	Risk Rating	Designer Response
2	Cul-de-sac connection	The plans show the roads connecting through to existing cul-de-sacs. However, the plan does not show the footpaths being connected.  There are risks of slips trips or falls as a result of poor footpaths or uneven surfaces.	837 837 8800 29.9 838 836 848 519m	Improbable	Minor	Low	The footpath extensions will be undertaken as a separate application to Council.
3	Two intersections with identical names	There are two intersections of Ghera Road and Starline Road. Emergency services use the nearest cross street to identify the location. Two intersections with the same name may result in delays for emergency services.	ROAD 200  ROAD 200  STAGE 8-10  PROPOSED LOTS  A051  STARLINE DRIVE			Note	N/A

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Item No.	Location / type	Descriptions of Findings	Design/ Photo	Likelihood	Severity	Risk Rating	Designer Response
4	Ghera Road	Plans do not show parking restrictions. As there are 90 degree bends in Ghera Road. It is possible that vehicles may park on the bends restricting access for garbage trucks or other trucks accessing properties.	796 ± 5	Improbable	Moderate	Low	Signposting "No Parking" will be considered in conjunction with Council.

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# 5 Concluding Statement

The findings and opinions in the report are based on the examination of the specific road and environs, and might not address all concerns existing at the time of the audit.

The auditors have endeavoured to identify features of the road that could be modified in order to improve safety, although it must be recognised that safety cannot be guaranteed since no road can be regarded as absolutely safe.

While every effort has been made to ensure the accuracy of this report, it is made available strictly on the basis that anyone relying on it does so at their own risk without any liability to the Auditors.

Stephen Read
Level 3 Lead Road Safety Auditor
The Transport Planning Partnership

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Doris Lee Level 3 Road Safety Auditor The Transport Planning Partnership



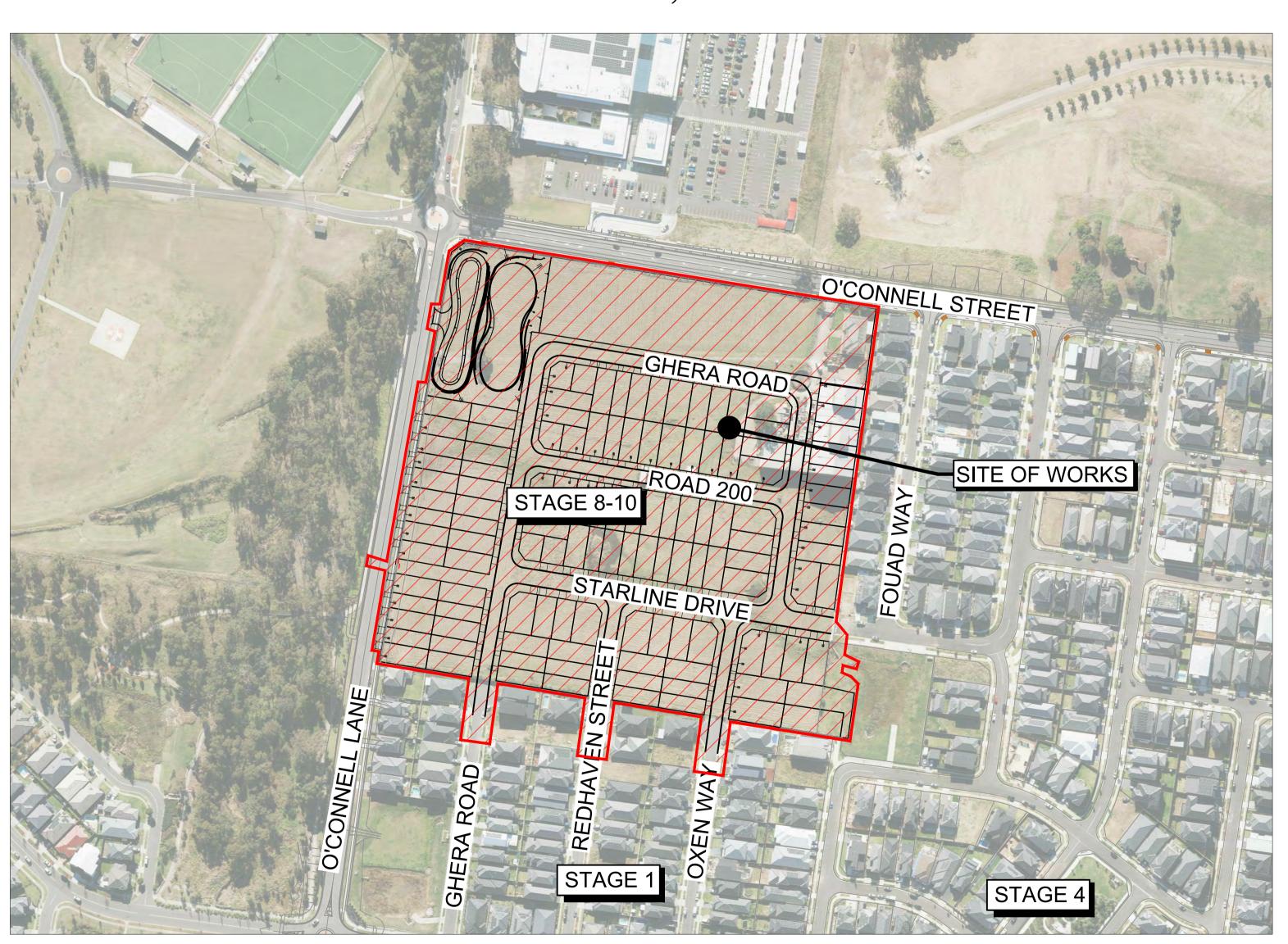
# Appendix A

Design Drawings



# CADDENS HILL STAGES 8 - 10

PROPOSED SUBDIVISION OF LOT 399 DP 1044732 & LOT 396 DP 1229232 PROPOSED STORMWATER, LOT AND ROAD WORKS



LOCALITY SKETCH

3 ISSUE FOR DA APPROVAL
2 ISSUE FOR DA APPROVAL
3 ISSUE FOR DA APPROVAL
4 GA JM MS DJ 05/11/21
5 ISSUE FOR DA APPROVAL
6 GA JM MS DJ 03/11/21
6 GA JM MS DJ 22/10/21
6 AMENDMENT
6 DES DRN CKD APR DATE

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CADDENS HILL STAGE 8 - 10 COVER SHEET PROJECT No: 110358-001 SHEET No: DA001

AZIMUTH: M.G.A. 94 DATUM: A.H.D. ORIGIN: PLAN No: 110358-09-DA001

	CIVIL PLAN INDEX	
PLAN NO.	PLAN NAME	REV
110358-09-DA001	COVER SHEET	3
110358-09-DA002	INDEX, LEGEND & GENERAL NOTES	3
110358-09-DA003	SITE LAYOUT PLAN	3
110358-09-DA004	ROAD TYPICAL SECTIONS	2
110358-09-DA010	CUT & FILL PLAN	3
110358-09-DA011	SITE SECTIONS SHEET 1	1
110358-09-DA012	SITE SECTIONS SHEET 2	2
110358-09-DA013	SITE SECTIONS SHEET 3	2
110358-09-DA014	SITE SECTIONS SHEET 4	1
110358-09-DA050	ENGINEERING PLAN SHEET 1	3
110358-09-DA051	ENGINEERING PLAN SHEET 2	2
110358-09-DA100	ROAD LONGITUDINAL SECTIONS SHEET 1	2
110358-09-DA101	ROAD LONGITUDINAL SECTIONS SHEET 2	1
110358-09-DA102	ROAD LONGITUDINAL SECTIONS SHEET 3	1
110358-09-DA300	STORMWATER PLAN	3
110358-09-DA301	SOIL & WATER MANAGEMENT PLAN	3
110358-09-DA302	SOIL & WATER MANAGEMENT NOTES	1
110358-09-DA400	BASIN PLAN AND RAINGARDEN DETAILS	3
110358-09-DA401	BASIN SECTIONS SHEET 1	2

# **GENERAL NOTES**

- 1. THESE PLANS ARE ONLY FOR THE PURPOSE OF LODGING A DEVELOPMENT APPLICATION TO COUNCIL.
- 2. THE PROPERTY BOUNDARIES, LAYOUT AND EASEMENTS SHOWN ARE SUBJECT TO CHANGE DURING THE DETAIL PROCESS OF THE DEVELOPMENT AND FINAL CADASTRAL SURVEY AND BOUNDARY 'FIX' TO MEET THE REQUIREMENTS OF NSW LRS SERVICE.
- 3. THE LEVEL AND CONFIGURATION OF ANY ROAD, THE LEVEL AND EXTENT OF ANY FILLING AREA, AND THE LEVEL, LOCATION AND SIZE OF ANY STORMWATER DRAINS ARE ALSO SUBJECT TO CHANGE DURING THE DETAIL DESIGN PROCESS OF THE DEVELOPMENT. ACCORDINGLY EVERY DIMENSION, DISTANCE, LEVEL OR SIMILAR IS APPROXIMATE ONLY.
- 4. DO NOT SCALE ANY DIMENSION FROM THESE PLANS. CHECK WITH J.WYNDHAM PRINCE REGARDING ANY UNDIMENSIONED DISTANCE.
- 5. THE WORKS SHOWN ON THESE PLANS WILL BE CONSTRUCTED TO COUNCIL'S ADOPTED ENGINEERING STANDARD.

# STORMWATER NOTES

- 1. STORMWATER IS SUBJECT TO DETAIL DESIGN. 2D LAYOUT SHOWN ON PLANS ONLY.
- 2. ALL DRAINAGE LINES THROUGH LOTS SHALL BE CONTAINED WITHIN THE FOLLOWING EASEMENTS:

a) INTER ALLOTMENT DRAINS (I.A.D) 2.0m WIDE EASEMENT (SUBJECT TO PIT AND ADJACENT RETAINING WALLS)

b) ALL OTHER DRAINS - REFER TO COUNCIL'S STORMWATER MANAGEMENT POLICY.

SURVEYED BY: VINCE MORGAN REGISTERED SURVEYORS 77 UNION ROAD PENRITH NSW 2750 (2) 47215293

CAD REFERENCE: 20467-DETAIL-89OCONNEL3.dxf DATE RECEIVED: 26/07/21

CAD REFERENCE: 20467-090821.dxf DATE RECEIVED: 09/08/21

CAD REFERENCE: 20467-T5.dwg DATE RECEIVED: 19/08/21

CAD REFERENCE: 20467-T5-GDA2020.dwg DATE RECEIVED: 26/08/21

	LEGEND					
DESCRIPTION	PROPOSED	EXISTING				
EXTENT OF WORKS						
GPT	GPT					
DRIVEWAY						
PRAM RAMP	$\square$					
DRAINAGE LINE & PIT						
HEADWALL	<b>)</b>	<b>)</b>				
RAINGARDEN PERMEABLE PIPE	KG					
KERB & GUTTER	FLUSHING POINT					
SUBSOIL DRAINAGE LINE	<b>ó</b> −ss−−ss−−					
DRAINAGE LINE, PIT & EASEMENT						
BATTER	ılı					
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STATE SURVEY MARKS		0				
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WATER	-www	—— eW —— eW ——				
SEWER	-s-s-s-	eS eS				
TREE TO BE REMOVED						
RETAINING WALL 1.0-1.5m MAX. HEIGHT						
RETAINING WALL 0-1.0m MAX. HEIGHT						



UTILITIES SHOWN ARE DIAGRAMMATIC ONLY, CONTRACTORS ARE RESPONSIBLE TO LOCATE AND AVOID DAMAGE TO THEM AS SPECIFIED BY EACH UTILITIES EXCAVATION GUIDE LINES & STANDARDS.

