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ABN 72 427 835 198

01 April 2021

Emtom Pty Ltd & Indy Investments Pty Ltd
C/- Insite SJC
via email: shane@insitesjc.com.au

Attention: Shane Booth

RE: – Development Application for Reconfiguring a Lot for Subdivision (1 Lot into 199 Lots - 6 Stages) and Variation Request (Low Density Residential Zoning) at 134 Telegraph Road, Kalkie; land described as Lot 96 on SP187576;

Thank you for your Development Application for Reconfiguring a Lot for Subdivision (1 Lot into 199 Lots - 6 Stages) and Variation Request (Low Density Residential Zoning) at 134 Telegraph Road, Kalkie; land described as Lot 96 on SP187576 lodged with Council on 28 January 2021.

Please find attached the Decision Notice for the above-mentioned development application.

Please quote Council's application number: 521.2021.195.1 in all subsequent correspondence relating to this development application. Should you require any clarification regarding this matter or wish to schedule a meeting, please contact Katrina Peardon on telephone 1300 883 699.

Yours sincerely

Richard Jenner

Digitally signed by Richard Jenner
Date: 2021.04.06 09:22:18 +10'00'

Michael Ellery
Group Manager Development

ENCL.

- **DECISION NOTICE**
- **APPROVED PLANS**
- **ADOPTED INFRASTRUCTURE CHARGES NOTICE**

Decision Notice — Approval (with conditions)

(Given under section 63 of the Planning Act 2016)

Thank you for your development application detailed below which was properly made on 29 January 2021. Please be aware that Bundaberg Regional Council has assessed your application and decided it as follows:

1. Applicant's details

Name: Emtom Pty Ltd & Indy Investments Pty Ltd

Postal Address: C/- Insite SJC

Email: shane@insitesjc.com.au

Phone No.: 07 4151 6677

1. Location details

Street address: 134 Telegraph Road, Kalkie

Real property description: Lot 96 on SP187576

Local government area: Bundaberg Regional Council

2. Details of the proposed development

Development Permit for Reconfiguring a Lot for Subdivision (1 Lot into 199 Lots - 6 Stages) and Variation Request (Low Density Residential Zoning)

3. Decision

Decision details: Approved in full with conditions. These conditions are set out in Schedule 1 and are clearly identified to indicate whether the assessment manager or a concurrence agency imposed them.

The following approvals are given:

	Planning Regulation 2017 reference	Development Permit	Preliminary Approval
Development assessable under the planning scheme, a temporary local planning instrument, a master plan or a preliminary approval which includes a variation approval		☒	☐

4. Approved plans and specifications

Copies of the following plans, specifications and/or drawings are enclosed.

Drawing/report title	Prepared by	Date	Reference no.	Version

Aspect of development: Reconfiguring a Lot				
Plan of Proposed Subdivision Lots 1-195 & 500-503 and New Road cancelling Lot 96 on SP187576	InsiteSJC	07/10/20	GC19-026-P11	N/A
Engineering Services Report	Urban Environmental Solutions	15 October 2020	UES003003 Eng Rpt	V3
Traffic Impact Assessment	Urban Environmental Solutions	15 October 2020	UES003003 TIA Rpt	V2
Flood Study Report	Urban Environmental Solutions	15 October 2020	UES003003 134 Telegraph Rd Flood Study	V2
Masterplan – Water Reticulation	Urban Environmental Solutions	N/A	UES-003003-FIG-30	Rev E
Sewer Option 5 – Plan	Urban Environmental Solutions	N/A	UES-003003-FIG-80	Rev A
Masterplan – Sewer Reticulation OPT 6	Urban Environmental Solutions	N/A	UES003003-FIG 90	Rev A

5. Variation approval details

A preliminary approval which includes a variation approval is given and the assessment manager has approved a **variation to the local planning instrument(s)**:

- Bundaberg Regional Council Planning Scheme 2015.

The variation approved is:/The variations approved are:

Local Planning Instrument	Variation Approved
Bundaberg Regional Council Planning Scheme 2015	Part 5 – Tables of Assessment – Table 5.4.15 Emerging community zone – Levels of Assessment for Material Change of Use is overridden by the provisions of Table 5.4.1 Low density residential zone Part 5 – Tables of Assessment – Table 5.5.1 Reconfiguring a lot. Emerging community zone is overridden by provisions of Low density residential zone Part 5 – Tables of Assessment – Table 5.6.1 Building work. Emerging community zone is overridden by provisions of Low density residential zone

	Part 5 – Tables of Assessment – Table 5.9.1 Overlays. Emerging community zone is overridden by provisions of Low density residential zone

6. Conditions

This approval is subject to the conditions in Schedule 1. These conditions are clearly identified to indicate whether the assessment manager or concurrence agency imposed them.

7. Further development permits

Please be advised that the following development permits are required to be obtained before the development can be carried out:

- All Operational Work

8. Properly made submissions

Properly made submissions were received from the following principal submitters:

Name of principal submitter	Residential or Business Address	Electronic Address
Pranaya Gurung	18 Sergiacomi Drive, Kalkie	pranayagurung@gmail.com

9. Referral agencies for the application

Not applicable

10. Currency period for the approval

This development approval will lapse at the end of the period set out in section 85 of *Planning Act 2016*.

11. Agreements under Section 49(4)(b) or 66(2)(b) or (c) of the Planning Act 2016

There are no agreements about these matters.

12. Conditions about infrastructure

The following conditions about infrastructure have been imposed under Chapter 4 of the *Planning Act 2016*:

Condition/s	Provision under which the condition was imposed
15, 18d, 18e,19, 20, 22, 26, 27, 28, 29, 30	Section 145 – Non-trunk Infrastructure
35, 18f	Section 128 – Trunk Infrastructure

13. Rights of appeal

The rights of applicants to appeal to a tribunal or the Planning and Environment Court against decisions about a development application are set out in Chapter 6, Part 1 of the

Planning Act 2016. For particular applications, there may also be a right to make an application for a declaration by a tribunal (see Chapter 6, Part 2 of the *Planning Act 2016*).

Appeal by an applicant

An applicant for a development application may appeal to the Planning and Environment Court against the following:

- the refusal of all or part of the development application
- a provision of the development approval
- the decision to give a preliminary approval when a development permit was applied for
- a deemed refusal of the development application.

An applicant may also have a right to appeal to the Development tribunal. For more information, see Schedule 1 of the *Planning Act 2016*.

Appeal by a submitter

A submitter for a development application may appeal to the Planning and Environment Court against:

- any part of the development application for the development approval that required impact assessment
- a variation request.

The timeframes for starting an appeal in the Planning and Environment Court are set out in Section 229 of the *Planning Act 2016*.

Schedule 2 is an extract from the *Planning Act 2016* that sets down the applicant's appeal rights and the appeal rights of a submitter.

SCHEDULE 1 – CONDITIONS AND ADVICE

SCHEDULE 1 CONDITIONS AND ADVICES IMPOSED BY THE ASSESSMENT MANAGER

NO.	CONDITION	TIMING
GENERAL		
1.	Comply with all conditions of this development approval prior to the submission of the survey plan for endorsement, unless otherwise stated within this notice.	As indicated
2.	Where there is any conflict between the conditions of this Development approval and details shown on the Approved plans, the conditions prevail.	At all times
3.	The full cost of all work and any other requirements associated with this development must be met by the developer, unless specified in a particular condition or Infrastructure agreement.	At all times
AGRICULTURAL BUFFERS		
4.	Establish a vegetated agricultural buffer (Transitional Buffer Type C) on proposed Lot 101, Lot 503 and Lot 500 in accordance with the Planning Scheme Policy for Agricultural Buffers. The vegetated agricultural buffers are to form part of the following stages of development: • Lot 503 is to be provided in Stage 1 • Lot 101 is to be provided in Stage 2 • Lot 500 is to be provided in Stage 4 & 5	Prior to the endorsement of the survey plan and then to be maintained until such time as agreed to by the Assessment Manager
5.	A vegetation covenant must be registered against the titles of the property (Lot 101, Lot 503 and Lot 500) over the required vegetated agricultural buffer pursuant to Section 97A of the Land Title Act 1994. The covenant document and a Survey Plan must be submitted to Council for endorsement prior to the lodgement with the relevant titles authority for registration of title. The covenant document must (a) incorporate the requirements of this Decision Notice (b) include Bundaberg Regional Council as Covenantee (c) reference Queensland Land Title Registry Standard Terms Document No. 713966030.	Prior to the endorsement of the survey plan
6.	If a provision included in the covenant document is requisitioned or refused registration by the State (Titles Office), a substitute provision must be included in the document which as nearly as practicable addresses the objective sought by the requisitioned or refused provision. The wording of the substituted provision must be submitted for approval to the Assessment Manager.	Prior to the endorsement of the survey plan
7.	The obligations of the registered covenants must be complied with by the present land owner and all successors in title.	At all times

NO.	CONDITION	TIMING
8.	Lot 101 & Lot 503 are to remain undeveloped for buffering purposes with no residential uses permitted until such time as Lot 1 on RP24913 is developed for urban purposes.	As indicated
STAGING		
9.	Development is to be carried out in accordance with the stages identified on the Approved plans. Staging must be completed sequentially in the stage order indicated on the Approved plans unless otherwise agreed to by the assessment manager.	As indicated
10.	Lot 63 is to form part of Stage 2 of the development, to ensure a vegetated agricultural buffer is provided to the rear property boundary.	As indicated
STREET NAMES		
11.	Submit for approval to the Assessment Manager a written request for the proposed naming of the streets. Each new street / road must be provided with three (3) suggested names that: a. reflect aspects of the area in which the streets are located, including historical names, unless otherwise determined by the Assessment manager. The order of preference in allocating street names is: i. historical persons / historical place name ii. other relevant aspects (e.g. local flora and fauna) iii. themes. Where themed names are proposed, a list of street names for the entire development must be submitted as part of the Operational works application for stage 1 of the development b. are nouns and generally contain one (1) word. Composite works may be acceptable when they supplement the primary name c. are unique and unambiguous to the local government area	Prior to the submission of an Operational works application
12.	Supply and erect all necessary street signs and posts.	Prior to the endorsement of the survey plan
OPERATIONAL WORK ASSOCIATED WITH THE ROL		
13.	Ensure all assessable Operational work is carried out in accordance with a valid Operational work approval.	Prior to the commencement of work
CONSTRUCTION MANAGEMENT		
14.	Unless otherwise approved in writing by the Assessment Manager, ensure no audible noise from work is made: a. on a business day or Saturday, before 6:30am or after 6:30pm on any other day, at any time.	At all times during construction

NO.	CONDITION	TIMING
STORMWATER		
15.	Provide stormwater management in accordance with UES Engineering Services & Flood Study Reports both dated 15 October 2020 except: a. Minimise the number of outlets discharging to the detention basins The drainage specifics must be determined as part of the operational work assessment process.	Prior to the site work commencing and at all times during construction and then to be maintained
WATER		
16.	Provide reticulated water in accordance with UES Engineering Services Report dated 15 October 2020 & drawing UES-003003-FIG-30 Rev E Masterplan – Water Reticulation. The reticulated water specifics must be determined as part of the operational work assessment process. **Note:** The 'pink' trunk main won't need to extend past the stage 4 Tee under this decision notice and the road crossing near proposed lot 15 is not required	Prior to the endorsement of the endorsement of the survey plan
17.	All 'live' reticulated water work must be undertaken by Council.	At all times
SEWERAGE		
18.	Provide reticulated sewer in accordance with UES Engineering Services Report dated 15 October 2020, drawing UES-003003-FIG-90 Rev A Sewer Option 6 (gravity) or drawing UES-003003-FIG-80 Rev A Sewer Option 5 (pump station) – Plan except: a. Minimise number of trunk access chambers by using non-standard alignment b. Minimise depth of trunk mains following open drains and historic lot precinct road corridors where feasible c. Maximise length of trunk sewer reaches by using non-standard alignment d. 'non-trunk' 1/3-7/3 to service stages 1, 2 & 3 only e. Connect the existing pump station control manhole to the stage 4 outlet via a direct trunk main prior to or with stage 4 f. Option to decommission existing pump station with stage 4 and either, to the satisfaction of the assessment manager: i. Commission a new pump station at the outlet of stage 4 (option 5), or ii. Connect to Hartnell Street – No.1 trunk main in FE Walker Street near the Ring Road overpass (option 6) The sewer specifics must be determined as part of the operational work assessment process, noting development beyond Stage 3 cannot drain to the existing pump station.	Prior to the endorsement of the endorsement of the survey plan

NO.	CONDITION	TIMING
19.	Decommission ~140m existing sewer reaches (2/X1-3/X1-4/X1-5/X1) discharging to existing sewerage access chamber SMH.09012 (opposite proposed lot 3).	As part of the first 'civils' operational work application
20.	Provide a new point of connection to service Lot 97 on SP187576 (78 Telegraph Road).	As part of the first 'civils' operational work application
21.	All 'live' reticulated sewer work must be undertaken by Council.	At all times
ROADWORKS		
22.	Provide roadwork in accordance with UES Engineering Services Report dated 15 October 2020 & drawing UES-003003-FIG-03 Rev C Masterplan – Roadworks except: a. 20m road corridors in accordance with BRC standard drawing R2003 – collector street – low density b. 18m road corridors in accordance with BRC standard drawing R2004 – Access Street – Low Density c. 25m road corridor in accordance with BRC standard drawing R2002 – Trunk Collector – Greenfield to 'centreline+1m' between Telegraph Road and the stage 4 intersection d. Telegraph Road corridor in accordance with UES drawing UES003003-FIG-01 Rev C – Trunk Road Infrastructure to 'centreline+1m' The roadwork specifics must be determined as part of the operational work assessment process.	Prior to the site work commencing and at all times during construction and then to be maintained
23.	Intersection designs and speed restriction devices must be in accordance with Main Roads Road Planning and Design Manual, Austroads *Guide to Road Design Part 4A: Unsignalised and Signalised Intersections & Complete Streets*. The intersection designs and speed restriction devices specifics must be determined as part of the operational work assessment process.	Prior to the endorsement of the survey plan
24.	Provide for temporary turnaround at each stage boundary. The temporary turnaround specifics must be determined as part of the operational work assessment process.	Prior to the endorsement of the survey plan
25.	Repair any damaged kerb and channel, footpath, or road (including removal of concrete slurry from footpath, roads, kerb and channel, and stormwater gullies and drain lines) and reinstate existing traffic signs and pavement markings that have been removed or damaged during any works carried out in association with the approved development.	Prior to the endorsement of the endorsement of the survey plan
PEDESTRIAN AND CYCLIST PATHS		
26.	Provide pedestrian and cyclist paths in accordance with the Planning (Walkable Neighbourhoods) Amendment Regulation 2020. A 1.5m wide path is to be provided along all new roads providing direct access to created residential lots. A 2.0m wide path is to be provided along the existing Telegraph Road and proposed Telegraph Road extension.	Prior to the endorsement of the endorsement of the survey plan for the relevant

NO.	CONDITION	TIMING
	The pedestrian and cyclist path specifics must be determined as part of the operational work assessment process.	stage of development
STREET TREES		
27.	Provide street trees in accordance with Planning (Walkable Neighbourhoods) Amendment Regulation 2020. The street tree specifics must be determined as part of the operational work assessment process.	Prior to the endorsement of the endorsement of the survey plan
ELECTRICITY, STREET LIGHTING, TELECOMMUNICATIONS		
28.	Provide for telecommunications in accordance with the Planning scheme policy for development works. ***Note:*** *Submission of the detail design must form part of an Operational works application.*	Prior to the endorsement of the survey plan
29.	Provide for electrical reticulation in accordance with the Planning scheme policy for development works. ***Note:*** *Submission of the detail design must form part of an Operational works application.*	Prior to the endorsement of the survey plan
30.	Provide lighting to public areas in accordance with the Planning scheme policy for development works. ***Note:*** *Submission of the detail design must form part of an Operational works application.*	Prior to the endorsement of the survey plan
SERVICES AND STRUCTURES		
31.	Supply and install all service conduits and meet the cost of any alterations to public utility mains, existing mains, services, installations required in connection with the development in accordance with the applicable Planning scheme codes, Planning scheme policy for development works, or requirements of the individual service provider.	Prior to the endorsement of the survey plan
32.	Ensure all existing and proposed utility services and connections (e.g. electricity, telecommunications, water, and sewerage) are wholly located within each lot that they serve or within a suitable easement to the satisfaction of the Assessment Manager.	Prior to the endorsement of the survey plan
GAS PIPELINE BUFFER		
33.	Provide a risk management plan for construction work adjacent to the gas pipeline to the satisfaction of an appropriately qualified person (APA Group representative). Submit evidence to Council as part of the first Operational Works application that the proposed works and subsequent building works on new lots, locating within the 100m gas pipeline buffer is to the satisfaction of the operator's (APA Group) requirements.	Prior to the commencement of work

NO.	CONDITION	TIMING
CANE RAILWAY BUFFER		
34.	Submit and have approved by the assessment manager an acoustic and vibration assessment of the cane railway line as it relates to potential impacts to the development. The acoustic and vibration assessment is to be undertaken by a suitably qualified person and to form part of the first Operational Works application for the development. The recommendations of the endorsed acoustic report are to be structured so as to be incorporated into each relevant stage of development.	Prior to the endorsement of the survey plan
EASEMENTS, LAND DEDICATION & STAGING		
35.	Dedicate 'New Road' with the respective stage unless required otherwise by this condition: 25m width plus truncation to Telegraph Road along the full length of the eastern property boundary (~600m) of Lot 96 on SP187576 (subject site) for future road P.RD.0010 must be dedicated as part of Stage 1 of the development.	When the survey plan is endorsed
36.	Proposed Lot 101 (5,000m^2) will not be accepted as dedicated park.	When the survey plan is endorsed
37.	Lodge to the State (Titles office) for registration the following easement documentation: a. Drainage easement in gross over stormwater infrastructure and flow paths within proposed lots 500, 501, 502 with the first survey plan b. Sewerage easement in gross over sewerage infrastructure within proposed lots 500, 501, 502 503 & 101 with the first survey plan c. Right of Way access easement over each temporary turnaround outside new road dedicated with the respective stage survey plan The easement extent specifics must be determined as part of the operational work assessment process.	When the survey plan is endorsed
38.	Submit draft easement documentation to the Assessment Manager with the plan seal request for each stage.	When the survey plan is endorsed
39.	Demonstrate development stormwater and sewerage work within proposed lot 502 does not conflict with existing easements: a. Easement D in SP115327 b. Easement B in RP150654 c. Easements A in RP91379 The easement interaction specifics must be determined as part of the operational work assessment process.	When the survey plan is endorsed
40.	All works must be clear of any existing or proposed easements on the subject land, unless agreed in writing by the Grantee.	At all times
41.	Ensure that any easement and rights pertaining to the parcel of land associated with this approval are maintained unless	When the survey plan is endorsed

NO.	CONDITION	TIMING
	otherwise stated on the approved plan(s) or the conditions of this approval. Proof of the registration or surrender of any easements is to be submitted to the Assessment Manager at the time of the submission of the Survey plan for endorsement.	

PART 1B – ADVICE NOTES

NO.	ADVICE	TIMING
INFRASTRUCTURE CHARGES		
1.	Infrastructure charges notice (331.2020.1187.1) applicable to the development is attached to this Development approval.	At all times
RATES AND CHARGES		
2.	In accordance with the *Planning Act 2016*, all rates, charges, or any expenses being a charge over the subject land under any Act must be paid prior to the Plan of Subdivision being endorsed by the Assessment Manager.	Prior to the endorsement of the survey plan
ENVIRONMENTAL HARM		
3.	The *Environmental Protection Act 1994* states that a person must not carry out any activity that causes, or is likely to cause, environmental harm unless the person takes all reasonable and practicable measures to prevent or minimise the harm. Environmental harm includes environmental nuisance. In this regard persons and entities, involved in the civil, earthworks, construction, and operational phases of this development, are to adhere to their 'general environmental duty' to minimise the risk of causing environmental harm. Environmental harm is defined by the Act as any adverse effect, or potential adverse effect whether temporary or permanent and of whatever magnitude, duration or frequency on an environmental value and includes environmental nuisance. Therefore, no person should cause any interference with the environment or amenity of the area by reason of the emission of noise, vibration, smell, fumes, smoke, vapour, steam, soot, ash, dust, wastewater, waste products, grit, sediment, oil, or otherwise, or cause hazards likely in the opinion of the administering authority to cause undue disturbance or annoyance to persons or affect property no connected with the use.	At all times

PART 1C – PROPERTY NOTES

NO.	ADVICE
1.	Development approval 521.2021.195.1 – Cane railway The following notation applies to the approved Lots 1, 16, 17, 44-50, 77-87, 115-133, 154-176, 188-195: All future purchases of the subject land should note that the land is in proximity to the cane railway corridor and may be subject to adverse environmental effects associated with the operation of the cane railway.
2.	Development approval 521.2021.195.1 – Agricultural buffer The following notation applies to the approved Lots 101 & 503: All future purchases of the subject land should note that Lot 101 & Lot 503 are to remain for buffering purposes with no residential uses permitted until such time as Lot 1 on RP24913 is developed for urban purposes.
3.	Development approval 521.2021.195.1 – Gas pipeline buffer The following notation applies to the approved Lots 1-31 & 45: All future purchases of the subject land should note that Lots 1-31 & 45 locate within the 100m gas pipeline buffer.

SCHEDULE 2 – PA EXTRACT ON APPEAL RIGHTS

CHAPTER 6, PART 1 APPEAL RIGHTS

229 Appeals to tribunal or P&E Court

(1) Schedule 1 states—

(a) matters that may be appealed to—

(i) either a tribunal or the P&E Court; or

(ii) only a tribunal; or

(iii) only the P&E Court; and

(b) the person—

(i) who may appeal a matter (the appellant); and

(ii) who is a respondent in an appeal of the matter; and

(iii) who is a co-respondent in an appeal of the matter; and

(iv) who may elect to be a co-respondent in an appeal of the matter.

(2) An appellant may start an appeal within the appeal period.

(3) The **appeal period** is—

(a) for an appeal by a building advisory agency—10 business days after a decision notice for the decision is given to the agency; or

(b) for an appeal against a deemed refusal—at any time after the deemed refusal happens; or

(c) for an appeal against a decision of the Minister, under chapter 7, part 4, to register premises or to renew the registration of premises—20 business days after a notice is published under section 269(3)(a) or (4); or

(d) for an appeal against an infrastructure charges notice—20 business days after the infrastructure charges notice is given to the person; or

(e) for an appeal about a deemed approval of a development application for which a decision notice has not been given—30 business days after the applicant gives the deemed approval notice to the assessment manager; or

(f) for any other appeal—20 business days after a notice of the decision for the matter, including an enforcement notice, is given to the person.

Note — See the P&E Court Act for the court's power to extend the appeal period.

(4) Each respondent and co-respondent for an appeal may be heard in the appeal.

(5) If an appeal is only about a referral agency's response, the assessment manager may apply to the tribunal or P&E Court to withdraw from the appeal.

(6) To remove any doubt, it is declared that an appeal against an infrastructure charges notice must not be about—

(a) the adopted charge itself; or

(b) for a decision about an offset or refund—

(i) the establishment cost of trunk infrastructure identified in a LGIP; or

(ii) the cost of infrastructure decided using the method included in the local government's charges resolution.

230 Notice of appeal

(1) An appellant starts an appeal by lodging, with the registrar of the tribunal or P&E Court, a notice of appeal that—

(a) is in the approved form; and

(b) succinctly states the grounds of the appeal.

(2) The notice of appeal must be accompanied by the required fee.

(3) The appellant or, for an appeal to a tribunal, the registrar must, within the service period, give a copy of the notice of appeal to—

(a) the respondent for the appeal; and

(b) each co-respondent for the appeal; and

(c) for an appeal about a development application under schedule 1, table 1, item 1—each principal submitter for the development application; and

(d) for an appeal about a change application under schedule 1, table 1, item 2—each principal submitter for the change application; and

(e) each person who may elect to become a co-respondent for the appeal, other than an eligible submitter who is not a principal submitter in an appeal under paragraph (c) or (d); and

(f) for an appeal to the P&E Court—the chief executive; and

(g) for an appeal to a tribunal under another Act—any other person who the registrar considers appropriate.

(4) The **service period** is—

(a) if a submitter or advice agency started the appeal in the P&E Court—2 business days after the appeal is started; or

(b) otherwise—10 business days after the appeal is started.

(5) A notice of appeal given to a person who may elect to be a co-respondent must state the effect of subsection (6).

(6) A person elects to be a co-respondent by filing a notice of election, in the approved form, within 10 business days after the notice of appeal is given to the person.

SCHEDULE 1 APPEALS

1 Appeal rights and parties to appeals

(1) Table 1 states the matters that may be appealed to—

(a) the P&E court; or

(b) a tribunal.

(2) However, table 1 applies to a tribunal only if the matter involves—

(a) the refusal, or deemed refusal of a development application, for—

(i) a material change of use for a classified building; or

(ii) operational work associated with building work, a retaining wall, or a tennis court; or

(b) a provision of a development approval for—

(i) a material change of use for a classified building; or

(ii) operational work associated with building work, a retaining wall, or a tennis court; or

(c) if a development permit was applied for—the decision to give a preliminary approval for—

(i) a material change of use for a classified building; or

(ii) operational work associated with building work, a retaining wall, or a tennis court; or

(d) a development condition if—

(i) the development approval is only for a material change of use that involves the use of a building classified under the Building Code as a class 2 building; and

(ii) the building is, or is proposed to be, not more than 3 storeys; and

(iii) the proposed development is for not more than 60 sole-occupancy units; or

(e) a decision for, or a deemed refusal of, an extension application for a development approval that is only for a material change of use of a classified building; or

(f) a decision for, or a deemed refusal of, a change application for a development approval that is only for a material change of use of a classified building; or

(g) a matter under this Act, to the extent the matter relates to—

(i) the Building Act, other than a matter under that Act that may or must be decided by the Queensland Building and Construction Commission; or

(ii) the Plumbing and Drainage Act, part 4 or 5; or

(h) a decision to give an enforcement notice in relation to a matter under paragraphs (a) to (g); or

(i) a decision to give an infrastructure charges notice; or

(j) the refusal, or deemed refusal, of a conversion application; or

(k) a matter that, under another Act, may be appealed to the tribunal; or

(l) a matter prescribed by regulation.

(3) Also, table 1 does not apply to a tribunal if the matter involves—

(a) for a matter in subsection (2)(a) to (d)—

(i) a development approval for which the development application required impact assessment; and

(ii) a development approval in relation to which the assessment manager received a properly made submission for the development application; or

(b) a provision of a development approval about the identification or inclusion, under a variation approval, of a matter for the development.

(4) Table 2 states the matters that may be appealed only to the P&E Court.

(5) Table 3 states the matters that may be appealed only to the tribunal.

(6) In each table—

(a) column 1 states the appellant in the appeal; and

(b) column 2 states the respondent in the appeal; and

(c) column 3 states the co-respondent (if any) in the appeal; and

(d) column 4 states the co-respondents by election (if any) in the appeal.

(7) If the chief executive receives a notice of appeal under section 230(3)(f), the chief executive may elect to be a co-respondent in the appeal.

Extract of Schedule 1 of the Planning Act 2016

Table 1
Appeals to the P&E Court and, for certain matters, to a tribunal

1. Development applications

An appeal may be made against—

(a) the refusal of all or part of the development application; or

(b) the deemed refusal of the development application; or

(c) a provision of the development approval; or

(d) if a development permit was applied for—the decision to give a preliminary approval.

Column 1 Appellant	Column 2 Respondent	Column 3 Co-respondent (if any)	Column 4 Co-respondent by election (if any)
The applicant	The assessment manager	If the appeal is about a concurrence agency's referral response—the concurrence agency	1 A concurrence agency that is not a co-respondent 2 If a chosen assessment manager is the respondent—the prescribed assessment manager 3 Any eligible advice agency for the application 4 Any eligible submitter for the application

Table 2
Appeals to the P&E Court only

2. Eligible submitter appeals

An appeal may be made against the decision to give a development approval, or an approval for a change application, to the extent that the decision relates to—

(a) any part of the development application for the development approval that required impact assessment; or

(b) a variation request.

Column 1 Appellant	Column 2 Respondent	Column 3 Co-respondent (if any)	Column 4 Co-respondent by election (if any)
1 For a development application—an eligible submitter for the development application 2 For a change application—an eligible submitter for the change application	1 For a development application—the assessment manager 2 For a change application—the responsible entity	1 The applicant 2 If the appeal is about a concurrence agency's referral response—the concurrence agency	Another eligible submitter for the application

3. Eligible submitter and eligible advice agency appeals

An appeal may be made against a provision of a development approval, or failure to include a provision in the development approval, to the extent the matter relates to—

(a) any part of the development application or the change application, for the development approval, that required impact assessment; or

(b) a variation request.

Column 1 Appellant	Column 2 Respondent	Column 3 Co-respondent (if any)	Column 4 Co-respondent by election (if any)
1 For a development application—an eligible submitter for the development application 2 For a change application—an eligible submitter for the change application 3 An eligible advice agency for the development application or change application	1 For a development application—the assessment manager 2 For a change application—the responsible entity	1 The applicant 2 If the appeal is about a concurrence agency's referral response—the concurrence agency	Another eligible submitter for the application

Note:
Attached is a Rights of Appeal Waiver form (Schedule 3). Please complete and return this form if you are satisfied with the approval and agree to the conditions contained therein and you wish to waiver the 20 day appeal period available under the *Planning Act 2016*

SCHEDULE 3 – RIGHT OF APPEAL WAIVER

Mail To: Bundaberg Regional Council
Email Address: development@bundaberg.qld.gov.au
Attention: Development Assessment

RE:
Council reference: 521.2021.195.1
Property Address: 134 Telegraph Road, Kalkie; land described as Lot 96 on SP187576

This advice is to confirm that I/We have received the above approval and agree to the conditions contained therein. I/We hereby waiver My/Our appeal rights available under the *Planning Act 2016.*

Applicant's Name: _____

Signature: _____

Date: _____

Scale 1:1250 – Lengths are in Metres.

