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OVERLAND FLOW STUDY

Proposed Residential Development

At

3 Edward Street, Kingswood

For

Signature GROUP OF COMPANIES

DESIGN CONSTRUCTION DEVELOPMENT

Ref.: U20122- REV A
Issue Date: 05 August 2020

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1 INTRODUCTION

1.1 Background

Uber Engineering were commissioned by Signature group of companies to complete an overland flow study for the proposed two storey Boarding house with full length driveway along eastern boundary and rear car parking at 3 Edward Street, Kingswood

The objective of this report is to determine the overland flow characteristics and to review the impact that the proposed development will have on the existing drainage system and surrounding properties.

HEC-RAS Modeling was completed by Uber engineering based on the infrastructure and Flood information received from Penrith City Council as well as survey plan and site inspection.

This report quantifies the overland flood water levels and identifies the flood impact on the surrounding properties due to the proposed development.

The proposed development is located on the north of Edward and west of Edith street and east of Manning street, as shown in Figure 1, below.

Figure 1: Site Location (from Six maps)

1.2 Site Description

The site falls within the boundaries of Penrith City Council and is therefore subject to Council's Development Application approvals processes, DCP's and LEP's. The subject site is on the north of Edward and east of Edith street and west of Manning street. Series of council's stormwater pits and pipes are located upstream of the site including a kerb inlet pit and pipe within Edward street frontage that runs diagonally within an existing easement 2.44m wide from south to north of the subject site.

The existing site consist of a single fibro residential building, brick garage, metal roof shed and concrete driveway and pathway. The proposed development comprises of two storey Boarding house with full length driveway along western boundary and car parking area at the rear of the subject site.

The layout of the existing site is shown in Figure 2, below. The existing kerb inlet pit and pipe is located in front of the site. A copy of the survey plan may be found in Appendix A.

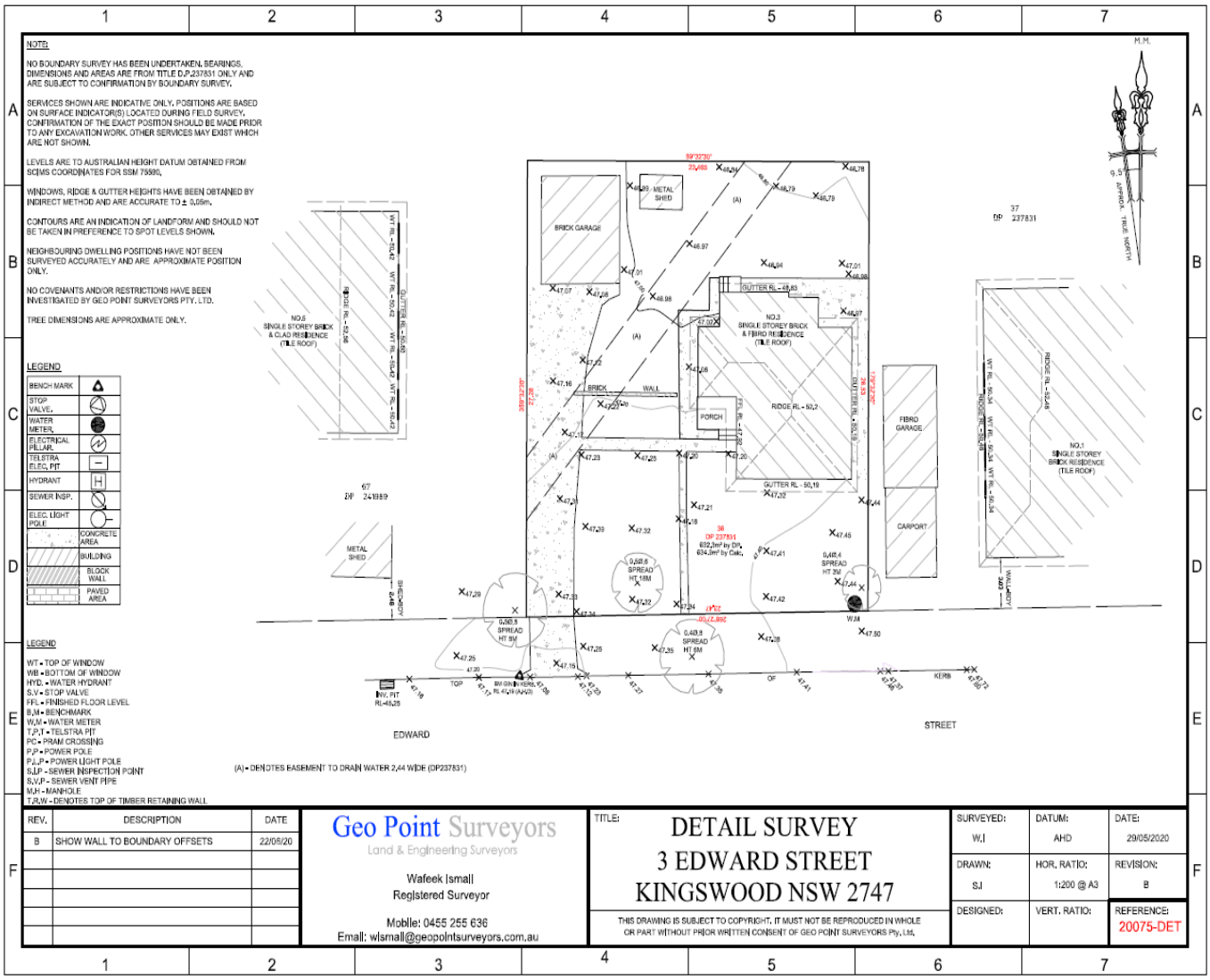
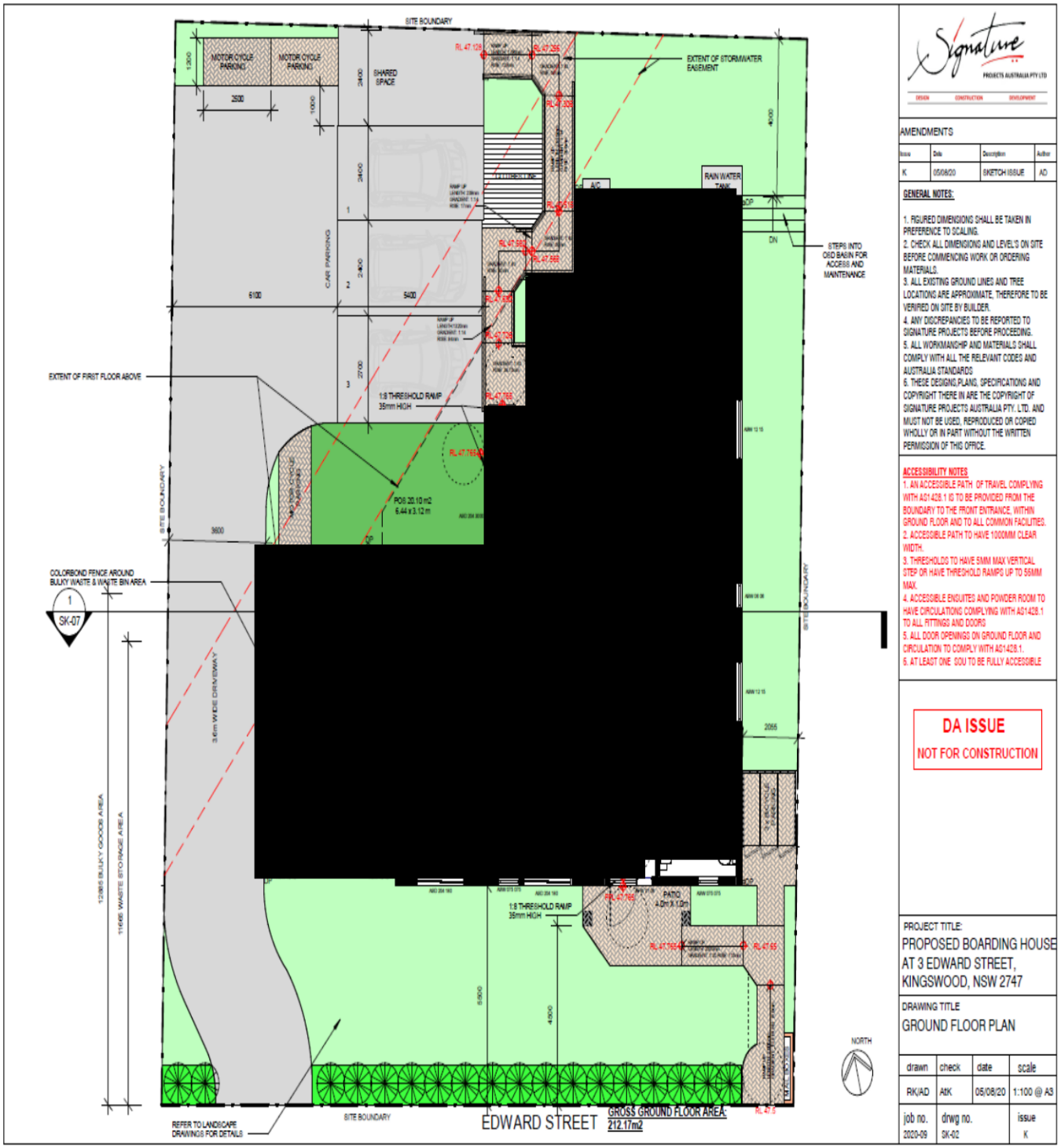


Figure 2: Existing Site Survey Plan

1.3 Proposed Development

The proposed development comprises of two storey Boarding house with full length driveway along the western boundary and car parking area at the rear of the subject site.
The extent of the proposed development is shown in Figure 3, below. A copy of the Development Application architectural drawings may be found submitted with this report.



issue	date	description	author
K	05/08/20	SKETCH ISSUE	AD

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RK/AD	AtK	05/08/20	1:100 @ A3

job no.	drwg no.	issue
2020-09	SK-02	K

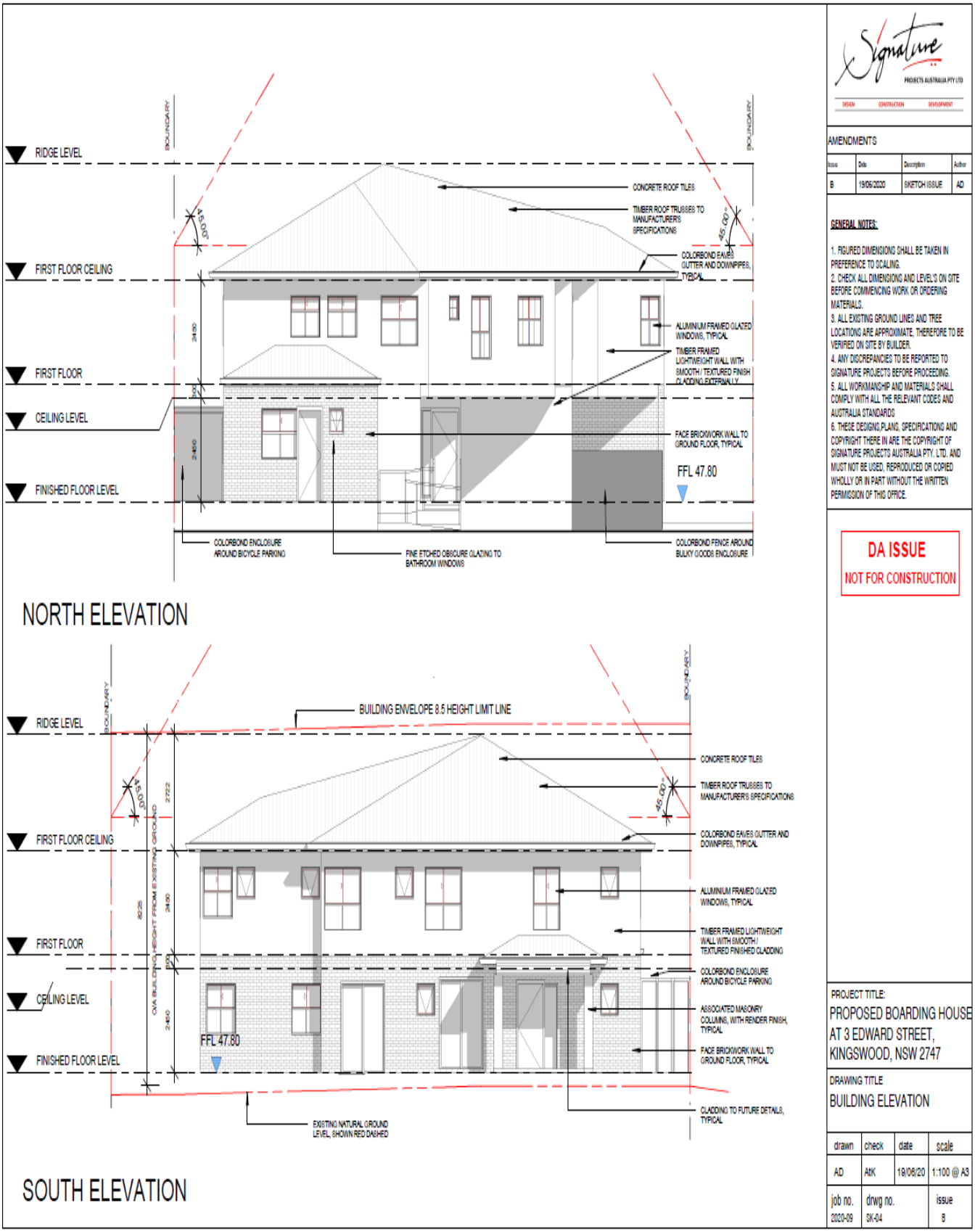


Figure 3: Proposed Ground Floor Plan and Elevations

1.4 Flood Risk Assessment

This report quantifies the flood water levels and identifies the flood risks and management procedures necessary for the proposed new development. This report provides:

- A review of the impact of flooding on the proposed development and the surrounding properties and any modifications to the design that might be required to minimise any adverse impacts.