NOTE: UTILITIES SHOWN MAY NOT INCLUDE ALL SERVICES WITHIN THE LIMIT OF WORKS

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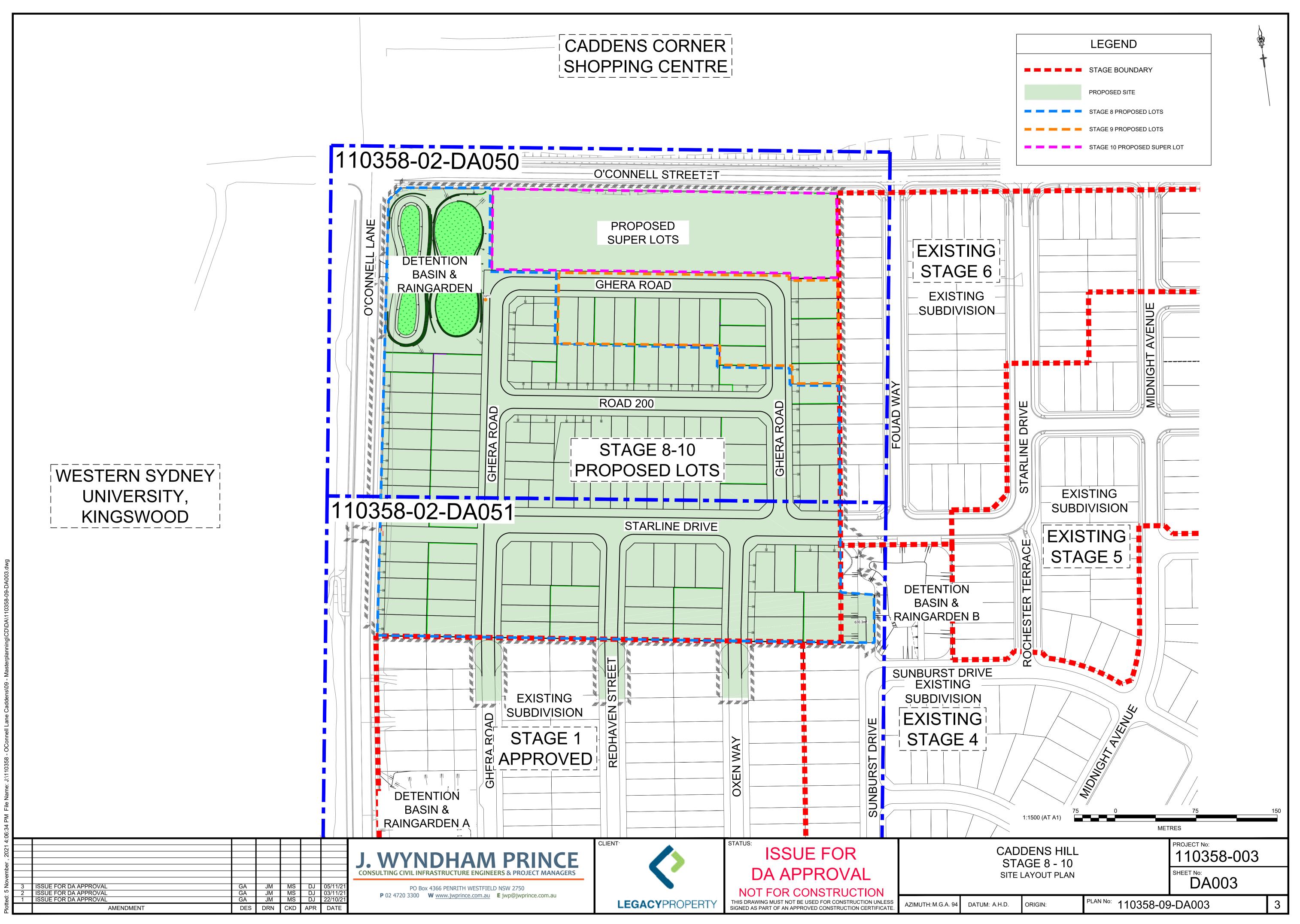
**CADDENS HILL** STAGE 8 - 10 INDEX, LEGEND & GENERAL NOTES 110358-002

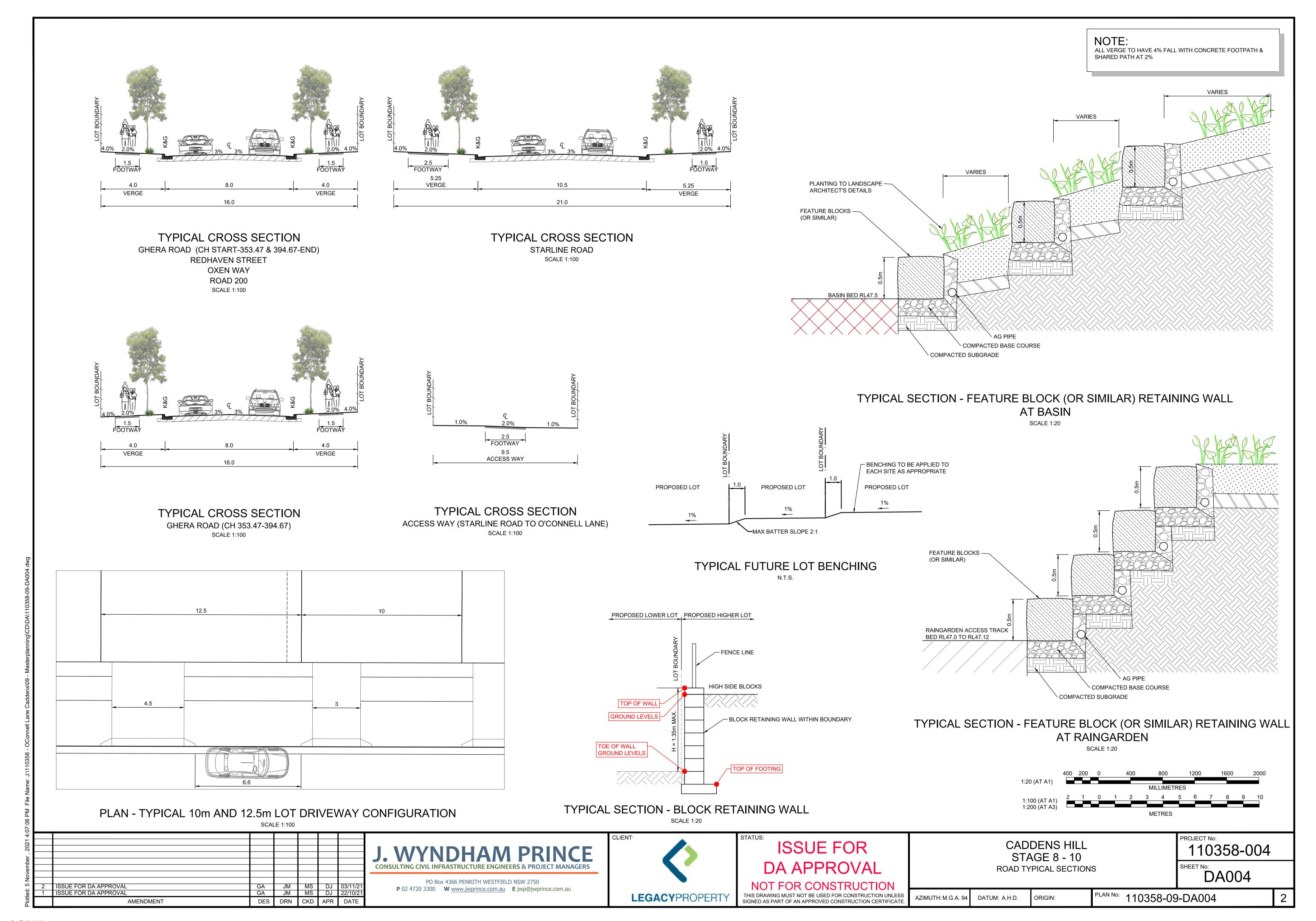
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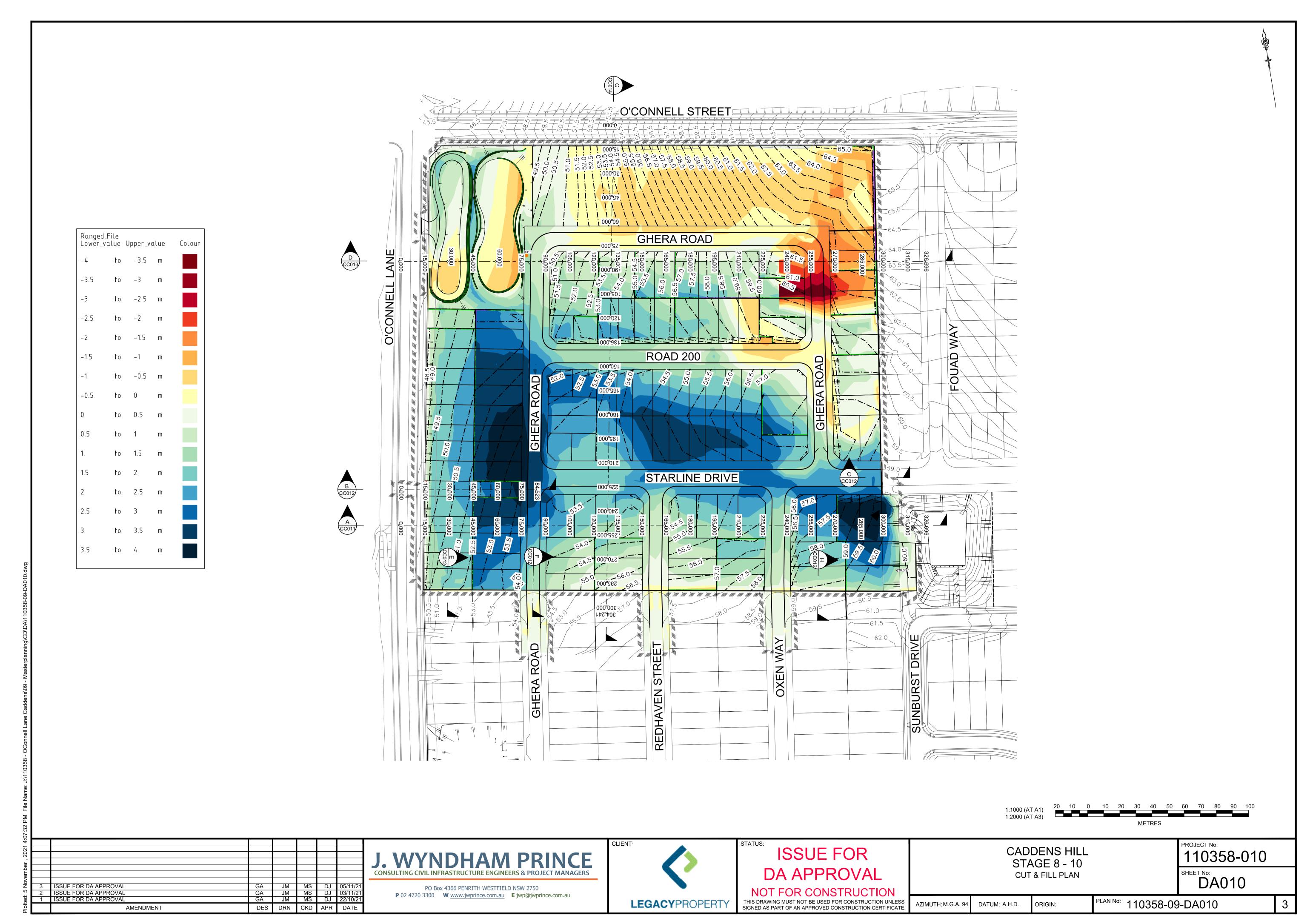
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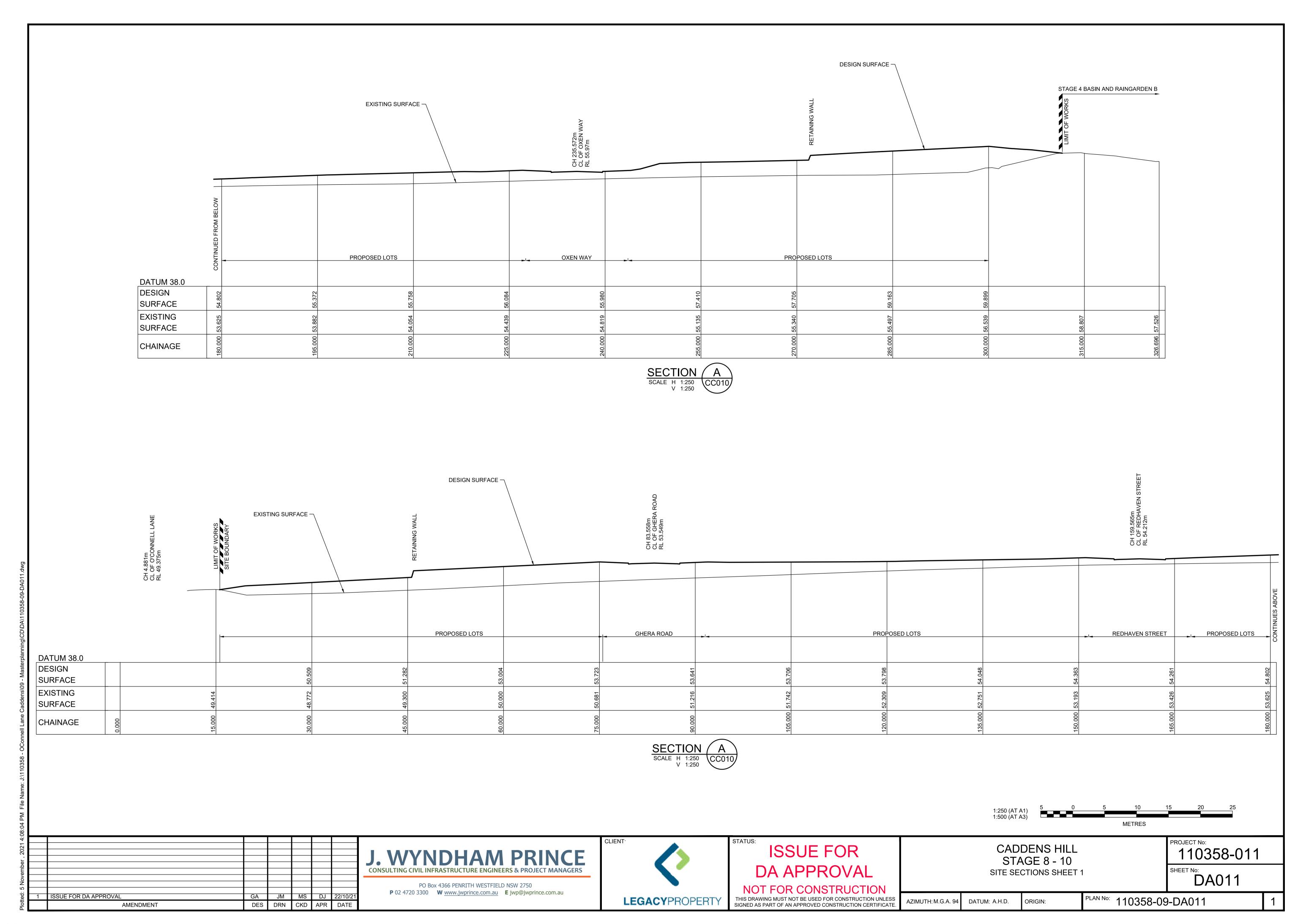
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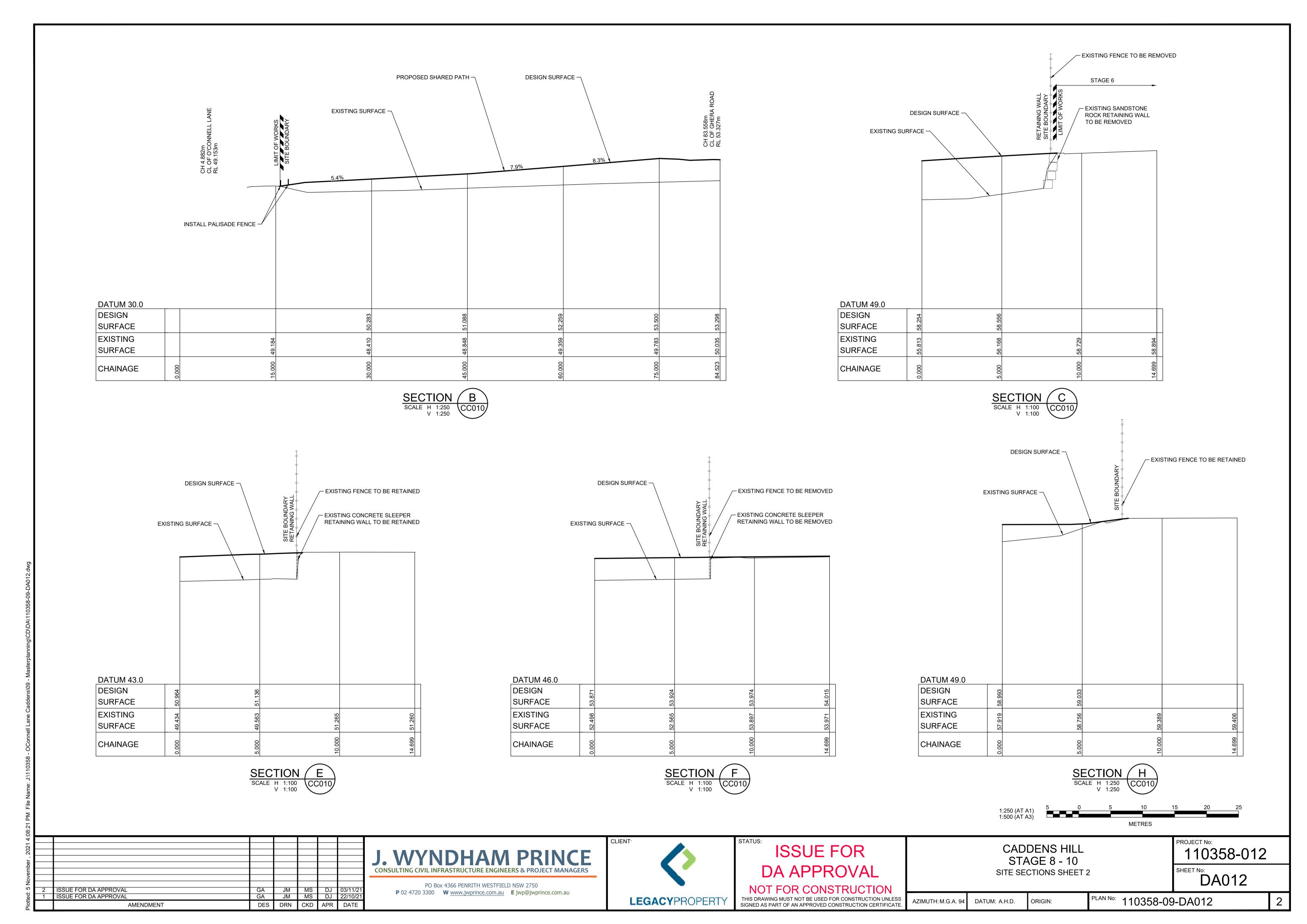
Version: 1, Version Date: 24/11/2021