10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190

Area of New Road
259 m²

APPROVED PLAN
Date: 31/03/2021
Application No.: 521.2021.195.1
BUNDABERG REGIONAL COUNCIL

N

TELEGRAPH ROAD

NEW ROAD

57°50'50" (430.682)

EMT B RP162787

EMT C RP162788

EMT D SP115327

97 SP198576

95 SP182568

ROAD

357°07'45" 90.282

357°08'20" 47.193

21°13'15" 42.106

25°47'25" 4.412

334°37'30" (171.99)

EMT A RP91379

/ SP115331

41°19'40" 9.272

32°07'10" (45.9)

311°19'40" 45.627

EMT B RP150654

EMT E

221.532

292°33'

66.7

120 120

SP115327

29°53'10" 3.971

90 SP115327

EMT A RP91379

/ RP24913

148°07'35" (600.29)

234°41' (139.47)

229°15' (46.98)

154°40' 9.88

91 SP140598

108 C37357

NEW ROAD (18.0m wide)

(20.0m wide)

(25.0m wide)

1 810 m²	2 808 m²	3 808 m²	4 808 m²	5 808 m²	6 808 m²	7 808 m²	8 808 m²	9 808 m²	10 808 m²	11 808 m²	12 808 m²	13 808 m²	14 808 m²	15 808 m²		
16 738 m²	17 868 m²	18 820 m²	19 820 m²	20 820 m²	21 820 m²	22 820 m²	23 820 m²	24 820 m²	25 820 m²	26 820 m²	27 820 m²	28 954 m²	29 1008 m²	30 1137 m²	503 5588 m²	
45 636 m²	46 615 m²	47 608 m²	48 688 m²	49 757 m²	44 830 m²	43 790 m²	42 788 m²	41 788 m²	40 788 m²	39 788 m²	38 788 m²	37 788 m²	36 788 m²	35 788 m²	34 788 m²	33 778 m²
31 922 m²	32 810 m²	62 790 m²	63 1006 m²	64 1070 m²	101 5000 m² Park											
81 904 m²	80 817 m²	79 930 m²	78 834 m²	77 826 m²	76 788 m²	75 788 m²	74 788 m²	73 788 m²	72 778 m²							
82 901 m²	83 872 m²	84 844 m²	85 838 m²	86 939 m²	87 978 m²	88 787 m²	89 788 m²	90 788 m²	91 788 m²	92 706 m²	93 703 m²	94 788 m²	95 788 m²	96 788 m²	97 788 m²	98 719 m²	99 719 m²	100 719 m²
71 779 m²	70 788 m²	69 788 m²	68 788 m²	67 816 m²	66 890 m²	65 1090 m²										
121 744 m²	122 694 m²	123 680 m²	124 696 m²	125 742 m²	126 820 m²	120 890 m²	119 843 m²	118 838 m²	117 796 m²	116 786 m²	115 807 m²	114 788 m²	113 788 m²	112 788 m²	111 788 m²	110 703 m²
109 706 m²	108 788 m²	107 788 m²	106 788 m²	105 788 m²	104 714 m²	103 714 m²	102 714 m²									
163 697 m²	162 781 m²	161 725 m²	160 725 m²	159 725 m²	158 750 m²	157 769 m²	156 788 m²	155 788 m²	154 788 m²	153 788 m²	152 788 m²	151 788 m²	150 788 m²	149 788 m²	148 788 m²	147 778 m²
164 695 m²	165 735 m²	166 735 m²	167 741 m²	168 1079 m²	169 726 m²	170 822 m²	171 763 m²	172 788 m²	173 788 m²	174 788 m²	175 788 m²	176 788 m²	177 788 m²	178 788 m²	179 788 m²	180 788 m²	181 778 m²
137 778 m²	138 788 m²	139 788 m²	140 787 m²	141 788 m²	142 889 m²	143 1098 m²										
144 1005 m²	145 810 m²	146 810 m²	182 810 m²	183 810 m²												
501 220 m²	502 2.44 ha	500 5.9 ha														
195 1026 m²	194 806 m²	193 788 m²	192 788 m²	191 788 m²	190 788 m²	189 788 m²	188 788 m²	187 788 m²	186 788 m²	185 788 m²	184 779 m²					

STAGING

Stage 1	Lots 16 - 45, 62, 63 & 503
Stage 2	Lots 46 - 61 & 64-81
Stage 3	Lots 1 - 15 & New Road
Stage 4	Lots 82 - 100, 102 - 122
Stage 5	Lots 123 - 163
Stage 6	Lots 164 - 195, 500 - 502

Footpath

Insite SJC
Town Planning | Surveying | Projects
ABN 62 329 746 562
Phone: 07 4151 6677
67 Barolin Street
PO Box 1688
BUNDABERG QLD 4670
admin@insitesjc | c
www | i

PLAN OF PROPOSED SUBDIVISION

Lots 1–195 & 500–503 and New Road cancelling Lot 96 on SP187576
134 Telegraph Road, Kalkie

CLIENT: Emtom Pty Ltd and Indy Investments Pty Ltd

SCALE: 1:1250 on A1

PROPOSAL PLAN ONLY
Not to be used for contractual purposes.

Areas & Dimensions are approximate only & subject to Council's Conditions of approval & final survey.

DESIGN	DRAWN	CHECKED	PLAN REFERENCE No.
SB	JR	SB	GC19–026 –P11
DATE Oct. 2020	DATE 07/10/20	DATE 07/10/20	

UES

Proposed Residential Subdivision
134 Telegraph Rd, Kalkie
Engineering Services Report

Prepared for EMTOM Pty Ltd

15 October 2020

Document Information

Prepared for	EMTOM Pty Ltd
File Reference	UES003003 Eng Rpt V3
Project Number	UES003003
Date	15 October 2020

Contact Information

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www.urbanenvironmentalsolutions.com.au

Document Control

Version	Date	Author		Reviewer	
1	30 April 2020	Jesse Stubbs	JS	Gavin Fields	
2	25 May 2020	Gavin Fields	GF	Gavin Fields	
3	15 October 2020	Gavin Fields	GF	Gavin Fields	

Table of Contents

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1 Introduction

Urban Environmental Solutions (UES) has been engaged by EMTOM Pty Ltd to prepare this Engineering Services Report for the proposed Material Change of Use and Reconfiguration of Allotment application for their site at 134 Telegraph Road, Kalkie. This report forms part of a development application to Bundaberg Regional Council (BRC) in support of the proposed works and is to be read in conjunction with the Flood Study, prepared by UES, in addition to town planning reporting by Insite SJC.

2 Site Characteristics

The development site has a total area of 308,800m^2 (30.880ha) and is described as Lot 96 on SP187576. The site has boundary frontage on Telegraph Road to the north, with the Bundaberg Ring Road to the west. The site is adjacent to an agricultural property to the east and a rural property to the south. A tributary of Bundaberg Creek is located to the east and south, which discharges across Fe Walker Street to the south. A defined overland flow path that collects runoff from the catchment to the north discharges through the site along the north-west boundary before ultimately discharging into the tributary to the south. An aerial photograph showing the site locality is presented in Figure 1.

Figure 1: Site Location (Source: Nearmap, 2020)

The site, in its existing state, is a cleared rural lot that is largely un-serviced. As noted above, access is from Telegraph Road along the northern frontage. The regional cane rail network also passes through the site along the south-western boundary. There is also a gas main and low and high voltage overhead power lines that run along the southern side of Telegraph Road, which we understand have capacity to supply the site in varying formats.

2.1 Site Topography

The existing terrain within the site ranges from a high elevation of approximately RL 19.12m AHD south and east of the internal area of the site with a low elevation of RL 11.30m AHD in the overland flow path at the north-western boundary. The average slope across the site is approximate 1.5% although there are some minor areas with steeper gradients. The site has been subject to survey by Straughair & Bent, with the relevant survey plans included in **Appendix A**.

In addition to the site-based survey, we have obtained the regional LiDAR information from the ELVIS online database, which is for the aerial survey completed in 2016. This information has been used to verify external stormwater catchments and other indicative surface elevations for other infrastructure assets. We note that we also obtained the 2011 LiDAR data for comparison purposes as this dataset was utilised in the Bundaberg Creeks Flood Analysis that was completed in 2013.

3 Proposed Site Layout

The proposed site layout was developed in conjunction with Insite SJC. In response to discussions with Council's Technical and Planning Officers we have jointly modified the originally proposed layout with the proposed Plan of Subdivision included in **Appendix B**. The layout proposes the establishment of new residential allotments and a park, serviced by road reserve and stormwater drainage areas, with a balance allotment to the south. The proposed residential allotments will have a general area of 800m^2 with some variation to account for site geometry and grading requirements.

4 Site Flooding

A review of BRC flood mapping was completed for the site by reviewing the Flood Hazard Assessment Report mapping for the locality. The key flood map is presented in **Appendix C**. The mapping confirms that the site is subject inundation in varying extents for the major design storm event, being the 1% annual exceedance probability (AEP) flood event. The minor design storm event is the 18.39% AEP or 1 in 5 year average recurrence interval (ARI) event for the residential aspect of the development, with the trunk road sections along Telegraph Road and the eastern trunk road within the development having a design storm requirement of the 10% AEP or 1 in 10 year ARI.

A detailed review of the site drainage was undertaken given that the BRC flood mapping for the locality is based on the 2013 analysis and does not take into account the updated LiDAR data that has been available since 2016. Additionally, the site represents a notable area of the upper extent of the regional model and the site survey is therefore also seen to be a valuable addition to the flood modelling. Details of the flood analysis is presented in the UES Flood Study that has been prepared in conjunction with this report.

5 Acid Sulfate Soils

The development site has been identified on BRC's Interactive Mapping as having potential acid sulfate soils. According to the Acid Sulfate Overlay, the site is subject to having potential acid sulfate soils between RL 5m and 20m AHD, which is referred to as 'Category 2'. A construction management plan will be developed to ensure that appropriate measures are implemented during the earthworks and trenching associated with stormwater infrastructure to identify, manage, and treat any acid sulfate bearing material within the site. An Acid Sulfate Soils Management Plan will also be prepared and submitted to Council as part of the future application for Operational Works.

6 Environmental

While the site has been subject to clearing in the past there remains a small growth of 'Groundsel' within the site. This has been managed using the application of approved chemical controls to restrict further spread. During the bulk earthworks process a specific management plan will be implemented to ensure that the weed is destroyed to reduce its potential for future growth and transmission off-site.

7 Erosion and Sediment Control

During the future construction phase of the proposed development, erosion and sediment control measures will be implemented. An erosion and sediment control strategy will be designed and installed in accordance with International Erosion Control Association (Australasia) – 'Best Practice Erosion & Sediment Control – for Building and Construction Sites' November 2008 as well as all relevant BRC requirements for Erosion and Sediment Control.

8 Services for the Development

8.1 Earthworks

Due to the nature of the proposed development, earthworks will be required across the site. A master plan earthworks plan has been prepared for the proposed development, which will be provided to BRC in conjunction with this Engineering Services Report.

The performance criteria and code response for the proposed development in relation to Filling and Excavation Code is presented in the following table.

Table 1: Excavation and Filling Code Response

Performance Outcomes	Acceptable Outcomes	Comments
PO6 Excavation and filling:- (a) does not cause environmental harm; (b) does not impact adversely on visual amenity; (c) does not impact adversely on adjoining properties; (d) maintains natural landforms as far as reasonably practicable; (e) is stable in both the short and long term; (f) does not prevent or create difficult access to the property; and (g) does not result in ponding, concentration or diversion of overland runoff flows that cause damage to adjacent lands or infrastructure.	**AO6.1** Development provides that:- (a) on sites of:- (i) 15% or more in slope, the extent of excavation (cut) and fill does not involve a total change of more than 1.5m relative to the natural ground level at any point; or (ii) in other areas, the extent of excavation (cut) and fill does not involve a total change of more than 1m relative to the natural ground level at any point; (b) no part of any cut or fill batter is within 1.5m of any property boundary except cut and fill involving a change in ground level of less than 200mm that does not necessitate the removal of any vegetation; (c) retaining walls are no greater than 1m high; and (d) retaining walls are constructed a minimum 150mm from property boundaries. **AO6.2** Driveways are able to be constructed and maintained accordance with the requirements of the **Planning scheme policy for development works.** **AO6.3** For filling and excavation work altering overland runoff flows, no acceptable outcome is provided.	The proposed bulk earthworks plan does include some areas of earthworks with depths of cut/fill greater than 1.0m. This is to allow for appropriate grading of the roadways and allotments relative to the natural terrain. The required elevations within Stage 1 require the most amount of fill to maintain an appropriate interface with the natural elevations along the Telegraph Road allotments (Stage 3 allotments) – particularly towards the north-east of the site. The areas of cut within the site are from the long-term stockpiles of material that was transported to the site by the Department of Transport and Main Roads during the construction of the Ring Road. The depth of cut in this location is therefore the removal of a stockpile rather than significant excavation of natural material. There is no proposal to modify the interface elevations of the external properties. The retaining walls proposed within the site do, at specific locations, exceed 1.0m in height. All locations with retaining walls greater than 1.0m will be subject to engineering design and certification during the future applications for Operational Works. All retaining walls will be a minimum 150mm from property boundaries.

8.2 Access

It is proposed to construct a new access network within the site, on a staged basis, to service each of the new residential allotments. The road widths are in accordance with BRC design requirements with the connection between Telegraph Road (western entry) and the eastern trunk road being a local collector standard. Typical sections of the proposed road layout are presented in the engineering figures for the development.

In addition to the internal road network, Telegraph Road will be subject to a road widening to cater for future traffic demands as part of Stage 1, which is a requirement of Council's Priority Infrastructure Planning. Also, the eastern boundary of the site will be converted to a trunk collector standard road as per the Priority Infrastructure Planning, which is referred to as P.RD.0010. We confirm that during the information request response period we have worked in conjunction with Council's Technical Officer's to ensure that the proposed widening of Telegraph Road maximised the potential of the existing road reserve constraints.

Standard driveway access to each allotment will be facilitated in each stage of the proposed works.

For further information relating to the proposed road layout please refer to the Traffic Impact Assessment and associated engineering drawings prepared for the development.

8.3 Stormwater

A Flood Study has been prepared for the proposed development, which should be read in conjunction with this Engineering Services Report.

In addition to the Flood Study, the internal stormwater drainage for the site has been assessed using 12d to size and grade the minor drainage network. This has been undertaken in accordance with the current version of the Queensland Urban Drainage Manual and relevant council standards. We confirm the minor drainage for Telegraph Road and the eastern trunk road are to be based on the 10% AEP. The tailwater conditions for the minor drainage analysis was taken from the results of the XPSWMM flood analysis to ensure consistency across the design process.

8.4 Sewerage Reticulation

8.4.1 Existing Infrastructure

There is existing sewerage infrastructure that crosses Telegraph Road from the site to the existing sewerage pump station on the northern side of Telegraph Road. We have obtained the construction drawings for the existing pump station (PSE0025) to verify the levels and capacity of the device and identified that the invert elevations are not low enough to service 134 Telegraph Road.

In addition to the Telegraph Road sewerage reticulation there is a potential network connection to the south and west of the site across FE Walker Street. The location of the existing sewerage infrastructure is shown in the engineering plans.

8.4.2 Proposed Infrastructure

It is proposed that a new connection be made into the existing sewerage line to cater for as much of the proposed development as possible – within the physical limitations of the existing invert elevations of the Telegraph Road Pump Station (PSE0025). To provide a suitable connection for the balance of the site we have analysed and presented two conceptual options that would service the allotments in Stages 4 , 5 and 6 as well as the balance allotment. These options include a gravity connection through to the existing infrastructure south of FE Walker Street and alternatively a pump station within the site that would have a rising main to connect to the Stage 2 network and drain towards the Telegraph Road Pump Station.

We propose that the final configuration and selection of between these two options be determined as part of future applications for Operation Works. The timing of the works relative to other potential network upgrades will likely inform the final appropriateness of the detailed design.

With the exception of the final alignments, it is acknowledged that the existing infrastructure has sufficient capacity, with respect to flow capacity, and can be utilised to service the development without augmenting the existing pump station and associated rising main or the network downstream of FE Walker Street.

We confirm that the proposed increase in the number of equivalent persons (EP) on the site is within the established parameters of the BRC Priority Infrastructure Planning for Greater Bundaberg and specifically the Kalkie sub-area. We also confirm that the expected timing for construction is also consistent with the planning horizons of Councils planning provisions.

8.5 Water Reticulation

8.5.1 Existing Infrastructure

Based on information gathered from Council's Interactive Mapping and Dial Before You Dig data, there is existing water infrastructure located to the north of the development site on Telegraph Road. This existing infrastructure provides adequate capacity for the early phases of the development. However, for the overall development there is a requirement for a pipe upgrade along the southern side of Telegraph Road.

8.5.2 Proposed Infrastructure

The modelling undertaken as part of Council's Priority Infrastructure Planning identified that a 150mm diameter distribution water main is required to be constructed on the southern side of Telegraph Road to service not only this development site, but also the future developable allotments in the Kalkie sub-area. It is proposed that this main be constructed as part of the Stage 3 works. This main with then subsequently run south on the eastern side of the proposed trunk road, which will be constructed as part of Stage 4 works.

Once complete, the 150mm diameter distribution main will provide suitable supply connectivity for the balance of the development site with an internal network of 150mm diameter water mains. Each proposed allotment can be serviced by connecting into the proposed water mains. Details of the new connections will be provided as part of each subsequent Operational Works application.

8.6 Electrical, Telecommunications, Gas and NBN

A DBYD enquiry was lodged to confirm the presence of other underground services infrastructure within and surrounding the development site. Refer to the Asset Plans obtained from the DBYD service within **Appendix E** for further details of the below infrastructure.

There is existing electrical infrastructure located to the north and east of the development site in the form of overhead power lines that carry both high and low voltage lines. This infrastructure will be subject to modification to facilitate the future intersection upgrade of the north-eastern corner of the site. This future intersection provides the connection to the trunk collector grade road that is required by Councils Priority Infrastructure Plans within the current development horizon (i.e. prior to 2031).

Telecommunications infrastructure is also present along Telegraph Road at the frontage of the development site. Also located within Telegraph Road, is existing gas infrastructure. According to the DBYD inquiry, NBN infrastructure is not present within the area.

The gas main that runs along the Telegraph Road frontage of the site was designed in 2015 and assumed that the previously approved retirement village development would be constructed adjacent to the pipeline. The current development application does not fundamentally modify the design intent by APA Group and their compliance requirements in AS2885.

We have engaged with APA Group through their Rockhampton Office and have been given some initial construction protection requirements that will be needed as part of the Stage 1 works for the entry road and other services. This includes concrete protection to the main and requirements by the Civil Contractor who will undertake the works. We are able to provide contact details of the relevant persons at APA Group upon request.

It is expected that the proposed development can be connected to electrical and telecommunications infrastructure. It is also anticipated that NBN services will also be made available to the development as part of future applications for Operational Works. All service connections will be designed and constructed in accordance with the requirements of the relevant service providers.

Appendix A: Survey Plans by Straughair and Bent

TELEGRAPH ROAD

Permanent
Survey Mark
45766
EL 18·409

Engineering services
and constructed features
are not shown

Contours are to
feasibility standard
only

Dumped earth
not measured

96

SP187576

Engineering services and constructed features
are not shown

Contours are to
feasibility standard
only

Dumped earth
not measured

Contours are to
feasibility standard
only

n

Survey by Straughair & Bent
Surveyors, Bundaberg
Ph. (07)4152 3811
Mob. 0400 810 735
Reference 497910

Datum for Directions : SP187576

Datum for Levels : AHD by PSM43439 at 16·279m from NRM
and PSM45766 at 18·409m from NRM

Contour interval 0·5 metres

NOTES RE PURPOSES & LIMITATIONS

This survey data has been prepared for John Gorza and Norm East for the purpose of assessing feasibility of constructing development works but not for carrying out a detailed design on the land and we take no responsibility for its use for any other purpose.

Any discrepancies should be clarified with Straughair & Bent, Surveyors, prior to the commencement, or recommencement as the case may be, of work for confirmation of this survey.

No underground or surface constructed features or services have been located.

These notes are an integral part of this plan. If others use this information, they should be advised of its purposes and limitations.

Scale 1:1250 at A1

10m 0m 20m 40m 60m 80m 100m 120m 140m 160m 180m

JOHN GORZA & NORM EAST

SUMMARY PLAN OF CONTOUR SURVEY OF THE UNFILLED AREAS OF LOT 96 ON SP187576

03/09/2012

Drawing No. 497920

TELEGRAPH ROAD

Survey Mark 202

Crown bitumen

Lip of channel

Edge bitumen

Power pole

Elec.Peg "Site 2"

Elec.Peg "Site 3"

Elec.Peg "Site 4"

Elec.Peg "Pole 6"

Sewer MH IL 9·31 /9·28 Top 13·98

Culvert Four cells & 3 gaps IL 11·82 Obvert 13·03 & 13·13

Sewer MH IL 10·01 /9·99 Top 13·51

RCP 0·375

Survey Mark 200 Sewer MH IL 10·62 /10·59 Top 13·18

Culvert Four cells & 3 gaps IL 11·76 Obverts 12·97 & 13·07

Poly 0·090

Easement D SP115327

Survey Mark 1120

Survey Mark 1121

Survey Mark 1440

Survey Mark 209

1 (PROPOSED)

2 (PROPOSED)

Culvert Three cells & two gaps IL 11·29 Obverts 12·79 & 12·93

Piles of earth and rocks with tall grass and trees. Scattered levels only.

Some rock piles amongst trees within fence. Scattered levels only.

Rails

Easement B RP150654

Easement A RP91379

n

ROAD FURNITURE DETAILS

DIGITAL POINT NO.	FEATURE AT POINT
2975	Crossroads
3018	Tram crossing with lights
3064	Guide post
3065	Guide post

SURVEY MARK DETAILS

MARK	DESCRIPTION	ELEVATION
"200"	Screw in MH	13·188
"202"	Bolt in kerb	13·917
"209"	Bolt in concrete	13·629
1120	Pin	13·677
1121	Pin	14·203
1440	Pin	15·698

Survey by Straughair & Bent
Surveyors, Bundaberg
Ph. (07)4152 3811
Mob. 0400 810 735

Datum for Directions : MGA Zone 56

Datum for Levels :
AHD by PSM 45766 at 18·409m
with a check measurement
to PSM 43439

Contour interval 0·25 metres

NOTES RE PURPOSES & LIMITATIONS

This survey data has been prepared for John Gorza & Norm East for the purpose of designing new constructions on the land and we take no responsibility for its use for any other purpose.

Any discrepancies should be clarified with Straughair & Bent, Surveyors, prior to the commencement, or recommencement as the case may be, of work for confirmation of this survey.

The positions of land boundaries have been plotted from minimum connections to survey marks and then from the measurements shown on existing survey plans. The boundaries were not fully measured and marked during this survey.

Whilst evidence of some underground services has been located by field measurements to visible evidence of such services and also following consultation with the relevant authorities, you would agree that the relevant authorities should be contacted prior to any excavation or construction on the site to check for possible location of further underground services and detailed locations of all services.

Sub-surface structures, if any, originating from previous internal or external works have not been located.

You would agree that any future construction contractor should note the possibility that survey marks can be disturbed subsequent to the surveyor leaving the site and that additional marks can be placed by others.

These notes are an integral part of this plan. If others use this information, they should be advised of its purposes and limitations.

Amendment A 12/12/2013
Labels added for
Easements A, B & D

Scale 1:1000 at A1

10m 0m 20m 40m 60m 80m 100m 120m 140m

JOHN GORZA & NORM EAST

SUMMARY PLAN OF CONTOUR AND DETAIL SURVEY OF NEW LOT 1 IN LOT 96 ON SP187576

17/08/2013

Drawing No. 497930A

Appendix B: Proposed Plan of Subdivision by Insite SJC

Scale 1:1250 – Lengths are in Metres.

10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190

Area of New Road
259 m?

STAGING

Stage 1	Lots 16 - 45, 62, 63 & 503
Stage 2	Lots 46 - 61 & 64-81
Stage 3	Lots 1 - 15
Stage 4	Lots 82 - 100, 101, 102 - 122
Stage 5	Lots 123 - 163
Stage 6	Lots 164 - 195, 500-502

Stage Boundary

Footpath

ABN 62 329 746 562
Phone: 07 4151 6677
admin@insitesjc | c
www | i
67 Barolin Street
PO Box 1688
BUNDABERG QLD 4670

Plan of proposed Subdivision

Lots 1–195 & 500–503 and New Road
cancelling Lot 96 on SP187576
134 Telegraph Road, Kalkie

CLIENT: Emtom Pty Ltd and Indy Investments Pty Ltd

SCALE 1:1250 on A1

PROPOSAL PLAN ONLY
Not to be used for contractual purposes.

Areas & Dimensions are approximate only & subject to Council's Conditions of approval & final survey

DESIGN	DRAWN	CHECKED	PLAN REFERENCE No.
SB	JR	SB	GC19–026 –P10
DATE	DATE	DATE	
10/05/20	10/05/20	10/05/20	

Appendix C: BRC Flood Hazard Assessment Report Mapping

Flood Hazard Assessment Report - Series 1 Inset Map

BUNDABERG REGIONAL COUNCIL

- Zoning - urban area
- Zoning - rural residential area
- Locality boundary
- Burnett River riverine high hazard area
- Riverine - Baffle Creek 1% Draft Result
- Riverine - Burnett River DFE
- Riverine - Burrum River 1% AEP CC
- Riverine - Kolan River / Gin Gin Creek DFE
- Local DFE - Apple Tree Creek Study
- Local DFE - Bundaberg Creek Study
- Local DFE - BCC Drainage Scheme
- Local DFE - Coastal Small Streams Study
- Local DFE - McCoy Creek Study
- Local DFE - Saltwater Creek Study
- Non-urban creeks / overland flow

State planning policy flood hazard area

- State planning policy flood hazard area

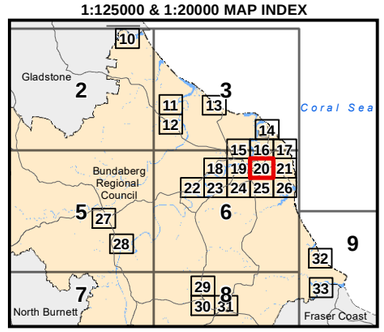
Scale at A3 1:20000

0 500 1,000

Metres

Co-ordinate System:- GDA94 MGA Zone 56

1:125000 & 1:20000 MAP INDEX

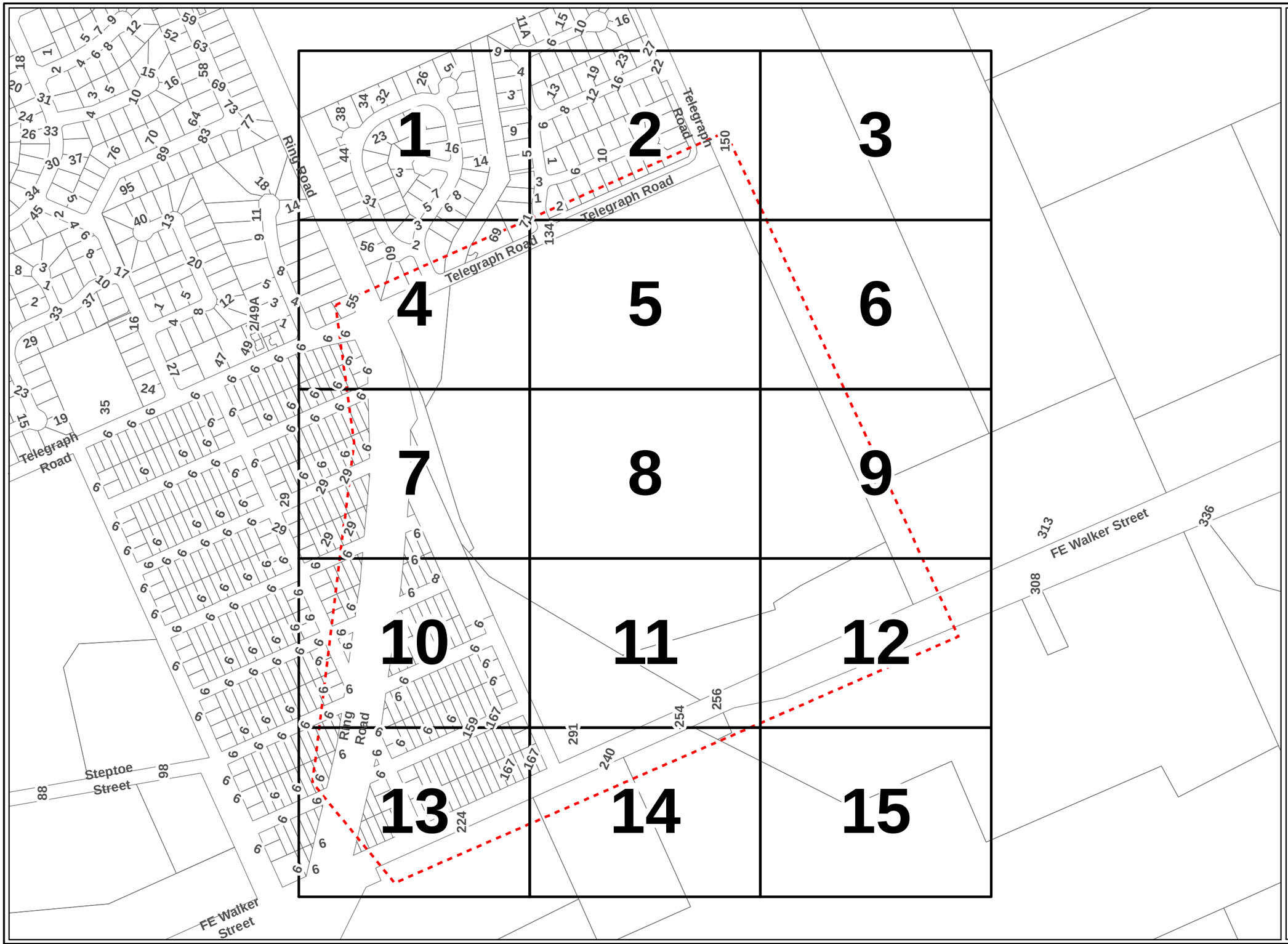


Revision 6.0

S:\Business Information Services\GIS\Projects\2019\68487 - Flood Hazard Assessment Report Maps v6.0\Flood Hazard Assessment Report Series 1 2019 20000.mxd

BRC Drawing No.120316

Appendix D: Dial Before You Dig Information



BUNDABERG REGIONAL COUNCIL

DBYD Map Book Sheet Index

Location Details

Address :
134 Telegraph Road

Suburb :
Kalkie

Region :
QLD

Postcode :
4670

Activity Description :
Planning & Design

Legend

Map Grid Reference

Submitted DBYD Area

Vertical Datum: mAHD

N

0 140 280 560 Meters

DBYD Job No.: 18669464

DBYD Sequence No.:92704498

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BUNDABERG REGIONAL COUNCIL

Legend

- Submitted DBYD Area
- Hydrants
- Valves
- Water Mains
- Stormwater Pits
- Stormwater Pipes
- Sewerage Maintenance Holes
- Gravity
- Pressure
- Vacuum