The objective of the hydraulic review was to ensure that the development does not adversely affect neighbouring properties and to provide adequate free board against the peak storm event. In order to achieve this, the following scope of works was carried out:

- Review of existing documentation and existing drainage infrastructure provided by Penrith City Council for the subject site and available survey information.
- Liaison with Local Council officers regarding the proposed development and implementation of suitable development controls to ensure adequate performance of the proposed development during flood events.
- A review of College, Orth and Werrington Creeks Overland flow catchment Study by Catchment Simulation Solutions June 2017, existing topography maps, flood inundation maps, flood hazard maps, etc.
- Engineering assessment and reporting of the proposed development and its impact on the existing developments.

2 CATCHMENT MODELLING

2.1 Background

Based on information from Penrith City Council, the subject site is within the College, Orth and Werrington Creeks Catchment overland flow flooding zone. The contributing catchment study area is from west of M4 Western Motorway on the upstream side to Werrington street on the downstream. There are series of pits, pipes, culverts and open drains within the study area that conveys flows to downstream receiving waters. The excess flow of the pits, pipes culverts and open drains capacity will run as an overland flow.

2.2 Catchment Details & Modeling Approach

The review of the flood impact for this site and the assessment of flows have been based on the relevant national design guidelines, Australian Standard Codes of Practice, the standards of Penrith City Council Development Control Plan 2014 C3 Water Management section 3.5 Flood planning and accepted engineering practice. Overall site runoff and stormwater management will be designed in accordance with the Institution of Engineers, Australia publication "Australian Rainfall and Runoff" (1987 Edition), Volumes 1 and 2 (AR&R).

The relevant stormwater infrastructure adjacent to the sites was established by survey information.

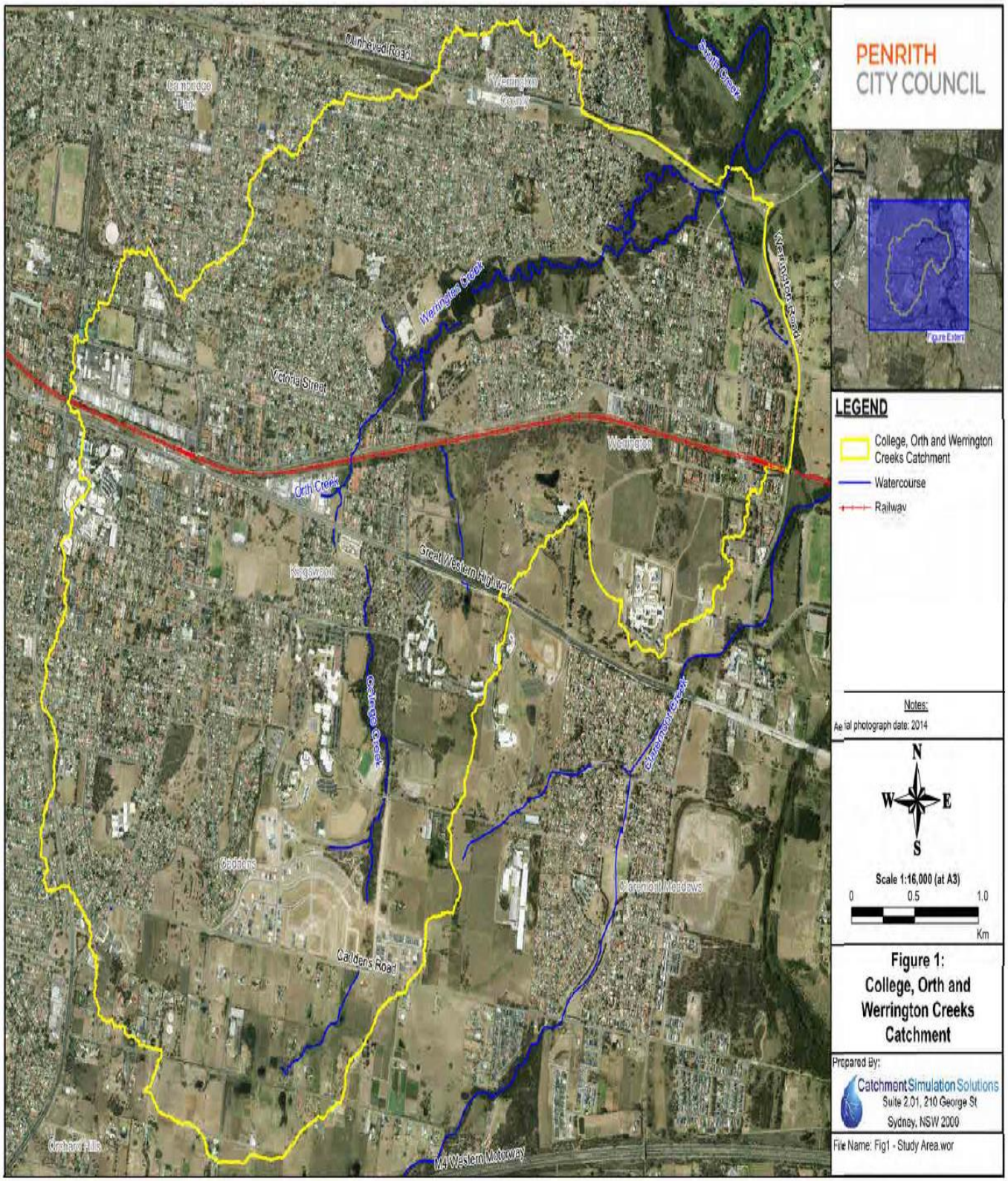
The discharge rate for the overland flow is extracted from College, Orth and Werrington Creeks Flood study page 239 flow rate reference 156. This flow rate is 0.54 cumec.(i.e. $Q_{o/f} = 0.54\ m^3/s$)

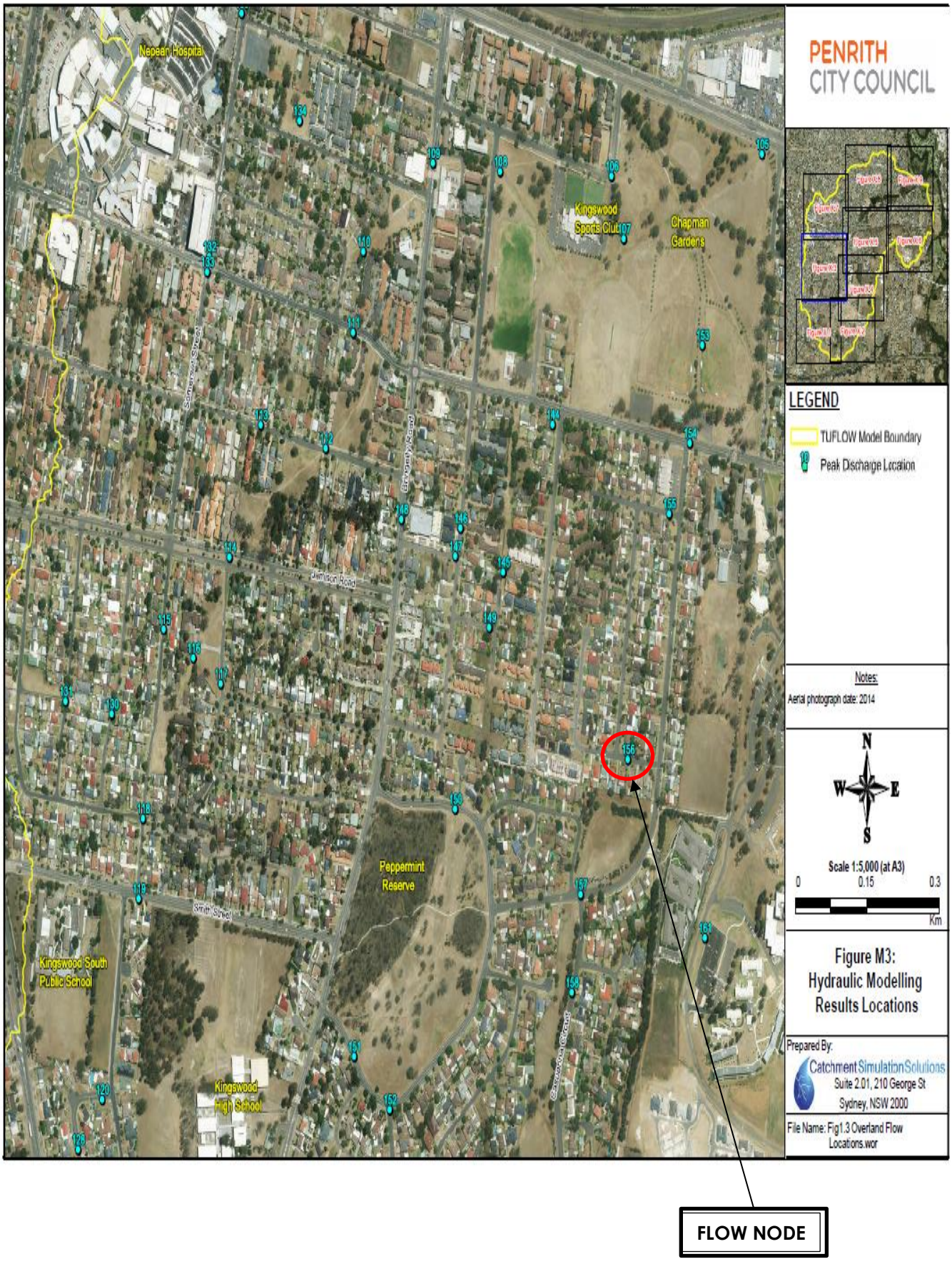
The following assumptions were used:

- The entire above flow ($Q_{100} = 0.54m^3/s$) will enter the overland flow path from Edward street via western boundary of the site.
- The overland flow is assumed to enter from upstream catchment through Edward street,
- The cross sectional areas are assumed to be right angle to the flow path,
- The gradient of the flow path is constant
- The flow path roughness (Manning's n value) was assumed to be 0.035 for the banks and 0.05 for main channel areas and 0.015 for concrete and hard surfaces.
- A "Mixed" flow regime is adopted for steady state analysis in the hec-ras model,

- The boundary condition is set as Normal depth with slope equals to the slope of the land.
- Due to extend of limited survey information, levels along the banks of the stations were interpolated and extrapolated from surrounding survey spot levels.

A HEC-RAS computer model was then devised to analyse the flow path for the site condition and to establish the flow depth.