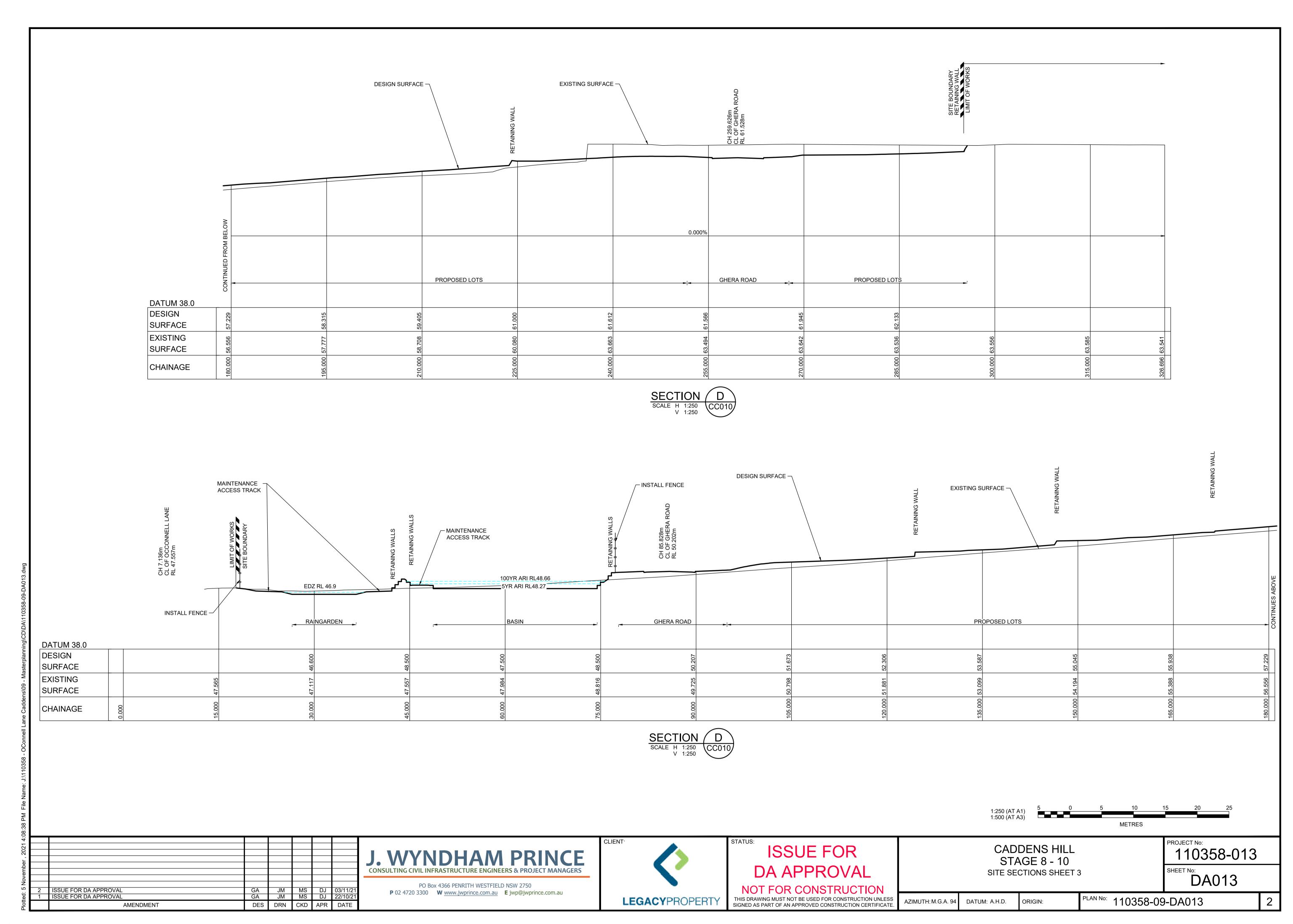


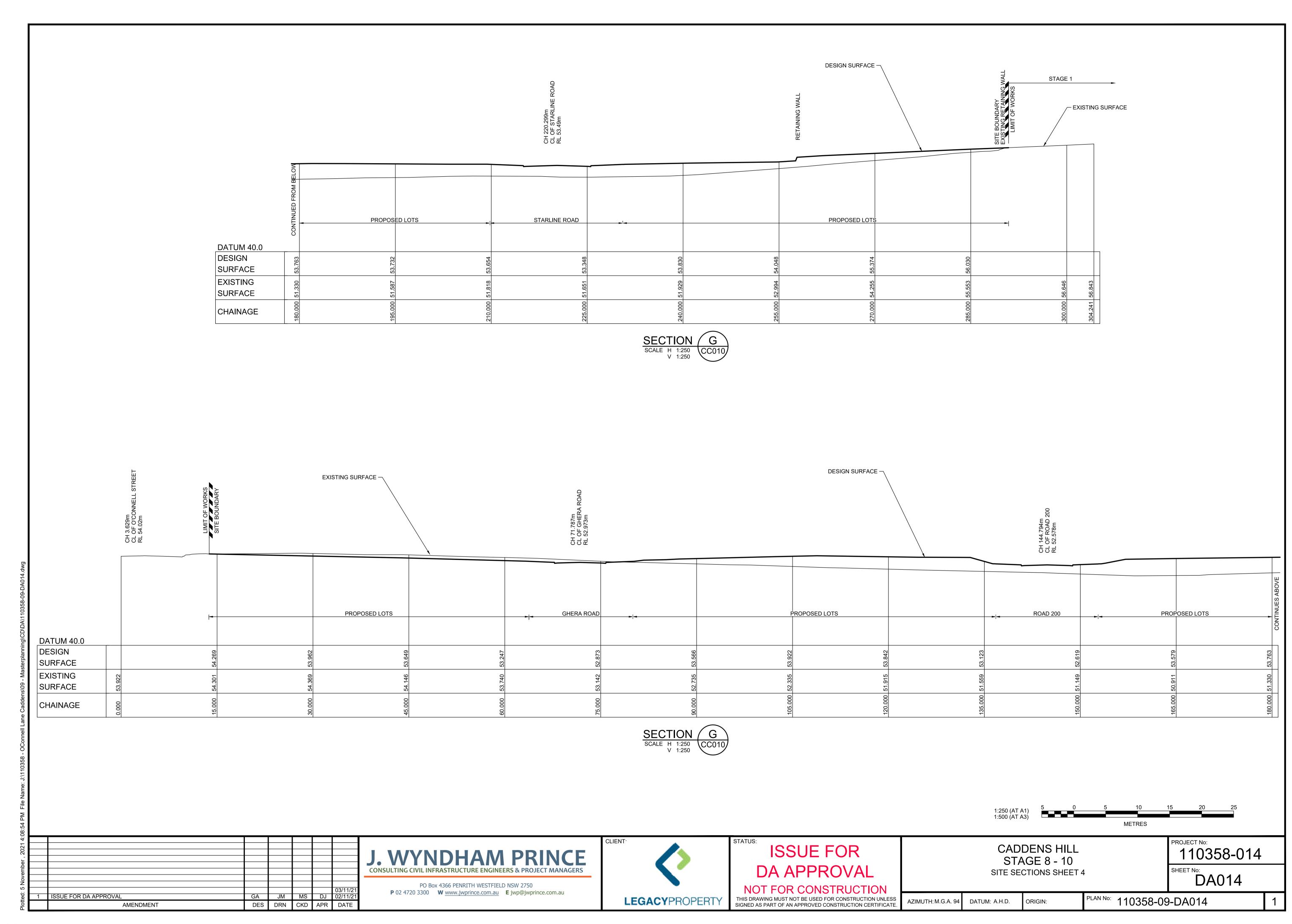


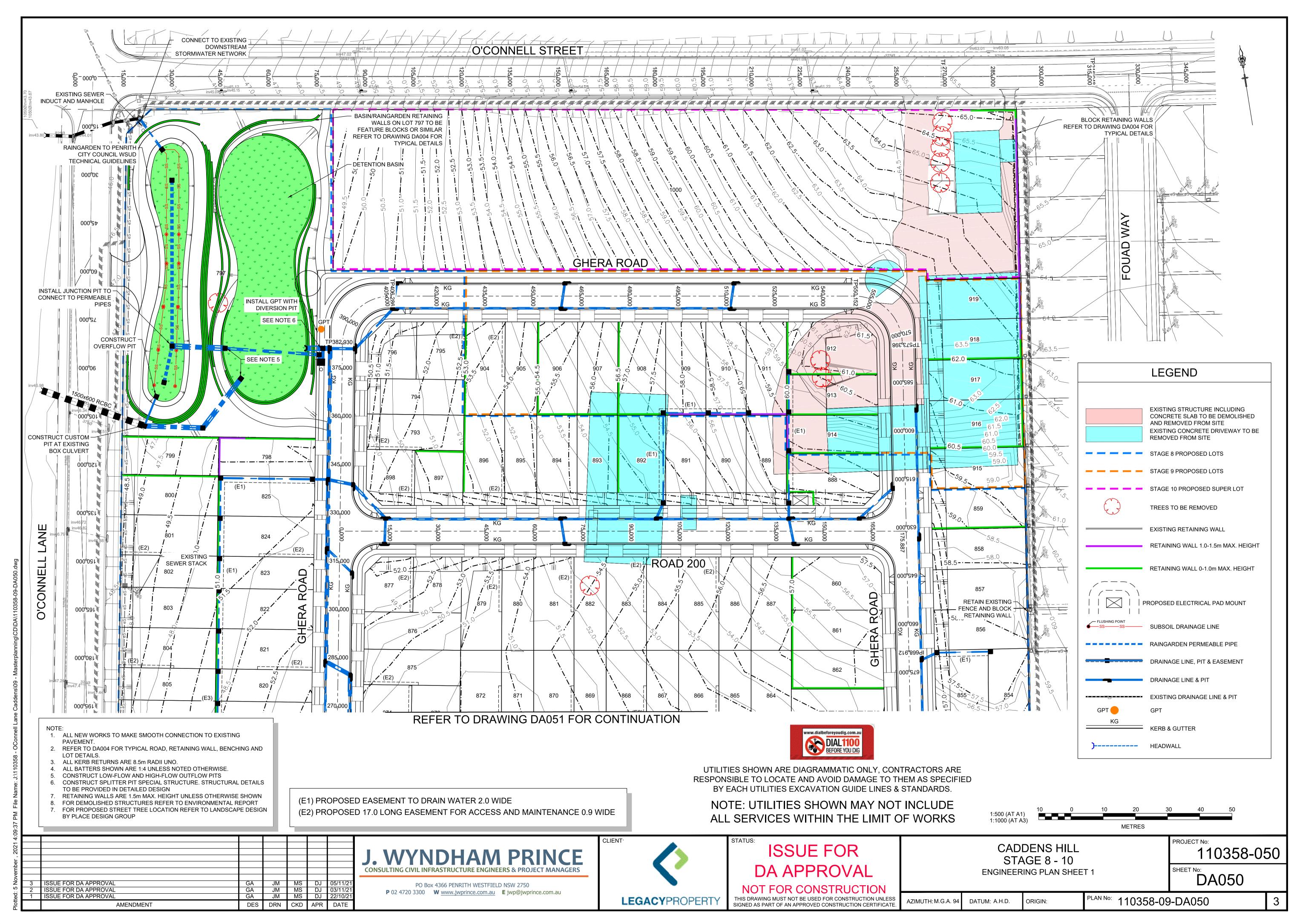


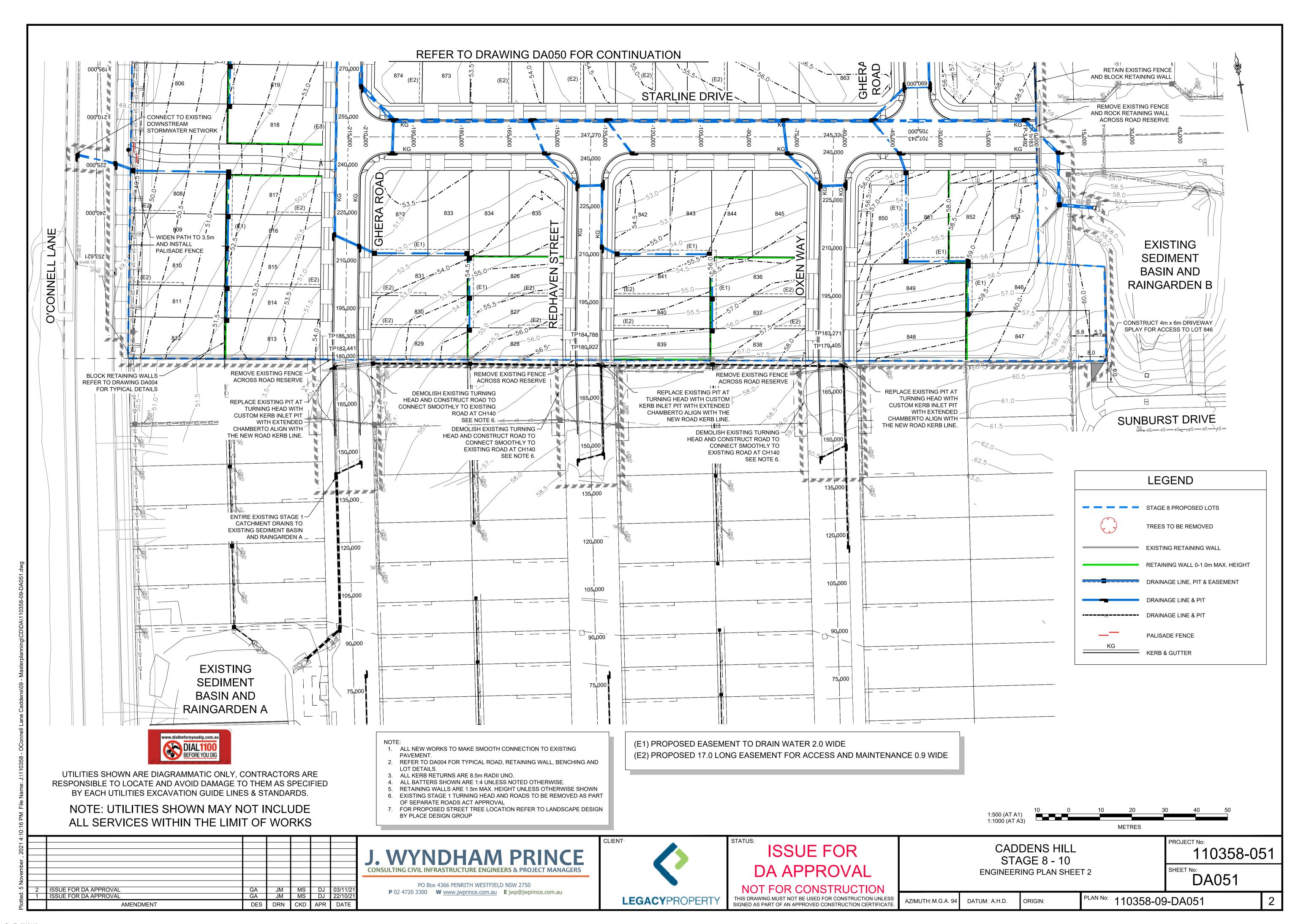


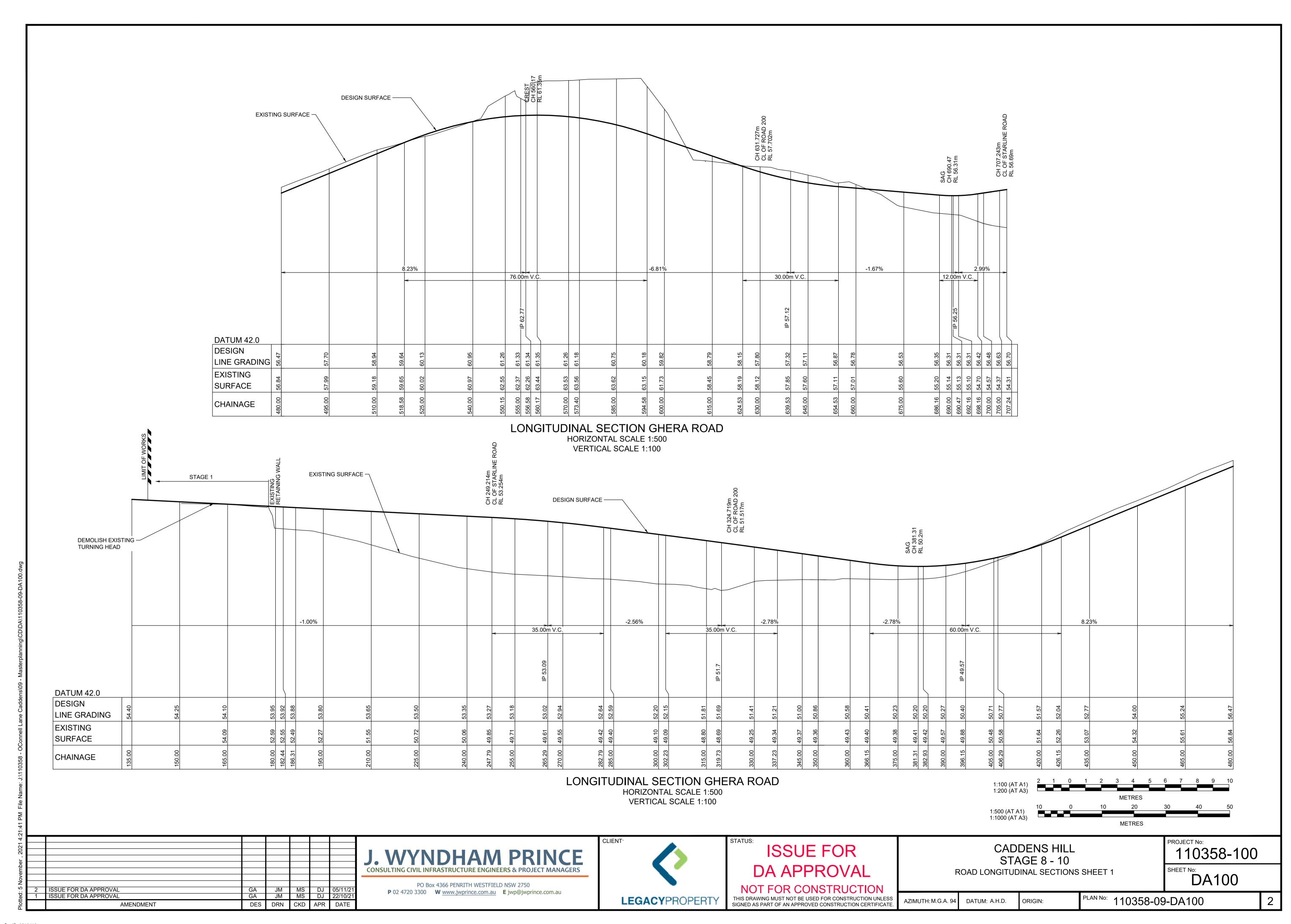


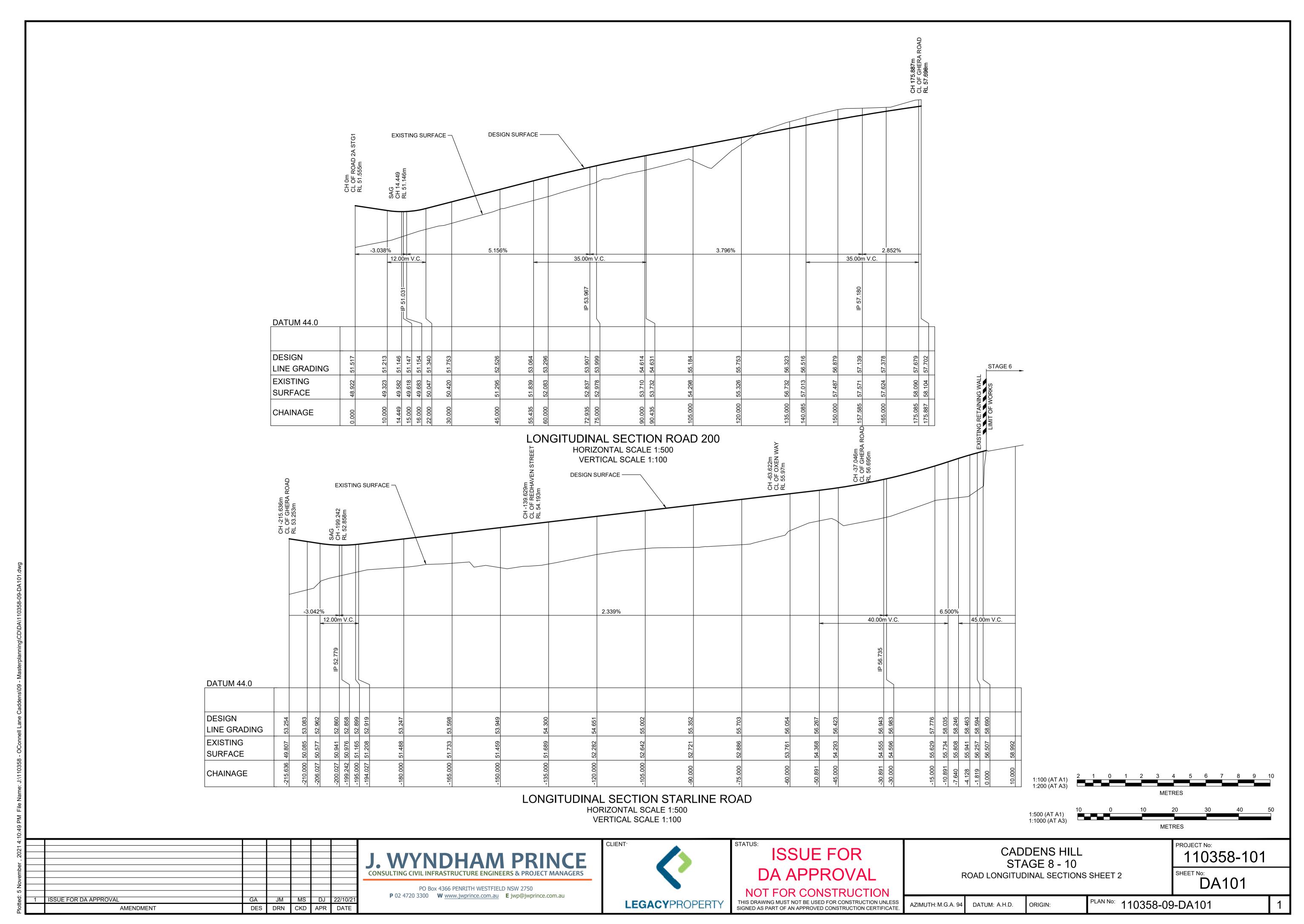


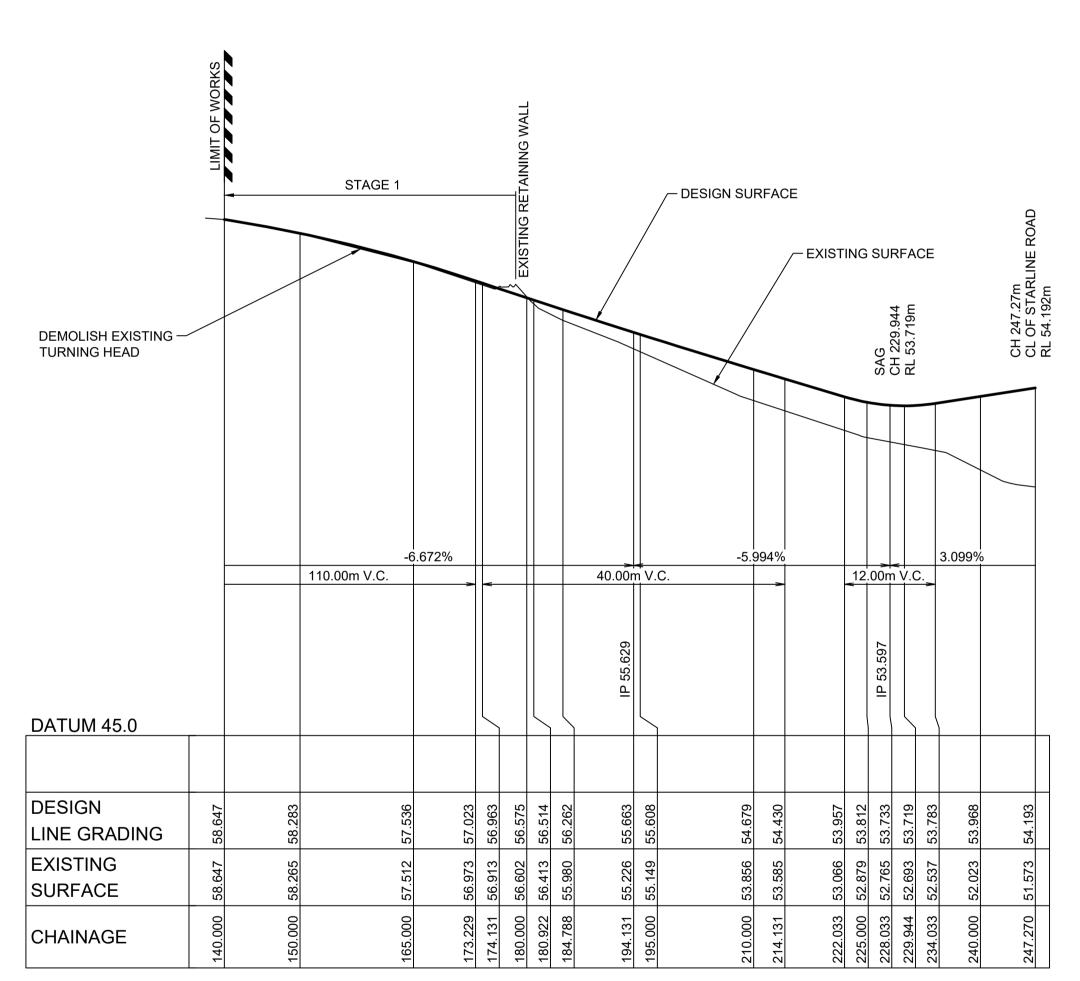