Water/Stormwater/Sewerage Pipes Information Guide

Diameter — Pipe: 300 mm Vitrified Clay — IL: 1.234 — Material Type (See Below) — Invert Level

Material Type	Description
AC with uPVC liner	Asbestos Cement - PVC Lined
CICL	Cast Iron Cement Lined
CISL	Cast Iron Situ Lined
DICL	Ductile Iron Cement Lined
FRC	Fibre-reinforced concrete
HDPE 100B	High-density Polyethylene
MDPE 80B	Medium-density Polyethylene
S/S	Stainless Steel
uPVC	Unplasticised Polyvinyl chloride
VC with uPVC liner	Vitrified Clay - uPVC Liner
mPVC	Modified Polyvinyl chloride
oPVC	Oriented Polyvinyl chloride

Map 1

of 15

Vertical Datum: mAHD

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0 25 50 100 Meters

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DBYD Sequence No.:92704498

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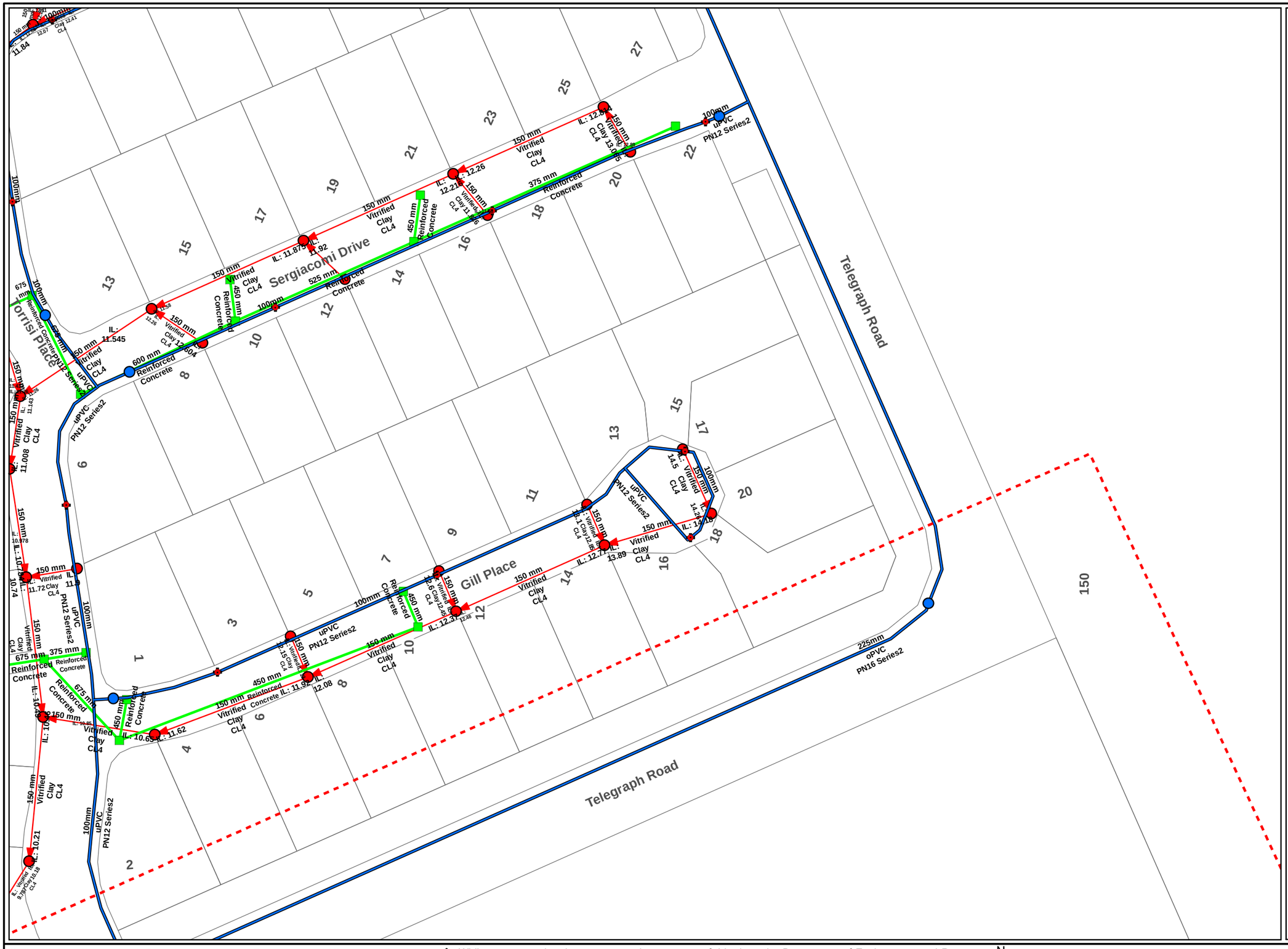

BUNDABERG REGIONAL COUNCIL

Legend

- Submitted DBYD Area
- Hydrants
- Valves
- Water Mains
- Stormwater Pits
- Stormwater Pipes
- Sewerage Maintenance Holes
- Gravity
- Pressure
- Vacuum

Water/Stormwater/Sewerage Pipes Information Guide

Diameter — Pipe: 300 mm Vitrified Clay IL: 1.234 — Material Type (See Below) — Invert Level

Material Type	Description
AC with uPVC liner	Asbestos Cement - PVC Lined
CICL	Cast Iron Cement Lined
CISL	Cast Iron Situ Lined
DICL	Ductile Iron Cement Lined
FRC	Fibre-reinforced concrete
HDPE 100B	High-density Polyethylene
MDPE 80B	Medium-density Polyethylene
S/S	Stainless Steel
uPVC	Unplasticised Polyvinyl chloride
VC with uPVC liner	Vitrified Clay - uPVC Liner
mPVC	Modified Polyvinyl chloride
oPVC	Oriented Polyvinyl chloride

Map 2

of 15

Vertical Datum: mAHD

N

0 25 50 100 Meters

DBYD Job No.: 18669464

DBYD Sequence No.:92704498

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BUNDABERG
REGIONAL COUNCIL

Legend

- Submitted DBYD Area
- Hydrants
- Valves
- Water Mains
- Stormwater Pits
- Stormwater Pipes
- Sewerage Maintenance Holes
- Gravity
- Pressure
- Vacuum

Water/Stormwater/Sewerage Pipes Information Guide

Diameter — 300 mm — Pipe
Vitrified Clay — IL: 1.234
Material Type (See Below) — Invert Level

Material Type	Description
AC with uPVC liner	Asbestos Cement - PVC Lined
CICL	Cast Iron Cement Lined
CISL	Cast Iron Situ Lined
DICL	Ductile Iron Cement Lined
FRC	Fibre-reinforced concrete
HDPE 100B	High-density Polyethylene
MDPE 80B	Medium-density Polyethylene
S/S	Stainless Steel
uPVC	Unplasticised Polyvinyl chloride
VC with uPVC liner	Vitrified Clay - uPVC Liner
mPVC	Modified Polyvinyl chloride
oPVC	Oriented Polyvinyl chloride

Map 3

of 15

Vertical Datum: mAHD

0 25 50 100 Meters

N

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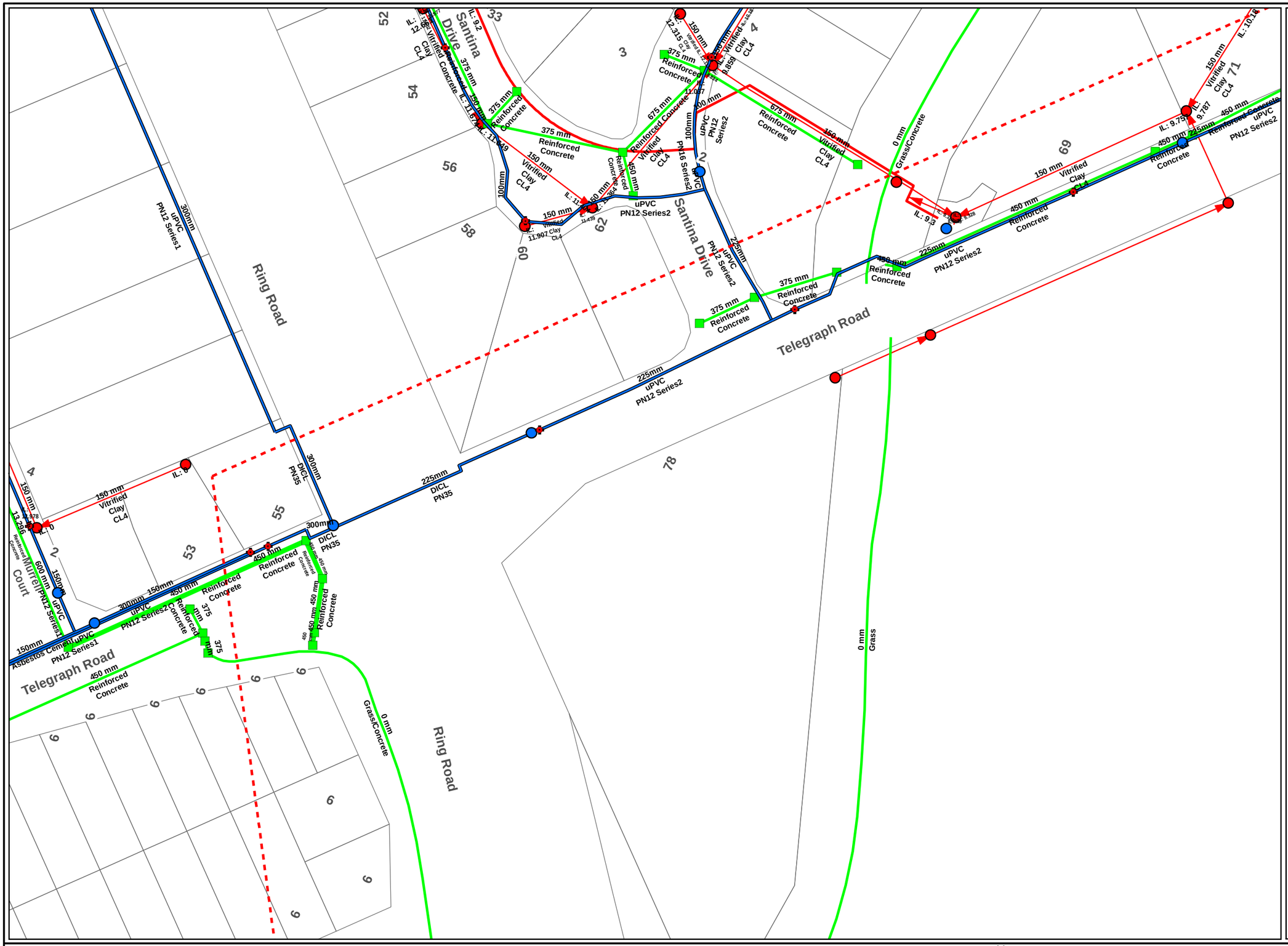

BUNDABERG REGIONAL COUNCIL

Legend

- Submitted DBYD Area
- Hydrants
- Valves
- Water Mains
- Stormwater Pits
- Stormwater Pipes
- Sewerage Maintenance Holes
- Gravity
- Pressure
- Vacuum

Water/Stormwater/Sewerage Pipes Information Guide

Diameter — Pipe: 300 mm

Material Type (See Below) — Vitrified Clay — Invert Level: IL: 1.234

Material Type	Description
AC with uPVC liner	Asbestos Cement - PVC Lined
CICL	Cast Iron Cement Lined
CISL	Cast Iron Situ Lined
DICL	Ductile Iron Cement Lined
FRC	Fibre-reinforced concrete
HDPE 100B	High-density Polyethylene
MDPE 80B	Medium-density Polyethylene
S/S	Stainless Steel
uPVC	Unplasticised Polyvinyl chloride
VC with uPVC liner	Vitrified Clay - uPVC Liner
mPVC	Modified Polyvinyl chloride
oPVC	Oriented Polyvinyl chloride

Map 4

of 15

Vertical Datum: mAHD

0 25 50 100 Meters

N

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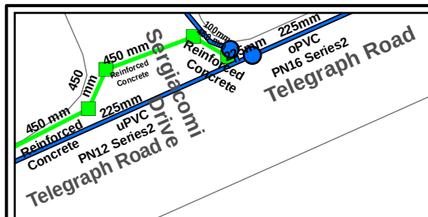

BUNDABERG REGIONAL COUNCIL

Legend

- Submitted DBYD Area
- Hydrants
- Valves
- Water Mains
- Stormwater Pits
- Stormwater Pipes
- Sewerage Maintenance Holes
- Gravity
- Pressure
- Vacuum

Water/Stormwater/Sewerage Pipes Information Guide

Diameter — Pipe
300 mm
Vitrified Clay — IL: 1.234
Material Type (See Below) — Invert Level

Material Type	Description
AC with uPVC liner	Asbestos Cement - PVC Lined
CICL	Cast Iron Cement Lined
CISL	Cast Iron Situ Lined
DICL	Ductile Iron Cement Lined
FRC	Fibre-reinforced concrete
HDPE 100B	High-density Polyethylene
MDPE 80B	Medium-density Polyethylene
S/S	Stainless Steel
uPVC	Unplasticised Polyvinyl chloride
VC with uPVC liner	Vitrified Clay - uPVC Liner
mPVC	Modified Polyvinyl chloride
oPVC	Oriented Polyvinyl chloride

Map 5

of 15

Vertical Datum: mAHD

0 25 50 100 Meters

N

DBYD Job No.: 18669464

DBYD Sequence No.:92704498

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BUNDABERG
REGIONAL COUNCIL

Legend

- Submitted DBYD Area
- Hydrants
- Valves
- Water Mains
- Stormwater Pits
- Stormwater Pipes
- Sewerage Maintenance Holes
- Gravity
- Pressure
- Vacuum

Water/Stormwater/Sewerage Pipes Information Guide

Material Type	Description
AC with uPVC liner	Asbestos Cement - PVC Lined
CICL	Cast Iron Cement Lined
CISL	Cast Iron Situ Lined
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FRC	Fibre-reinforced concrete
HDPE 100B	High-density Polyethylene
MDPE 80B	Medium-density Polyethylene
S/S	Stainless Steel
uPVC	Unplasticised Polyvinyl chloride
VC with uPVC liner	Vitrified Clay - uPVC Liner
mPVC	Modified Polyvinyl chloride
oPVC	Oriented Polyvinyl chloride

Map 6

of 15

Vertical Datum: mAHD

0 25 50 100 Meters

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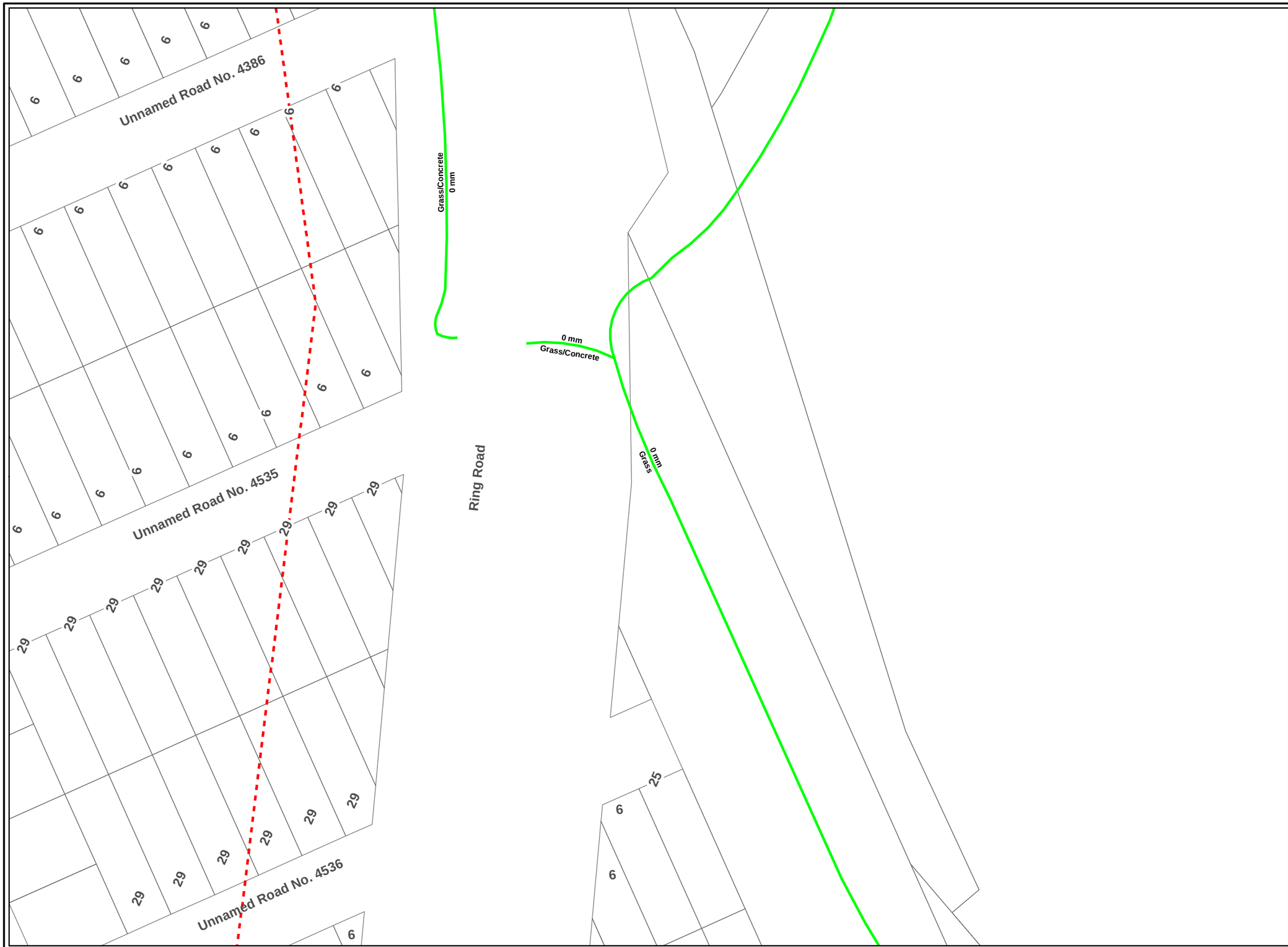

BUNDABERG REGIONAL COUNCIL

Legend

- Submitted DBYD Area
- Hydrants
- Valves
- Water Mains
- Stormwater Pits
- Stormwater Pipes
- Sewerage Maintenance Holes
- Gravity
- Pressure
- Vacuum

Water/Stormwater/Sewerage Pipes Information Guide

Diameter — Pipe: 300 mm Vitrified Clay IL: 1.234 — Material Type (See Below) — Invert Level

Material Type	Description
AC with uPVC liner	Asbestos Cement - PVC Lined
CICL	Cast Iron Cement Lined
CISL	Cast Iron Situ Lined
DICL	Ductile Iron Cement Lined
FRC	Fibre-reinforced concrete
HDPE 100B	High-density Polyethylene
MDPE 80B	Medium-density Polyethylene
S/S	Stainless Steel
uPVC	Unplasticised Polyvinyl chloride
VC with uPVC liner	Vitrified Clay - uPVC Liner
mPVC	Modified Polyvinyl chloride
oPVC	Oriented Polyvinyl chloride

Map 7

of 15

Vertical Datum: mAHD

0 25 50 100 Meters

N

DBYD Job No.: 18669464

DBYD Sequence No.:92704498

Scale 1:1000 on A3 Sheet

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BUNDABERG
REGIONAL COUNCIL

Legend

- Submitted DBYD Area
- Hydrants
- Valves
- Water Mains
- Stormwater Pits
- Stormwater Pipes
- Sewerage Maintenance Holes
- Gravity
- Pressure
- Vacuum

Water/Stormwater/Sewerage Pipes Information Guide

Material Type	Description
AC with uPVC liner	Asbestos Cement - PVC Lined
CICL	Cast Iron Cement Lined
CISL	Cast Iron Situ Lined
DICL	Ductile Iron Cement Lined
FRC	Fibre-reinforced concrete
HDPE 100B	High-density Polyethylene
MDPE 80B	Medium-density Polyethylene
S/S	Stainless Steel
uPVC	Unplasticised Polyvinyl chloride
VC with uPVC liner	Vitrified Clay - uPVC Liner
mPVC	Modified Polyvinyl chloride
oPVC	Oriented Polyvinyl chloride

Map 8

of 15

Vertical Datum: mAHD

0 25 50 100 Meters

N

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DBYD Sequence No.:92704498

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BUNDABERG
REGIONAL COUNCIL

Legend

- Submitted DBYD Area
- Hydrants
- Valves
- Water Mains
- Stormwater Pits
- Stormwater Pipes
- Sewerage Maintenance Holes
- Gravity
- Pressure
- Vacuum

Water/Stormwater/Sewerage Pipes Information Guide

Material Type	Description
AC with uPVC liner	Asbestos Cement - PVC Lined
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CISL	Cast Iron Situ Lined
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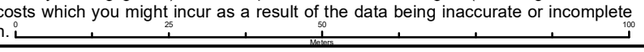
FRC	Fibre-reinforced concrete
HDPE 100B	High-density Polyethylene
MDPE 80B	Medium-density Polyethylene
S/S	Stainless Steel
uPVC	Unplasticised Polyvinyl chloride
VC with uPVC liner	Vitrified Clay - uPVC Liner
mPVC	Modified Polyvinyl chloride
oPVC	Oriented Polyvinyl chloride

Map 9

of 15

Vertical Datum: mAHD



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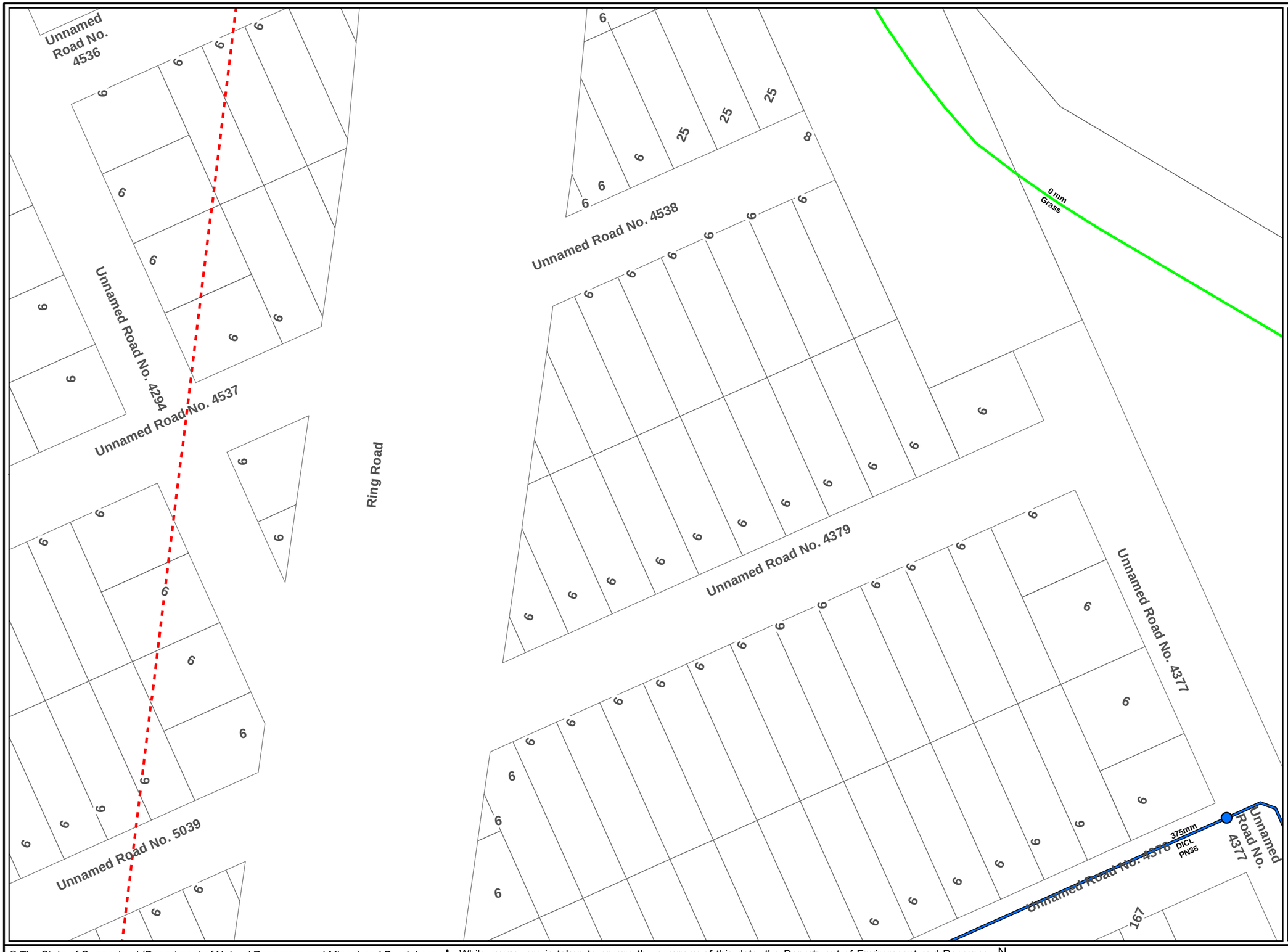

BUNDABERG REGIONAL COUNCIL

Legend

- Submitted DBYD Area
- Hydrants
- Valves
- Water Mains
- Stormwater Pits
- Stormwater Pipes
- Sewerage Maintenance Holes
- Gravity
- Pressure
- Vacuum

Water/Stormwater/Sewerage Pipes Information Guide

Diameter — Pipe: 300 mm Vitrified Clay — IL: 1.234

Material Type (See Below) — Invert Level

Material Type	Description
AC with uPVC liner	Asbestos Cement - PVC Lined
CICL	Cast Iron Cement Lined
CISL	Cast Iron Situ Lined
DICL	Ductile Iron Cement Lined
FRC	Fibre-reinforced concrete
HDPE 100B	High-density Polyethylene
MDPE 80B	Medium-density Polyethylene
S/S	Stainless Steel
uPVC	Unplasticised Polyvinyl chloride
VC with uPVC liner	Vitrified Clay - uPVC Liner
mPVC	Modified Polyvinyl chloride
oPVC	Oriented Polyvinyl chloride

Map 10

of 15

Vertical Datum: mAHD

0 25 50 100 Meters

N

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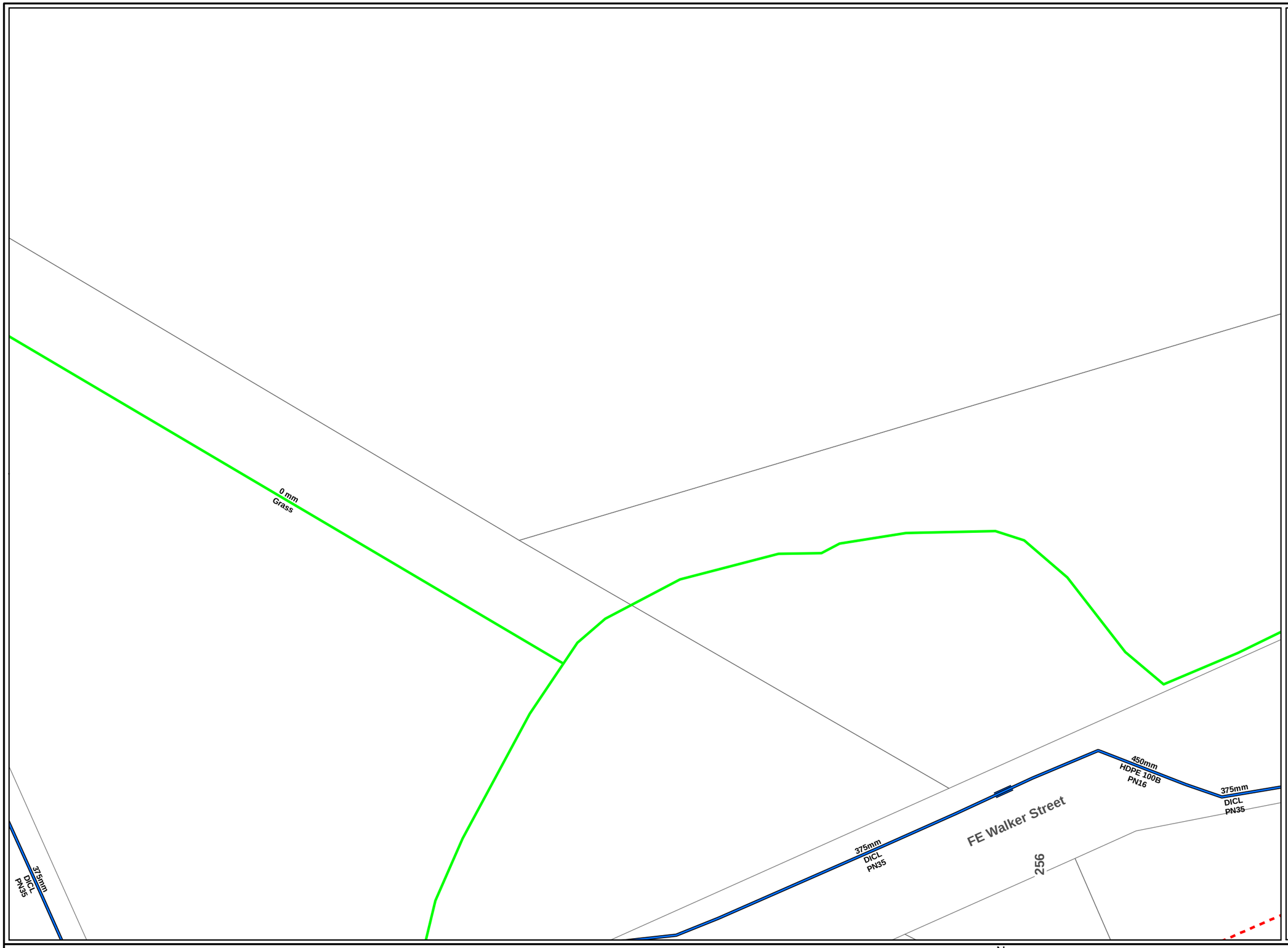

BUNDABERG
REGIONAL COUNCIL

Legend

- Submitted DBYD Area
- Hydrants
- Valves
- Water Mains
- Stormwater Pits
- Stormwater Pipes
- Sewerage Maintenance Holes
- Gravity
- Pressure
- Vacuum

Water/Stormwater/Sewerage Pipes Information Guide

Diameter — Pipe
300 mm
Vitrified Clay — IL: 1.234
Material Type (See Below) — Invert Level