Location	Description	Peak Discharge (m^3/s)			Critical Duration (minutes)	Time of Peak Discharge (hours)
		Overland	Structure	Total		
106	SantleyCres	5.24	0.08	5.32	120mins	1.27
107	DougRennieField	21.33	8.12	29.45	120mins	1.13
108	FirstStN	20.12	8.39	28.51	120mins	1.23
109	BringellyRdNearFirst	18.43	9.52	27.95	120mins	1.20
110	HargraveSt	11.76	1.86	13.63	120mins	1.17
111	DerbySy	12.56	7.30	19.86	120mins	1.10
112	StaffordSyNearBringellyRd	5.38	5.67	11.06	120mins	1.00
113	StaffordSt	8.00	0.00	8.00	120mins	1.00
114	JamisonRd	15.21	2.93	18.14	120mins	0.90
115	StapleySt	3.59	3.55	7.13	120mins	0.87
116	StapleyStandClemsonSt	6.39	3.75	10.14	120mins	0.87
117	ClemsonSt	0.73	0.36	1.09	30mins	0.33
118	LucySt	7.14	6.47	13.61	120mins	0.87
119	SmithSt	7.22	5.31	12.53	120mins	0.83
120	OagCresandTentSt	4.59	4.23	8.81	120mins	0.83
121	TentSt	2.51	3.12	5.63	120mins	0.80
122	TentStandPiperCl	3.00	2.13	5.12	120mins	0.97
123	PiperCl	0.18	0.41	0.59	120mins	0.80
124	BringellyRd	0.80	0.30	1.11	120mins	0.73
125	BringellyRdandCaddensSt	3.57	1.43	5.01	120mins	0.93
126	AngophoraAve	0.55	0.13	0.68	120mins	0.70
127	CaddensRd	1.50	0.63	2.14	120mins	0.73
128	OagCres	1.39	0.61	2.00	120mins	0.77
129	TheNorthernRd	0.87	0.24	1.12	120mins	0.73
130	ElliottSt	0.74	0.71	1.45	30mins	0.37
131	GladysSt	1.16	0.55	1.71	30mins	0.33
132	SomersetNearHargraveSt	1.58	0.22	1.80	120mins	0.73
133	SomersetStandDerbySt	0.45	0.10	0.55	120mins	0.73
134	OrthSt	6.56	2.30	8.86	120mins	0.83
135	SomersetSt	5.43	2.18	7.61	120mins	0.77
136	GreatWesternHwySomersetSt	2.62	0.00	2.62	120mins	0.77
137	GreatWesternHwyHospital	0.00	2.30	2.31	120mins	0.97
138	RailwaynearHospital	0.00	4.65	4.66	120mins	0.97
139	CoxAve	7.99	1.10	9.09	120mins	0.73
140	CopelandSt	3.77	0.67	4.44	120mins	0.73
141	PhillipSt	1.26	0.56	1.82	30mins	0.37
142	GascoigneSt	0.42	0.31	0.72	30mins	0.33
143	RichmondRd	0.22	0.03	0.25	30mins	0.33
144	SecondAveandJonesSt	3.95	4.47	8.42	120mins	0.80
145	BadenPowellAve	1.27	3.25	4.53	120mins	0.77
146	FirstSt	0.85	0.83	1.68	120mins	0.73
147	BadenPowellAveandFirstSt	1.10	0.54	1.64	120mins	0.77
148	BringellyRdNearJamisonRd	0.08	0.24	0.31	30mins	0.33
149	FuryStandStockAve	1.25	2.56	3.81	120mins	0.83
150	PeppermintCres	0.56	1.14	1.70	120mins	0.73
151	PeppermintCresandYeelannaPl	1.92	0.46	2.38	120mins	0.73
152	AngophoraAveand PeppermintCres	0.26	0.53	0.79	30mins	0.33
153	ChapmanGardens	3.75	4.67	8.42	120mins	0.83
154	SecondAveandManningSt	3.97	4.27	8.24	120mins	0.77
155	EdgaSt	4.29	3.48	7.78	120mins	0.77
156	EdwardSt	0.54	1.90	2.44	120mins	0.73
157	ManningSt	1.05	1.55	2.59	120mins	0.70
158	CasuarinaCircuitandMaculataPl	0.25	0.20	0.45	120mins	0.70

FLOW RATE
Q= 0.54 m3

23

Figure 4: Contributing Catchment Map and Flow Rate Nodes

3 FLOOD MODELLING & HYDRAULIC REVIEW

3.1 Background

A HEC-RAS model has been prepared to suit the detailed survey information available along the overland flow path being through the site labelled Overland flow.

HEC-RAS Pre and Post-Development modelling of the overland flow will determine the impact the development may have on the water flow rate, depth and velocity. Generally, the minimum floor level for the proposed residence will be derived from this process.

HEC-RAS computer modelling has been used for this report to determine the water surface profile at each cross-section covering the site during 1 in 100 year ARI storm event. The model calculates water surface profiles based on a one dimensional, steady state water surface profiles iteration developed by U.S. Army Corp of Engineers. Referring to NSW catchment plan (Figure 4) and the pre-development flood map (Figure 7), flood water would pass through eastern boundary of No 5 Edward street and enters the subject site from western boundary and follow within the existing easement/proposed driveway through the downstream rear property of the site.

3.2 Flood Modeling for the Site

Figure 7; below illustrates a layout plan for each HEC-RAS station along the overland flow for Pre- and post-development conditions. It should be noted that the survey information was only extended within site boundaries hence levels along the banks of the stations were interpolated and extrapolated from surrounding survey spot levels.

Three Flood Classifications have been defined as follow:

- **High Flood Risk:** is where the land below the 100 Year flood that is either subject to a high hydraulic hazard or where there are significant evacuation difficulties.
- **Medium Flood Risk:** is where the land below the 100 Year flood that is not subject to a high hydraulic hazard and there are no significant evacuation difficulties.
- **Low Flood Risk:** is where the land is not identified within either the High Flood Risk or the Medium Flood Risk.

Therefore, the site is classified as being within the **Medium to Low Flood Risk** Precinct.
Below are listed the council design criteria for the proposed site as per the flood advise letter:

Floor Level:

• Habitable floor levels to be equal to or greater than the 100 year ARI flood level plus freeboard (500mm).

• Non-habitable floor levels (garages, laundry, sheds, etc) shall be 100mm above the flood level at the upstream side of the structure.

• Crest in driveway to car parking area shall be 300mm above the top water level of the 1% AEP flood.

Building Components & Methods:

• All structures to have flood compatible building components below or at the 1% AEP plus 500mm freeboard.

• The impact of the development on flooding elsewhere shall be considered.

Evacuation:

• The proposed ground floor level shall be above the flood level (plus freeboard) for 1 in 100 year ARI flood. However, if the flood level is raised above 1 in 100 year ARI, the residents in the building shall move to the upper levels. Residents shall not leave the site during 1 in 100 year ARI and shall stay in their property until be advised by police or SES.

Flood Emergency Response

Floods can occur any time without warning, the residents in the development should prepare, maintain and replace if necessary the following item for any expected emergency that may happen.

- Wet weather clothing
- Torch, Radio with Battery and Spare Batteries
- Local map, a prepared home emergency plan
- A First aid Kit and prescription medicines
- Important papers including emergency contact numbers and any personal documentations
- Mobile Phone
- Store basic food items and bottled water

Residents shall develop their own family flood emergency plan following the instructions provided on http://www.ses.nsw.gov.au/community-safety/. Talk to the council to confirm safe travel route that are less likely to be cut by flood waters. In addition, in case of heavy rainfall listen to your local radio station, check weather condition by BOM and flood information on the flood safe webpage and follow the instruction by SES.

During the heavy rainfall event, raise any electrical items and high value items within garage area as high level as possible to avoid any damage during the flood impact. If possible, turn off and disconnect any large electrical item that cannot be raised. Moreover, residents shall take the actions below,

- Do not try to evacuate and travel through floodwater on foot;

- Do not stay inside any vehicles on the street and in garage;

- Residents and their pets should move and stay in the higher levels of building such as move to First Floor if possible.

- Residents want to leave the site must check and follow the instructions from SES.

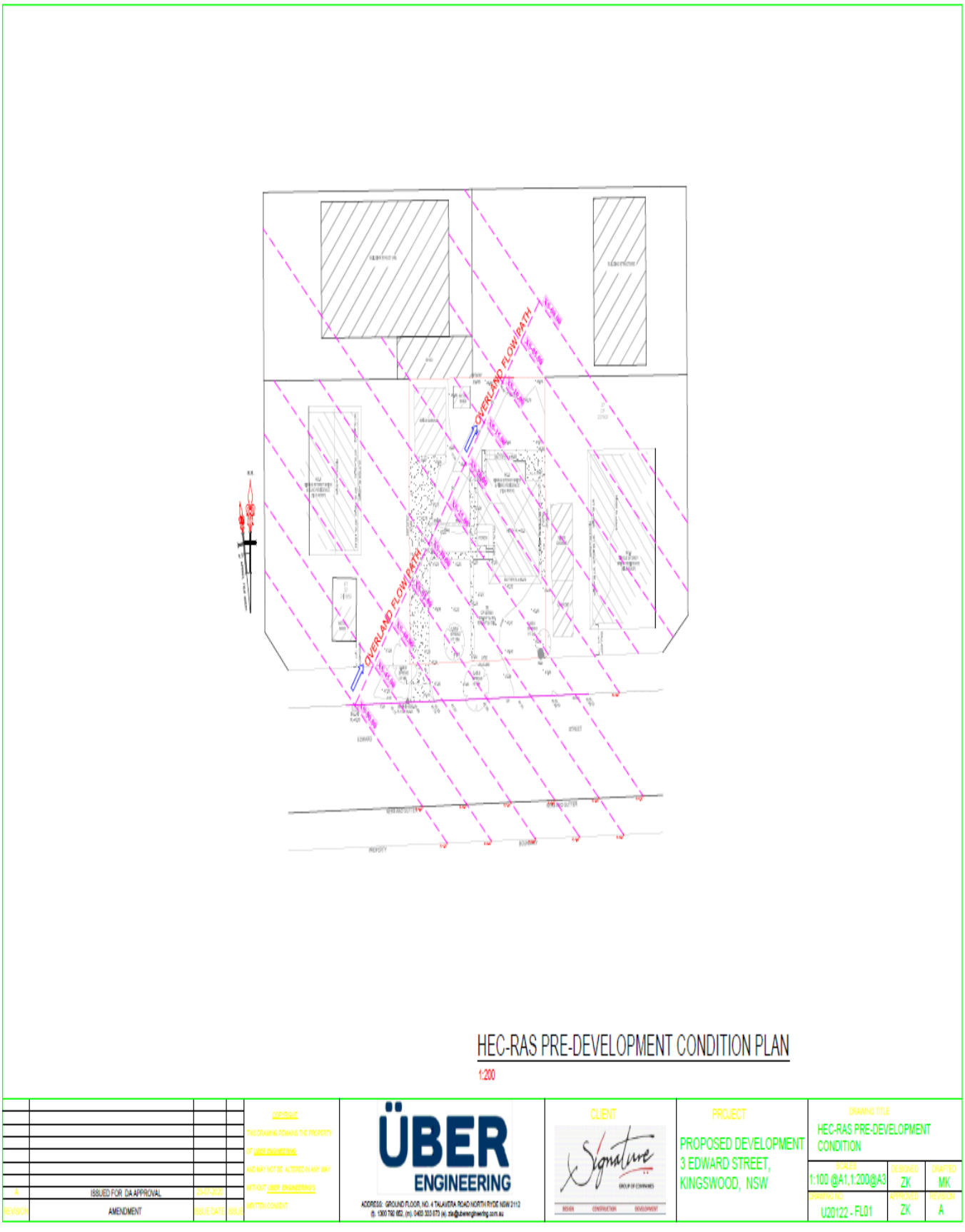


Figure 5: Pre-Development HEC-RAS Stations

HEC-RAS POST-DEVELOPMENT CONDITION PLAN

1:200

REVISION		ISSUE DATE	ISSUE
A	ISSUED FOR DA APPROVAL	30/07/2020	
	AMENDMENT		

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CLIENT

Signature GROUP OF COMPANIES

DESIGN CONSTRUCTION DEVELOPMENT

PROJECT

PROPOSED DEVELOPMENT
3 EDWARD STREET,
KINGSWOOD, NSW

DRAWING TITLE

HEC-RAS POST-DEVELOPMENT CONDITION

SCALES	DESIGNED	DRAFTED
1:100 @A1,1:200@A3	ZK	MK
DRAWING NO.	APPROVED	REVISION
U20122 - FLO2	ZK	A

Figure 6: Post-Development HEC-RAS Stations

A summary of the pre and post development flood levels for the critical storm events as calculated from the HEC-RAS model is provided in Table 2 and 3, below. The depth of flow within the flow path ranges from 90mm – 300mm for both existing and post development conditions. The depth and velocity shown in table below are within the main flow path of the channel areas.