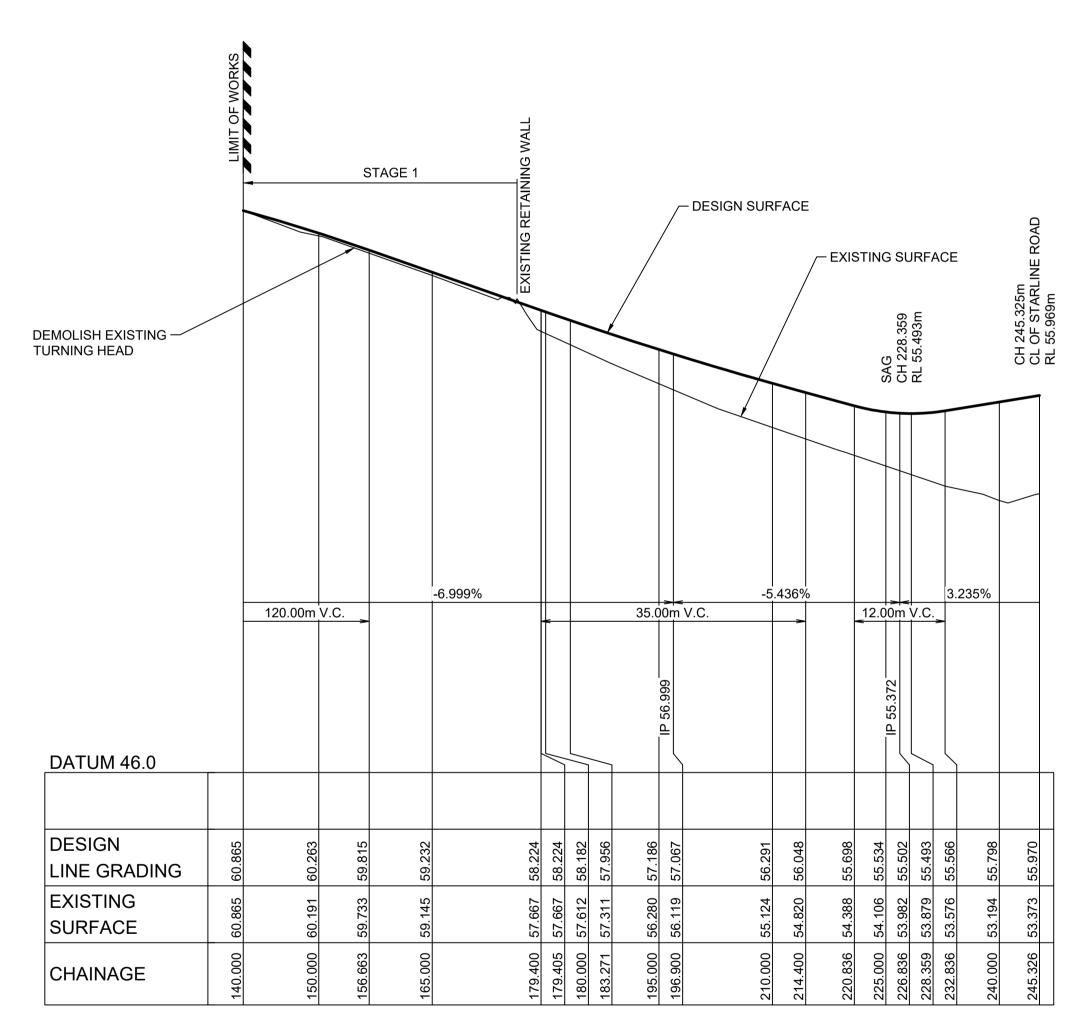




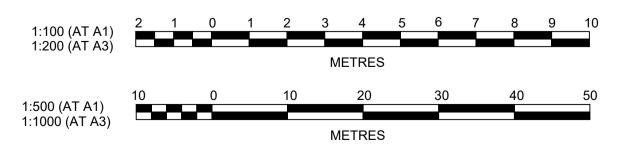




LONGITUDINAL SECTION REDHAVEN STREET HORIZONTAL SCALE 1:500 VERTICAL SCALE 1:100



LONGITUDINAL SECTION OXEN WAY HORIZONTAL SCALE 1:500 VERTICAL SCALE 1:100



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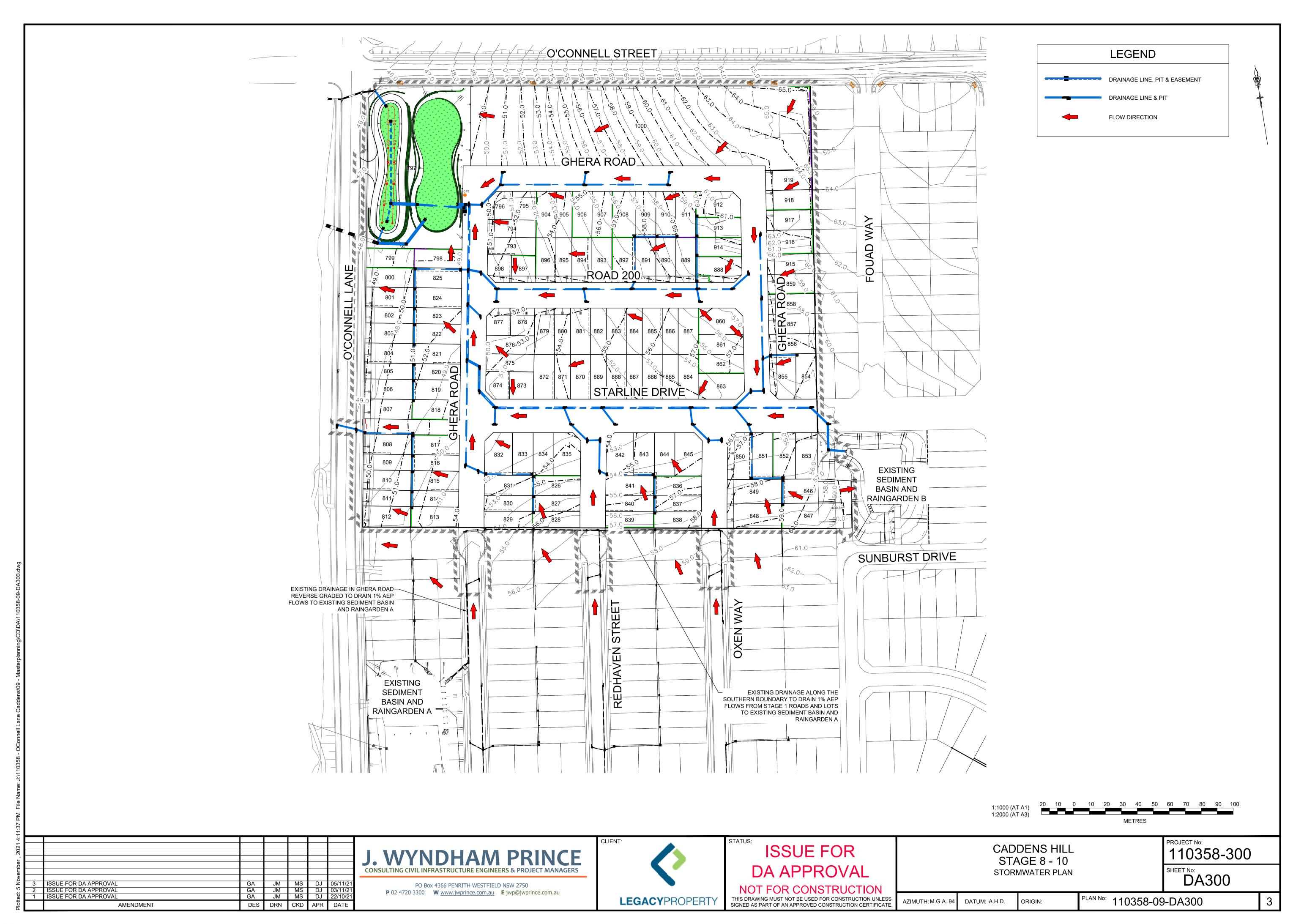