Material Type	Description
AC with uPVC liner	Asbestos Cement - PVC Lined
CICL	Cast Iron Cement Lined
CISL	Cast Iron Situ Lined
DICL	Ductile Iron Cement Lined
FRC	Fibre-reinforced concrete
HDPE 100B	High-density Polyethylene
MDPE 80B	Medium-density Polyethylene
S/S	Stainless Steel
uPVC	Unplasticised Polyvinyl chloride
VC with uPVC liner	Vitrified Clay - uPVC Liner
mPVC	Modified Polyvinyl chloride
oPVC	Oriented Polyvinyl chloride

Map 11

of 15

Vertical Datum: mAHD

0 25 50 100 Meters

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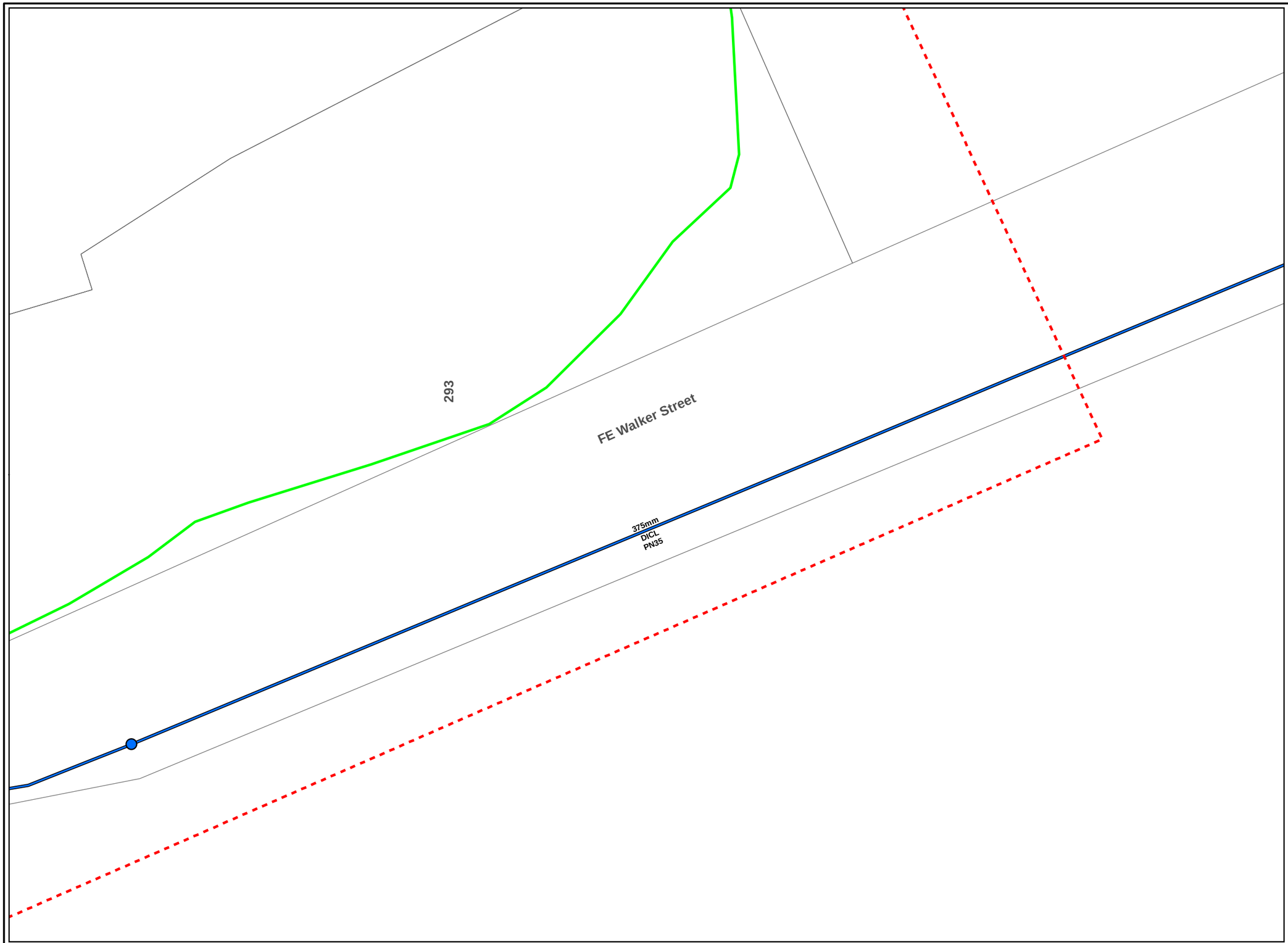

BUNDABERG
REGIONAL COUNCIL

Legend

- Submitted DBYD Area
- Hydrants
- Valves
- Water Mains
- Stormwater Pits
- Stormwater Pipes
- Sewerage Maintenance Holes
- Gravity
- Pressure
- Vacuum

Water/Stormwater/Sewerage Pipes Information Guide

Diameter — Pipe
300 mm
Vitrified Clay — IL: 1.234
Material Type (See Below) — Invert Level

Material Type	Description
AC with uPVC liner	Asbestos Cement - PVC Lined
CICL	Cast Iron Cement Lined
CISL	Cast Iron Situ Lined
DICL	Ductile Iron Cement Lined
FRC	Fibre-reinforced concrete
HDPE 100B	High-density Polyethylene
MDPE 80B	Medium-density Polyethylene
S/S	Stainless Steel
uPVC	Unplasticised Polyvinyl chloride
VC with uPVC liner	Vitrified Clay - uPVC Liner
mPVC	Modified Polyvinyl chloride
oPVC	Oriented Polyvinyl chloride

Map 12

of 15

Vertical Datum: mAHD

0 25 50 100 Meters

N

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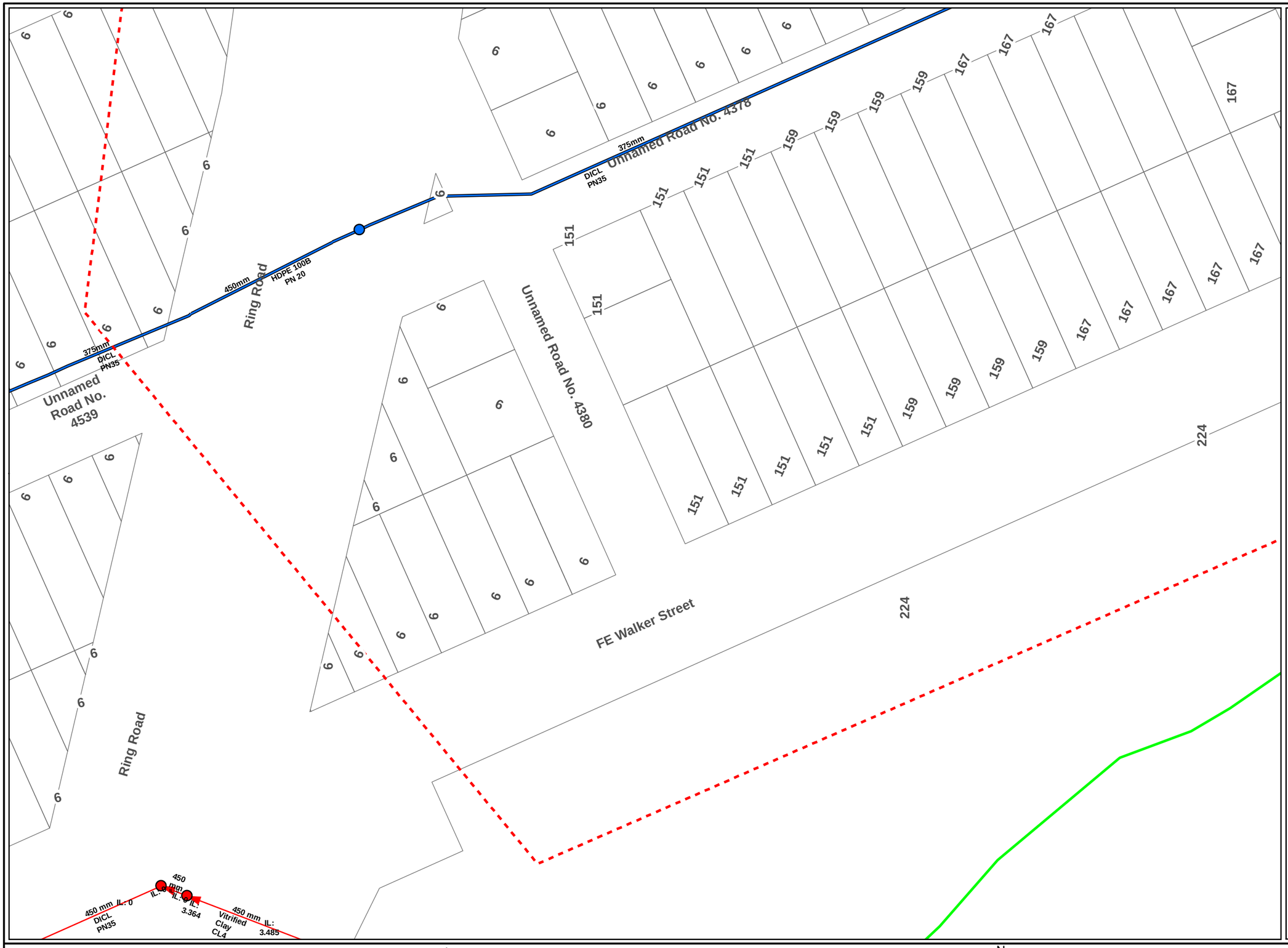

BUNDABERG REGIONAL COUNCIL

Legend

- Submitted DBYD Area
- Hydrants
- Valves
- Water Mains
- Stormwater Pits
- Stormwater Pipes
- Sewerage Maintenance Holes
- Gravity
- Pressure
- Vacuum

Water/Stormwater/Sewerage Pipes Information Guide

Diameter — Pipe: 300 mm — Vitrified Clay — IL: 1.234 — Material Type (See Below) — Invert Level

Material Type	Description
AC with uPVC liner	Asbestos Cement - PVC Lined
CICL	Cast Iron Cement Lined
CISL	Cast Iron Situ Lined
DICL	Ductile Iron Cement Lined
FRC	Fibre-reinforced concrete
HDPE 100B	High-density Polyethylene
MDPE 80B	Medium-density Polyethylene
S/S	Stainless Steel
uPVC	Unplasticised Polyvinyl chloride
VC with uPVC liner	Vitrified Clay - uPVC Liner
mPVC	Modified Polyvinyl chloride
oPVC	Oriented Polyvinyl chloride

Map 13

of 15

Vertical Datum: mAHD

N

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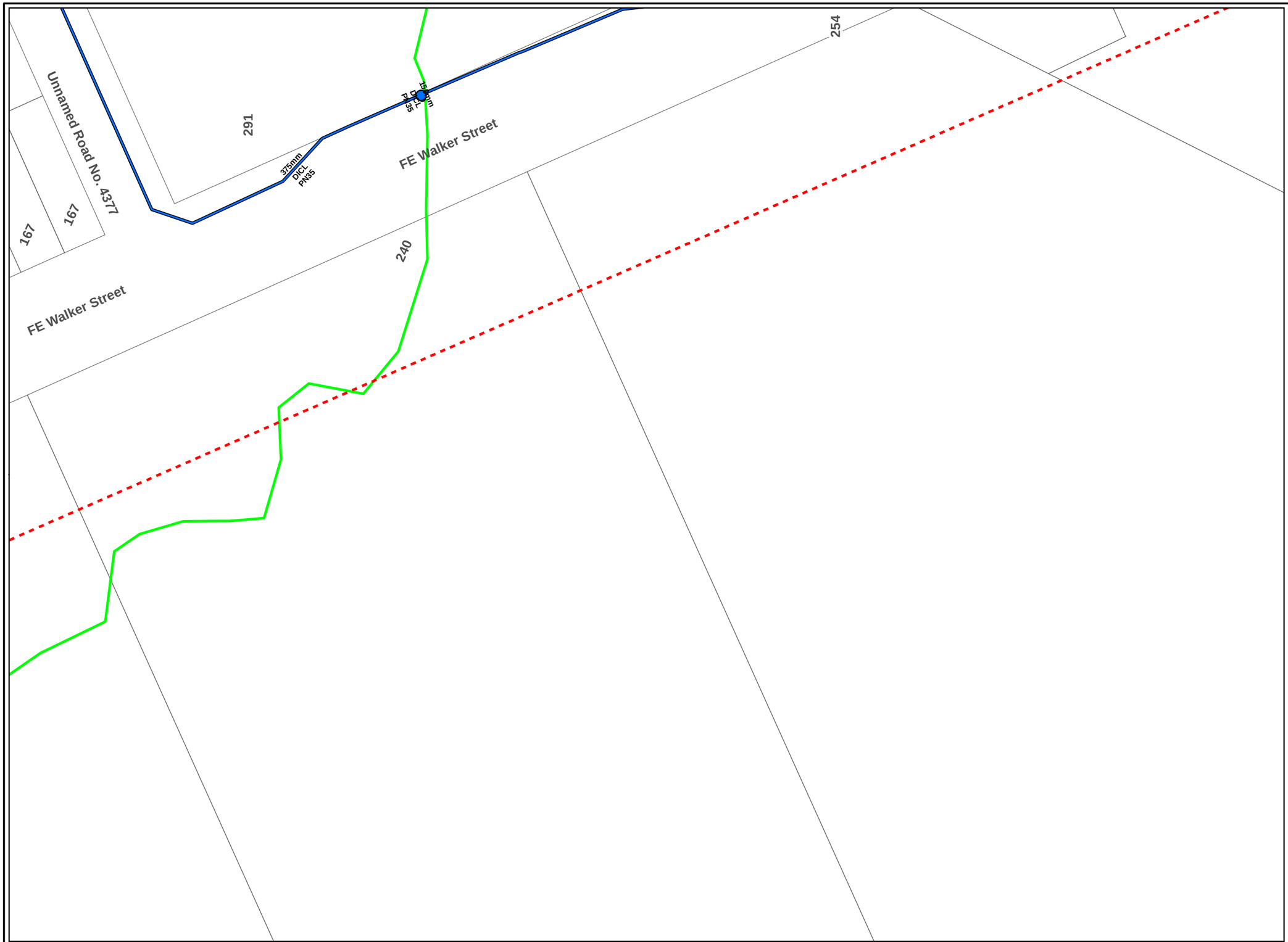

BUNDABERG REGIONAL COUNCIL

Legend

- Submitted DBYD Area
- Hydrants
- Valves
- Water Mains
- Stormwater Pits
- Stormwater Pipes
- Sewerage Maintenance Holes
- Gravity
- Pressure
- Vacuum

Water/Stormwater/Sewerage Pipes Information Guide

Diameter — Pipe
300 mm
Vitrified Clay — IL: 1.234
Material Type (See Below) — Invert Level

Material Type	Description
AC with uPVC liner	Asbestos Cement - PVC Lined
CICL	Cast Iron Cement Lined
CISL	Cast Iron Situ Lined
DICL	Ductile Iron Cement Lined
FRC	Fibre-reinforced concrete
HDPE 100B	High-density Polyethylene
MDPE 80B	Medium-density Polyethylene
S/S	Stainless Steel
uPVC	Unplasticised Polyvinyl chloride
VC with uPVC liner	Vitrified Clay - uPVC Liner
mPVC	Modified Polyvinyl chloride
oPVC	Oriented Polyvinyl chloride

Map 14

of 15

Vertical Datum: mAHD

0 25 50 100 Meters

N

DBYD Job No.: 18669464

DBYD Sequence No.:92704498

Scale 1:1000 on A3 Sheet

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BUNDABERG
REGIONAL COUNCIL

Legend

- Submitted DBYD Area
- Hydrants
- Valves
- Water Mains
- Stormwater Pits
- Stormwater Pipes
- Sewerage Maintenance Holes
- Gravity
- Pressure
- Vacuum

Water/Stormwater/Sewerage Pipes Information Guide

Diameter — Pipe
300 mm
Vitrified Clay — IL: 1.234
Material Type (See Below) — Invert Level

Material Type	Description
AC with uPVC liner	Asbestos Cement - PVC Lined
CICL	Cast Iron Cement Lined
CISL	Cast Iron Situ Lined
DICL	Ductile Iron Cement Lined
FRC	Fibre-reinforced concrete
HDPE 100B	High-density Polyethylene
MDPE 80B	Medium-density Polyethylene
S/S	Stainless Steel
uPVC	Unplasticised Polyvinyl chloride
VC with uPVC liner	Vitrified Clay - uPVC Liner
mPVC	Modified Polyvinyl chloride
oPVC	Oriented Polyvinyl chloride

Map 15

of 15

Vertical Datum: mAHD

0 25 50 100 Meters

N

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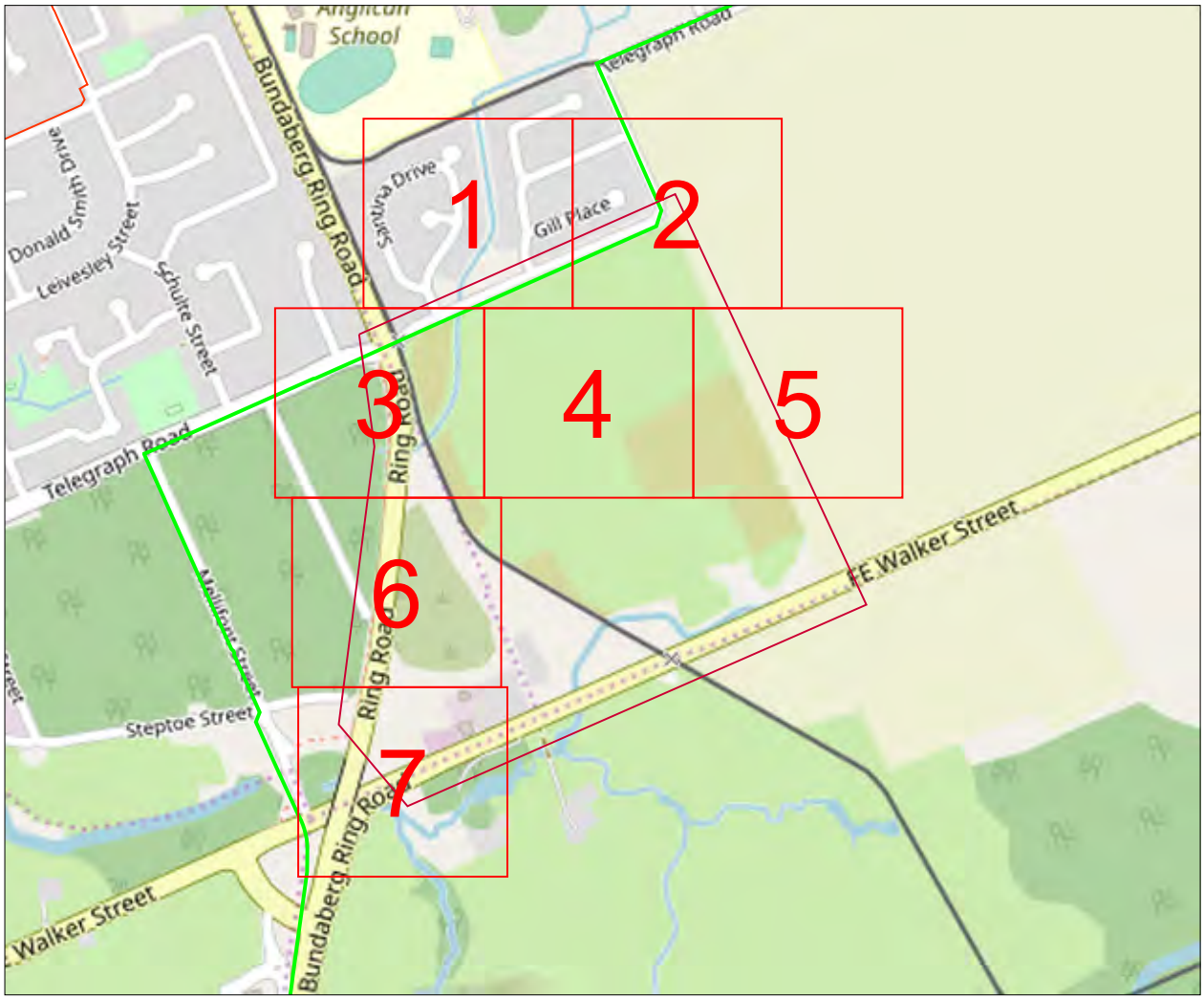
Date Generated: 30/11/2019 8:45:44 AM

DIAL BEFORE YOU DIG www.1100.com.au
The Essential First Step

operated by apa

30/11/2019 **SCALE: DO NOT SCALE** **REF NO**: 92704495

As work on APA underground plant is ongoing any drawing with an issue date of more than one month previous can no longer be considered valid. All persons planning civil works on any site are advised to contact APA to confirm location. All underground gas pipelines are the property of APA & are not to be accessed by unauthorised persons. All care is taken with preparation of the drawings & no responsibility is accepted for errors or omissions.



92704495

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NORTH

Data Source

Pipeline Data Copyright APA Group, Property Parcels Copyright QLD Government, UBD Imagery – Copyright Sensis, DBYD Dig Location provided by DBYD.

operated by apa

This maps is created in colour and shall be printed in colour

Legend

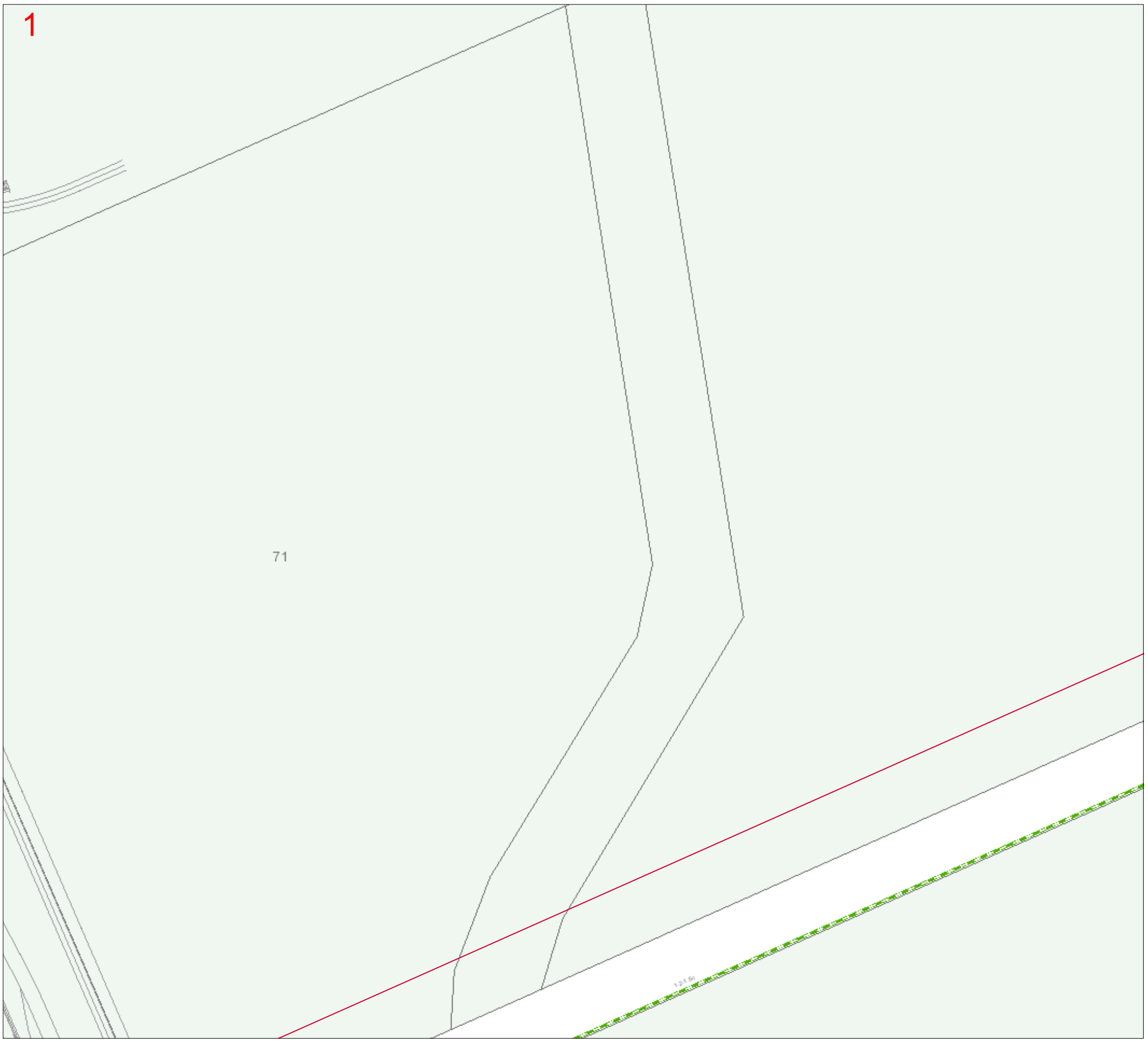
Distribution Main	Gas Assets and Fittings	Pipe Materials	
Class 900 Transmission	Gate Station	CI	Cast Iron
Class 600 Transmission	Regulator Station	CU	Copper
Class 300 Transmission	Block/ Emergency Valve	GAL	Wrought Galvanised Iron
High Pressure Steel	Isolation Valve	PGAL	Poly Coated Wrought Galvanised Iron
High Pressure PE Trunk	Test Point	ST	Steel
High Pressure/ Class 500	Syphon	NY/ NY11	Nylon
Medium Pressure PE/ Nylon	Anode	PE	Polyethylene
Medium Pressure (Allgas)	Pipeline Marker	MDPE	Medium Density Polyethylene
Low Pressure	Trace Wire Point	HDPE	High Density Polyethylene
LPG	Reducer	DN	Nominal Diameter
TLP	Pipe Connector/ Tee	OD	Outside Diameter
Proposed/ Under Construction	Pipe Connector		
Idle Gas Pipe	End Cap		
Abandoned Gas Pipe			
Sleeve			

(1) Medium Pressure in AGN/ Nylon in Allgas

Examples: 40PE in DN80 CI — 40mm Polyethylene in an 80mm (Nominal Diameter) Cast Iron Sleeve

63PE INS — 63mm Polyethylene inserted in another pipe

Line/ Polygon Request



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NORTH

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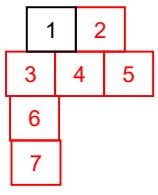


This maps is created in colour and shall be printed in colour

Legend

Distribution Main

- Class 900 Transmission
- Class 600 Transmission
- Class 300 Transmission
- High Pressure Steel
- High Pressure PE Trunk
- High Pressure/ Class 500 (1)
- Medium Pressure PE/ Nylon
- Medium Pressure (Allgas)
- Low Pressure
- LPG
- TLP
- Proposed/ Under Construction
- Idle Gas Pipe
- Abandoned Gas Pipe
- Sleeve

(1) Medium Pressure in AGN/ Nylon in Allgas

Gas Assets and Fittings

- Gate Station
- R Regulator Station
- V Block/ Emergency Valve
- V Isolation Valve
- OP T Test Point
- S Syphon
- A Anode
- M Pipeline Marker
- W Trace Wire Point
- Reducer
- T Pipe Connector/ Tee
- = Pipe Connector
- End Cap

Pipe Materials

CI	Cast Iron
CU	Copper
GAL	Wrought Galvanised Iron
PGAL	Poly Coated Wrought Galvanised Iron
ST	Steel
NY/ NY11	Nylon
PE	Polyethylene
MDPE	Medium Density Polyethylene
HDPE	High Density Polyethylene
DN	Nominal Diameter
OD	Outside Diameter

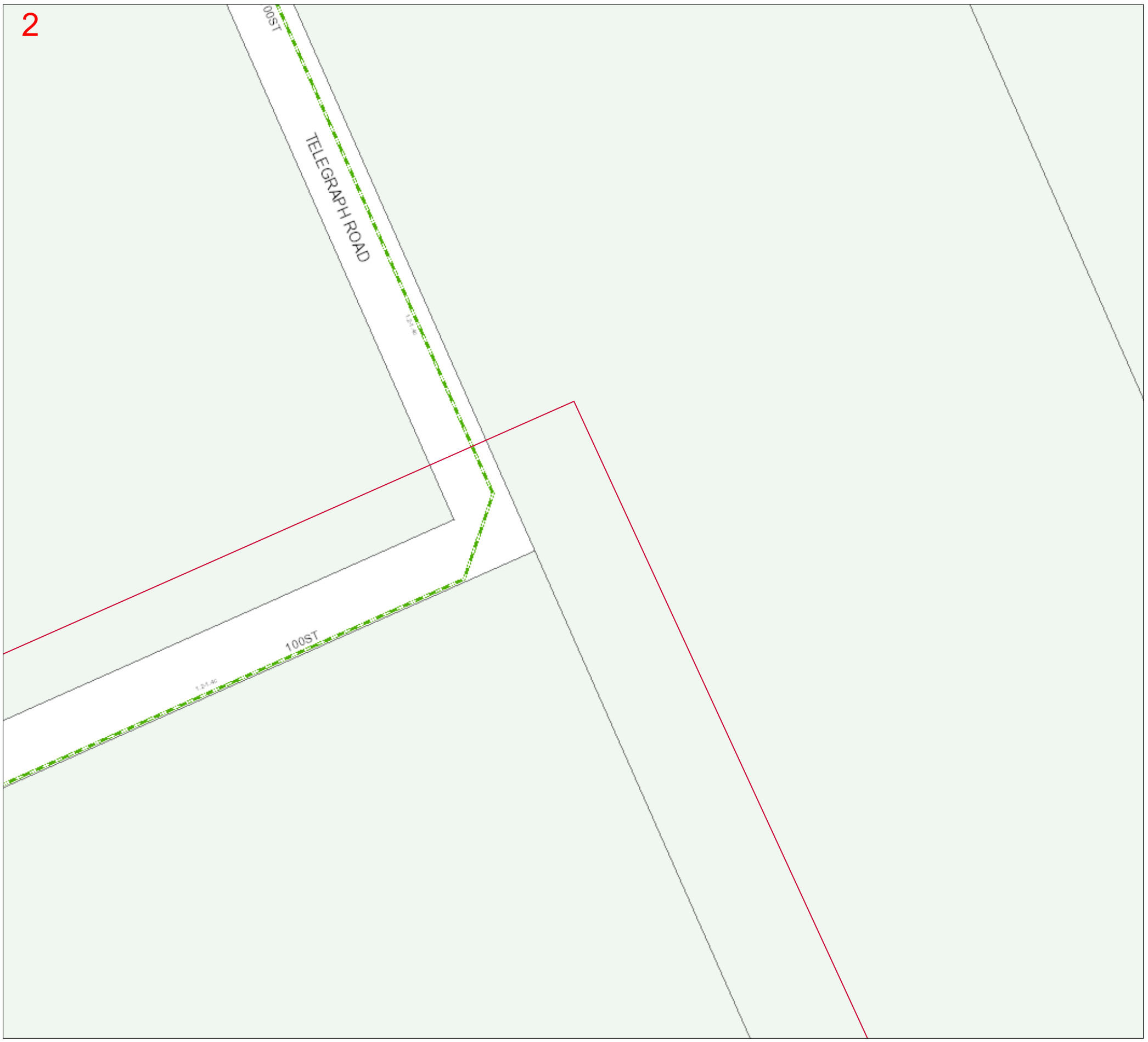
Examples:
- 40PE in DN80 CI — 40mm Polyethylene in an 80mm (Nominal Diameter) Cast Iron Sleeve
- 63PE INS — 63mm Polyethylene inserted in another pipe

Line/ Polygon Request

Data Source

Pipeline Data Copyright APA Group, Property Parcels Copyright QLD Government, UBD Imagery – Copyright Sensis, DBYD Dig Location provided by DBYD.

operated by apa



92704495 Map Sheet: 2

Scale: 1: 1000

0 0.01km

NORTH

Map Key:

1 2
3 4 5
6
7

This maps is created in colour and shall be printed in colour

Legend

Distribution Main

- Class 900 Transmission
- Class 600 Transmission
- Class 300 Transmission
- High Pressure Steel
- High Pressure PE Trunk
- High Pressure/ Class 500 (1)
- Medium Pressure PE/ Nylon
- Medium Pressure (Allgas)
- Low Pressure
- LPG
- TLP
- Proposed/ Under Construction
- Idle Gas Pipe
- Abandoned Gas Pipe
- Sleeve

(1) Medium Pressure in AGN/ Nylon in Allgas

Gas Assets and Fittings

- Gate Station
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- V Isolation Valve
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- M Pipeline Marker
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- Reducer
- T Pipe Connector/ Tee
- = Pipe Connector
- End Cap

Pipe Materials

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OD	Outside Diameter

Examples:
40PE in DN80 CI — 40mm Polyethylene in an 80mm (Nominal Diameter) Cast Iron Sleeve
63PE INS — 63mm Polyethylene inserted in another pipe

Line/ Polygon Request

Data Source

Pipeline Data Copyright APA Group, Property Parcels Copyright QLD Government, UBD Imagery – Copyright Sensis, DBYD Dig Location provided by DBYD.