River Station Reach 1	Water Surface Level (AHD)	Velocity, V (m/s)	Depth, D (m)	V x D (m^2/s)
50	47.31	0.09	0.30	0.03
45	47.31	0.12	0.27	0.03
40	47.30	0.19	0.18	0.03
35	47.30	0.14	0.20	0.03
30	47.29	0.36	0.09	0.03
25	47.25	0.7	0.10	0.07
20	47.12	0.58	0.14	0.08
15	47.04	0.86	0.09	0.08
10	46.85	0.89	0.10	0.09
5	46.81	0.27	0.11	0.03
0	46.79	0.28	0.09	0.03

Table 2: Overland flow - Pre-Development HEC-RAS results

River Station Reach 1	Water Surface Level (AHD)	Velocity, V (m/s)	Depth, D (m)	V x D (m^2/s)
50	47.31	0.09	0.30	0.03
45	47.31	0.12	0.27	0.03
40	47.31	0.17	0.19	0.03
35	47.30	0.21	0.20	0.04
30	47.28	0.56	0.08	0.04
25	47.24	0.74	0.09	0.07
20	47.02	1.79	0.04	0.07
15	47.03	0.94	0.08	0.08
10	46.81	1.81	0.06	0.11
5	46.81	0.27	0.11	0.03
0	46.79	0.28	0.09	0.03

Table 3: Overland flow - Post-Development HEC-RAS results

The habitable areas are subjected to 500 mm of freeboard while the non-habitable areas require 100 mm of free board. In addition, the driveway crest requires a minimum of 300 mm freeboard.

A detailed summary of the HEC-RAS output from the site specific modelling for the pre and post development configuration and elevations can be found in Appendix D & E.

4 RECOMMENDATIONS & CONCLUSIONS

Uber Engineering were commissioned by Signature group of companies to complete an overland flow study for the proposed development at 3 Edward street Kingswood.

The current site consists of a single fibro residential building, brick garage, metal roof shed and concrete driveway and pathway. The proposed development comprises of two storey residential boarding units with 3.6 m wide driveway along the western boundary and car parking at the rear of the site.

The objective of this report is to determine the overland flow characteristics and to review the impact that the proposed development will have on the existing drainage infrastructure and surrounding properties.

The contributing catchment area and flow rates for 1% AEP critical storm event for the overland flow is extracted from College, Orth and Werrington Creeks flood study (refer to figure 4). All flows generated from this catchment is captured through a network of pits and pipes as well as culverts and open drains, the excess flows to the capacity of the existing stormwater system will run as an overland flow from top of the catchment being Derby street to the lower ground along Bringelly road and Orth street.

Based on investigations, design review and calculations undertaken as part of this Flood Impact Report overland flow marginally enters the site from the western boundary of the site and flows through the site and No 5 Edward street and through downstream property to Manning street. The impact of the overland flow on the adjoining properties is perceived to be nil as result of the proposal.
The proposed flow path within the site closely follows the existing, this is achieved by setting back the building structure from western boundary. The proposed building and permanent structures are modelled in Hec-Ras as obstruction to assess its impact on the flow characteristics such as depth, velocity and flow distribution. It is found that the net impact is an increase and decrease of 10mm and 40mm respectively through the flow path area. The driveway is ramped up to crest of RL 47.60 for a distance of 4.3 m from the subject site front boundary, this is 300mm above the nominated 1%AEP flood level (i.e. Flood level RL 47.30). Approximate extent of overland flow path is shown hatched in Figure 6.-(Proposed development HEC RAS stations).

The proposed overland flow management meets Penrith City Council's Development Control Plan 2014 C3 Water Management section 3.5 Flood Planning criteria.

Generally The adopted overland flow levels are taken from the HEC-RAS output results in absent of more comprehensive flood information such 2D flood model. However, flood level adopted for this development is derived from council flood information. The hec ras model is calibrated to match the flood level provided by council, the critical river stations considered are XS-40 for the front of the site and XS-10 for the rear of the site. The respective water surface levels are RL 47.30 and RL 46.81 and hence the Finished Floor level and driveway crest is recommended above the RL 47.30 plus 500mm and 300mm respectively. These levels are summarised in the table below and the flood information is shown in Figure 7. – Flood information.

Flood Information
Lot 36 DP 237831 - No. 3 Edward Street Kingswood

Date of issue: 23 July 2020

The 1%AEP local overland flow flood levels in the vicinity of the above properties are estimated to be RL47.3m AHD at the southern boundary and RL46.8m AHD at the northern boundary.

Property less than 0.5m above the 1% AEP flood level is subject to Penrith Development Control Plan 2014 Section C3.5 Flood Planning. The Penrith Development Control Plan 2014 is available from Council's website www.penrithcity.nsw.gov.au.

Definitions

AEP – *Annual Exceedance Probability* – the chance of a flood of this size occurring in any one year.
AHD – *Australian Height Datum* – A standard level datum used throughout Australia, approximately equivalent to mean sea level.

Legend

	Extent of 1% AEP local catchment overland flow path. Generally depths less than 150mm is not shown.

Notes:

1. The contours shown above in yellow numbering are at 0.5m intervals and are based on Aerial Laser Scanning (ALS) Survey undertaken in 2002. The contour levels are approximate and for general information only. Accurate ground levels should be obtained by a Registered Surveyor.
2. The flood level is based on current information available to Council at the date of issue. The flood level may change in the future if new information becomes available. The 1% AEP flood is the flood adopted by Council for planning controls. Rarer and more extreme flood events will have a greater effect on the property.
3. Council's studies are reflected in flood mapping for the City which show properties potentially affected by overland flows in excess of 150mm.
4. This property is shown on Council's flood mapping as potentially so affected.
5. Council imposes flood related development controls where, in its opinion, such controls are justified. Such controls may or may not be imposed with respect to this property in the event of an application for development consent.
6. If a development proposal is submitted with respect to this property, Council will consider the possibility of flood or overland flow in the context of the application. Council may impose a requirement that the applicant for development consent carry out a detailed assessment of the possible overland water flows affecting the property (a flood study) and/or may impose other controls on any development designed to ameliorate flood risk.
7. You are strongly advised if you propose to carry out development upon the property, that you retain the assistance of an experienced flooding engineer and have carried out a detailed investigation.
8. Council accepts no liability for the accuracy of the flood levels (or any other data) contained in this certificate, having regard to the information disclosed in Notes "1" to "4". As such you should carry out and rely upon your own investigations.

[redacted]

Dr Elias Ishak
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Figure 7: Flood Information

The proposed levels are summarised in Table 4, below.

	Water Surface Level (m)	Min. Finished Floor Level (AHD)	Proposed Finished Floor Level (AHD)
Proposed development			
Ground Level	47.30	47.80	47.80
Driveway Crest	47.30	47.60	47.60

Table 4: Proposed FFL for the proposed development

It is recommended that the finished floor level of the ground level to be adopted as minimum as per table above. In addition, the northern, western and internal boundary fences including waste bin area to be flow through type fence, this is to be approximately 300 mm high clearance from ground or louvers, to allow for overland flow water to flow freely within overland flow path. The Driveway ramp is proposed with crest RL 47.60 at a distance of 4.3m from front boundary, this will prevent any flood waters entering the driveway and car parking area from Edward Street.

Based on the Hec-Ras overland flow analysis, the flow regime of the overland flow is maintained almost as to the existing conditions. The proposed development is designed to facilitate this and minimise the impact on the adjoining properties.

This report is a brief and basic overland flow investigation and analysis. The input data in the computer models is based on numerous assumptions, therefore this will reflect on the output results.

Appendix A

Survey plan prepared by GEOPOINT Surveyors dated 29 May 2020

NOTE:

NO BOUNDARY SURVEY HAS BEEN UNDERTAKEN. BEARINGS, DIMENSIONS AND AREAS ARE FROM TITLE D.P.237831 ONLY AND ARE SUBJECT TO CONFIRMATION BY BOUNDARY SURVEY.

SERVICES SHOWN ARE INDICATIVE ONLY. POSITIONS ARE BASED ON SURFACE INDICATOR(S) LOCATED DURING FIELD SURVEY. CONFIRMATION OF THE EXACT POSITION SHOULD BE MADE PRIOR TO ANY EXCAVATION WORK. OTHER SERVICES MAY EXIST WHICH ARE NOT SHOWN.

LEVELS ARE TO AUSTRALIAN HEIGHT DATUM OBTAINED FROM SCIMS COORDINATES FOR SSM 75990.

WINDOWS, RIDGE & GUTTER HEIGHTS HAVE BEEN OBTAINED BY INDIRECT METHOD AND ARE ACCURATE TO ± 0.05m.

CONTOURS ARE AN INDICATION OF LANDFORM AND SHOULD NOT BE TAKEN IN PREFERENCE TO SPOT LEVELS SHOWN.

NEIGHBOURING DWELLING POSITIONS HAVE NOT BEEN SURVEYED ACCURATELY AND ARE APPROXIMATE POSITION ONLY.

NO COVENANTS AND/OR RESTRICTIONS HAVE BEEN INVESTIGATED BY GEO POINT SURVEYORS PTY. LTD.

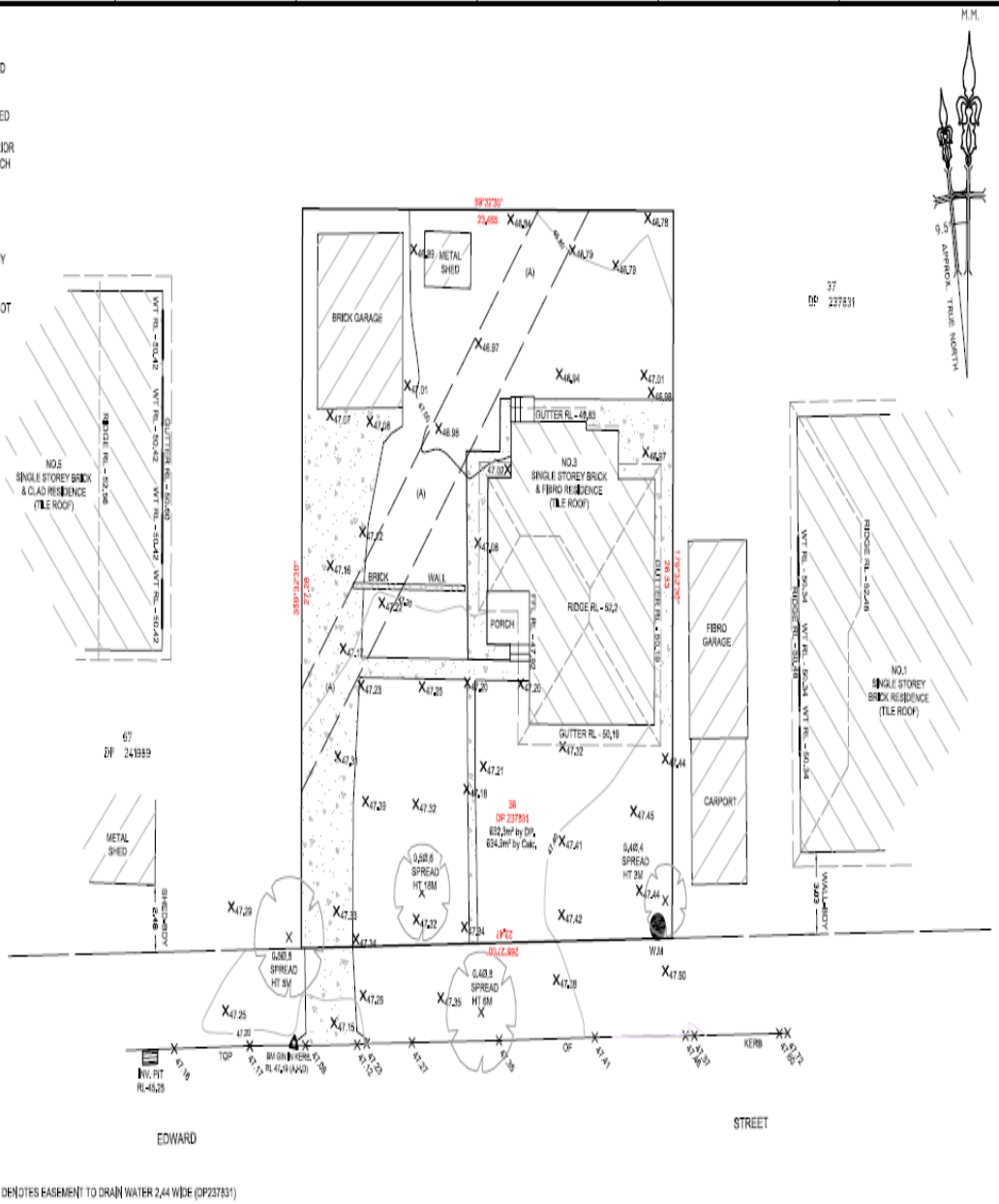
TREE DIMENSIONS ARE APPROXIMATE ONLY.