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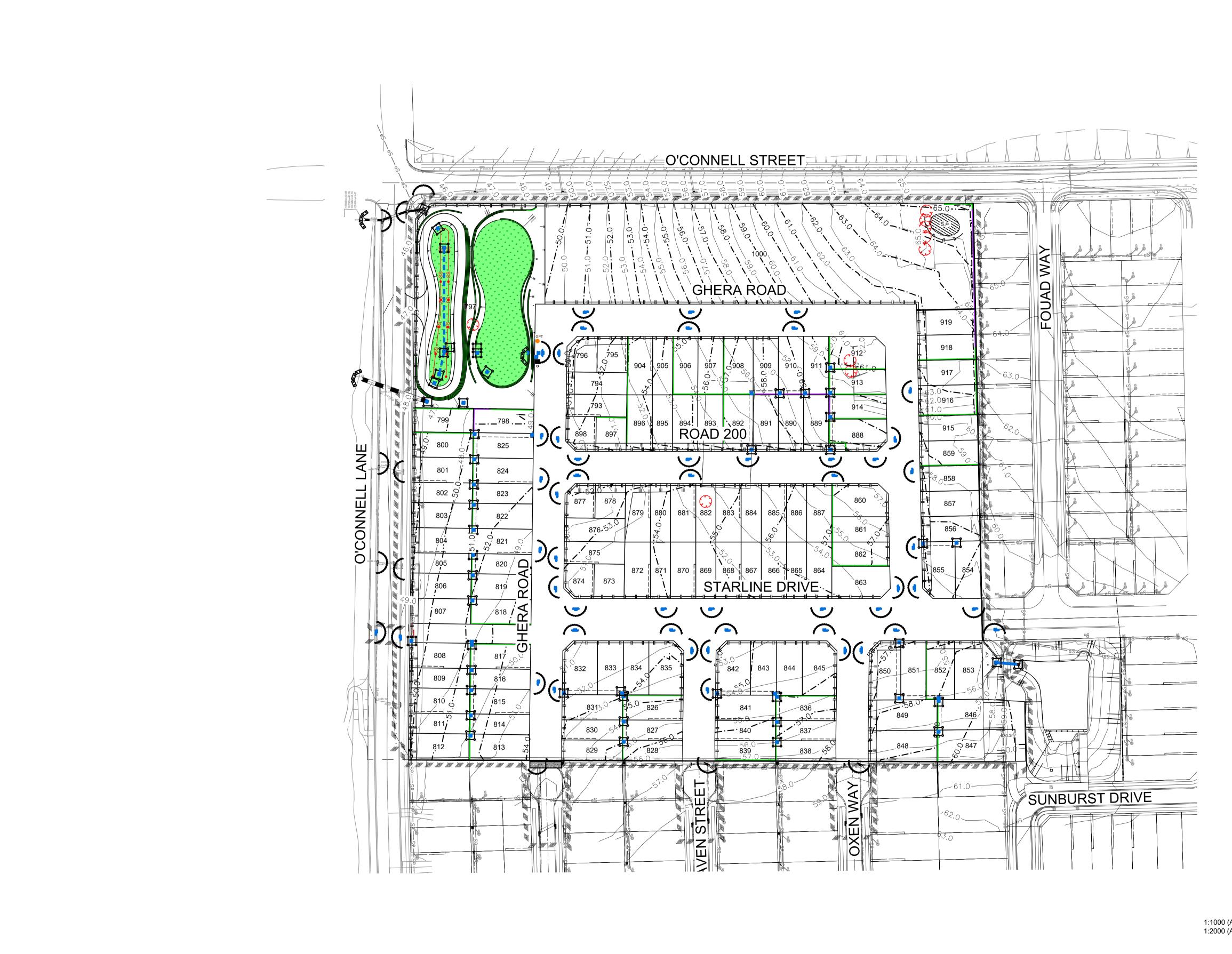
**CADDENS HILL** STAGE 8 - 10 ROAD LONGITUDINAL SECTIONS SHEET 3

PROJECT No: 110358-102 SHEET No: DA102

PLAN No: 110358-09-DA102 AZIMUTH: M.G.A. 94 ORIGIN: DATUM: A.H.D.