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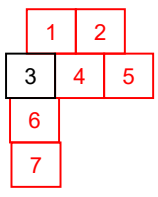
92704495 Map Sheet: 3

Scale: 1: 1000

0 0.01km

NORTH

Map Key:



This maps is created in colour and shall be printed in colour

Legend

Distribution Main

- Class 900 Transmission
- Class 600 Transmission
- Class 300 Transmission
- High Pressure Steel
- High Pressure PE Trunk
- High Pressure/ Class 500 (1)
- Medium Pressure PE/ Nylon
- Medium Pressure (Allgas)
- Low Pressure
- LPG
- TLP
- Proposed/ Under Construction
- Idle Gas Pipe
- Abandoned Gas Pipe
- Sleeve

(1) Medium Pressure in AGN/ Nylon in Allgas

Gas Assets and Fittings

- Gate Station
- R Regulator Station
- V Block/ Emergency Valve
- V Isolation Valve
- OP T Test Point
- S Syphon
- A Anode
- M Pipeline Marker
- W Trace Wire Point
- Reducer
- T Pipe Connector/ Tee
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- End Cap

Pipe Materials

CI	Cast Iron
CU	Copper
GAL	Wrought Galvanised Iron
PGAL	Poly Coated Wrought Galvanised Iron
ST	Steel
NY/ NY11	Nylon
PE	Polyethylene
MDPE	Medium Density Polyethylene
HDPE	High Density Polyethylene
DN	Nominal Diameter
OD	Outside Diameter

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63PE INS — 63mm Polyethylene inserted in another pipe

Line/ Polygon Request

Data Source

Pipeline Data Copyright APA Group, Property Parcels Copyright QLD Government, UBD Imagery – Copyright Sensis, DBYD Dig Location provided by DBYD.

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4

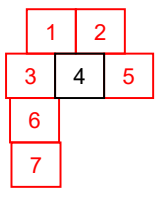
92704495 Map Sheet: 4

Scale: 1: 1000

0 0.01km

NORTH

Map Key:



This maps is created in colour and shall be printed in colour

Legend

Distribution Main

- Class 900 Transmission
- Class 600 Transmission
- Class 300 Transmission
- High Pressure Steel
- High Pressure PE Trunk
- High Pressure/ Class 500 (1)
- Medium Pressure PE/ Nylon
- Medium Pressure (Allgas)
- Low Pressure
- LPG
- TLP
- Proposed/ Under Construction
- Idle Gas Pipe
- Abandoned Gas Pipe
- Sleeve

(1) Medium Pressure in AGN/ Nylon in Allgas

Gas Assets and Fittings

- Gate Station
- R Regulator Station
- V Block/ Emergency Valve
- V Isolation Valve
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- S Syphon
- A Anode
- M Pipeline Marker
- W Trace Wire Point
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- = Pipe Connector
- End Cap

Pipe Materials

CI	Cast Iron
CU	Copper
GAL	Wrought Galvanised Iron
PGAL	Poly Coated Wrought Galvanised Iron
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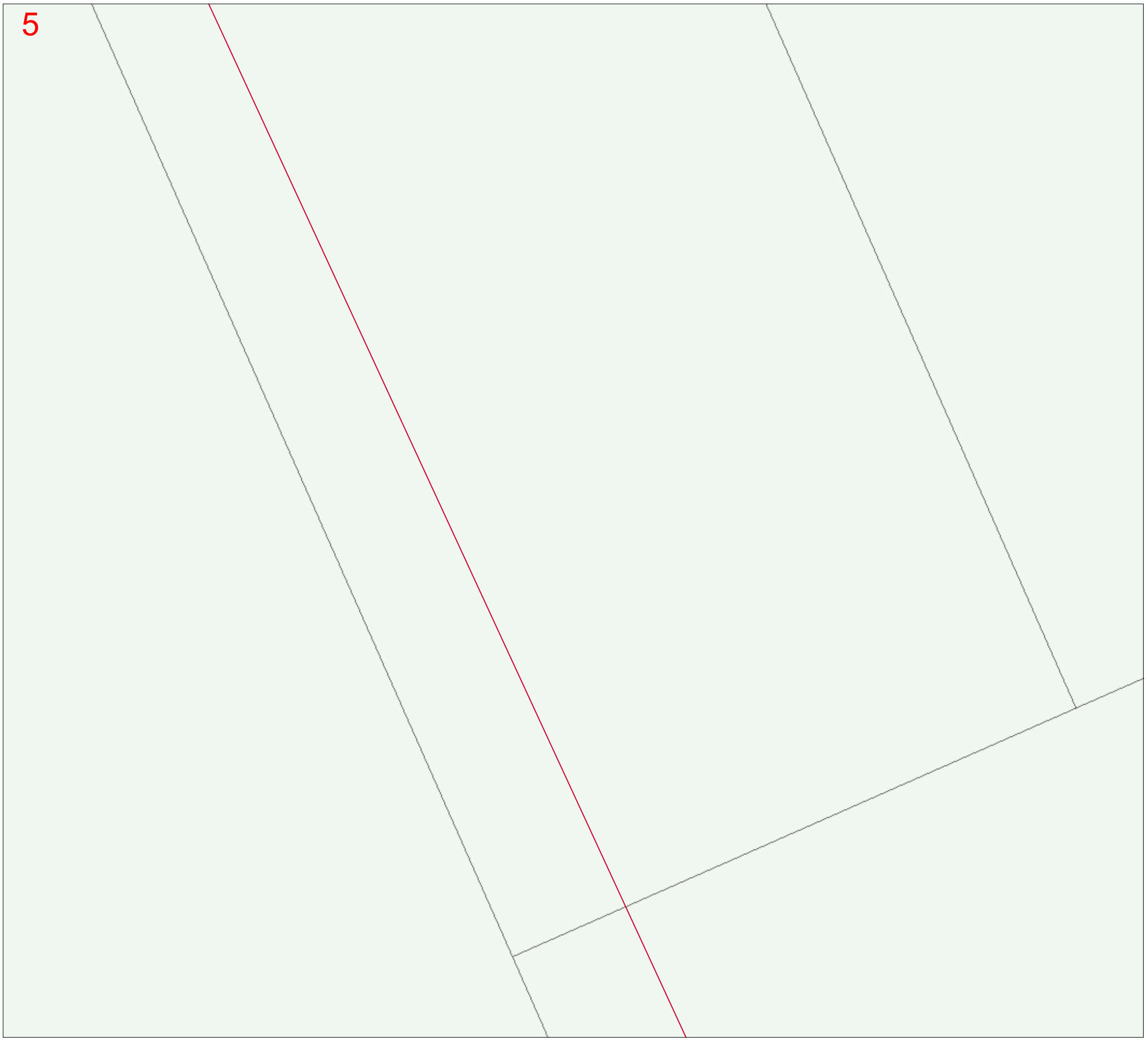
Examples:
- 40PE in DN80 CI — 40mm Polyethylene in an 80mm (Nominal Diameter) Cast Iron Sleeve
- 63PE INS — 63mm Polyethylene inserted in another pipe

Line/ Polygon Request

Data Source

Pipeline Data Copyright APA Group, Property Parcels Copyright QLD Government, UBD Imagery – Copyright Sensis, DBYD Dig Location provided by DBYD.

operated by apa



92704495 Map Sheet: 5

Scale: 1: 1000

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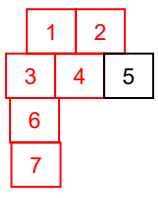
NORTH

Map Key:



This maps is created in colour and shall be printed in colour

Legend

Distribution Main

- Class 900 Transmission
- Class 600 Transmission
- Class 300 Transmission
- High Pressure Steel
- High Pressure PE Trunk
- High Pressure/ Class 500 (1)
- Medium Pressure PE/ Nylon
- Medium Pressure (Allgas)
- Low Pressure
- LPG
- TLP
- Proposed/ Under Construction
- Idle Gas Pipe
- Abandoned Gas Pipe
- Sleeve

(1) Medium Pressure in AGN/ Nylon in Allgas

Gas Assets and Fittings

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- V Isolation Valve
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63PE INS — 63mm Polyethylene inserted in another pipe

Line/ Polygon Request

Data Source

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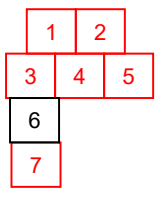
92704495 Map Sheet: 6

Scale: 1: 1000

0 0.01km

NORTH

Map Key:



This maps is created in colour and shall be printed in colour

Legend

Distribution Main

- Class 900 Transmission
- Class 600 Transmission
- Class 300 Transmission
- High Pressure Steel
- High Pressure PE Trunk
- High Pressure/ Class 500 (1)
- Medium Pressure PE/ Nylon
- Medium Pressure (Allgas)
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- Proposed/ Under Construction
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(1) Medium Pressure in AGN/ Nylon in Allgas

Gas Assets and Fittings

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63PE INS — 63mm Polyethylene inserted in another pipe

Line/ Polygon Request

Data Source

Pipeline Data Copyright APA Group, Property Parcels Copyright QLD Government, UBD Imagery – Copyright Sensis, DBYD Dig Location provided by DBYD.

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92704495 Map Sheet: 7

Scale: 1: 1000

0 0.01km

NORTH

Map Key:

1 2
3 4 5
6
7

This maps is created in colour and shall be printed in colour

Legend

Distribution Main

- Class 900 Transmission
- Class 600 Transmission
- Class 300 Transmission
- High Pressure Steel
- High Pressure PE Trunk
- High Pressure/ Class 500 (1)
- Medium Pressure PE/ Nylon
- Medium Pressure (Allgas)
- Low Pressure
- LPG
- TLP
- Proposed/ Under Construction
- Idle Gas Pipe
- Abandoned Gas Pipe
- Sleeve

(1) Medium Pressure in AGN/ Nylon in Allgas

Gas Assets and Fittings

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- R Regulator Station
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- Reducer
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- = Pipe Connector
- End Cap

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GAL	Wrought Galvanised Iron
PGAL	Poly Coated Wrought Galvanised Iron
ST	Steel
NY/ NY11	Nylon
PE	Polyethylene
MDPE	Medium Density Polyethylene
HDPE	High Density Polyethylene
DN	Nominal Diameter
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Examples: 40PE in DN80 CI — 40mm Polyethylene in an 80mm (Nominal Diameter) Cast Iron Sleeve

63PE INS — 63mm Polyethylene inserted in another pipe

Line/ Polygon Request

Data Source

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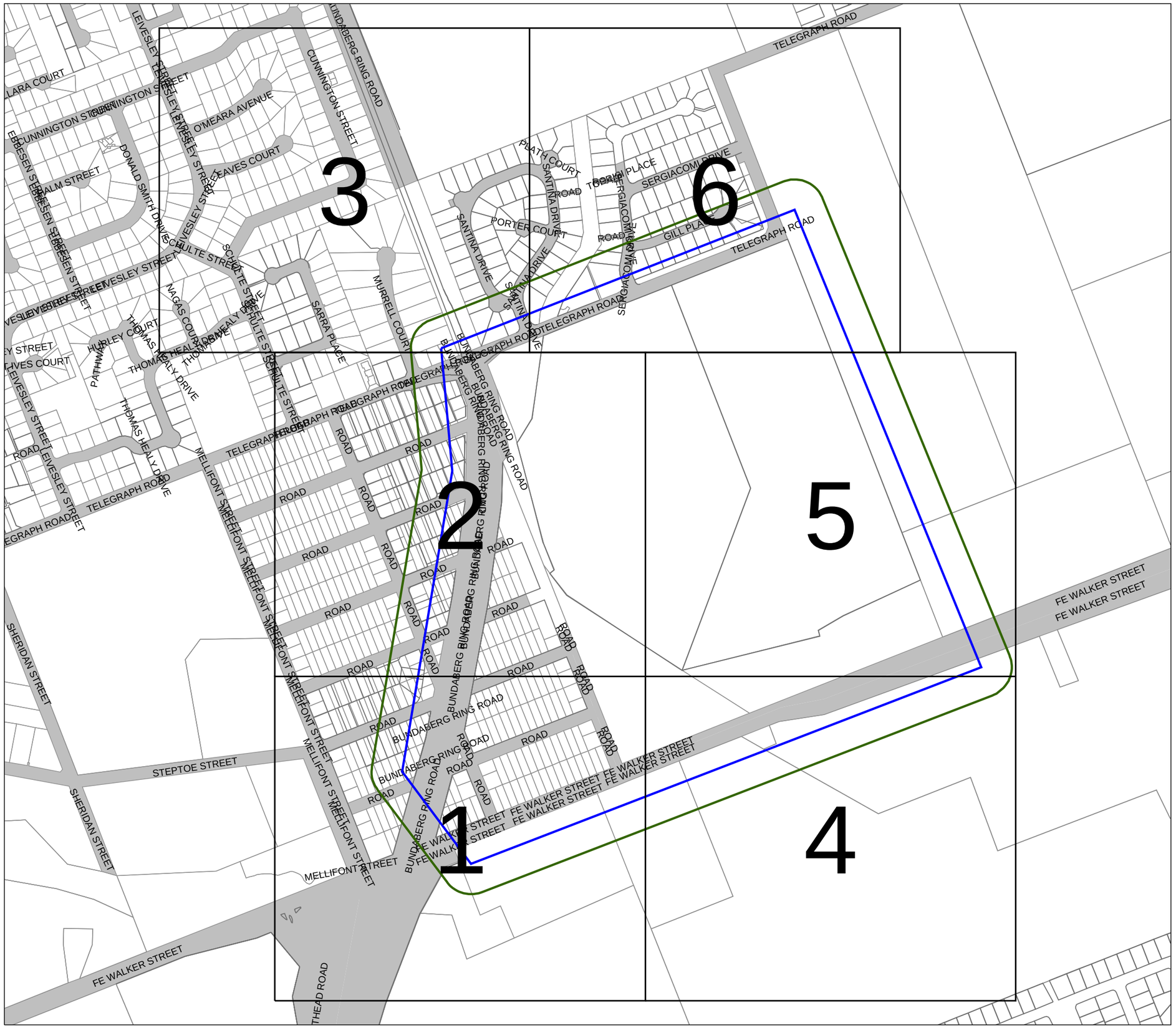
operated by apa



92704493-18669464

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Created Date 30/11/2019 12:26:36

Scale: 1:6300

LEGEND

DBYD [Misc_oracle]

- **DBYD Request.Ergon Search Area**
- **DBYD Request.Area**

DCDB Text [Operational_cadastre]

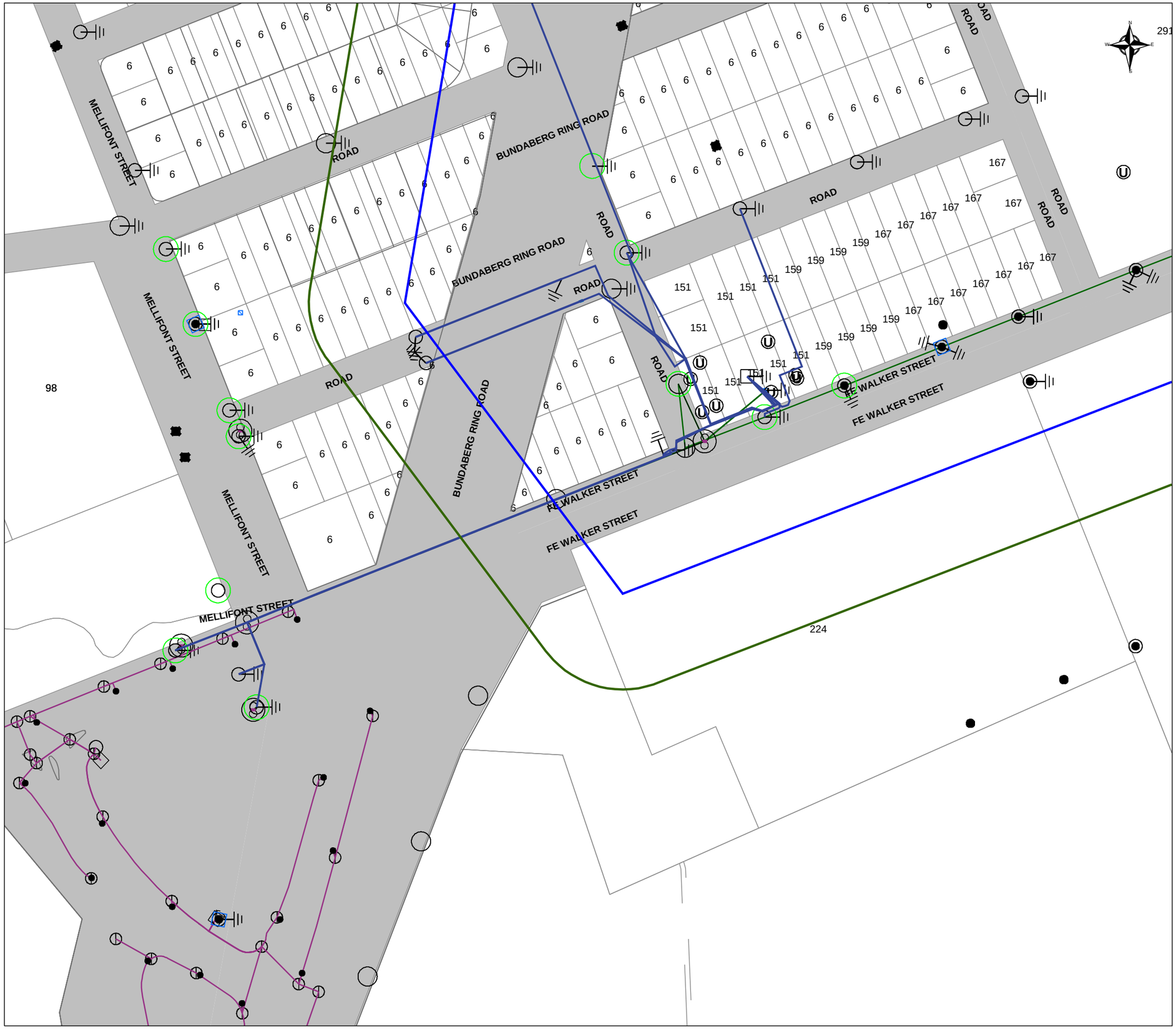
- Abc Def **Road Text.Name Annotation**

DCDB [Operational_cadastre]

- **Land Parcel.Area Geom**
- **Land Parcel Medium.Area Geom**
- **Road Coverage.Area Geom**

Unregistered Plan [Operational_cadastre]

- **URP Lot.Geometry**



ERGON. ENERGY

92704493-18669464

Sheet: 1 Layer:All Layers

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Created Date 30/11/2019 12:26:49

Scale: 1:2000

LEGEND

Segments [Electric]
- Cable Segment.HV Route - 11kV
- Cable Segment.LV Route - 240V
- Cable Segment.LV Route - 415V
- Connector Point Installation.External Location - Cable Joint 11kV
- Connector Point Installation.External Location - Earth Existing

Distribution Structures [Electric]
- Accurate Route.Route
- Pedestal.Existing Location - Normal Pillar
- Pit.Existing Location
- Pole.Existing Location - Unknown
- Pole.Existing Location - Comms
- Pole.Existing Location - HV
- Pole.Existing Location - HV/Comms
- Pole.Existing Location - HV/LV
- Pole.Existing Location - HV/LV/Comms
- Pole.Existing Location - LV
- Pole.Existing Location - SL
- Pole.Existing Location - TR
- Pole.Existing Location - TR/Comms
- Pole.Existing Location - Bollard

Substation Site [Electric]
- Substation.Existing Location - Pole Mounted Distribution
- Substation.Existing Location - Zone Substation

Communications [Electric]
- Communications Site.Location - Existing
- Communications Cable.Route - Existing
- Communications Joint.Location - Existing
- Communications Pit.Location - Existing

DBYD [Misc_oracle]
- DBYD Request.Ergon Search Area
- DBYD Request.Area
- Abc Def Qvas.Label Geom

DCDB Text [Operational_cadastre]
- Abc Def Road Text.Name Annotation

DCDB [Operational_cadastre]
- Land Parcel.Area Geom
- Land Parcel Medium.Area Geom
- Easement.Area Geom
- Road Coverage.Area Geom

Unregistered Plan [Operational_cadastre]
- URP Lot.Geometry

92704493-18669464

Sheet: 2 Layer:All Layers

Created By: svc-SmallworldEO_PRD

Created Date 30/11/2019 12:26:55

Scale: 1:2000

LEGEND

Segments [Electric]
- Cable Segment.HV Route - 11kV
- Cable Segment.LV Route - 240V
- Cable Segment.LV Route - 415V
- Cable Segment.Other Route - Earth Cable
- Connector Point Installation.External Location - Earth Existing

Distribution Structures [Electric]
- Accurate Route.Route
- Pedestal.Existing Location - Link Pillar
- Pedestal.Existing Location - Normal Pillar
- Pedestal.Existing Location - Cross Road Pillar
- Pit.Existing Location
- Pole.Existing Location - Unknown
- Pole.Existing Location - HV
- Pole.Existing Location - HV/Comms
- Pole.Existing Location - HV/LV
- Pole.Existing Location - HV/LV/Comms
- Pole.Existing Location - LV
- Pole.Existing Location - SL

Substation Site [Electric]
- Substation.Existing Location - Pole Mounted Distribution

Communications [Electric]
- Communications Joint.Location - Existing
- Communications Pit.Location - Existing

DBYD [Misc_oracle]
- DBYD Request.Ergon Search Area
- DBYD Request.Area
- Abc Def Qvas.Label Geom

DCDB Text [Operational_cadastre]
- Abc Def Road Text.Name Annotation

DCDB [Operational_cadastre]
- Land Parcel.Area Geom
- Land Parcel Medium.Area Geom
- Easement.Area Geom
- Road Coverage.Area Geom

Unregistered Plan [Operational_cadastre]
- URP Lot.Geometry

92704493-18669464

Sheet: 3 Layer:All Layers

Created By: svc-SmallworldEO_PRD

Created Date 30/11/2019 12:27:00

Scale: 1:2000

LEGEND

Segments [Electric]
- Cable Segment.HV Route - 11kV
- Cable Segment.LV Route - 240V
- Cable Segment.LV Route - 415V
- Connector Point Installation.External Location - Earth Existing

Distribution Structures [Electric]
- Accurate Route.Route
- Pedestal.Existing Location - Link Pillar
- Pedestal.Existing Location - Normal Pillar
- Pedestal.Existing Location - Cross Road Pillar
- Pole.Existing Location - Unknown
- Pole.Existing Location - HV
- Pole.Existing Location - HV/LV
- Pole.Existing Location - LV
- Pole.Existing Location - SL
- Pole.Existing Location - Bollard

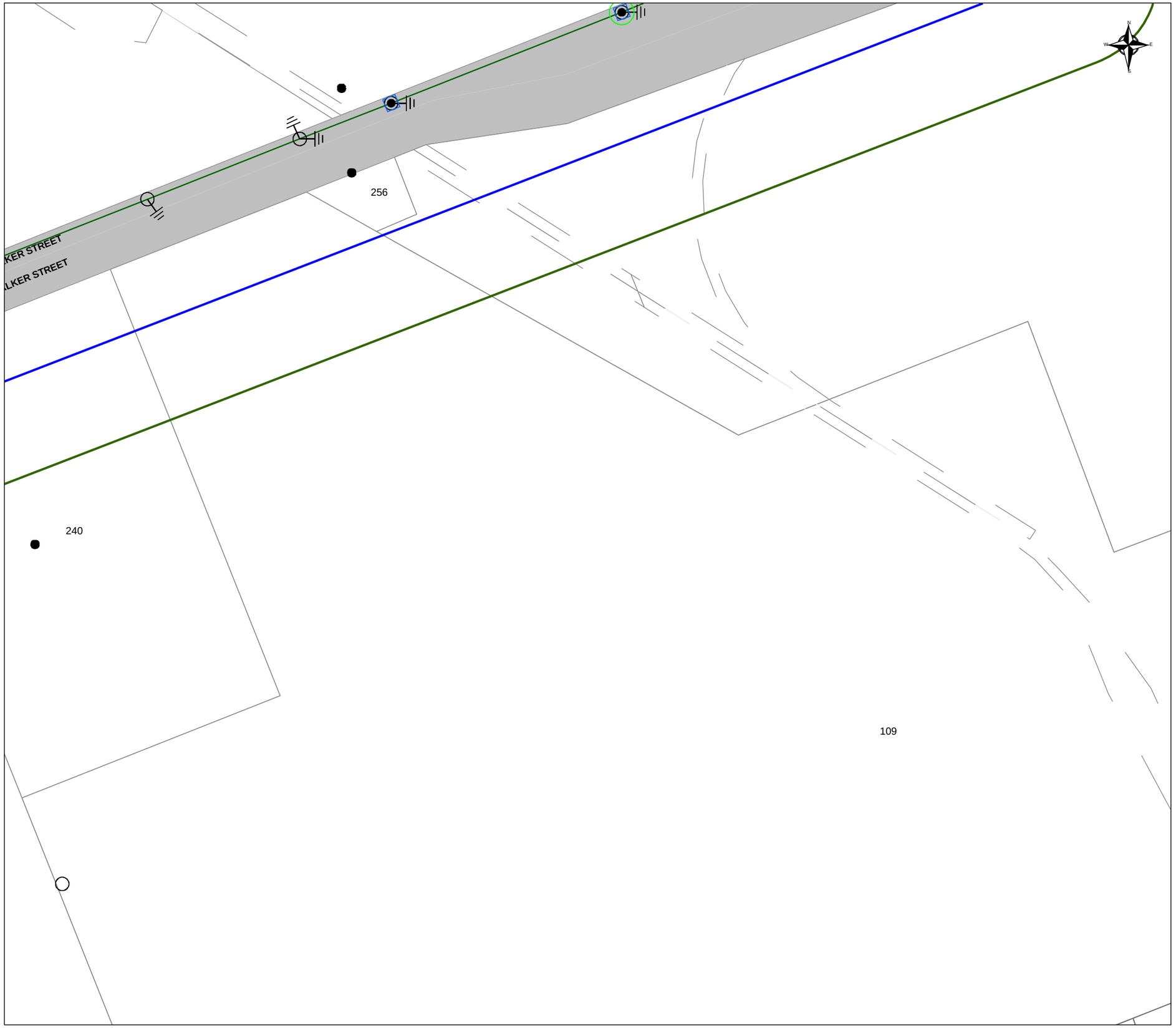
Substation Site [Electric]
- Substation.Existing Location - Padmount

DBYD [Misc_oracle]
- DBYD Request.Ergon Search Area
- DBYD Request.Area
- Abc Def Qvas.Label Geom

DCDB Text [Operational_cadastre]
- Abc Def Road Text.Name Annotation

DCDB [Operational_cadastre]
- Land Parcel.Area Geom
- Land Parcel Medium.Area Geom
- Easement.Area Geom
- Road Coverage.Area Geom

Unregistered Plan [Operational_cadastre]
- URP Lot.Geometry



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Created Date 30/11/2019 12:27:08

Scale: 1:2000

LEGEND

Segments [Electric]
- Connector Point Installation.External Location - Earth Existing

Distribution Structures [Electric]
- Pole.Existing Location - HV
- Pole.Existing Location - HV/LV
- Pole.Existing Location - HV/LV/Comms
- Pole.Existing Location - LV

Substation Site [Electric]
- Substation.Existing Location - Pole Mounted Distribution