LEGEND

BENCH MARK	
STOP VALVE.	
WATER METER.	
ELECTRICAL PILLAR.	
TELSTRA ELEC. PIT	
HYDRANT	
SEWER INSP.	
ELEC. LIGHT POLE	
	CONCRETE AREA
	BUILDING
	BLOCK WALL
	PAVED AREA

LEGEND

WT - TOP OF WINDOW
WB - BOTTOM OF WINDOW
HYD. - WATER HYDRANT
S.V - STOP VALVE
FFL - FINISHED FLOOR LEVEL
B.M - BENCHMARK
W.M - WATER METER
T.P.T - TELSTRA PIT
PC - PRAM CROSSING
P.P - POWER POLE
P.L.P - POWER LIGHT POLE
S.I.P - SEWER INSPECTION POINT
S.V.P - SEWER VENT PIPE
M.H - MANHOLE
T.R.W - DENOTES TOP OF TIMBER RETAINING WALL



(A) - DENOTES EASEMENT TO DRAIN WATER 2.44 WIDE (DP237831)

REV.	DESCRIPTION	DATE
B	SHOW WALL TO BOUNDARY OFFSETS	22/06/20

Geo Point Surveyors
Land & Engineering Surveyors

Wafeek Ismail
Registered Surveyor

Mobile: 0455 255 636
Email: wismail@geopointsurveyors.com.au

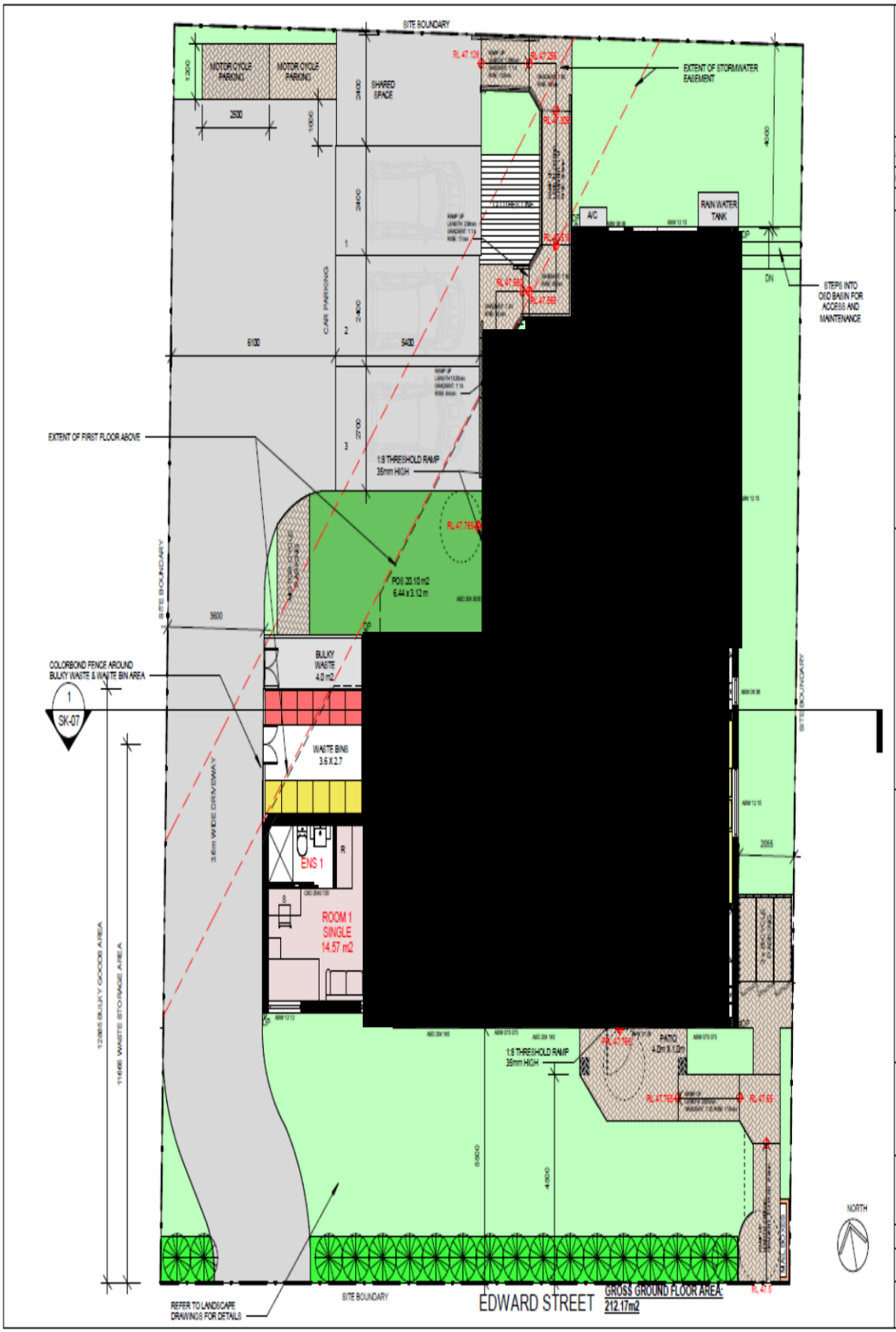
TITLE:

DETAIL SURVEY
3 EDWARD STREET
KINGSWOOD NSW 2747

SURVEYED:	DATUM:	DATE:
W.I	AHD	29/05/2020
DRAWN:	HOR. RATIO:	REVISION:
S.I	1:200 @ A3	B
DESIGNED:	VERT. RATIO:	REFERENCE:
		20075-DET

Appendix B

Architectural plans prepared by Signature Projects Australia P/L dated 05 AUGUST 2020



Signature PROJECTS AUSTRALIA PTY LTD
DESIGN CONSTRUCTION DEVELOPMENT

AMENDMENTS

Issue	Date	Description	Author
K	05/08/20	SKETCH ISSUE	AD

GENERAL NOTES:

1. FIGURED DIMENSIONS SHALL BE TAKEN IN PREFERENCE TO SCALING.
2. CHECK ALL DIMENSIONS AND LEVELS ON SITE BEFORE COMMENCING WORK OR ORDERING MATERIALS.
3. ALL EXISTING GROUND LINES AND TREE LOCATIONS ARE APPROXIMATE, THEREFORE TO BE VERIFIED ON SITE BY BUILDER.
4. ANY DISCREPANCIES TO BE REPORTED TO SIGNATURE PROJECTS BEFORE PROCEEDING.
5. ALL WORKMANSHIP AND MATERIALS SHALL COMPLY WITH ALL THE RELEVANT CODES AND AUSTRALIA STANDARDS
6. THESE DESIGNS,PLANS, SPECIFICATIONS AND COPYRIGHT THERE IN ARE THE COPYRIGHT OF SIGNATURE PROJECTS AUSTRALIA PTY. LTD. AND MUST NOT BE USED, REPRODUCED OR COPIED WHOLLY OR IN PART WITHOUT THE WRITTEN PERMISSION OF THIS OFFICE.

ACCESSIBILITY NOTES

1. AN ACCESSIBLE PATH OF TRAVEL COMPLYING WITH AS1428.1 IS TO BE PROVIDED FROM THE BOUNDARY TO THE FRONT ENTRANCE, WITHIN GROUND FLOOR AND TO ALL COMMON FACILITIES.
2. ACCESSIBLE PATH TO HAVE 1000MM CLEAR WIDTH.
3. THRESHOLDS TO HAVE 5MM MAX VERTICAL STEP OR HAVE THRESHOLD RAMPS UP TO 56MM MAX.
4. ACCESSIBLE ENSUITES AND POWDER ROOM TO HAVE CIRCULATIONS COMPLYING WITH AS1428.1 TO ALL FITTINGS AND DOORS
5. ALL DOOR OPENINGS ON GROUND FLOOR AND CIRCULATION TO COMPLY WITH AS1428.1.
6. AT LEAST ONE SOU TO BE FULLY ACCESSIBLE

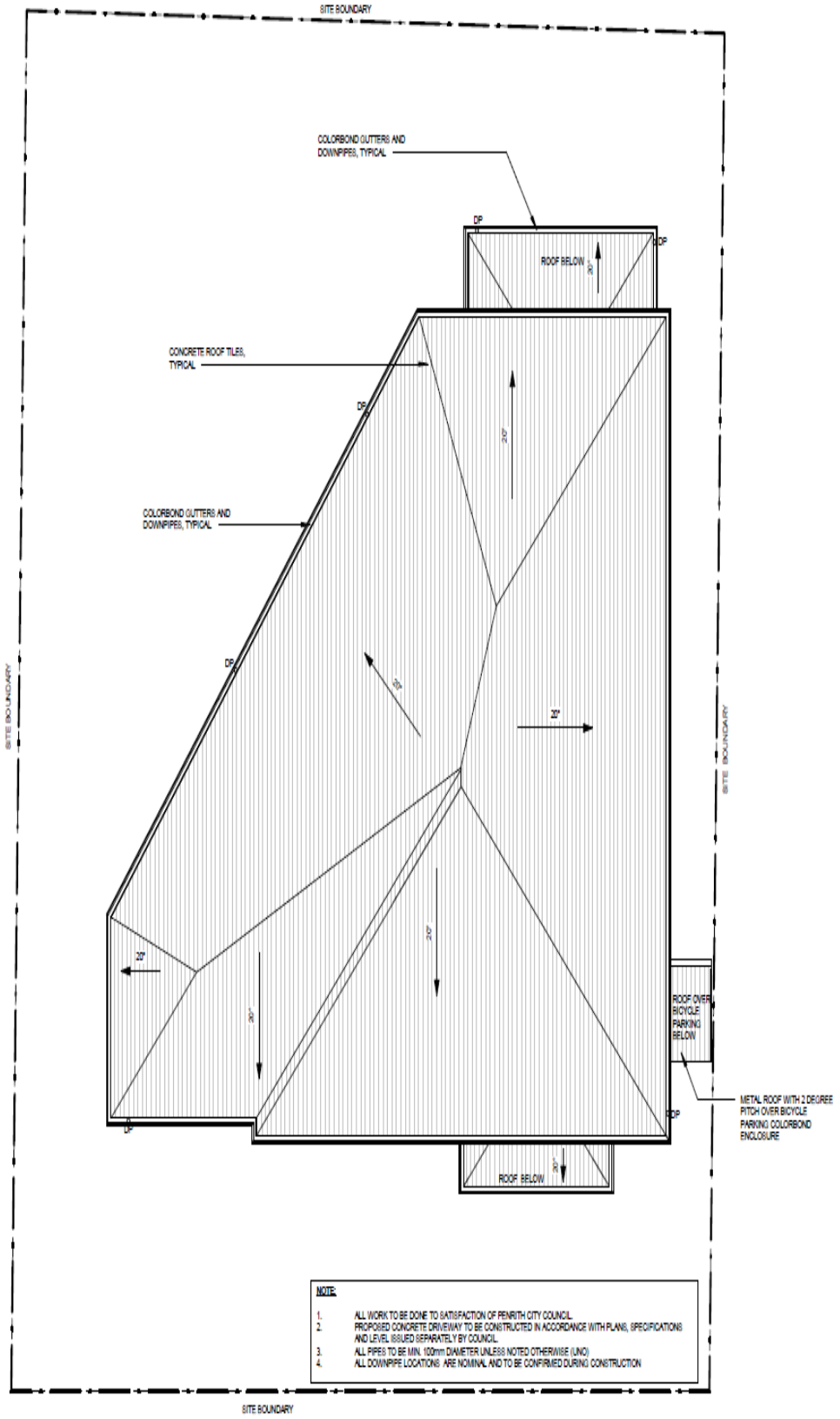
DA ISSUE
NOT FOR CONSTRUCTION

PROJECT TITLE:
PROPOSED BOARDING HOUSE AT 3 EDWARD STREET, KINGSWOOD, NSW 2747

DRAWING TITLE
GROUND FLOOR PLAN

drawn	check	date	scale
RK/AD	AtK	05/08/20	1:100 @ A3

job no.	drwg no.	issue
2020-09	SK-02	K



NOTE:

1. ALL WORK TO BE DONE TO SATISFACTION OF PENRITH CITY COUNCIL.
2. PROPOSED CONCRETE DRIVEWAY TO BE CONSTRUCTED IN ACCORDANCE WITH PLANS, SPECIFICATIONS AND LEVEL ISSUED SEPARATELY BY COUNCIL.
3. ALL PIPES TO BE MIN. 100mm DIAMETER UNLESS NOTED OTHERWISE (UNO)
4. ALL DOWNPIPE LOCATIONS ARE NOMINAL AND TO BE CONFIRMED DURING CONSTRUCTION

Signature PROJECTS AUSTRALIA PTY LTD
DESIGN CONSTRUCTION DEVELOPMENT

AMENDMENTS

Issue	Date	Description	Author
C	05/08/2020	SKETCH ISSUE	AD

GENERAL NOTES:

1. FIGURED DIMENSIONS SHALL BE TAKEN IN PREFERENCE TO SCALING.
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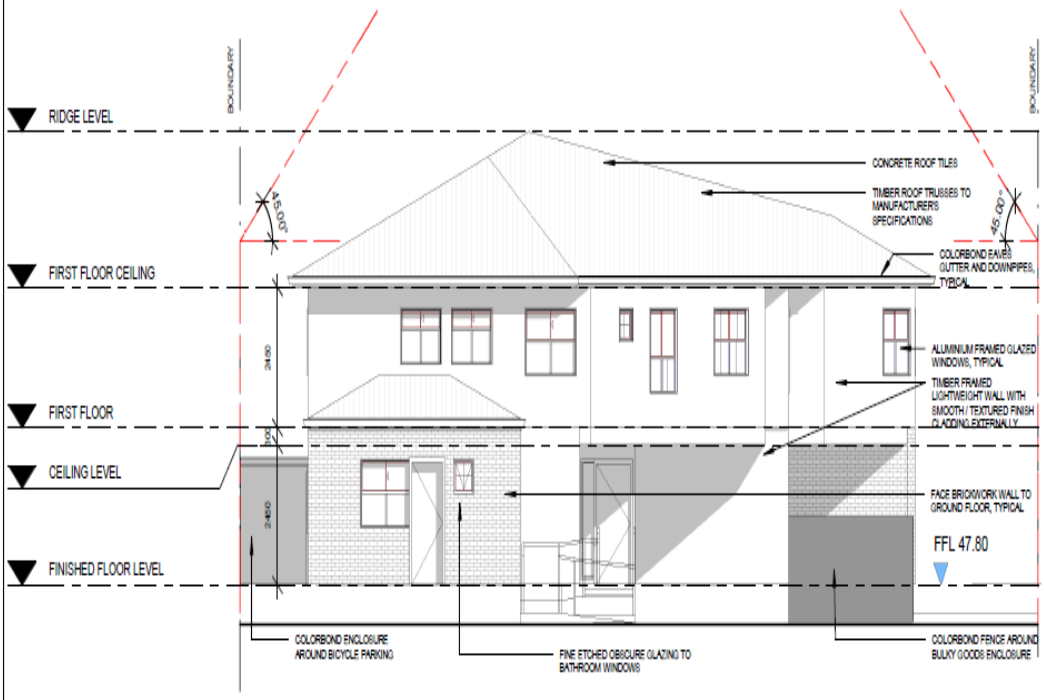
DA ISSUE
NOT FOR CONSTRUCTION

PROJECT TITLE:
PROPOSED BOARDING HOUSE AT 3 EDWARD STREET, KINGSWOOD, NSW 2747

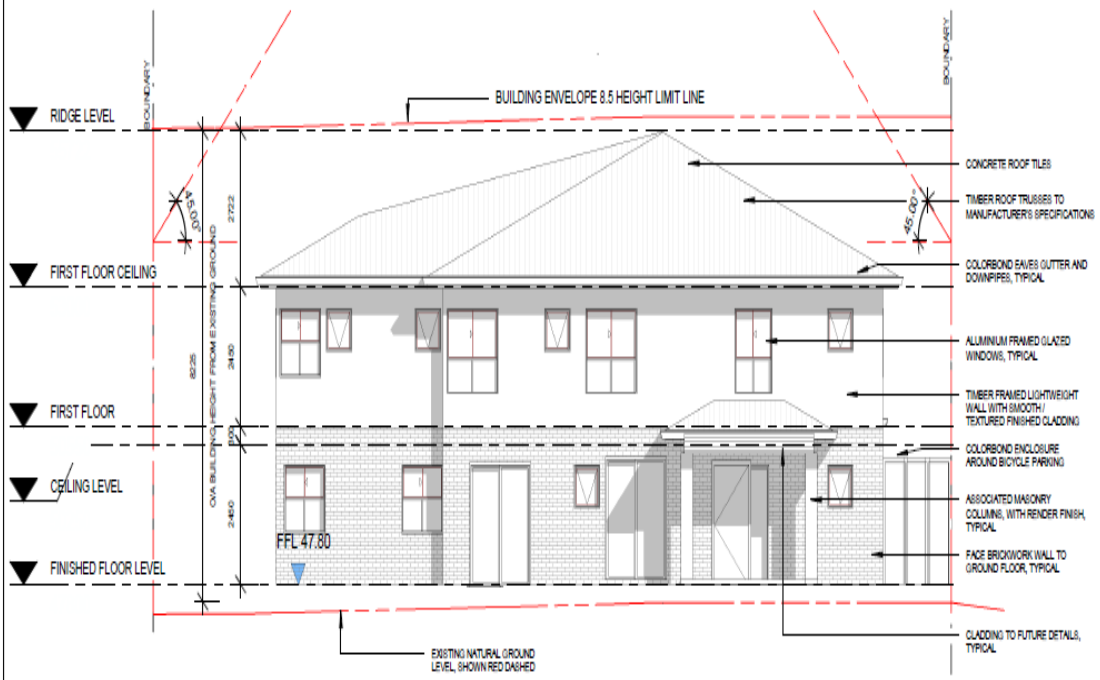
DRAWING TITLE
PROPOSED ROOF PLAN

drawn	check	date	scale
AD	AtK	05/08/20	1:100 @ A3

job no.	drwg no.	issue
2020-09	SK-08	C



NORTH ELEVATION



SOUTH ELEVATION

Signature PROJECTS AUSTRALIA PTY LTD
DESIGN CONSTRUCTION DEVELOPMENT

AMENDMENTS

Issue	Date	Description	Author
B	19/06/2020	SKETCH ISSUE	AD

GENERAL NOTES:

1. FIGURED DIMENSIONS SHALL BE TAKEN IN PREFERENCE TO SCALING.
2. CHECK ALL DIMENSIONS AND LEVEL'S ON SITE BEFORE COMMENCING WORK OR ORDERING MATERIALS.
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DA ISSUE
NOT FOR CONSTRUCTION

PROJECT TITLE:
PROPOSED BOARDING HOUSE AT 3 EDWARD STREET, KINGSWOOD, NSW 2747

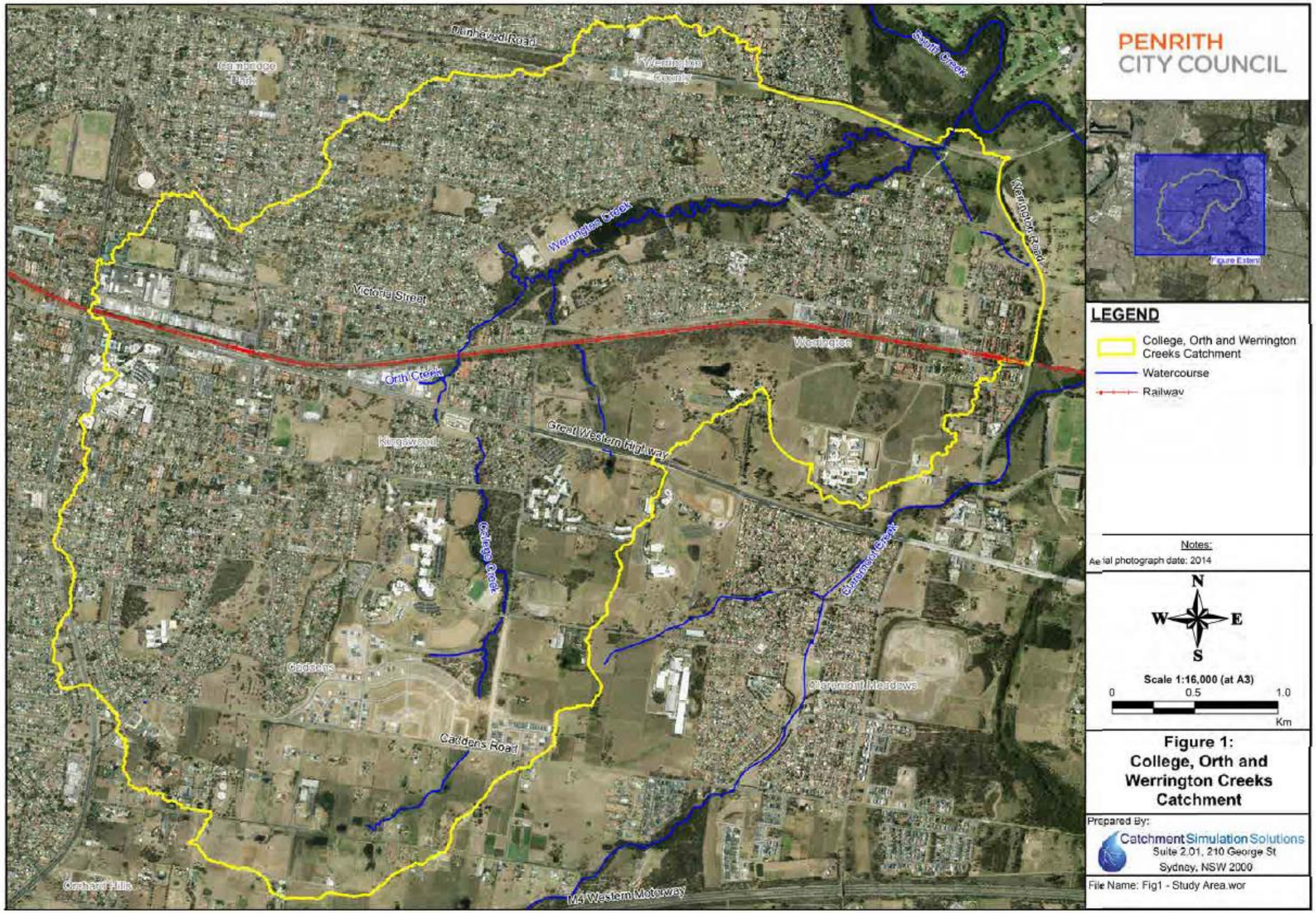
DRAWING TITLE
BUILDING ELEVATION

drawn	check	date	scale
AD	AtK	19/06/20	1:100 @ A3

job no.	drwg no.	issue
2020-09	SK-04	B

Appendix C

Contributing Catchment Map provided by Penrith City Council (From College, Orth and Werrington Creeks catchment study)