Document Set ID: 9819410





STABILISED SITE ACCESS
& WHEEL WASH BAY

SEDIMENT FENCE

STRAW BALE BARRIER

STOCKPILE

MESH AND GRAVEL INLET FILTER

GEOTEXTILE INLET FILTER

INTERALLOTMENT DRAINAGE PIT

KERB INLET PIT

1:1000 (AT A1) 1:2000 (AT A3)

20 10 0 10 20 30 40 50 60 70 80 90 10

METRES

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3 ISSUE FOR DA APPROVAL
4 GA JM MS DJ 05/11/21
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CADDENS HILL STAGE 8 - 10 SOIL & WATER MANAGEMENT PLAN PROJECT No: 110358-301 SHEET No: DA301

AZIMUTH: M.G.A. 94 DATUM: A.H.D. ORIGIN: PLAN No: 110358-09-DA301

#### **GENERAL NOTES:**

- 1. ALL EROSION AND SEDIMENT CONTROL MEASURES, INCLUDING REVEGETATION AND STORAGE OF SOIL AND TOPSOIL, SHALL BE IMPLEMENTED TO THE REQUIREMENTS OF THE "SOILS AND CONSTRUCTION - VOLUME 1, 4TH EDITION, MARCH 2004 ".
- 2. TOPSOIL FROM ALL AREAS TO BE DISTURBED SHALL BE STOCKPILED AND LATER RESPREAD TO AID REVEGETATION IN THOSE AREAS.
- 3. ALL DRAINAGE WORKS SHALL BE CONSTRUCTED AND STABILISED AS EARLY AS POSSIBLE DURING
- 4. ALL TAIL-OUT DRAINS SHALL BE COUCH GRASSED AND TRAPEZOIDAL IN SECTION. STRAW BALES SHALL BE PLACED AS A SEDIMENT CONTROL DEVICE WHERE REQUIRED.
- 5. VEHICULAR TRAFFIC SHALL BE CONTROLLED DURING DEVELOPMENT CONFINING ACCESS WHERE POSSIBLE TO PROPOSED OR EXISTING ROAD ALIGNMENTS. AREAS TO BE LEFT UNDISTURBED SHALL BE MARKED OFF.
- 6. ROADS SHALL BE PAVED AS EARLY AS POSSIBLE AFTER FORMATION.
- 7. DISTURBANCE OF VEGETATION SHALL BE LIMITED TO FILL AREAS, ROADWAYS AND DRAINAGE LINES. NO LOT GRADING SHALL BE CARRIED OUT IN UNDISTURBED AREAS WITHOUT CONSULTATION WITH COUNCIL'S
- 8. ALL DISTURBED AREAS SHALL BE REVEGETATED AS SOON AS THE RELEVANT WORKS ARE COMPLETED.
- 9. ALL SEDIMENT BASINS AND TRAPS SHALL BE CLEANED WHEN THE STRUCTURES ARE A MAXIMUM 60% FULL OF SOLID MATERIALS, INCLUDING DURING THE MAINTENANCE PERIOD.
- 10. THE SOIL AND WATER MANAGEMENT PLAN IS TO BE READ IN CONJUNCTION WITH THE ENGINEERING PLANS, AND COUNCIL'S WRITTEN GUIDELINES FOR THE DEVELOPMENT OF LAND.
- 11. CONTRACTORS SHALL ENSURE THAT ALL SOIL AND WATER MANAGEMENT WORKS ARE UNDERTAKEN AS SPECIFIED ON THE PLAN AND IN ACCORDANCE WITH THE GUIDELINES SHOWN IN "MANAGING URBAN STORMWATER - SOILS AND CONSTRUCTION 4TH EDITION" ("THE BLUE BOOK").
- 12. ALL CONTRACTORS AND SUBCONTRACTORS ARE RESPONSIBLE FOR REDUCING THE SOIL EROSION AND POLLUTION OF DOWNSLOPE AREAS.
- 13. THE SOIL EROSION HAZARD ON THE SITE IS TO BE KEPT AS LOW AS POSSIBLE AND GENERALLY IN ACCORDANCE WITH THE FOLLOWING SCHEDULE:

LAND USE	LIMITATION	COMMENTS
CONSTRUCTION AREAS	DISTURBANCE TO BE NO FURTHER THAN 5m (PREF 2m) FROM THE EDGE OF ANY ESSENTIAL ENGINEERING ACTIVITY AS SHOWN ON THESE PLANS	ALL SITE WORKERS WILL CLEARLY RECOGNISE THESE ZONES - WHERE APPROPRIATE THE CONSTRUCTION AREAS ARE TO BE IDENTIFIED WITH BARRIER FENCING (DOWNSLOPE) OR SIMILAR MATERIAL.
ACCESS AREAS  LIMITED TO A MAXIMUM WIDTH OF 10m		THE SITE MANAGER SHALL DETERMINE AND MARK THE LOCATION OF THESE ZONES ONSITE. THEY CAN VARY IN POSITION TO BEST CONSERVE THE EXISTING VEGETATION AND PROTECT DOWNSTREAM AREAS WHILE BEING CONSIDERATE OF THE NEEDS OF EFFICIENT WORKS ACTIVITIES. ALL SITE WORKERS SHALL CLEARLY RECOGNISE THEIR BOUNDARIES. WHERE APPROPRIATE THE ACCESS AREAS ARE TO BE MARKED WITH BARRIER MESH, SEDIMENT FENCING OR SIMILAR MATERIALS.
REMAINING LANDS	ENTRY PROHIBITED EXCEPT FOR ESSENTIAL THINNING OF PLANT GROWTH	THINNING OF GROWTH MAY BE REQUIRED FOR FIRE HAZARD REDUCTION.

WORKS WITHIN WATERWAYS AND CREEKS SHALL BE RESTRICTED AS DIRECTED - ALL LANDS WITHIN CREEKS AND WATERWAYS SHALL HAVE A GROUNDCOVER MORE THAN 70%, USING MATERIALS THAT CAN CATER FOR CONCENTRATED FLOWS.

- 14. WORKS ARE TO BE UNDERTAKEN IN THE FOLLOWING SEQUENCE. EACH SUBSEQUENT STAGE IS NOT TO COMMENCE UNTIL THE PREVIOUS ONE IS COMPLETE:-
- a. INSTALL ALL BARRIER AND SEDIMENT FENCING WHERE SHOWN ON THE PLAN AND TO DETAIL(SD) 6-8.
- b. CONSTRUCT STABILISED SITE ACCESS AS SHOWN ON THE PLAN AND TO DETAIL (SD) 6-14.
- c. CONSTRUCT LOW FLOW EARTH BANKS WHERE SHOWN ON THE PLAN AND TO DETAIL (SD) 5-5. d. PROVIDE TEMP. ACCESS TO THE SEDIMENT BASIN(S)AND PROTECT THIS WITH SEDIMENT FENCING (SD) 6-8
- OR BARRIER FENCING AND EARTH BANKS (SD) 5-5.
- e. PLACE SEDIMENT FENCING (SD) 6-8 DOWNSLOPE OF LANDS TO BE DISTURBED FOR CONSTRUCTION OF
- THE SEDIMENT BASINS. f. CONSTRUCT SEDIMENT BASIN(S) GENERALLY IN ACCORDANCE WITH (SD) 6-4
- g. STABILISE LAND SURFACES DISTURBED BY CONSTRUCTION OF THE SEDIMENT BASIN(S) AS SOON AS
- FINAL LEVELS ARE ESTABLISHED h. CLEAR THE SITE AND STRIP AND STOCKPILE THE TOPSOIL IN THE LOCATIONS SHOWN ON THE PLAN OR AS DIRECTED BY THE SITE SUPERINTENDENT TO DETAIL (SD) 4-1.
- i. UNDERTAKE ALL ESSENTIAL CONSTRUCTION WORKS. j. GRADE LOT AREAS TO FINAL GRADES AND APPLY PERMANENT STABILISATION (LANDSCAPING) WITHIN 14
- DAYS OF COMPLETION OF CONSTRUCTION WORKS.
- k. REMOVE TEMPORARY EROSION CONTROL MEASURES AFTER THE PERMANENT LANDSCAPING HAS BEEN COMPLETED.
- 15. CLEARLY VISIBLE BARRIER FENCING SHALL BE INSTALLED WHERE DIRECTED BY THE SITE SUPERINTENDENT TO CONTROL AND PROHIBIT UNNECESSARY SITE DISTURBANCE
- 16. EARTH BATTERS SHALL BE CONSTRUCTED WITH AS LOW A GRADIENT AS PRACTICABLE BUT NO STEEPER THAN:-
- a. 2(h) 1(v) WHERE SLOPE LENGTH IS LESS THAN 7m b. 2.5(h) - 1(v) WHERE SLOPE LENGTH IS BETWEEN 7m AND 10m
- c. 3(h) 1(v) WHERE SLOPE LENGTH IS BETWEEN 10m AND 12m
- d. 4(h) 1(v) WHERE SLOPE LENGTH IS BETWEEN 12m AND 18m
- e. 5(h) 1(v) WHERE SLOPE LENGTH IS BETWEEN 18m AND 27m
- f. 6(h) 1(v) WHERE SLOPE LENGTH IS GREATER THAN 27m

SLOPE LENGTHS CAN BE SHORTENED BY USING LOW FLOW EARTH BANKS AS CATCH DRAINS ABOVE THE EARTH BATTER AREA.

- 17. PROTECTION FROM EROSIVE FORCES SHALL BE UNDERTAKEN ON ALL LANDS. GROUND COVER TO BE IN PLACE WITHIN 10 WORKING DAYS FROM COMPLETION OF FORMATION AND BEFORE THEY ARE ALLOWED TO CARRY ANY CONCENTRATED FLOWS.
- 18. TEMPORARY GROUND COVER SHOULD BE MINIMUM 70%. FOOT AND VEHICULAR TRAFFIC SHALL BE KEPT AWAY FROM REHABILITATED AREAS.
- 19. WHERE POSSIBLE THE CONSTRUCTION PROGRAM IS TO SCHEDULE WORKS SUCH THAT LAND DISTURBANCE ACTIVITIES ARE COMPLETED IN LESS THAN 6 MONTHS. REVEGETATION WORKS MUST BE CARRIED OUT AS STIPULATED IN THE RELEVANT COUNCIL GUIDELINES / SPECIFICATIONS SUCH THAT A SATISFACTORY GROUND COVER IS PROVIDED TO AT LEAST 60% OF THE DISTURBED AREA WITHIN 10 DAYS AND AT LEAST 70% OF THE DISTURBED AREA WITHIN A FURTHER 60 DAYS...
- 20. SEDIMENT FENCES (SD) 6-8 SHALL:-
- a. BE INSTALLED WHERE SHOWN ON THE PLAN AND AS DIRECTED AT THE DISCRETION OF THE SITE SUPERINTENDENT DURING THE COURSE OF CONSTRUCTION TO CONTAIN THE COARSER SEDIMENT FRACTIONS AS NEAR AS POSSIBLE TO THEIR SOURCE.
- b. HAVE A CATCHMENT AREA NOT EXCEEDING 720sq.m, AND A STORAGE DEPTH OF AT LEAST 0.6m. c. PROVIDE AN UPSLOPE RETURN OF 1m AT INTERVALS ALONG THE FENCE WHERE THE CATCHMENT AREA EXCEEDS 720sq.m. TO LIMIT THE DISCHARGE REACHING EACH SECTION TO 50litres/sec IN A MAX. 10yr Tc
- 21. STOCKPILES (SD) 4-1 SHALL BE LOCATED AS SHOWN ON THE PLANS AND AT THE DISCRETION OF THE SITE SUPERINTENDENT.
- 22. DURING WINDY WEATHER LARGE UNPROTECTED AREAS ARE TO BE KEPT MOIST (NOT WET) BY SPRINKLING WITH WATER TO KEEP DUST UNDER CONTROL. IN THE EVENT WATER IS NOT AVAILABLE IN SUFFICIENT QUANTITIES SOIL BINDERS AND/OR DUST RETARDANTS SHALL BE USED OR THE SURFACE SHALL BE LEFT IN A CLODDY STATE THAT RESISTS REMOVAL BY WIND.
- 23. STOCKPILES SHALL NOT BE LOCATED WITHIN 5m OF HAZARD AREAS, INCLUDING LIKELY AREAS OF HIGH VELOCITY FLOWS SUCH AS WATERWAYS, PAVED AREAS OR DRIVEWAYS.
- 24. THE SEDIMENT RETENTION BASINS (SD) 6-4 SHALL:-
- a. BE CONSTRUCTED WHERE SHOWN ON THE PLANS. b. BE FLOCCULATED (APPENDIX E MANAGING URBAN STORMWATER SOILS & CONSTRUCTION 4TH ED.)
- BEFORE DISCHARGE OCCURS (UNLESS THE DESIGN STORM EVENT IS EXCEEDED) c. HAVE ONE OR MORE PEGS PLACED ON THE FLOOR TO CLEARLY INDICATE THE LEVEL AT WHICH DESIGN CAPACITY OCCURS AND WHEN SEDIMENT SHALL BE REMOVED.
- 25. STORED CONTENTS OF THE BASINS SHALL BE TREATED WITH GYPSUM (APPENDIX E MANAGING URBAN STORMWATER SOILS & CONSTRUCTION 4TH ED.) OR OTHER FLOCCULATING AGENTS WHERE THEY CONTAIN
- MORE THAN 50mg/litre OF SUSPENDED SOLIDS. TREATMENT SHALL BE AS FOLLOWS:-
- a. LOWER SUSPENDED SOLIDS TO LESS THAN 50mg/litre WITHIN 24hrs OF FILLING b. THE BASINS SHALL THEN BE ALLOWED TO STAND 36 TO 48hrs FOR FLOCCULATED PARTICLES TO SETTLE c. THE BASINS SHALL THEN BE DRAINED SO THAT FULL STORAGE CAPACITY IS REGAINED WITHOUT DISCHARGING SEDIMENT FROM THE SITE.
- 26. SEDIMENT REMOVED FROM ANY TRAPPING DEVICE SHALL BE DISPOSED IN LOCATIONS WHERE FURTHER EROSION AND CONSEQUENT POLLUTION TO DOWNSLOPE LANDS AND WATERWAYS SHALL NOT OCCUR.
- 27. WATER SHALL BE PREVENTED FROM DIRECTLY ENTERING THE PERMANENT DRAINAGE SYSTEM UNLESS IT IS RELATIVELY SEDIMENT FREE (ie THE CATCHMENT HAS BEEN LANDSCAPED AND/OR ANY LIKELY SEDIMENT HAS BEEN TREATED IN AN APPROVED DEVICE) NEVERTHELESS STORMWATER INLETS SHALL BE PROTECTED
- 28. TEMPORARY SOIL AND WATER MANAGEMENT STRUCTURES SHALL BE REMOVED ONLY AFTER THE LANDS THEY ARE PROTECTING ARE STABILISED.
- 29. ACCEPTABLE BINS SHALL BE PROVIDED FOR ANY CONCRETE AND MORTAR SLURRIES, PAINTS, ACID WASHINGS, LIGHTWEIGHT WASTE MATERIALS AND LITTER. CLEARANCE SERVICES SHALL BE PROVIDED AT LEAST ONCE A WEEK.