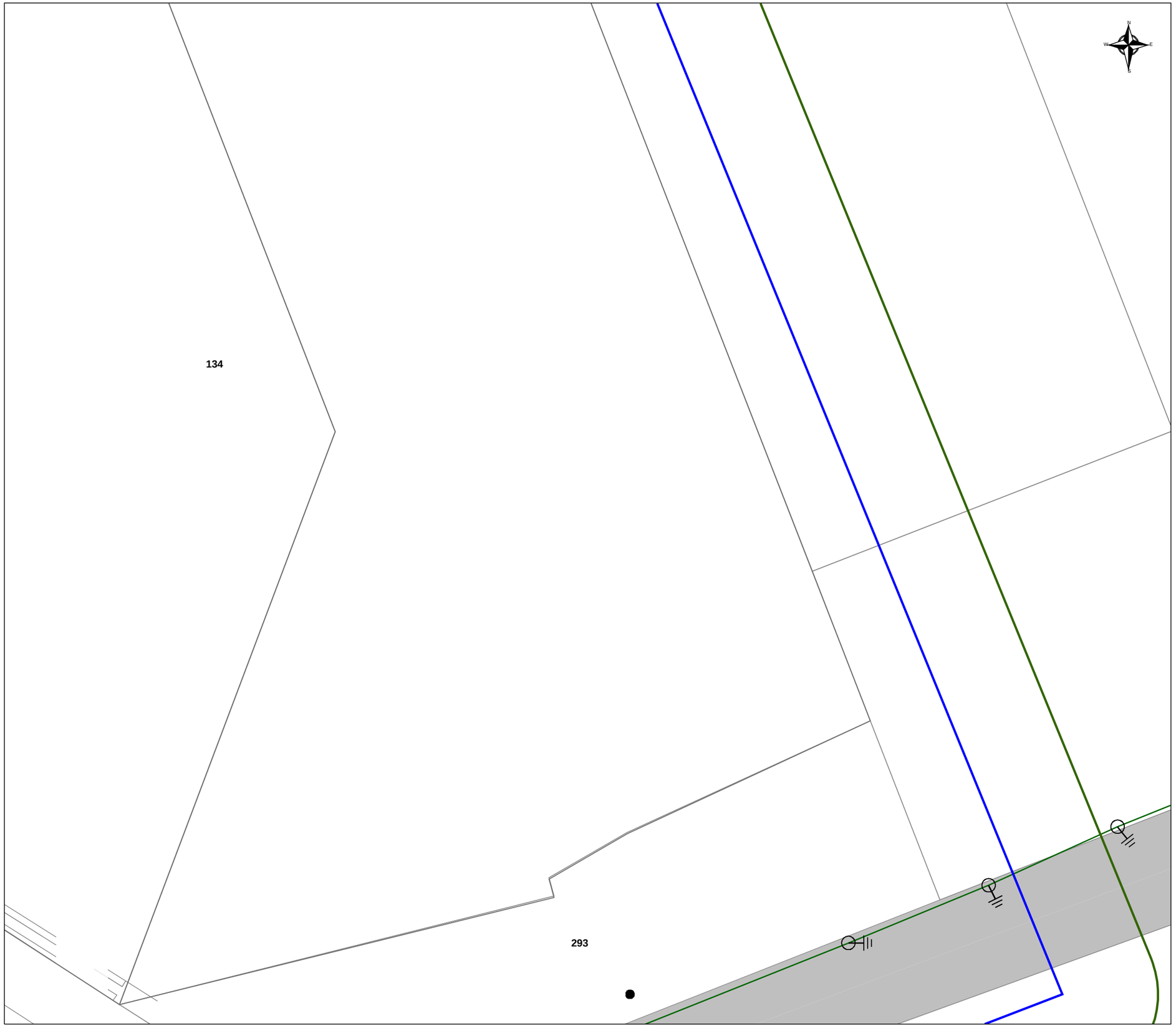
Communications [Electric]
- Communications Cable.Route - Existing

DBYD [Misc_oracle]
- DBYD Request.Ergon Search Area
- DBYD Request.Area
- Abc Def Qvas.Label Geom

DCDB Text [Operational_cadastre]
- Abc Def Road Text.Name Annotation

DCDB [Operational_cadastre]
- Land Parcel.Area Geom
- Land Parcel Medium.Area Geom
- Easement.Area Geom
- Road Coverage.Area Geom

Unregistered Plan [Operational_cadastre]
- URP Lot.Geometry



92704493-18669464

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Created Date 30/11/2019 12:27:10

Scale: 1:2000

LEGEND

Segments [Electric]
- **Connector Point Installation.External Location - Earth Existing**

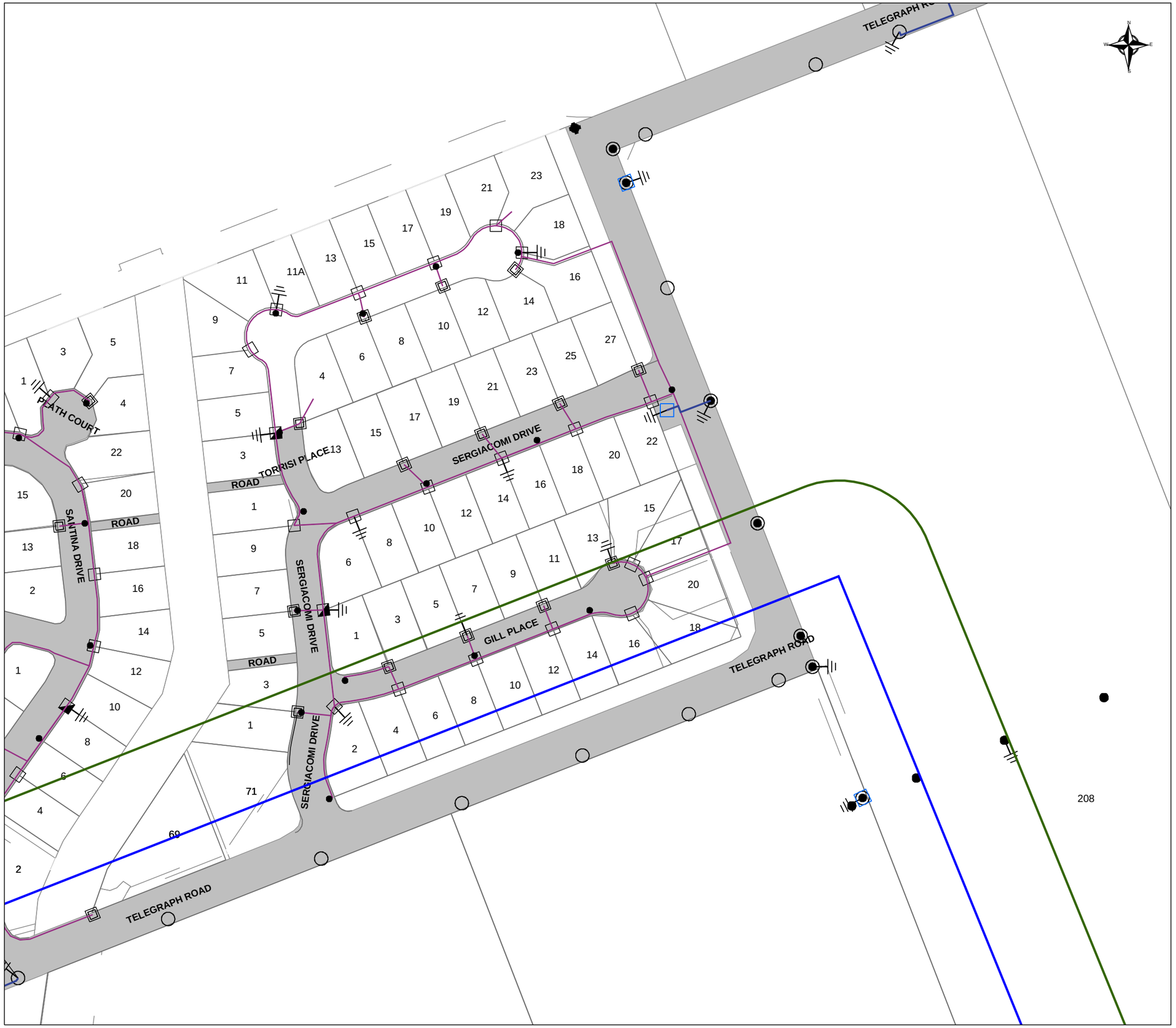
Distribution Structures [Electric]
- **Pole.Existing Location - HV**
- **Pole.Existing Location - LV**

Communications [Electric]
- **Communications Cable.Route - Existing**

DBYD [Misc_oracle]
- **DBYD Request.Ergon Search Area**
- **DBYD Request.Area**
- **Qvas.Label Geom**

DCDB [Operational_cadastre]
- **Land Parcel.Area Geom**
- **Land Parcel Medium.Area Geom**
- **Easement.Area Geom**
- **Road Coverage.Area Geom**

Unregistered Plan [Operational_cadastre]
- **URP Lot.Geometry**



ERGON. ENERGY

92704493-18669464

Sheet: 6 Layer:All Layers

Created By: svc-SmallworldEO_PRD

Created Date 30/11/2019 12:27:12

Scale: 1:2000

LEGEND

Segments [Electric]
- Cable Segment.HV Route - 11kV
- Cable Segment.LV Route - 240V
- Cable Segment.LV Route - 415V
- Connector Point Installation.External Location - Earth Existing

Distribution Structures [Electric]
- Accurate Route.Route
- Pedestal.Existing Location - Link Pillar
- Pedestal.Existing Location - Normal Pillar
- Pedestal.Existing Location - Cross Road Pillar
- Pole.Existing Location - HV
- Pole.Existing Location - HV/LV
- Pole.Existing Location - LV
- Pole.Existing Location - SL
- Pole.Existing Location - Bollard

Substation Site [Electric]
- Substation.Existing Location - Pole Mounted Distribution
- Substation.Existing Location - Padmount

DBYD [Misc_oracle]
- DBYD Request.Ergon Search Area
- DBYD Request.Area
- Abc Def Qvas.Label Geom

DCDB Text [Operational_cadastre]
- Abc Def Road Text.Name Annotation

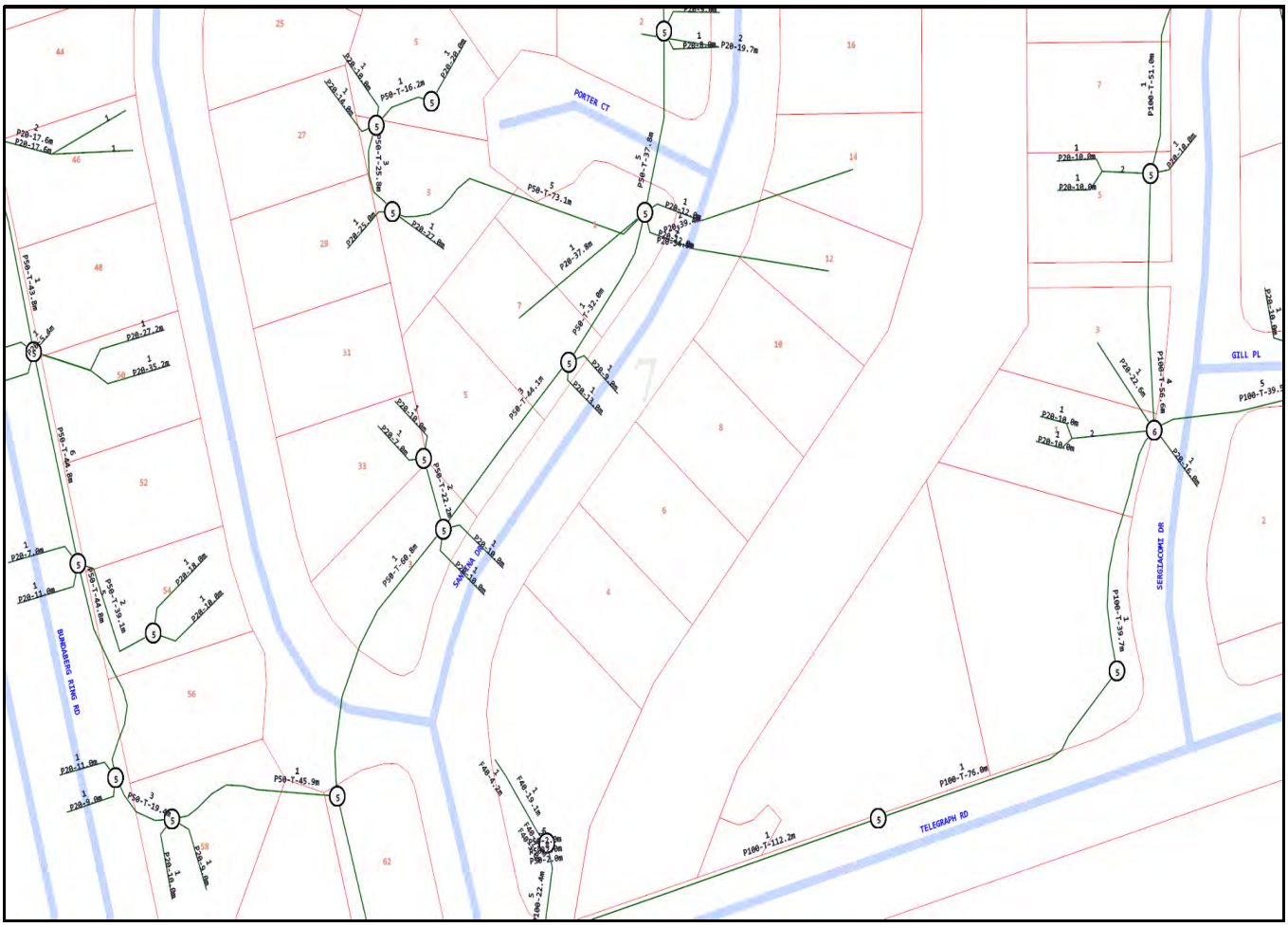
DCDB [Operational_cadastre]
- Land Parcel.Area Geom
- Land Parcel Medium.Area Geom
- Easement.Area Geom
- Road Coverage.Area Geom

Unregistered Plan [Operational_cadastre]
- URP Lot.Geometry

LEGEND

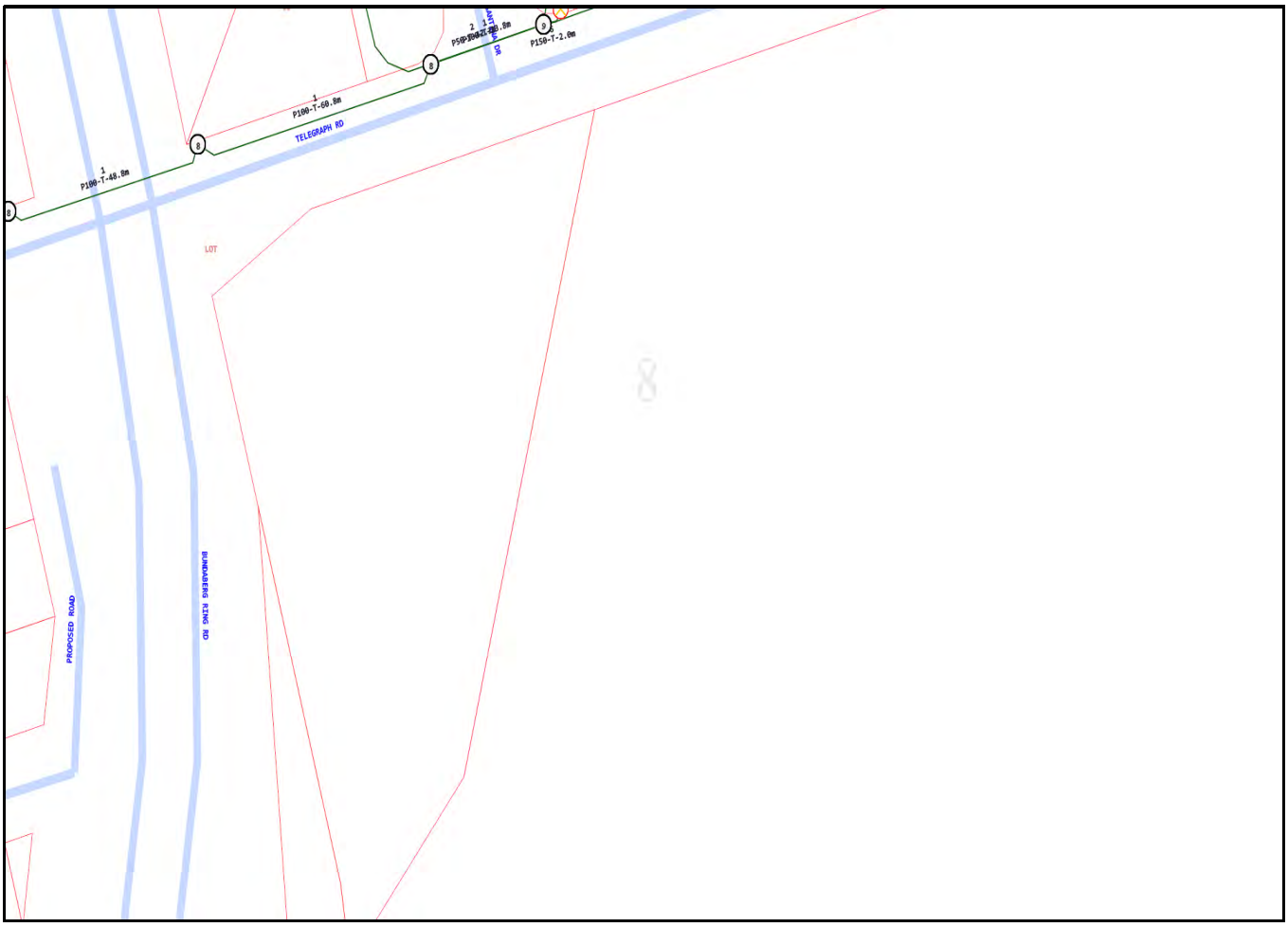
33	Parcel and the location
5	Pit with size "5"
2E	Power Pit with size "2E". Valid PIT Size: e.g. 2E, 5E, 6E, 8E, 9E, E, null.
	Manhole
	Pillar
2 PO – T- 25.0m P40 – 20.0m 5 9	Cable count of trench is 2. One "Other size" PVC conduit (PO) owned by Telstra (-T-), between pits of sizes, "5" and "9" are 25.0m apart. One 40mm PVC conduit (P40) owned by NBN, between pits of sizes, "5" and "9" are 20.0m apart.
2 10.0m 5 9	2 Direct buried cables between pits of sizes ,"5" and "9" are 10.0m apart.
5 9	Trench containing any INSERVICE/CONSTRUCTED (Copper/RF/Fibre) cables.
5 9	Trench containing only DESIGNED/PLANNED (Copper/RF/Fibre/Power) cables.
5 9	Trench containing any INSERVICE/CONSTRUCTED (Power) cables.
BROADWAY ST	Road and the street name "Broadway ST"
Scale	0 20 40 60 Meters 1:2000 1 cm equals 20 m

Email info@nbn.com.au Web nbn.com.au



Level 11, 100 Arthur Street, North Sydney NSW 2060

Email info@nbn.com.au Web nbn.com.au



Level 11, 100 Arthur Street, North Sydney NSW 2060

Email info@nbn.com.au Web nbn.com.au

Proposed Residential Subdivision
134 Telegraph Rd, Kalkie
Traffic Impact Assessment

Prepared for EMTOM Pty Ltd

15 October 2020

Document Information

Prepared for	EMTOM Pty Ltd
File Reference	UES003003 TIA Rpt V2
Project Number	UES003003
Date	15 October 2020

Contact Information

Urban Environmental Solutions
ABN 81 428 134 679

Brisbane Office
10/9 Rossiter Parade
Hamilton QLD 4007

Brisbane Office: +61 7 3157 6660

admin@urbanenvironmentalsolutions.com.au
www.urbanenvironmentalsolutions.com.au

Document Control

Version	Date	Author		Reviewer	
1	25 May 2020	Mark Taber	MT	Gavin Fields	
2	15 October 2020	Mark Taber	MT	Gavin Fields	

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1 Introduction

Urban Environmental Solutions (UES) has been engaged by EMTOM Pty Ltd to prepare this Traffic Impact Assessment for the proposed Material Change of Use and Reconfiguration of Allotment application for their site at 134 Telegraph Road, Kalkie. This report forms part of a development application to Bundaberg Regional Council (BRC) in support of the proposed works and is to be read in conjunction with the Engineering Services Report, prepared by UES, in addition to town planning reporting by Insite SJC.

1.1 Scope

This Traffic Impact Assessment (TIA) was carried out to determine the level of potential impacts of both the construction and operational phases of the Project on the operation of the surrounding road network. The outcomes of the TIA will be used in support of the Development Application which will be assessed by Bundaberg Regional Council (BRC).

The assessment methodology adopted for this TIA is summarised in the key tasks listed below.

- Broadly identify the existing transport infrastructure which is of relevance to the Project.
- Estimate traffic generation associated with the construction and operational phases of the Project and the distribution of this development traffic on the identified road network, including the movement of materials, plant and equipment in addition to the construction and operational phase workforce.
- Assess the potential impact of the Project on the surrounding transport infrastructure during both the construction and operational phases.
- Identify potential mitigation and management strategies to be implemented during the construction and operational phases to offset the impact of the proposed Project (if required).

As outlined above, the adopted methodology centres on establishing a background, "existing development" traffic scenario for the identified transport routes and comparing this with a scenario including the Project-generated traffic, i.e. the "proposed development" scenario.

The process allows for the assessment of the traffic impacts of the Project in terms of road safety, access requirements, intersection operations, road link capacity, pavement and other transport infrastructure. Following this, if required, potential mitigation and/or management measures would be formulated to address the potential traffic impacts caused by the proposed Project.

1.2 Study Area

As noted above, the proposed Project site is located at 134 Telegraph Road, Kalkie (Lot 96 on SP187576). The location of the Project site is shown in Figure 1 below.

Figure 1: Site Location (Source: Nearmap, 2020)

2 Existing Conditions

2.1 Land Use and Zoning

The development site has a total area of 308,800m^2 (30.880ha) and is described as Lot 96 on SP187576. The site has boundary frontage on Telegraph Road to the north, with the Bundaberg Ring Road to the west. The site is adjacent to an agricultural property to the east and a rural property to the south, however both are zoned 'Emerging Community' as defined by Bundaberg Regional Council's Planning Scheme, as shown in Figure 2 below.

Figure 2: Land Use Zoning – Lot 96 on SP187576 (Source: BRC Interactive Mapping, 2020)

2.2 Surrounding Road Network Details

2.2.1 Project Transport Routes

The following information regarding the expected construction and future residential activities associated with the site were provided by Emtom and were used to establish the road transport networks anticipated to be used in servicing the project.

- The existing pavement width along the frontage of Telegraph Road is to be widened as part of the development;
- A new trunk collector is to be constructed within the site along the eastern boundary, which will ultimately connect through to FE Walker Street as part of the future development of the adjacent Emerging Community lot to the south.
- An internal road network will be developed to provide access to each new allotment, with road widths based on vehicle access numbers.

- It is expected that construction traffic will largely access the site via The Ring Road, which is a dedicated main road under the ownership of the Department of Transport and Main Roads. Defined construction transport routes are not yet determined.
- Future residents are expected to commute from surrounding suburbs via more dominant roads (i.e. Bargara Road, Fe Walker Street) and to a lesser extent Scotland Street / Telegraph Road to the west and Ashfield Road onto Telegraph Road from the east (refer Figure 3).

Figure 3: External Road Network (Source: Nearmap, 2020)

2.2.2 Road Links

Based on the information provided above the following sections of the road network were identified as relevant to this Traffic Impact Assessment.

Telegraph Road

Telegraph Road is approximately 2,880m in length and provides connectivity from Scotland Street in the west across the Bundaberg Ring Road, then up to Ashfield Street in the east. The road operates as a two-way, two lane carriageway with a sign posted speed limit of 60km/hr. The road is defined as a 'Public Road – Council Controlled', a 'Trunk Collector (Suburban)' along the frontage of the site and a 'Rural/Residential Collector' to the eastern end (between Coral Garden Drive and Ashfield Road) in accordance with the BRC road hierarchy. The BRC road hierarchy is presented in Figure 4.

Bundaberg Ring Road

Bundaberg Ring Road is approximately 14,400m in length and provides connectivity from Bargara Road in the north and east towards the Isis Highway in the south and west. The road generally operates as a two-way, two lane carriageway with variable sign posted speed limits between 60km/hr and 80km/hr. The road is defined as a 'Public Road – State Controlled' and 'State Strategic Road

(SCR)' in accordance with the BRC road hierarchy. This road provides for full heavy vehicle access to service the various heavy commercial and industrial precincts across the greater Bundaberg locality.

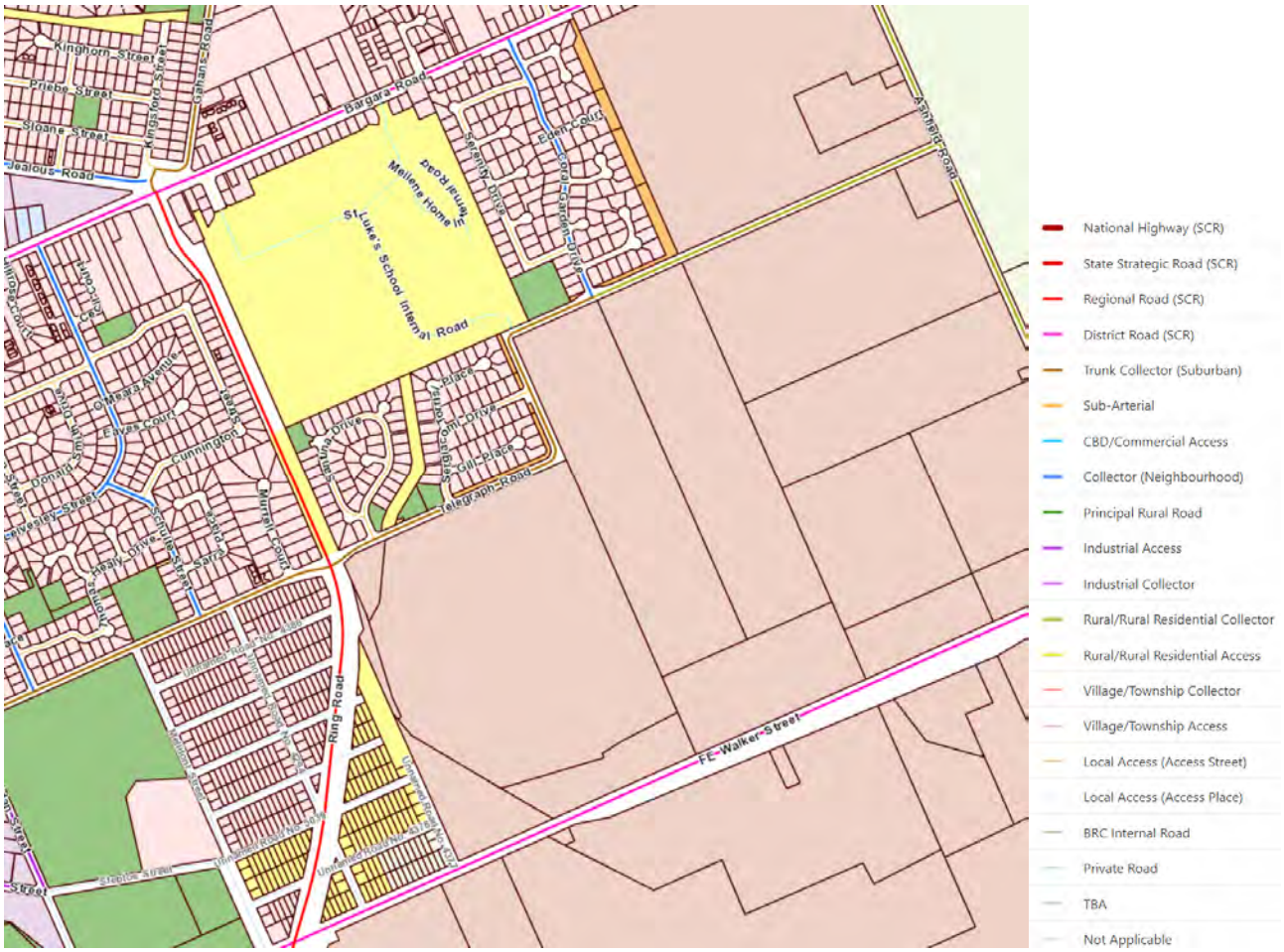


Figure 4: External Road Network (Source: Nearmap, 2020)

Coral Garden Drive

Coral Garden Drive is approximately 600m in length and provides connectivity from Bargara Road in the north to Telegraph Road at its southern end. The road generally operates as a two-way, two lane carriageway without a sign posted speed limit, therefore the maximum speed limit is 50km/hr as a residential road. The road is defined as a 'Public Road – State Controlled' and 'Collector (Neighbourhood)' in accordance with the BRC road hierarchy. This road provides for secondary access for residential properties from Telegraph Road through to Bargara Road and it is considered that end movements onto Bargara Road would be westerly for traffic along this road.

2.2.3 Key Intersections

Telegraph Road – Bundaberg Ring Road

The intersection of Telegraph Road and Bundaberg Ring Road currently operates as a cross-road priority controlled (Stop Sign) intersection, with priority given to the Bundaberg Ring Road approaches. Both directions along Bundaberg Ring Road are provided with right-hand turning slip lanes for access to the eastern and western sections of Telegraph Road. The left-off and left-on manoeuvres from Bundaberg Ring Road onto and from Telegraph Road have minor tapers to improve exit and merging capacity for the carriageway. The eastern approach to Bundaberg Ring Road also has an additional hold line (Stop Sign) for the cane rail line, which runs parallel to Bundaberg Ring Road. The intersection is shown in the following figures.