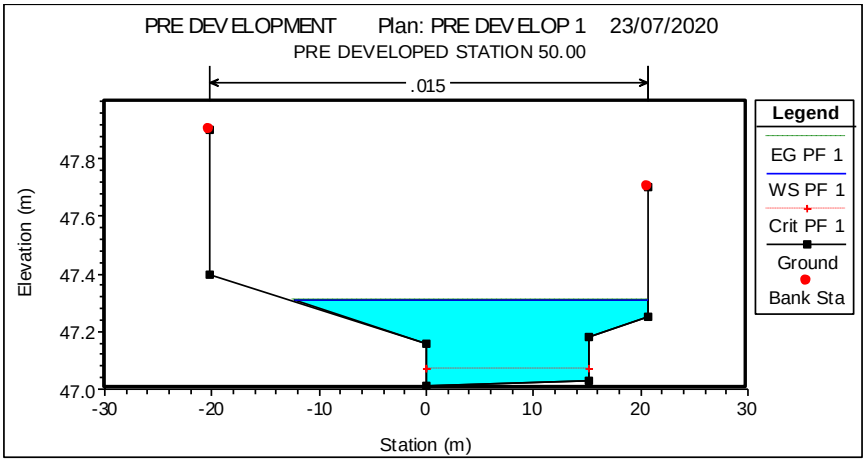


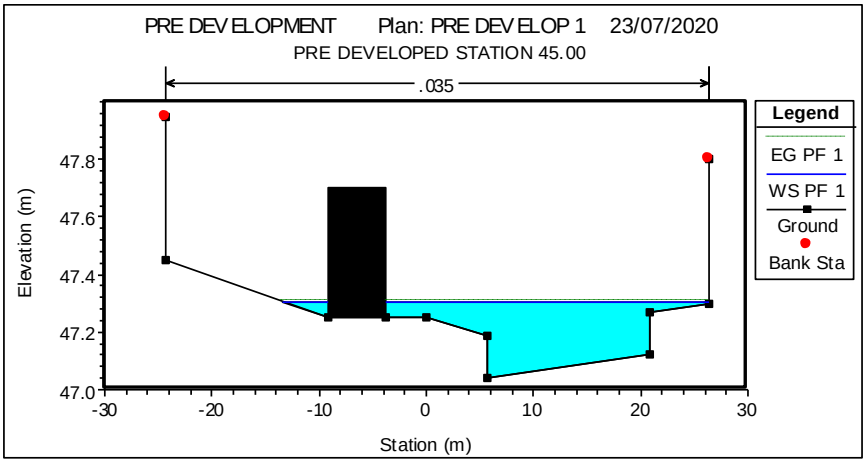
Appendix D

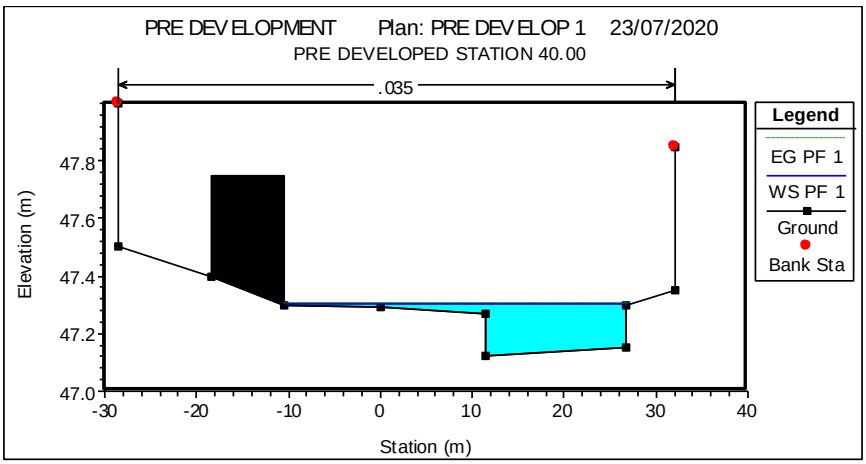
Pre-Development HEC-RAS model

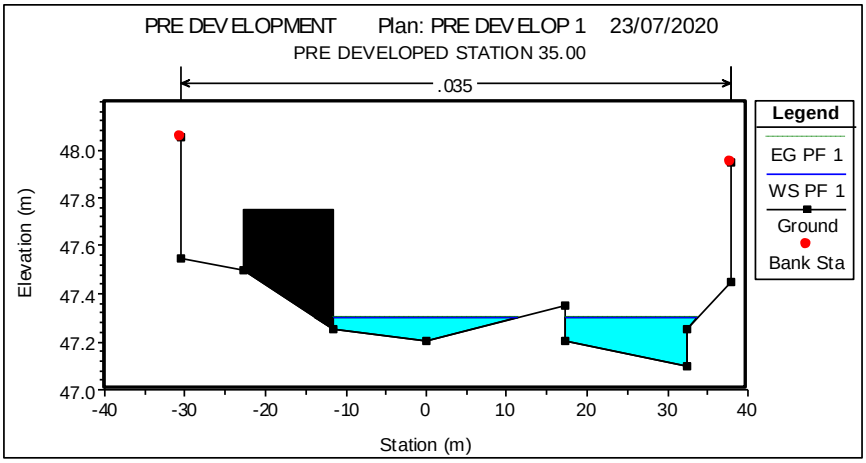
PRE DEVELOPMENT

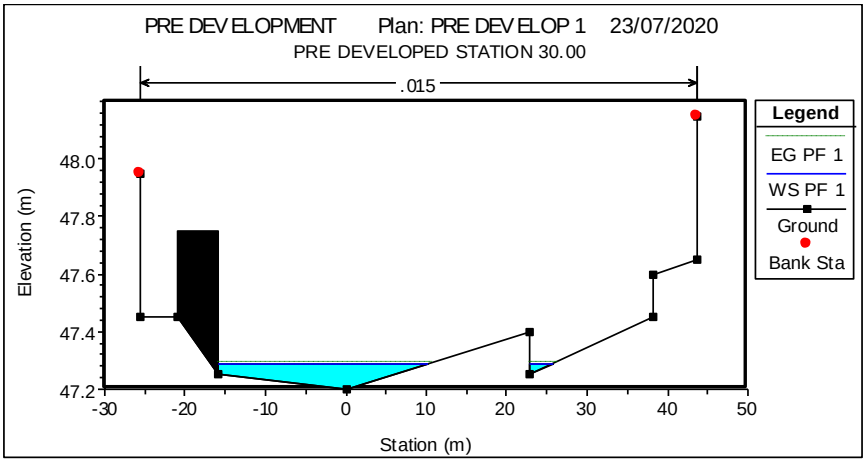
Reach	River Sta	Profile	Q Total (m3/s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area (m2)	Top Width (m)	Froude # Chl
OVERLAND FLOW	50	PF 1	0.54	47.01	47.31	47.07	47.31	0.00002	0.09	5.78	33.05	0.07
OVERLAND FLOW	45	PF 1	0.54	47.04	47.31		47.31	0.000292	0.12	4.4	34.52	0.11
OVERLAND FLOW	40	PF 1	0.54	47.12	47.3		47.3	0.001294	0.19	2.91	37.48	0.21
OVERLAND FLOW	35	PF 1	0.54	47.1	47.3		47.3	0.000607	0.14	3.73	39.57	0.15
OVERLAND FLOW	30	PF 1	0.54	47.2	47.29		47.3	0.001453	0.36	1.52	28.98	0.5
OVERLAND FLOW	25	PF 1	0.54	47.15	47.25	47.25	47.27	0.023796	0.7	0.78	15.58	1
OVERLAND FLOW	20	PF 1	0.54	46.98	47.12	47.08	47.14	0.006523	0.58	0.93	7.18	0.51
OVERLAND FLOW	15	PF 1	0.54	46.95	47.04	47.04	47.08	0.028653	0.86	0.63	8.23	1
OVERLAND FLOW	10	PF 1	0.54	46.75	46.85	46.86	46.89	0.050017	0.89	0.61	11.71	1.25
OVERLAND FLOW	5	PF 1	0.54	46.7	46.81	46.78	46.81	0.003918	0.27	1.98	33.18	0.36
OVERLAND FLOW	0	PF 1	0.54	46.7	46.79	46.76	46.79	0.005002	0.28	1.91	36.5	0.39