## STOCKPILE NOTES:

- 1. SPOIL AND TOPSOIL STOCKPILES SHALL BE LOCATED AWAY FROM DRAINAGE LINES AND AREAS WHERE WATER MAY CONCENTRATE.
- 2. IF STOCKPILES ARE TO BE IN PLACE FOR LONGER THAN 14 DAYS THEN THEY SHALL BE STABILIZED BY COVERING WITH A MULCH OR WITH TEMPORARY VEGETATION.
- 3. FOLLOWING CONSTRUCTION, TOPSOIL SHALL BE RESPREAD TO A MINIMUM DEPTH OF 100mm ON THE BARE SOIL SURFACES AND REVEGETATED.

## SEDIMENTATION CONTROL DEVICES:

- 1. ALL STRAW BALES SHALL BE BOUND WITH WIRE. STRAW BALES SHALL BE PLACED END TO END IN A SINGLE ROW AND EMBEDDED INTO THE SOIL TO A DEPTH OF 100mm. EACH BALE SHALL BE SECURELY ANCHORED WITH TWO STEEL STAKES DRIVEN 600mm INTO THE GROUND AND LOCKED ON THE BALE CENTRELINE.
- 2. SILT FENCES SHALL BE CONSTRUCTED BY STRETCHING A FILTER FABRIC (PROPEX OR SIMILAR) BETWEEN POSTS AT 2.5m CENTRES. FABRIC SHALL BE BURIED 150mm ALONG IT'S LOWER EDGE.
- 3. PROVIDE STRIP OF TURF MIN. 300mm WIDE BEHIND KERB + 1m WIDE AROUND ALL SURFACE INLET PITS

#### SITE INSPECTION AND MAINTENANCE:

- 1. A SELF-AUDITING PROGRAM SHALL BE ESTABLISHED BASED ON A INSPECTION TEST PLAN (ITP) OR LOG BOOK. A SITE INSPECTION USING THE ITP SHALL BE MADE BY THE SITE MANAGER-:
  - a. AT LEAST WEEKLY

WRITTEN REPORT.

- b. IMMEDIATELY BEFORE SITE CLOSURE
- c. IMMEDIATELY FOLLOWING RAINFALL EVENTS IN EXCESS OF 5mm IN ANY 24hr PERIOD.

#### THE SELF AUDIT SHALL INCLUDE:-

- a. RECORDING THE CONDITION OF EVERY 'BEST MANAGEMENT PRACTICE' EMPLOYED
- b. RECORDING MAINTENANCE REQUIREMENTS (IF ANY) FOR EACH 'BEST MANAGEMENT PRACTICE' c. RECORDING THE VOLUMES OF SEDIMENT REMOVED FROM SEDIMENT RETENTION SYSTEMS WHERE
- APPLICABLE d. RECORDING THE SITE WHERE SEDIMENT IS DISPOSED
- e. FORWARDING A SIGNED DUPLICATE OF THE COMPLETED CHECK SHEET TO THE PROJECT MANAGER/DEVELOPER FOR THEIR INFORMATION.
- 2. IN ADDITION A SUITABLY QUALIFIED PERSON SHALL BE RESPONSIBLE FOR OVERSEEING THE INSTALLATION AND MAINTENANCE OF ALL SOIL AND WATER MANAGEMENT WORKS ON THE SITE. THE PERSON SHALL BE REQUIRED TO SPEND A MINIMUM OF:-
- a. 2hrs ONSITE EACH FORTNIGHT UP UNTIL COMPLETION OF ROAD AND DRAINAGE WORKS AND/OR THE COMMISSIONING OF SEDIMENT BASIN(S)/WATER QUALITY CONTROL FACILITIES, AND DURING THE DECOMMISSIONING OF SAME AND/OR FINAL SITE STABILISATION. TO PROVIDE A SHORT MONTHLY
- b. ONE HOUR ONSITE EACH 2 MONTHS DURING THAT PHASE WHERE THE DEVELOPERS RESPONSIBILITIES ARE LIMITED TO MAINTENANCE OF THE SDS DEVICES AND/OR SEDIMENT BASINS (ie DURING THE STAGE WHEN BUILDING WORKS CAN BE UNDERTAKEN) TO PROVIDE A SHORT WRITTEN REPORT EACH 4 MONTHS

THE RESPONSIBLE PERSON SHALL ENSURE THAT:-

- a. THIS PLAN IS BEING IMPLEMENTED CORRECTLY
- b. REPAIRS ARE BEING UNDERTAKEN AS REQUIRED
- c. ESSENTIAL MODIFICATIONS TO THIS PLAN ARE BEING MADE IF AND WHEN NECESSARY. EACH REPORT SHALL CERTIFY THAT WORKS HAVE BEEN CARRIED OUT ACCORDING TO THE APPROVED PLANS.
- 3. WASTE BINS SHALL BE EMPTIED AS NECESSARY, DISPOSAL OF WASTE SHALL BE IN A MANNER APPROVED BY THE SITE SUPERINTENDENT
- 4. PROPER DRAINAGE OF THE SITE SHALL BE MAINTAINED. DRAINS (INCLUDING INLET AND OUTLET WORKS) SHALL BE CHECKED TO ENSURE THAT THEY ARE OPERATING AS INTENDED, ESPECIALLY THAT:-
- a. NO LOW POINTS EXIST WHICH CAN OVERTOP IN A LARGE STORM EVENT. b. AREAS OF EROSION ARE REPAIRED (e.g LINED WITH SUITABLE MATERIAL) AND/OR VELOCITY OF FLOW IS REDUCED APPROPRIATELY THROUGH CONSTRUCTION OF SMALL CHECK DAMS OR INSTALLING
- ADDITIONAL DIVERSIONS UPSLOPE c. BLOCKAGES ARE CLEARED (THESE MIGHT OCCUR BECAUSE OF SEDIMENT POLLUTION, SAND/SOIL/SPOIL BEING DEPOSITED IN OR TOO CLOSE TO THEM, BREACHED BY VEHICLE WHEELS etc)
- 5. SAND/SOIL/SPOIL MATERIALS PLACED CLOSER THAN 2m FROM HAZARD AREAS SHALL BE REMOVED SUCH HAZARD AREAS INCLUDE ANY AREAS OF HIGH VELOCITY WATER FLOWS (eg WATERWAYS AND GUTTERS) PAVED AREAS AND DRIVEWAYS.
- 6. RECENTLY STABILISED LANDS SHALL BE CHECKED TO ENSURE THAT THE EROSION HAZARD HAS BEEN EFFECTIVELY REDUCED. ANY REPAIRS SHALL BE INITIATED AS APPROPRIATE.
- 7. EXCESSIVE VEGETATIVE GROWTH SHALL BE CONTROLLED THROUGH MOWING OR SLASHING.
- 8. ALL SEDIMENT DETENTION SYSTEMS SHALL BE KEPT IN GOOD WORKING CONDITION. IN PARTICULAR ATTENTION SHALL BE GIVEN TO:-
- a. RECENT WORKS TO ENSURE THAT THEY HAVE NOT RESULTED IN DIVERSION OF SEDIMENT LADEN WATER
- AWAY FROM THEM.
- b. DEGRADABLE PRODUCTS TO ENSURE THAT THEY ARE REPLACED AS REQUIRED c. SEDIMENT REMOVAL TO ENSURE THE DESIGN CAPACITY OR LESS REMAINS IN THE SETTLING ZONE.
- 9. ADDITIONAL EROSION AND/OR SEDIMENT CONTROL WORKS SHALL BE CONSTRUCTED AS MIGHT BECOME NECESSARY TO ENSURE THE DESIRED PROTECTION IS GIVEN TO DOWNSLOPE LANDS AND WATERWAYS (ie MAKE ONGOING CHANGES TO THIS PLAN WHERE IT PROVES INADEQUATE IN PRACTICE OR IS SUBJECTED TO CHANGES IN CONDITIONS AT THE WORKS SITE OR ELSEWHERE IN THE CATCHMENT.
- 10. EROSION AND SEDIMENT CONTROL MEASURES SHALL BE MAINTAINED IN A FUNCTIONING CONDITION UNTIL ALL EARTHWORKS ACTIVITIES ARE COMPLETED AND THE SITE STABILISED.
- 11. WATERS IN SEDIMENT RETENTION BASIN(S) THAT OCCUPY MORE THAN 1/4 OF THE DESIGN CAPACITY DURING THAT STAGE OF THE WORKS UP UNTIL COMMISSIONING OF THE BASIN(s) SHALL BE:
  - a. TREATED WITH A FLOCCULATING AGENT (APPENDIX E MANAGING URBAN STORMWATER SOILS & CONSTRUCTION 4TH ED.)
  - b. DISCHARGED WITHIN 5 days FROM THE CONCLUSION OF ANY STORM EVENT LARGE ENOUGH TO FILL THE BASIN TO THAT LEVEL.
- 12. LITTER, DEBRIS AND COARSE SEDIMENT SHALL BE REMOVED FROM THE GROSS POLLUTANT TRAPS AND TRASH RACKS AS REQUIRED.