Figure 5: Telegraph Road – Bundaberg Ring Road Intersection (Source: Nearmap, 2020)

Figure 6: Eastern Approach to Telegraph Road – Bundaberg Ring Road Intersection (Source: Google Streetview, 2020)

Figure 7: Southern Approach to Telegraph Road – Bundaberg Ring Road Intersection (Source: Google Streetview, 2020)

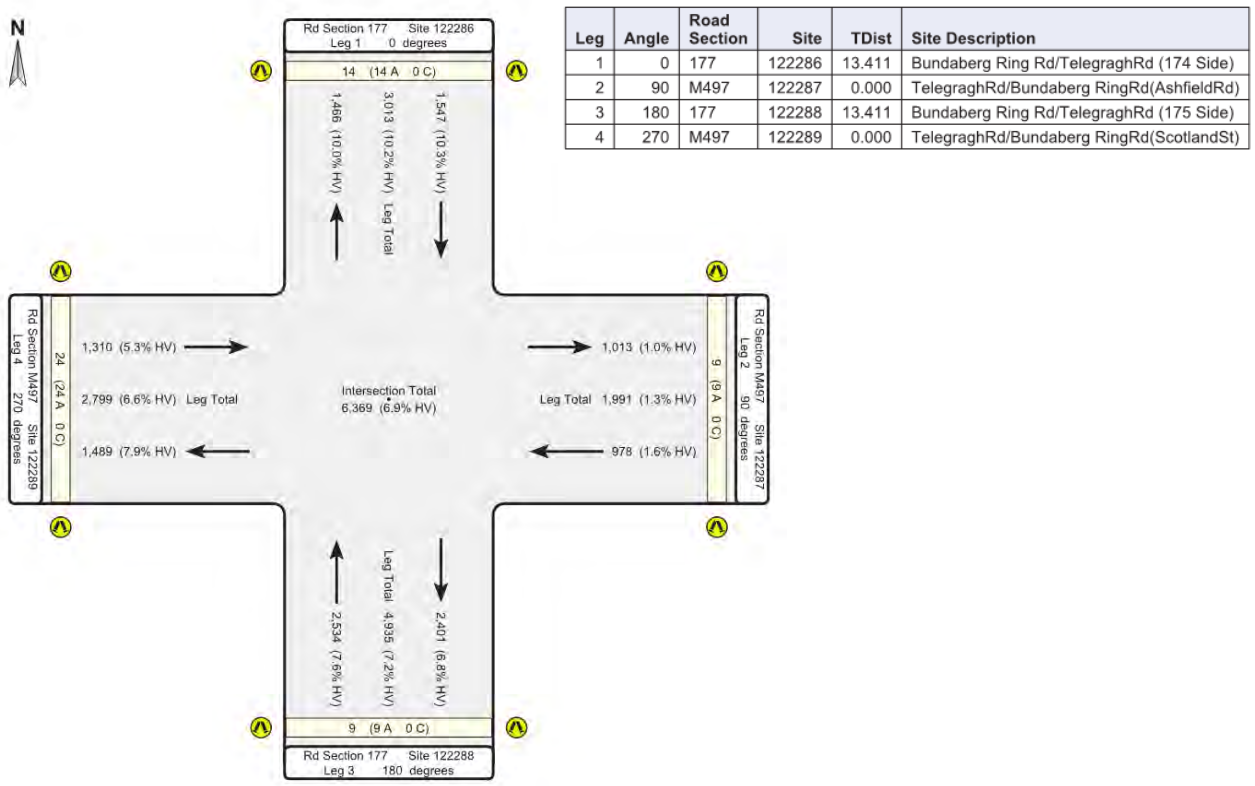
Figure 8: Western Approach to Telegraph Road – Bundaberg Ring Road Intersection (Source: Google Streetview, 2020)

Figure 9: Northern Approach to Telegraph Road – Bundaberg Ring Road Intersection (Source: Google Streetview, 2020)

3 Existing Intersection Analysis

The current development application for 134 Telegraph Road does not trigger referral assessment to the Department of Transport and Main Roads (DTMR). However, to provide some background to the local traffic conditions Emtom engaged with the department to verify any potential requirements. In response, the DTMR provided the results of a 12-hour intersection analysis taken on 19 February 2020 at the intersection of Bundaberg Ring Road / Telegraph Road. It is understood that there are no planned upgrades to the intersection of Bundaberg Ring Road / Telegraph Road within the current planning horizon (i.e. through to 2031), taking into consideration for growth within the area.

For reference purposes we have enclosed the complete details provided by DTMR of the intersection analysis in **Appendix A**. The overall summary of the intersection count is presented in Figure 10 below.



Leg	Angle	Road Section	Site	TDist	Site Description
1	0	177	122286	13.411	Bundaberg Ring Rd/TelegraghRd (174 Side)
2	90	M497	122287	0.000	TelegraghRd/Bundaberg RingRd(AshfieldRd)
3	180	177	122288	13.411	Bundaberg Ring Rd/TelegraghRd (175 Side)
4	270	M497	122289	0.000	TelegraghRd/Bundaberg RingRd(ScotlandSt)

Figure 10: Bundaberg Ring Road / Telegraph Road Intersection Analysis Summary (Source: DTMR, 2020)

The intersection count values in Figure 10 highlight that the southbound leg of Bundaberg Ring Road is the dominant direction of traffic with a 12 hour total of 4,935 vehicles with a heavy vehicle proportion of approximately 7.2%.

The proposed development of 134 Telegraph Road will progressively generate additional traffic to this intersection over the 10 year design horizon. To support the review of this additional traffic generation a breakdown of the existing traffic into the Bundaberg Ring Road intersection from the eastern leg of Telegraph Road is shown in Figure 11 below.

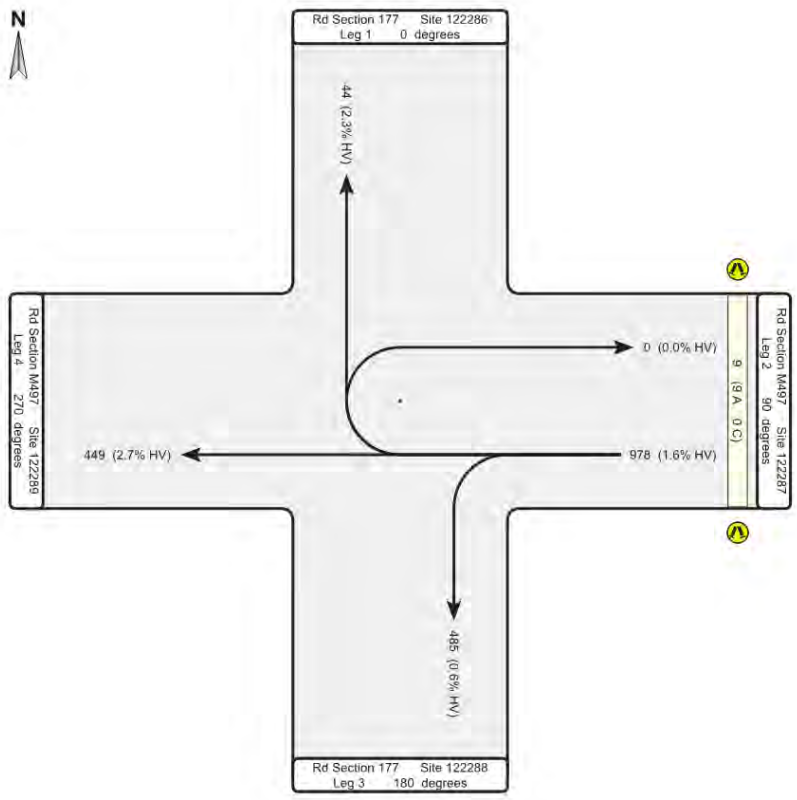


Figure 11: Existing Traffic Breakdown of Leg 2 within the Bundaberg Ring Road / Telegraph Road Intersection (Source: DTMR, 2020)

The results above highlight that approximately 49.6% of vehicles travel left into the intersection, and therefore towards the south, with 45.9% of vehicles traveling through the intersection to the western leg of Telegraph Road. The remaining 4.5% of vehicles turn right into the intersection towards the north along Bundaberg Ring Road.

For a general 4-way intersection, with limited additional traffic controls, the dominant road (Bundaberg Ring Road in this case) capacity during peak hour should be less than 600 vehicles per hour (vph) with the cross-road having less than 100 vph. A review of the DTMR intersection analysis indicates that the AM peak is greater than the PM peak and generates the following:

- Leg 1 – 280 vph
- Leg 2 – 193 vph
- Leg 3 – 420 vph
- Leg 4 – 131 vph

Therefore, the sum of Leg 1 and 3 is 600 vph with the sum of Leg 2 and 4 being 324 vph. The traffic in the secondary cross-road, being Telegraph Road, is therefore higher than 100 vph and requires additional measures to be a compliant intersection in its current state. To address this, the existing intersection is not bound by give-way controls but rather stop line controls to reduce the speed of entry into the intersection and ensure adequate sight visibility is achieved – particularly for through traffic across Bundaberg Ring Road.

The hold line storage distance from the stop line in Leg 2 through to the centreline of Santina Drive is 100m with the distance from the proposed entry to Road 1 in 134 Telegraph Road being a further 70m to the east.

4 Proposed Development Details

4.1 Development Layout

The planned development of 134 Telegraph Road is intended to cover the bulk of the site with a portion of the southern extent remaining as part of a balance allotment. The development comprises of 199 allotments that includes one drainage reserve along the western boundary, one potential sewer pump station allotment (that may or may not be necessary), one 0.5ha park and two balance lot areas. The remaining 194 allotments will be residential with a typical size of 800m^2.

It is proposed that a new road access off Telegraph Road be established to service the bulk of the development, which will be constructed as part of Stage 1 works. There is also a requirement by BRC to include a Trunk Collector along the eastern boundary that is proposed to be constructed progressively with the development – generally in accordance with the planning horizons presented in the Priority Infrastructure Plans for Kalkie.

The development has been reviewed with respect to Council's Transport and Parking Code, which is presented in **Appendix B**.

4.2 Construction Details

It is anticipated that the development of 134 Telegraph Road will be progressive over a period of approximately 10 years, which will be driven by demand for growth in the area. This estimate is consistent with the BRC growth strategy and estimates derived for the Priority Infrastructure Planning for the region.

Given the nature of the construction being in many phases, construction planning for traffic movements will be provided in conjunction with each future application for Operational Works. It is however noted that the site will provide for suitable construction facilities, storage and spatial offsets to completed stages of work as the development progresses. Construction will be undertaken in accordance with Council requirements in terms of hours of operation and environmental requirements. At this stage in planning, the longest phase of construction is expected to be for Stage 4 of the project in accordance with the engineering layout plans. Stage 4 construction at this point is estimated to occur over a period of 26 weeks, whereas other stages may be as short as 12 weeks (i.e. Stage 3).

4.3 Development Access

4.3.1 Key Intersections

134 Telegraph Road Proposed Site Access 1

The proposed access into the development will be in the form of a 'T-Intersection' off Telegraph Road, which will be constructed as part of the Stage 2 works. The location of the proposed road has been located to provide a suitable offset from the existing opposite local street access points to Santina Drive (70m to the west) and Sergiacomi Drive (110m to the east) on the northern side of Telegraph Road. The proposed internal road will be a 'Collector Street – Low Density' in accordance with Council's standard drawing R2003(A). The geometry of the proposed intersection is shown in UES drawing UES003003-FIG-03. To confirm the suitability of this configuration a swept path vehicle analysis was completed using a design vehicle with a length of 12.5m as shown on drawing UES003003-FIG-05, which also details the analysis of the internal intersections and the cul-de-sacs for the balance internal roads.

134 Telegraph Road Proposed Site Access 2

The second access to the site will be at the eastern boundary of the site in the form of a Trunk Collector as required by the Priority Infrastructure Planning for Kalkie. This access will ultimately provide through connectivity to FE Walker Street towards the end of the current planning horizon (i.e. 2031) in conjunction with the potential development of the southern neighbouring property. The conceptual details of the proposed intersection, which will be in the form of a 'T-Intersection' is shown on drawing UES003003-FIG-01. The design vehicle for a Trunk Collector is a 19m semi-trailer with the swept path analysis of this intersection also shown on Figure UES003003-FIG-05.

Based on discussions with Council's Technical Officer's during the information response period it was confirmed that the ultimate intersection at this location should be in the form of a four-way round-a-bout. We have prepared a 2d geometric analysis of this form of intersection to ensure that appropriate truncations are provided to avoid any future requirement for land resumptions from the 134 Telegraph allotments. The plan location of the ultimate round-a-bout also has the potential to make use of a portion of the reserve on the northern side of Telegraph Road, which will be the north-western corner of the round-a-bout. The details of this concept are presented in Figure UES003003-FIG-01. We confirm that this configuration will account for the turning capacity of the design vehicle being the 19m semi-trailer.

4.4 Traffic Generation

The traffic generation from the proposed development will increase directly in proportion to the residential allotments released in each progressive stage. The initial planning for the development has indicated that there will be 6 stages within the scope of the current development application. The projected generation rates applied for the development are in accordance with Table SC3.1.3 in Schedule 3 of the Bundaberg Regional Council Planning Scheme for Low Density Residential development. The number of movements per day have been estimated based on 89 vehicles per hectare per day with rate of 10.5 lots per hectare. Consequently, the estimated lot demand is 8.9 vehicles per lot per day with the following table summarises the stage characteristics for the development.

Table 1: Summary of Stage Characteristics

Stage	Number of Residential Allotments	Estimated Vehicles Per Day
Stage 1	32	285
Stage 2	34	303
Stage 3	15	134
Stage 4	40	356
Stage 5	41	365
Stage 6	32	285
Balance	2	0
Total	196	1728

It is estimated that 90% of all vehicular movements from the proposed development will travel west towards Bundaberg Ring Road either via the main entrance or the trunk road connection at the north-east onto Telegraph Road. This equates to a further 1,555 vehicles per day entering the Bundaberg Ring Road. Splitting this into directional constituents, we estimate that 50% of this value will leave the site towards the Bundaberg Ring Road and an equivalent will return from Bundaberg Ring Road.

The most significant impact to the intersection will be the vehicles travelling towards Bundaberg Ring Road, which will add 778 vehicles to the Leg 2 totals with 386 additional vehicles turning south, 357 vehicles traversing through the intersection and 35 vehicles turning towards the right per day.

With respect to the peak AM statistics, approximately 20% of the vehicle trips occur during this period. Therefore, the estimated increase in the AM peak volumes of approximately 156 vph will occur at the end of the design horizon.

This assessment also assumes that there is no connection through the site towards FE Walker Street within the 10-year planning horizon of this development. In the event the connection of the trunk road is able to be constructed within this timeline then the distribution of traffic onto Telegraph Road is expected to reduce due to the potential for efficiency in travel through to main destinations in Bundaberg South along FE Walker Street.

4.5 Frontage Impact Assessment and Mitigation

To facilitate the additional number of allotments the frontage of Telegraph Road has been identified by Council to require an upgrade to achieve the desired minimum pavement width for a 'Trunk Collector (Suburban)' road. To accommodate this, it is proposed that as part of the Stage 1 and 3 works the pavement on the southern side of Telegraph Road be widened to a minimum of 5.0m from the centreline

over the existing box culverts (3.5m vehicular lane and a 1.5m cycle lane) then further widened to be 7.7m from the centreline (3.5m vehicular lane, 1.5m cycle lane and a 2.7m parking lane) as shown on drawing UES003003-FIG-01.

In addition to the pavement widening works it is anticipated that appropriate street signage will also be included at the entry road and throughout the development, which will be detailed as part of future applications for Operational Works.

5 Conclusions

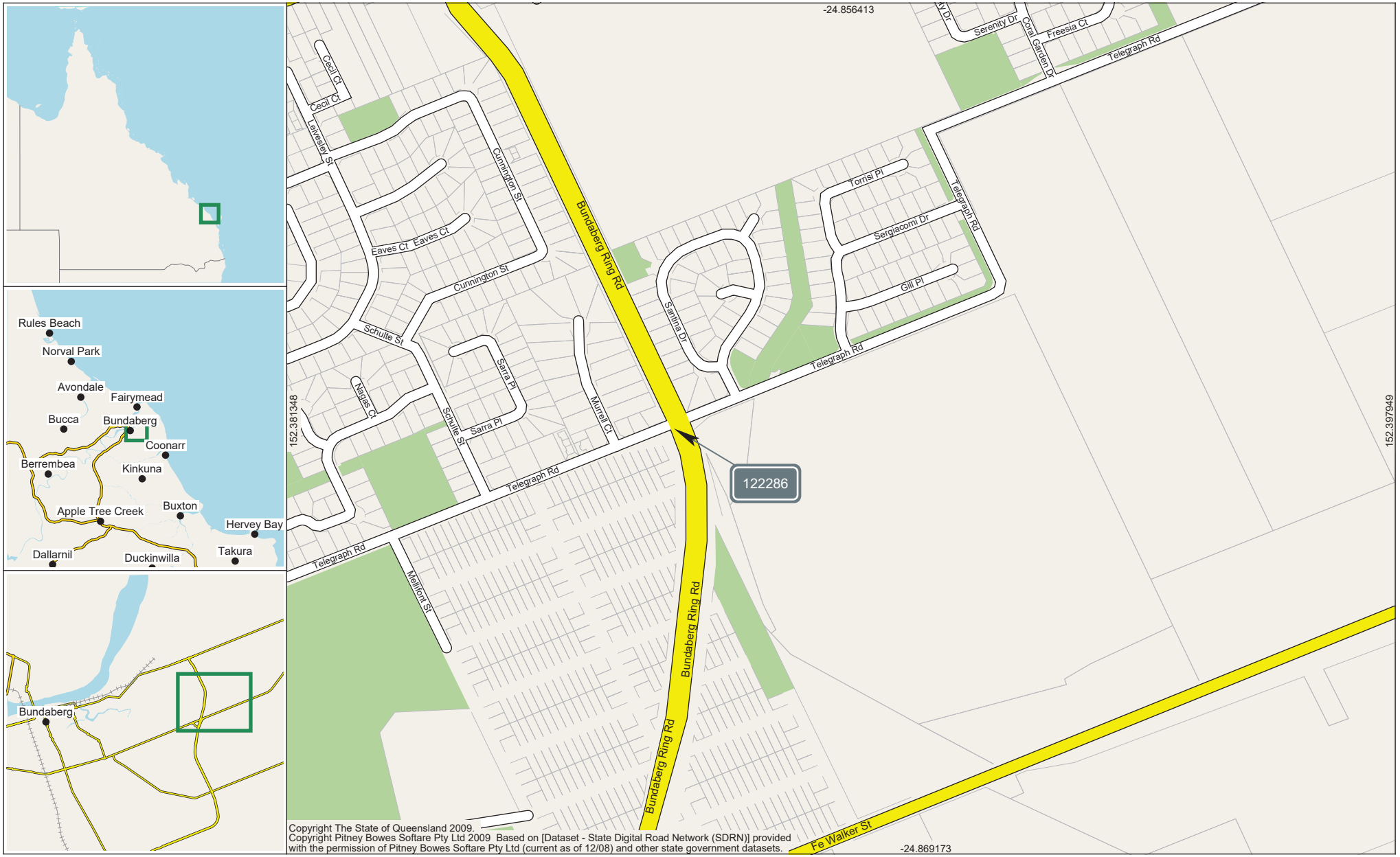
This traffic impact assessment has provided details of the proposed residential development at 134 Telegraph Road. The proposed works are consistent with Council's Priority Infrastructure Planning for the Kalkie locality. On this basis, the preliminary desktop assessment confirms that the potential for impact will be negligible for the identified sections of the BRC controlled road network taking the proposed widening of Telegraph Road and the construction of the Trunk Collector road along the eastern boundary of the site.

The traffic design has also taken into account details from the DTMR intersection analysis that was undertaken in February 2020 and provides an overview of the existing traffic generation statistics at Bundaberg Ring Road / Telegraph Road. The forecast increase of 156vph during the AM peak hour condition is not considered to significantly impact the intersection – although DTMR may look to modify this intersection in conjunction with additional development that may occur in the greater Kalkie area.

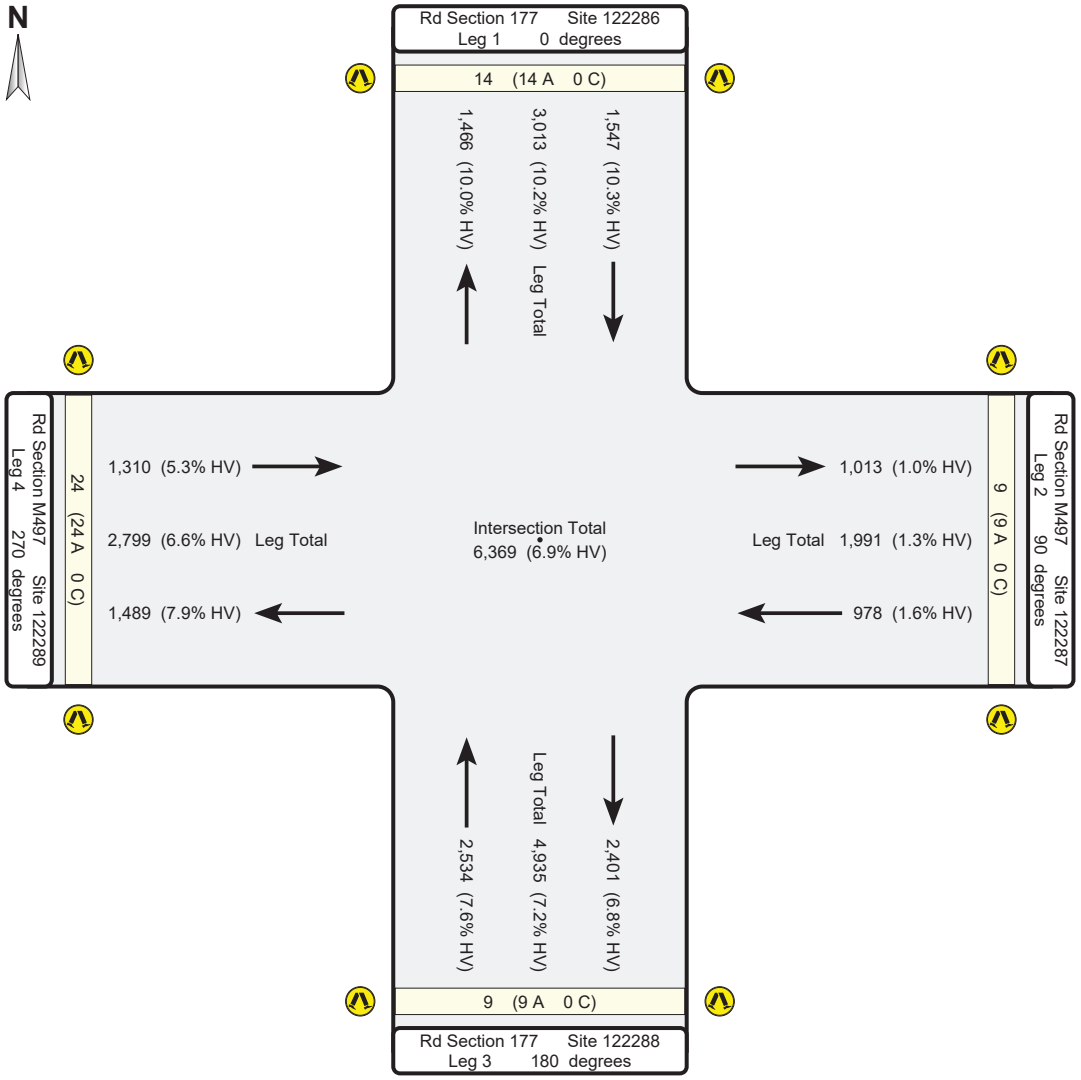
We confirm that additional traffic details will be provided as part of each future application for Operational Works with respect to each stage / stages of development to address line marking, traffic calming and other measures required to demonstrate compliance with the BRC Planning Scheme.

Appendix A: Bundaberg Ring Road / Telegraph Road Intersection Analysis (DTMR, 2020)

Traffic Analysis and Reporting System
Intersection Analysis Report
Area 412 - Wide Bay/Burnett District Road Section 177 - BUNDABERG RING ROAD
Intersection 15647 - 177 & Telegraph Rd (L) &(R)
Wednesday 19-Feb-2020 06:00 - 18:00



Summary



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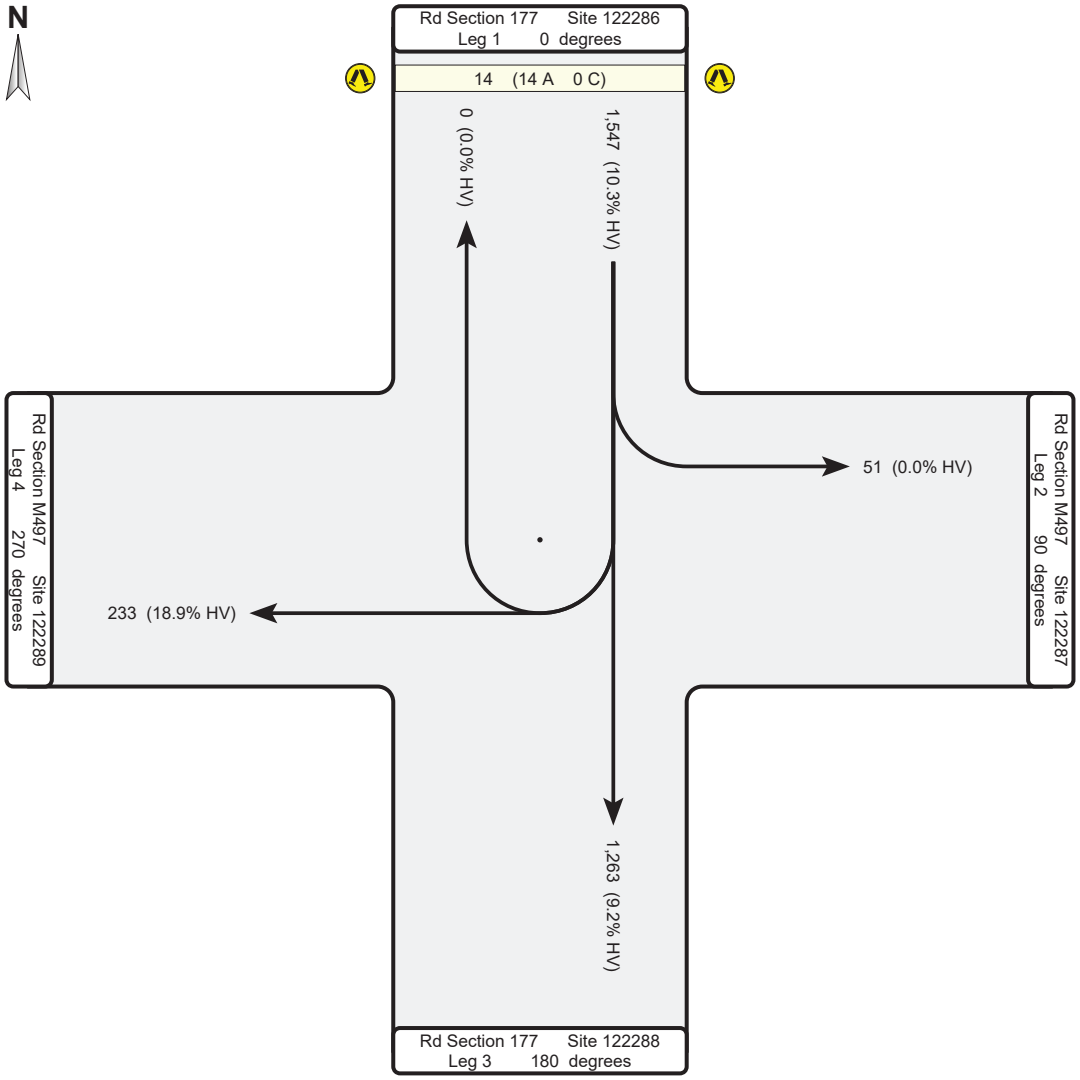
Leg 1 Site 122286 Tdist 13.411 km Bundaberg Ring Rd/TelegraghRd (174 Side)



Leg 1 Site 122286 Tdist 13.411 km Bundaberg Ring Rd/TelegraghRd (174 Side)

Time	Left	Through	Right	U-Turn	Pedestrians
00:00-00:15					
00:15-00:30					
00:30-00:45					
00:45-01:00					
01:00-01:15					
01:15-01:30					
01:30-01:45					
01:45-02:00					
02:00-02:15					
02:15-02:30					
02:30-02:45					
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04:00-04:15					
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04:30-04:45					
04:45-05:00					
05:00-05:15					
05:15-05:30					
05:30-05:45					
05:45-06:00					
06:00-06:15	1	6	2	0	0
06:15-06:30	0	12	3	0	2
06:30-06:45	0	11	3	0	1
06:45-07:00	4	22	7	0	1
07:00-07:15	1	17	6	0	0
07:15-07:30	0	23	4	0	0
07:30-07:45	1	40	5	0	0
07:45-08:00	2	46	9	0	1

Time	Left	Through	Right	U-Turn	Pedestrians
08:00-08:15	2	70	12	0	0
08:15-08:30	3	61	17	0	0
08:30-08:45	0	53	5	0	0
08:45-09:00	0	27	5	0	0
09:00-09:15	1	20	7	0	0
09:15-09:30	4	19	5	0	0
09:30-09:45	0	8	10	0	0
09:45-10:00	1	24	2	0	0
10:00-10:15	0	18	5	0	0
10:15-10:30	0	15	3	0	0
10:30-10:45	0	20	3	0	0
10:45-11:00	2	25	5	0	0
11:00-11:15	0	23	2	0	0
11:15-11:30	1	15	3	0	2
11:30-11:45	0	20	4	0	0
11:45-12:00	1	12	4	0	0
12:00-12:15	2	18	4	0	0
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13:30-13:45	0	14	5	0	0
13:45-14:00	0	20	6	0	0
14:00-14:15	1	26	2	0	0
14:15-14:30	0	22	3	0	0
14:30-14:45	2	24	1	0	0
14:45-15:00	2	39	8	0	0
15:00-15:15	3	73	9	0	0
15:15-15:30	4	64	10	0	4
15:30-15:45	1	34	6	0	0
15:45-16:00	1	47	3	0	0

Time	Left	Through	Right	U-Turn	Pedestrians
16:00-16:15	0	30	3	0	1
16:15-16:30	0	32	4	0	0
16:30-16:45	1	26	2	0	0
16:45-17:00	1	14	4	0	0
17:00-17:15	0	13	1	0	0
17:15-17:30	0	19	3	0	0
17:30-17:45	2	27	5	0	0
17:45-18:00	1	15	2	0	0
18:00-18:15					
18:15-18:30					
18:30-18:45					
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22:45-23:00					
23:00-23:15					
23:15-23:30					
23:30-23:45					
23:45-24:00					

Blank cells indicate the non-collection of corresponding counts.