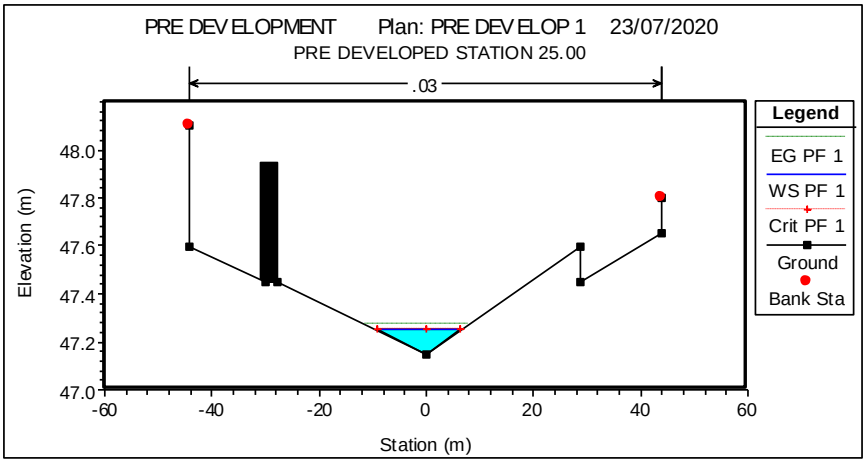


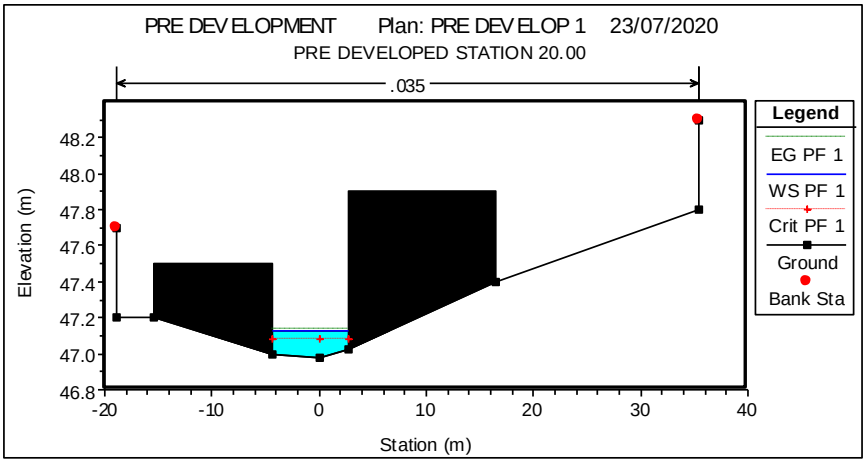


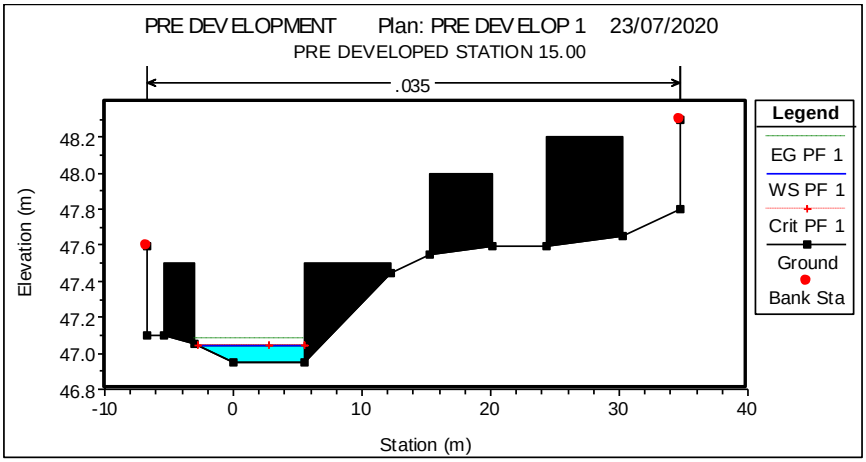


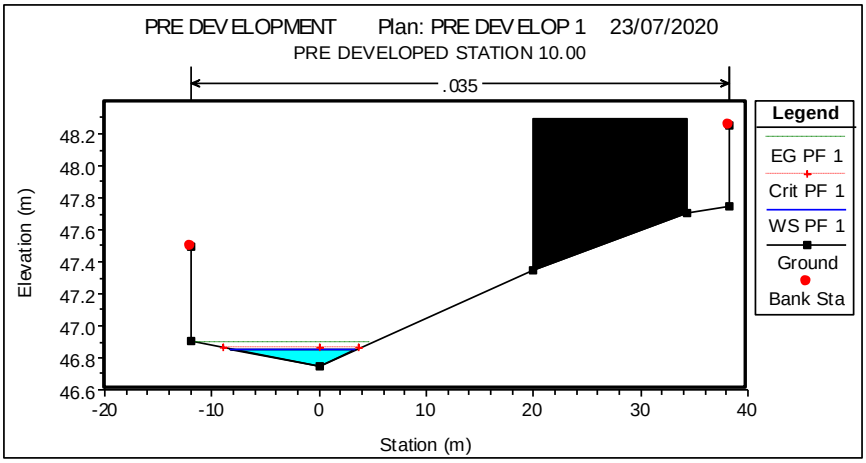


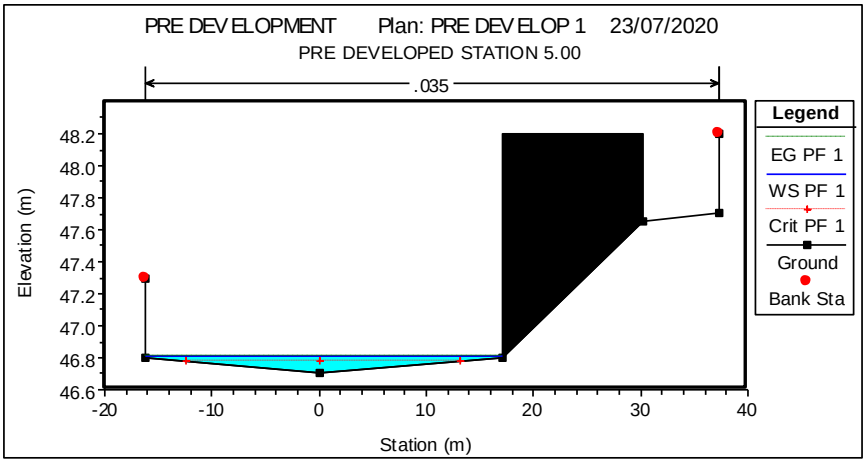


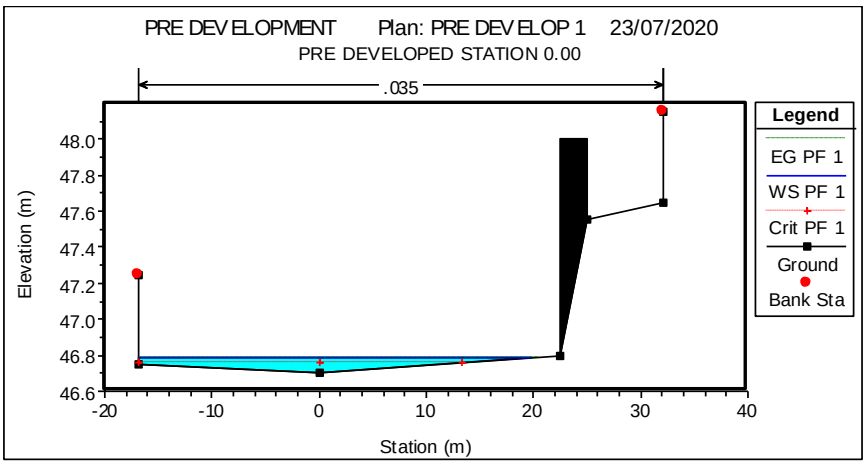


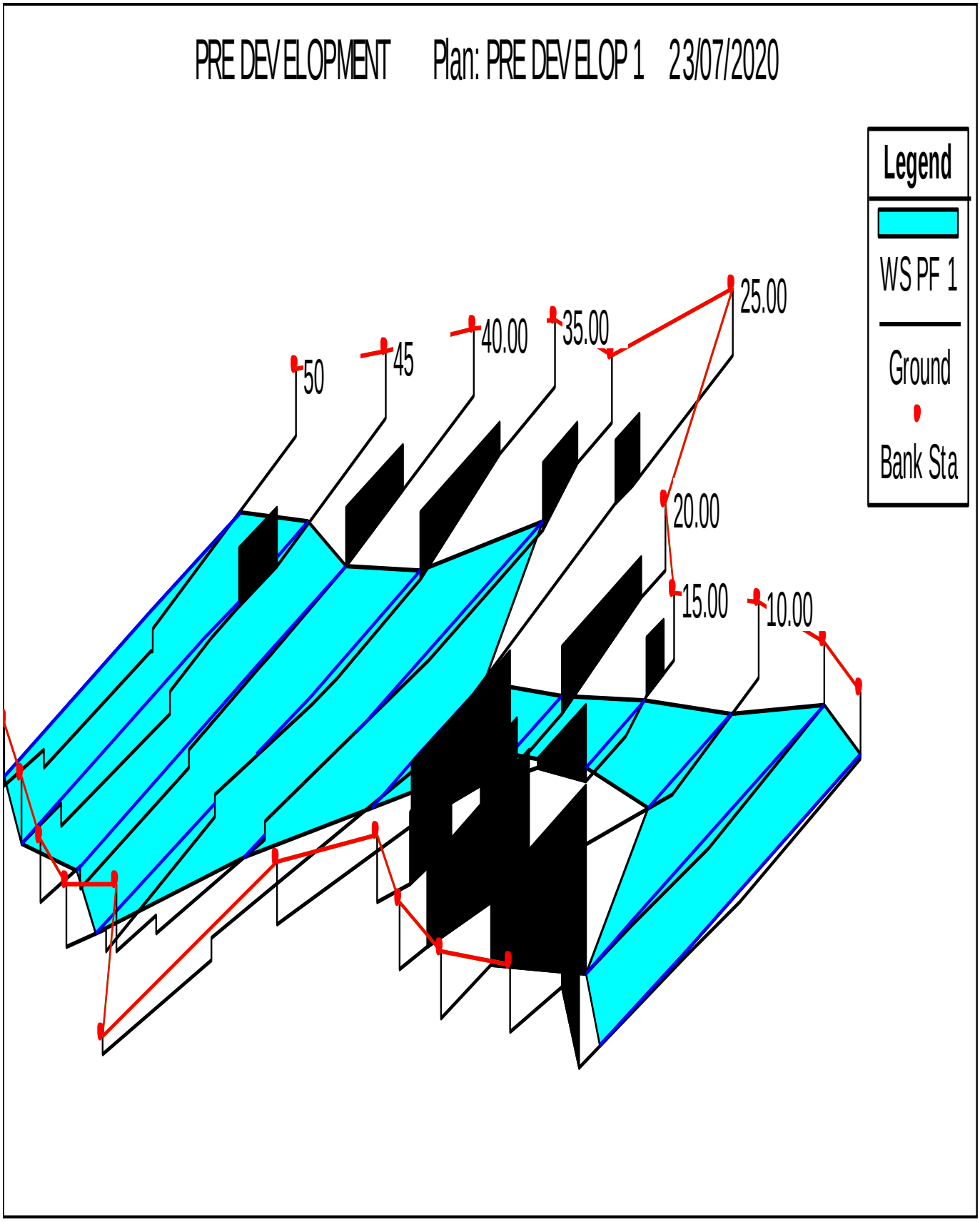


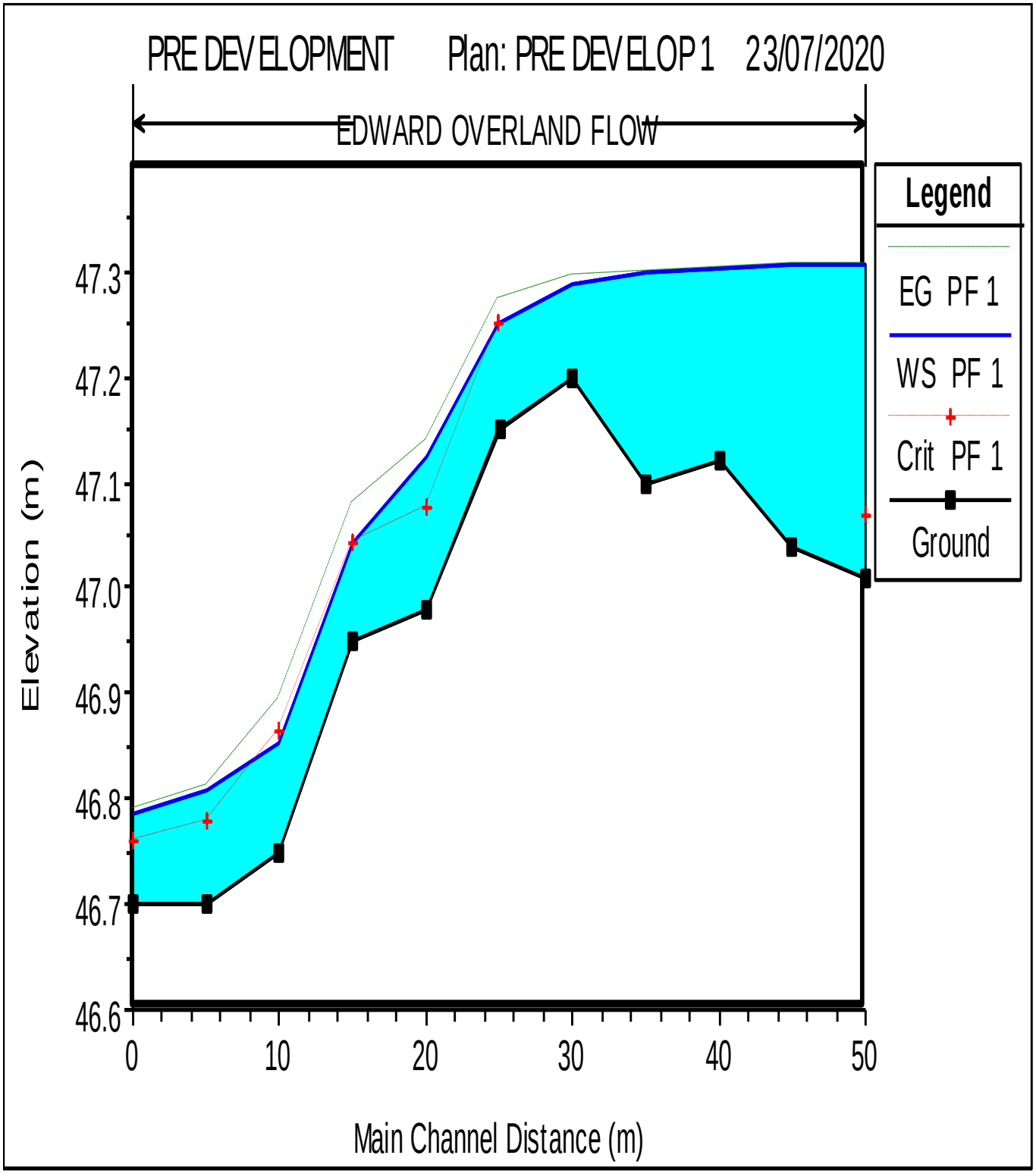












Appendix E
Post-Development HEC-RAS model

POST DEVELOPMENT

Reach	River Sta	Profile	Q Total (m3/s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area (m2)	Top Width (m)	Froude # Chl
OVERLAND FLOW	50	PF 1	0.54	47.01	47.31	47.07	47.31	0.00002	0.09	5.86	33.25	0.07
OVERLAND FLOW	45	PF 1	0.54	47.04	47.31		47.31	0.000277	0.12	4.48	34.7	0.11
OVERLAND FLOW	40	PF 1	0.54	47.12	47.31		47.31	0.001168	0.18	3.01	37.77	0.2
OVERLAND FLOW	35	PF 1	0.54	47.1	47.3		47.3	0.000771	0.21	2.57	23.54	0.2
OVERLAND FLOW	30	PF 1	0.54	47.2	47.28		47.29	0.003965	0.56	0.96	19.73	0.81
OVERLAND FLOW	25	PF 1	0.54	47.15	47.24	47.24	47.27	0.005738	0.74	0.73	12.91	1
OVERLAND FLOW	20	PF 1	0.54	46.98	47.02	47.06	47.19	0.076134	1.79	0.3	9.96	3.27
OVERLAND FLOW	15	PF 1	0.54	46.95	47.03	47.04	47.08	0.005987	0.94	0.58	7.33	1.07
OVERLAND FLOW	10	PF 1	0.54	46.75	46.81	46.85	46.98	0.280327	1.81	0.3	9.08	3.19
OVERLAND FLOW	5	PF 1	0.54	46.7	46.81	46.78	46.81	0.003918	0.27	1.98	33.18	0.36
OVERLAND FLOW	0	PF 1	0.54	46.7	46.79	46.76	46.79	0.005002	0.28	1.91	36.5	0.39