DJ SSUE FOR DA APPROVAL JM MS **AMENDMENT** DES DRN CKD APR DATE

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ISSUE FOR DA APPROVAL NOT FOR CONSTRUCTION THIS DRAWING MUST NOT BE USED FOR CONSTRUCTION UNLESS SIGNED AS PART OF AN APPROVED CONSTRUCTION CERTIFICATE

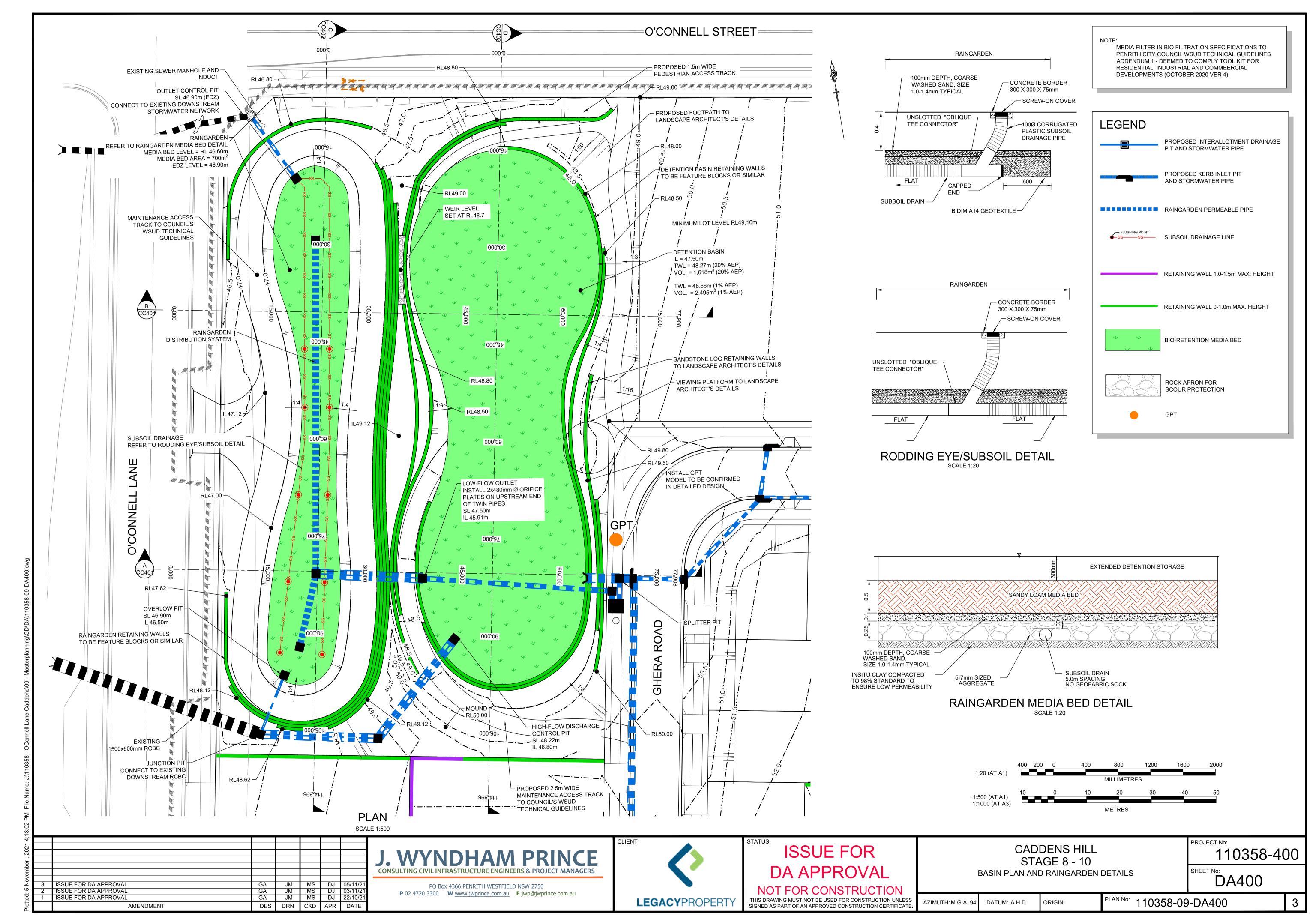
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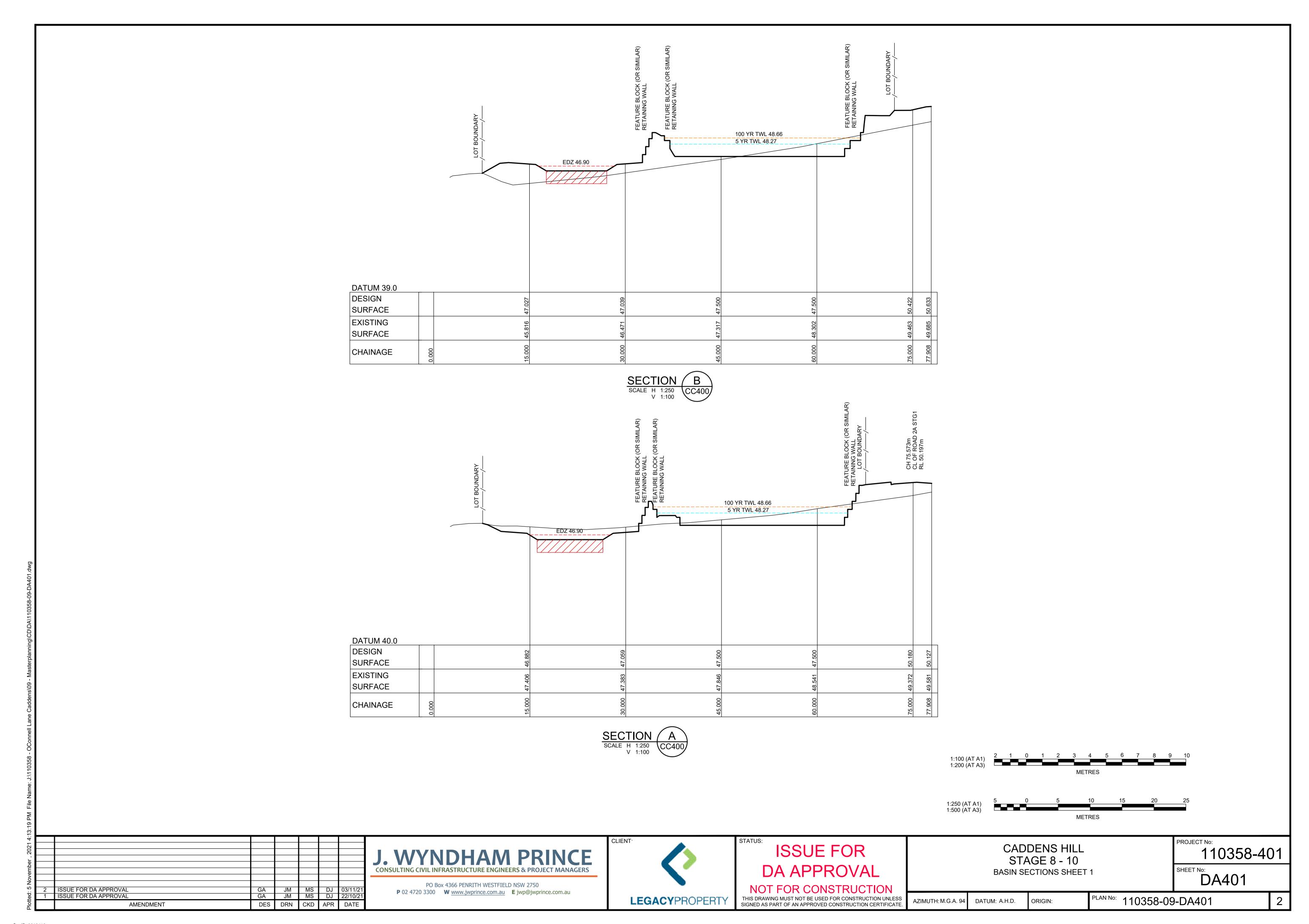
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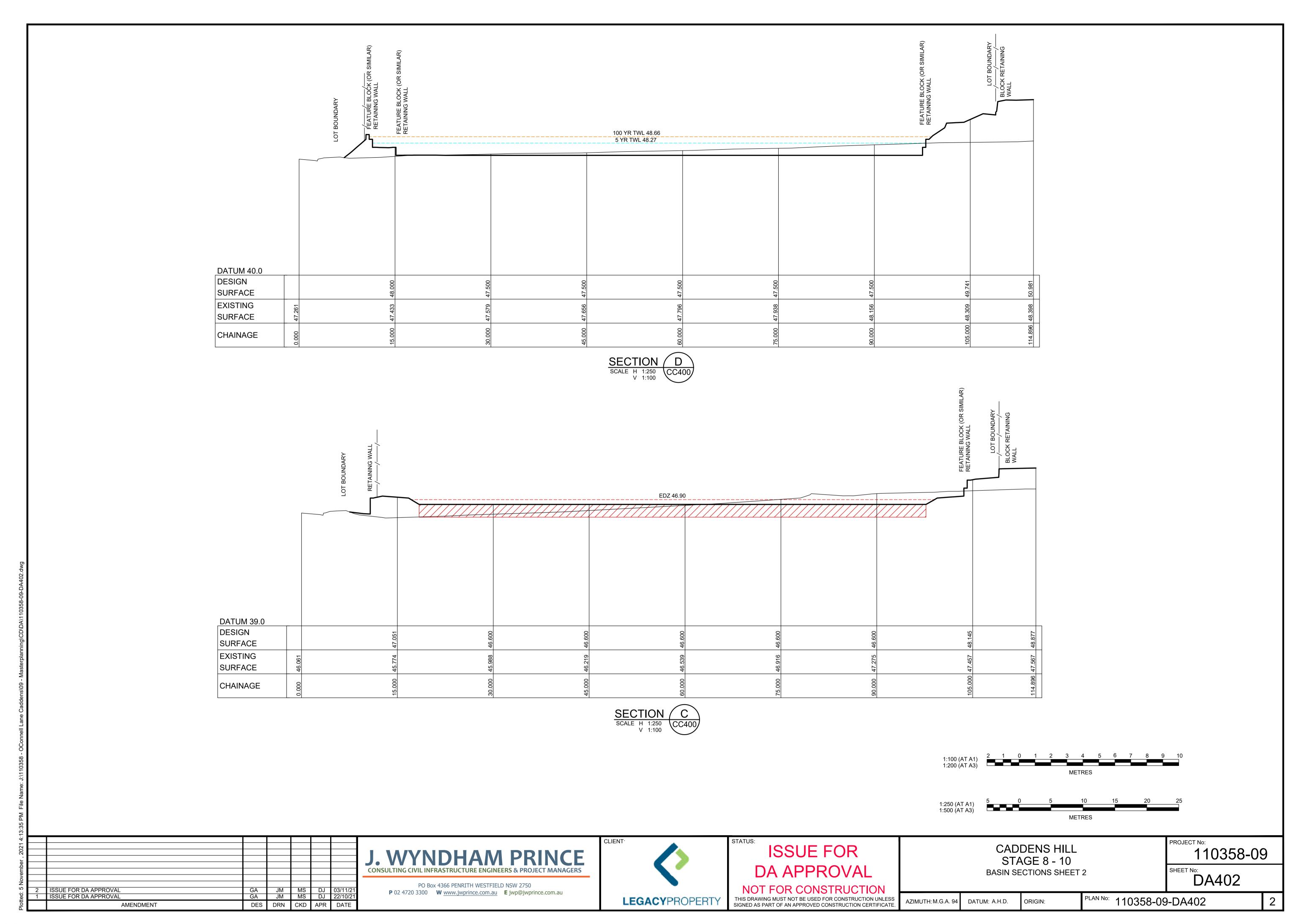
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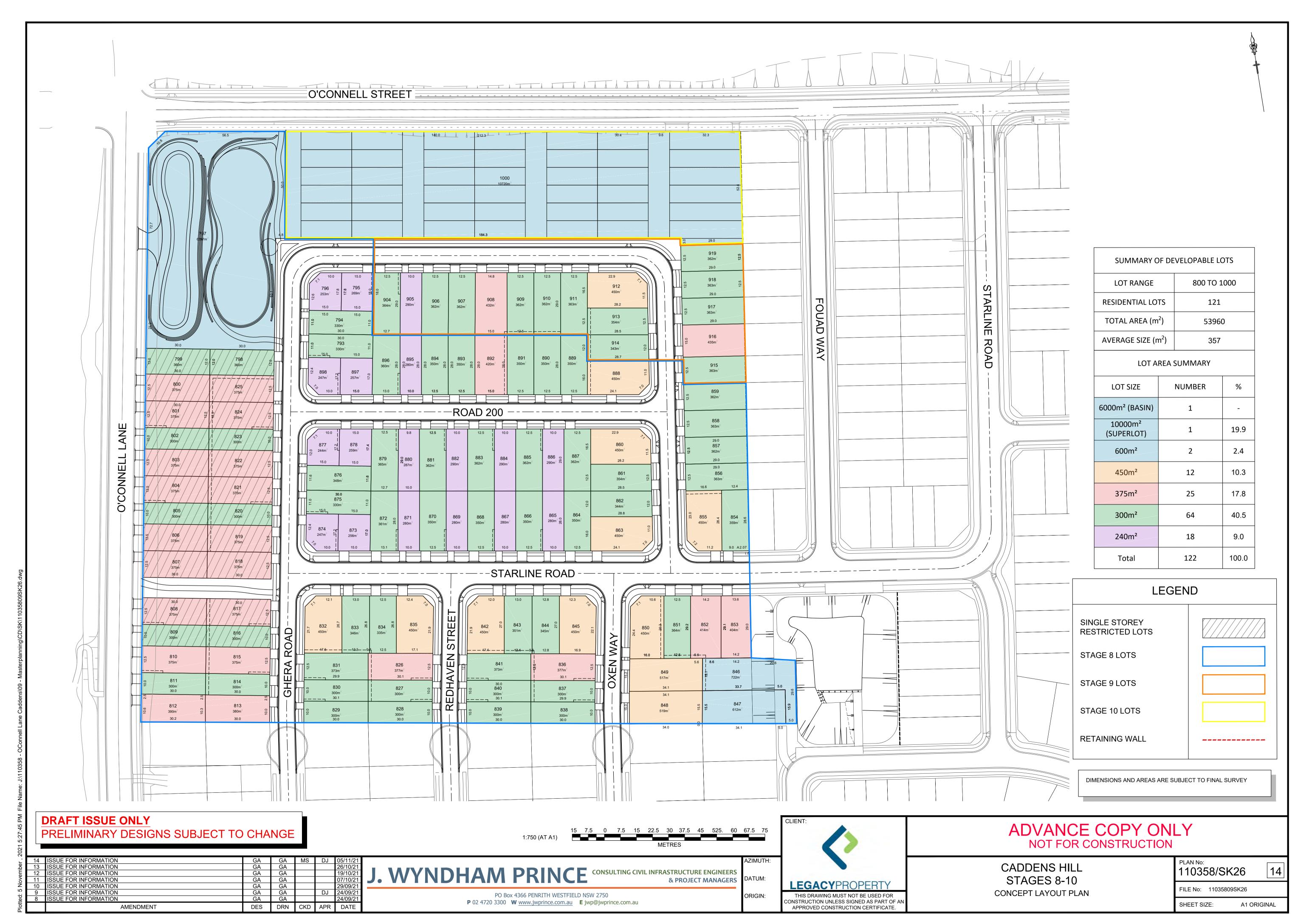
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