Traffic Analysis and Reporting System

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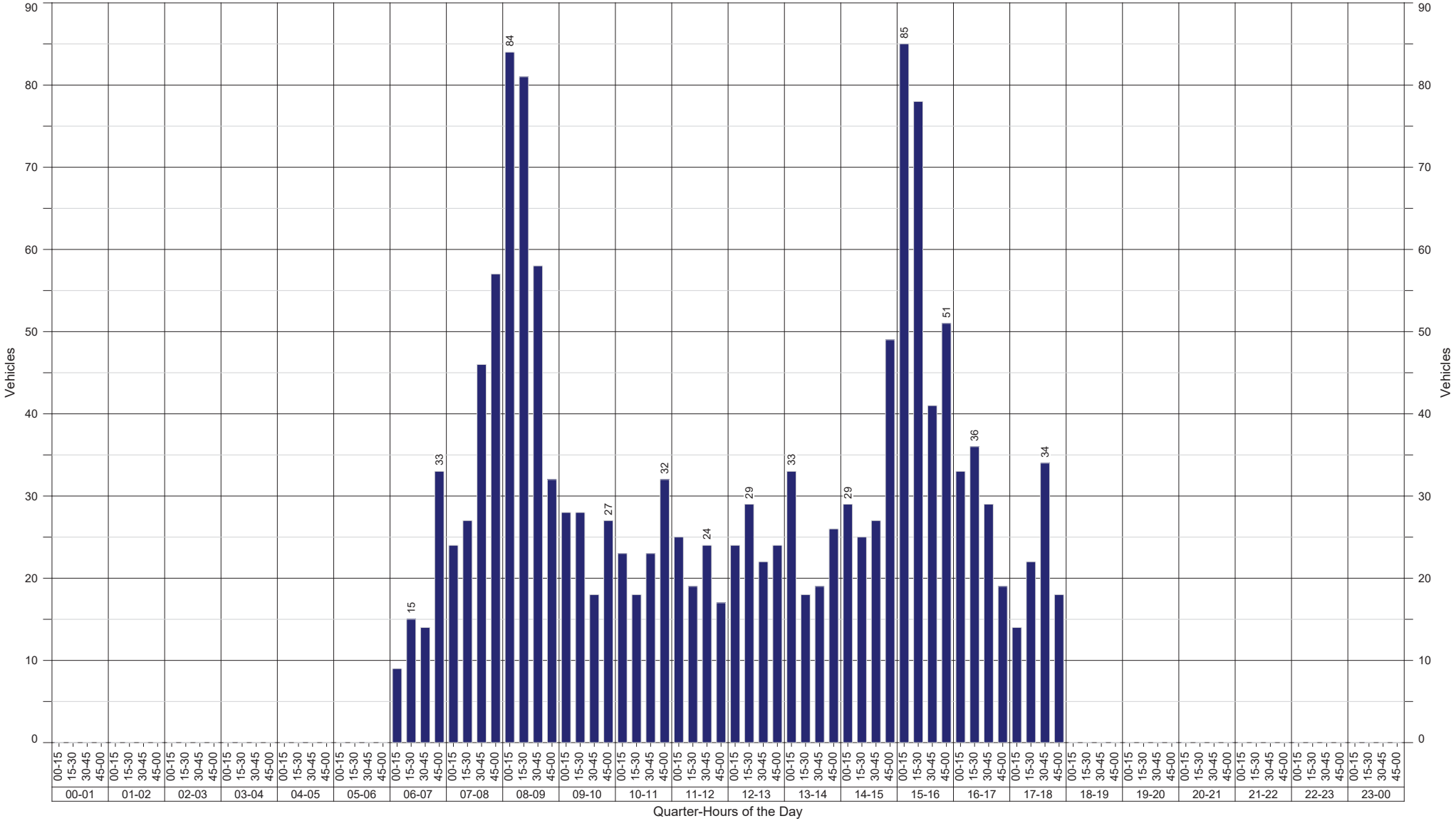
Intersection 15647 - 177 & Telegraph Rd (L) &(R)
Wednesday 19-Feb-2020 06:00 - 18:00

Leg 1 Site 122286 Tdist 13.411 km Bundaberg Ring Rd/TelegraghRd (174 Side)

Total volume 1,547

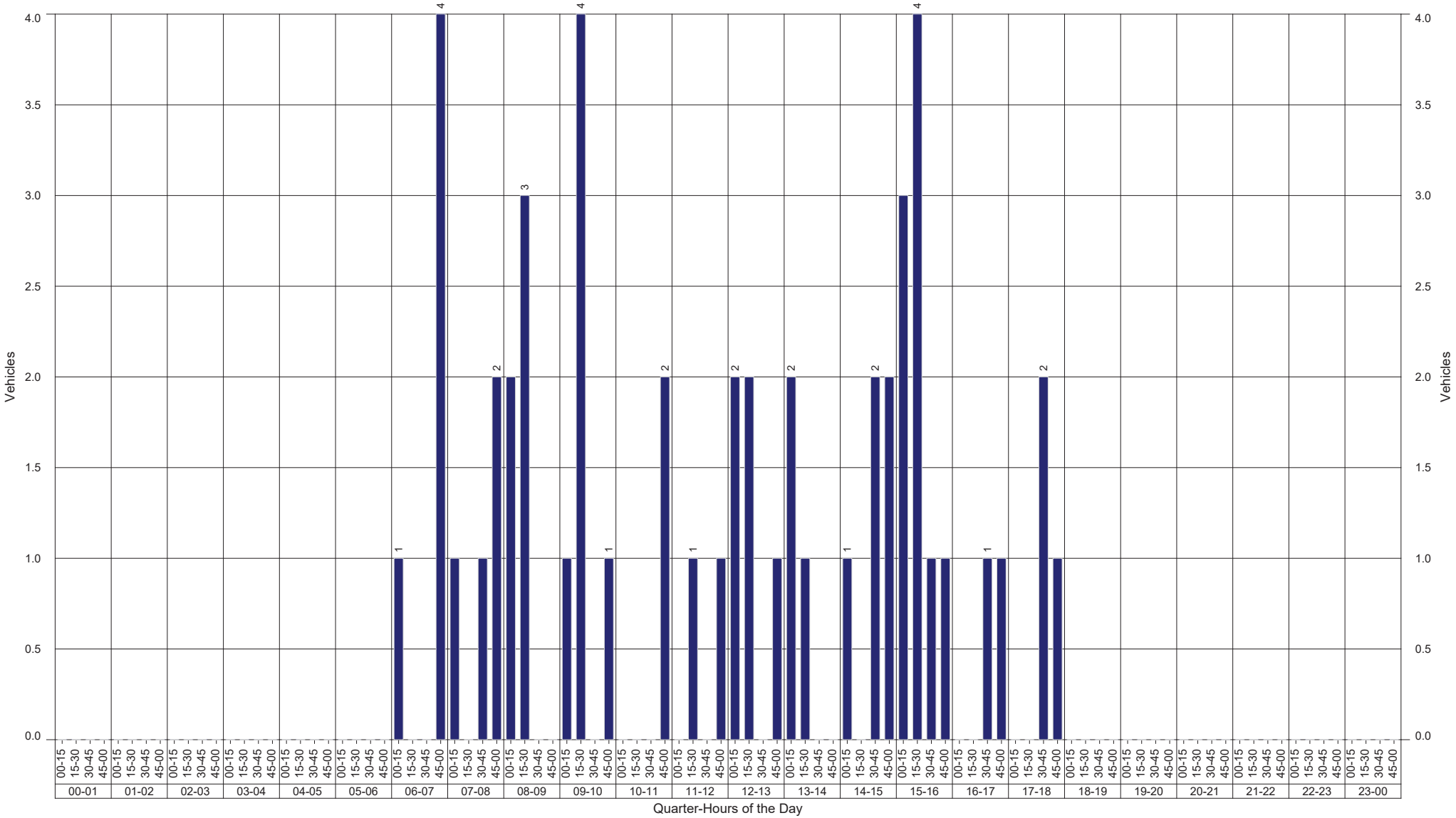
Quarter-Hour Volumes for All Vehicles Entering the Intersection - All Traffic Classes



Leg 1 Site 122286 Tdist 13.411 km Bundaberg Ring Rd/TelegraghRd (174 Side)

Total volume 51

Quarter-Hour Volumes for Left-turning Vehicles - All Traffic Classes



Intersection Analysis Report

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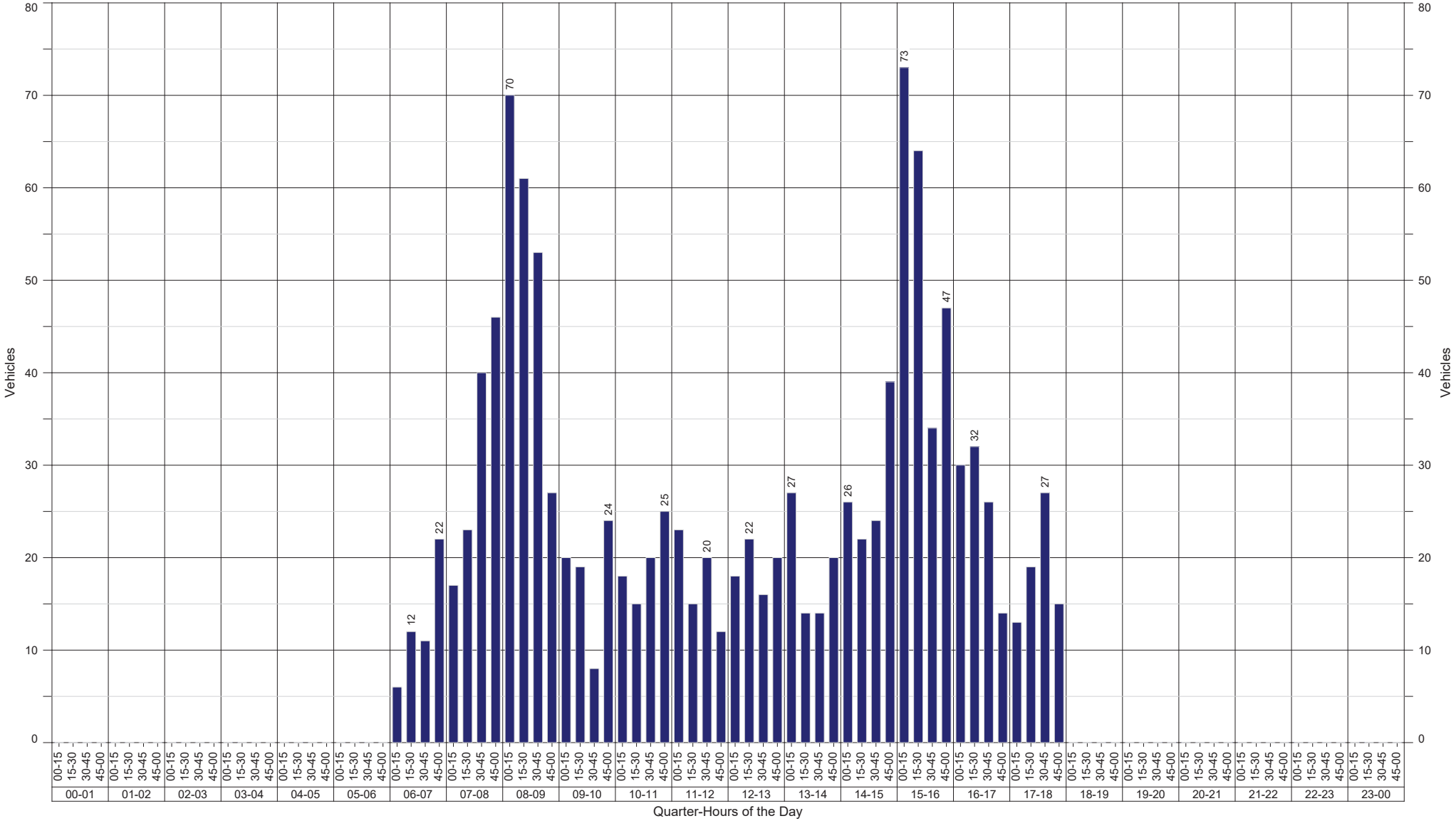
Intersection 15647 - 177 & Telegraph Rd (L) &(R)

Wednesday 19-Feb-2020 06:00 - 18:00

Leg 1 Site 122286 Tdist 13.411 km Bundaberg Ring Rd/TelegraghRd (174 Side)

Total volume 1,263

Quarter-Hour Volumes for Through Vehicles - All Traffic Classes



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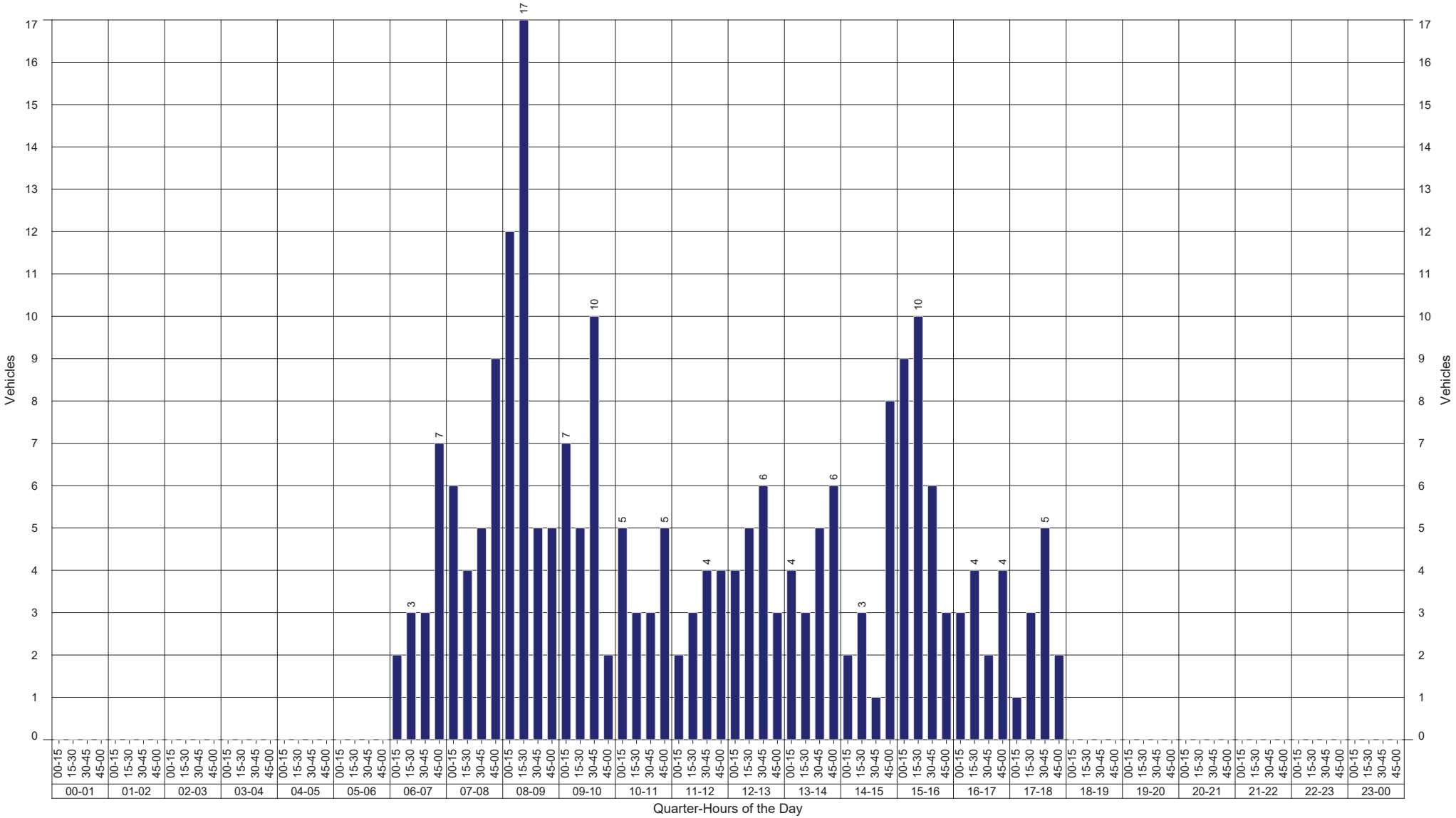
Intersection 15647 - 177 & Telegraph Rd (L) &(R)
Wednesday 19-Feb-2020 06:00 - 18:00

Leg 1 Site 122286 Tdist 13.411 km Bundaberg Ring Rd/TelegraghRd (174 Side)

Total volume 233

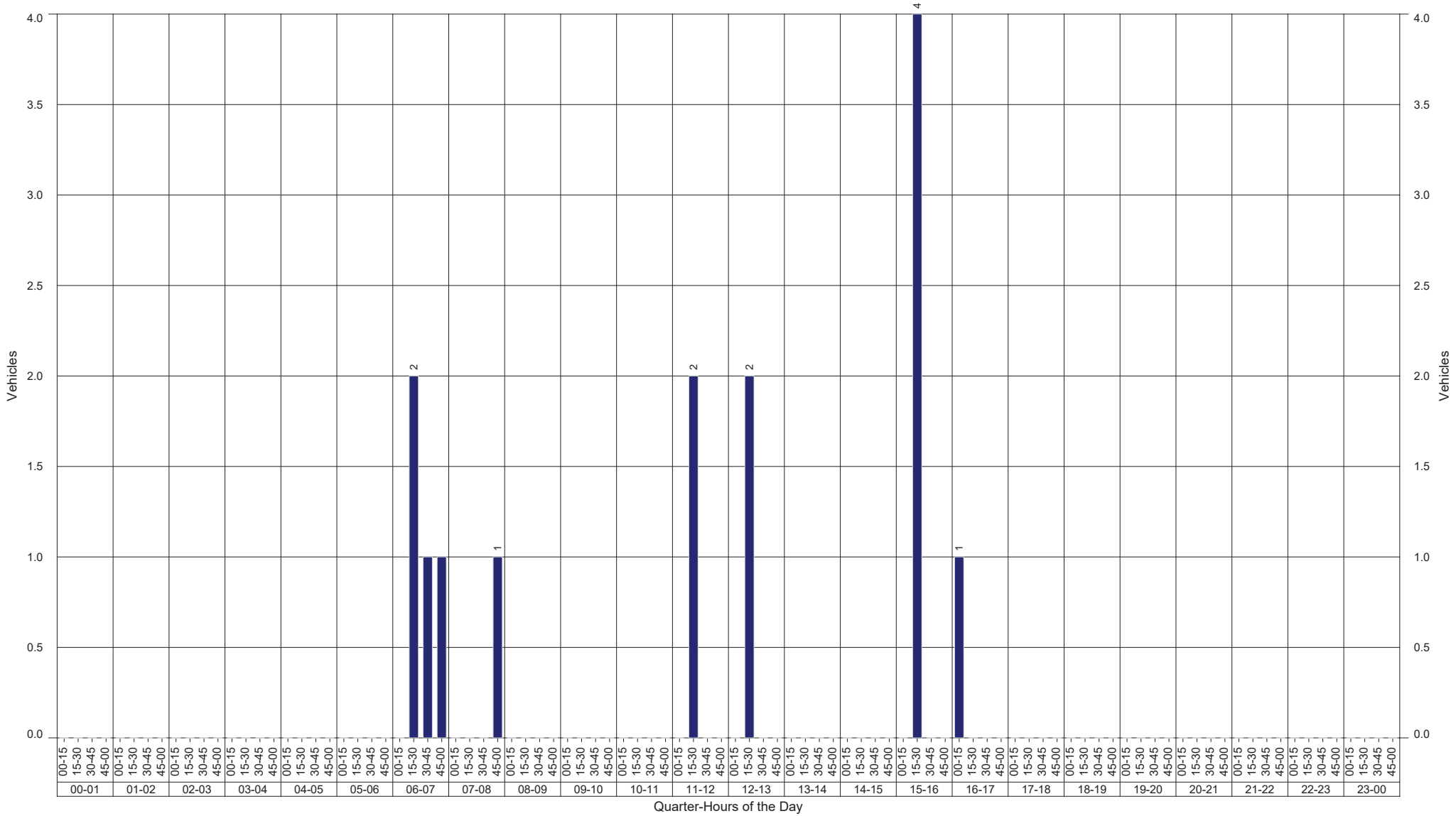
Quarter-Hour Volumes for Right-turning Vehicles - All Traffic Classes



Leg 1 Site 122286 Tdist 13.411 km Bundaberg Ring Rd/TelegraghRd (174 Side)

Total volume 14

Quarter-Hour Volumes for Pedestrians



Traffic Analysis and Reporting System

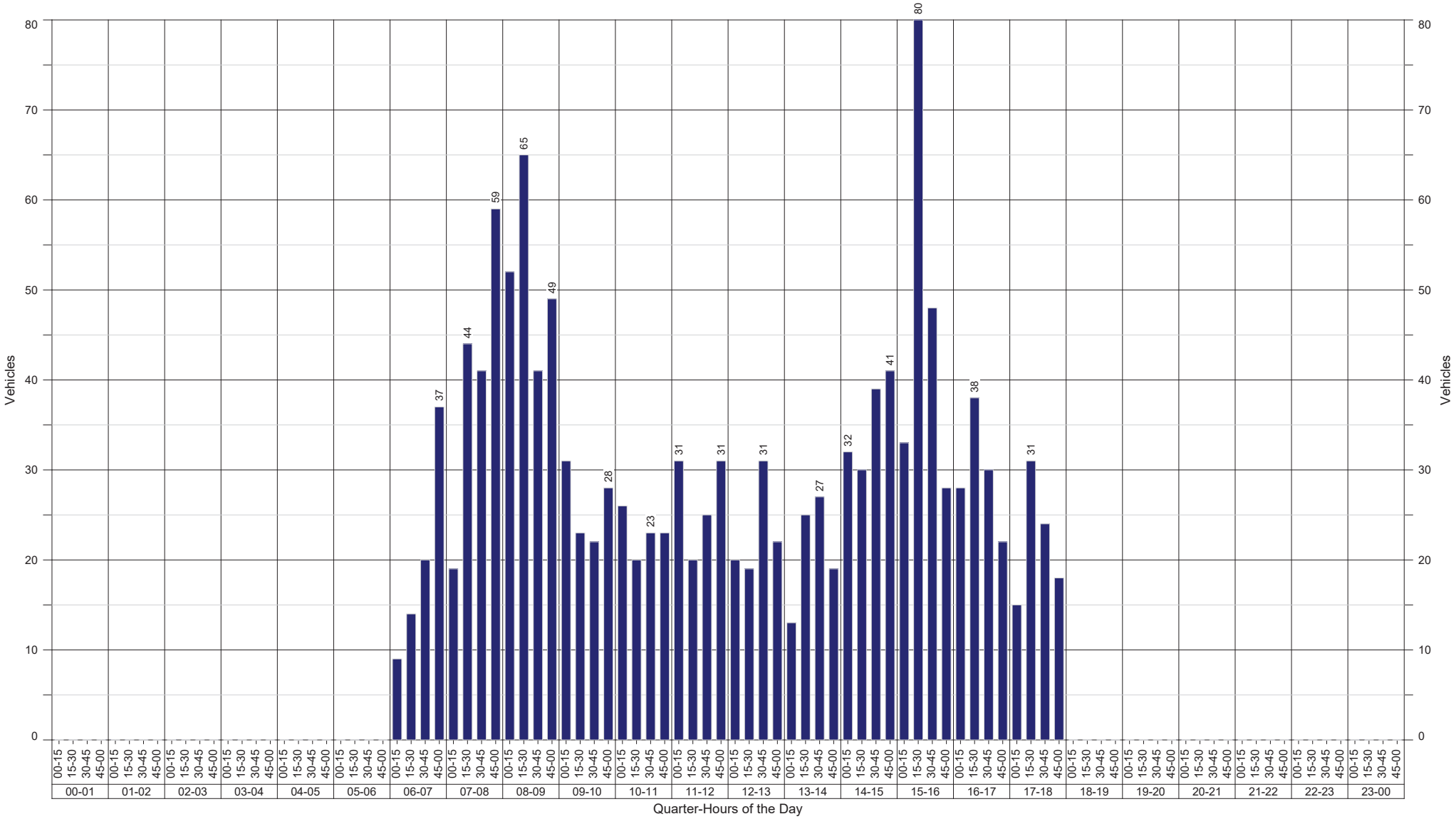
Intersection Analysis Report

Area 412 - Wide Bay/Burnett District Road Section 177 - BUNDABERG RING ROAD
Intersection 15647 - 177 & Telegraph Rd (L) &(R)
Wednesday 19-Feb-2020 06:00 - 18:00

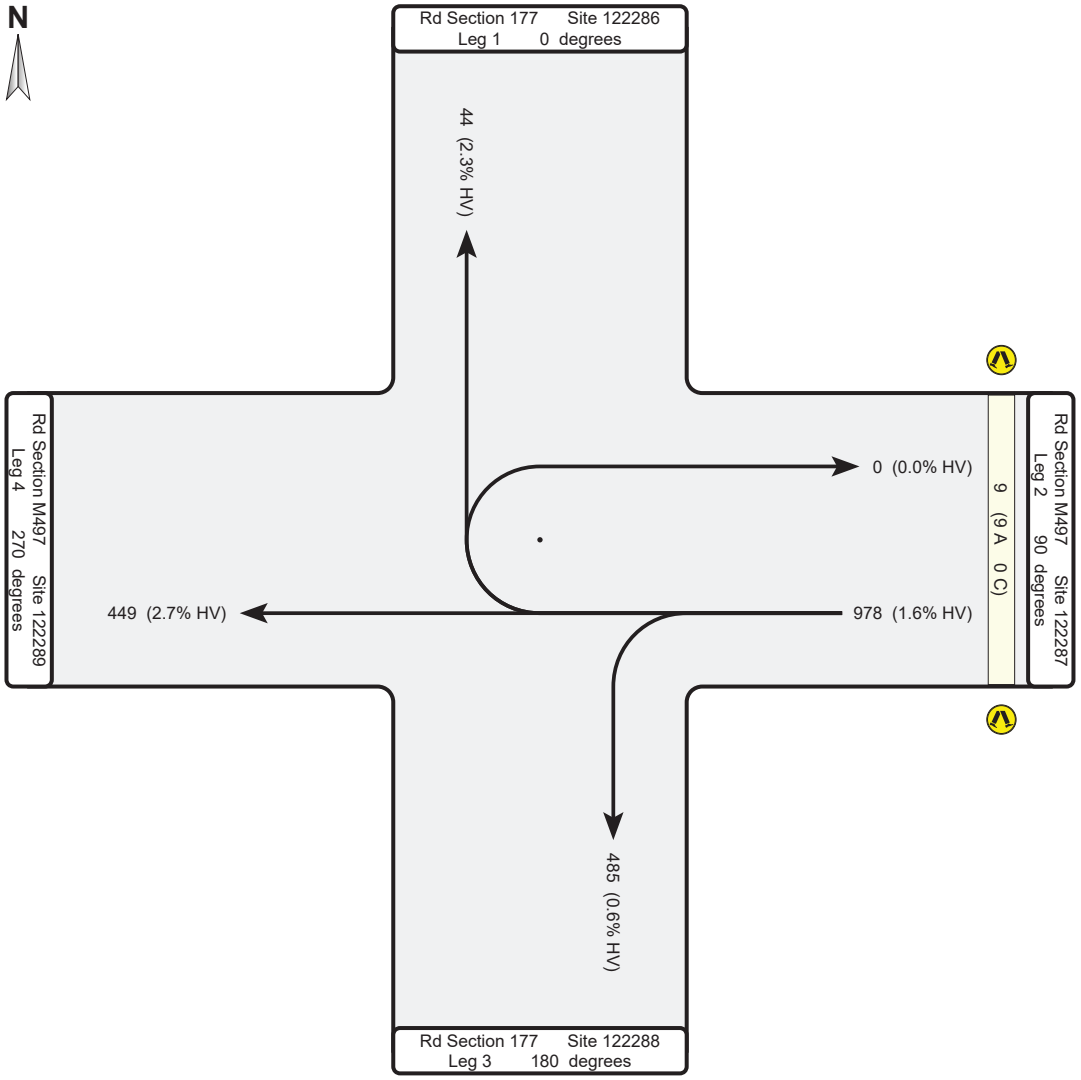
Leg 1 Site 122286 Tdist 13.411 km Bundaberg Ring Rd/TelegraghRd (174 Side)

Total volume 1,466

Quarter-Hour Volumes for All Vehicles Exiting the Intersection - All Traffic Classes



Leg 2 Site 122287 Tdist 0.000 km TelegraghRd/Bundaberg RingRd(AshfieldRd)



Leg 2 Site 122287 Tdist 0.000 km TelegraghRd/Bundaberg RingRd(AshfieldRd)

Time	Left	Through	Right	U-Turn	Pedestrians
00:00-00:15					
00:15-00:30					
00:30-00:45					
00:45-01:00					
01:00-01:15					
01:15-01:30					
01:30-01:45					
01:45-02:00					
02:00-02:15					
02:15-02:30					
02:30-02:45					
02:45-03:00					
03:00-03:15					
03:15-03:30					
03:30-03:45					
03:45-04:00					
04:00-04:15					
04:15-04:30					
04:30-04:45					
04:45-05:00					
05:00-05:15					
05:15-05:30					
05:30-05:45					
05:45-06:00					
06:00-06:15	2	1	0		0
06:15-06:30	6	8	0		0
06:30-06:45	6	4	0		0
06:45-07:00	4	8	3		0
07:00-07:15	6	9	1		0
07:15-07:30	3	14	3		0
07:30-07:45	22	13	1		0
07:45-08:00	24	27	0		0

Time	Left	Through	Right	U-Turn	Pedestrians
08:00-08:15	39	12	1		0
08:15-08:30	32	16	5		0
08:30-08:45	22	15	0		0
08:45-09:00	12	22	2		0
09:00-09:15	15	9	2		0
09:15-09:30	5	10	0		0
09:30-09:45	3	12	0		0
09:45-10:00	7	7	1		0
10:00-10:15	2	7	0		0
10:15-10:30	3	3	0		0
10:30-10:45	3	10	1		0
10:45-11:00	4	9	0		0
11:00-11:15	7	5	2		0
11:15-11:30	4	6	1		0
11:30-11:45	7	8	0		0
11:45-12:00	7	14	0		0
12:00-12:15	2	8	1		0
12:15-12:30	6	5	0		0
12:30-12:45	2	10	0		0
12:45-13:00	3	4	0		0
13:00-13:15	1	3	1		0
13:15-13:30	2	8	0		0
13:30-13:45	3	5	1		0
13:45-14:00	3	9	2		0
14:00-14:15	5	8	0		0
14:15-14:30	6	10	1		0
14:30-14:45	11	9	2		0
14:45-15:00	13	8	2		0
15:00-15:15	44	17	1		0
15:15-15:30	42	13	0		0
15:30-15:45	17	11	1		2
15:45-16:00	7	14	1		2

Time	Left	Through	Right	U-Turn	Pedestrians
16:00-16:15	14	9	1		2
16:15-16:30	20	10	2		1
16:30-16:45	13	11	1		0
16:45-17:00	11	9	1		1
17:00-17:15	6	8	0		1
17:15-17:30	2	5	2		0
17:30-17:45	3	4	1		0
17:45-18:00	4	2	0		0
18:00-18:15					
18:15-18:30					
18:30-18:45					
18:45-19:00					
19:00-19:15					
19:15-19:30					
19:30-19:45					
19:45-20:00					
20:00-20:15					
20:15-20:30					
20:30-20:45					
20:45-21:00					
21:00-21:15					
21:15-21:30					
21:30-21:45					
21:45-22:00					
22:00-22:15					
22:15-22:30					
22:30-22:45					
22:45-23:00					
23:00-23:15					
23:15-23:30					
23:30-23:45					
23:45-24:00					

Blank cells indicate the non-collection of corresponding counts.

Traffic Analysis and Reporting System

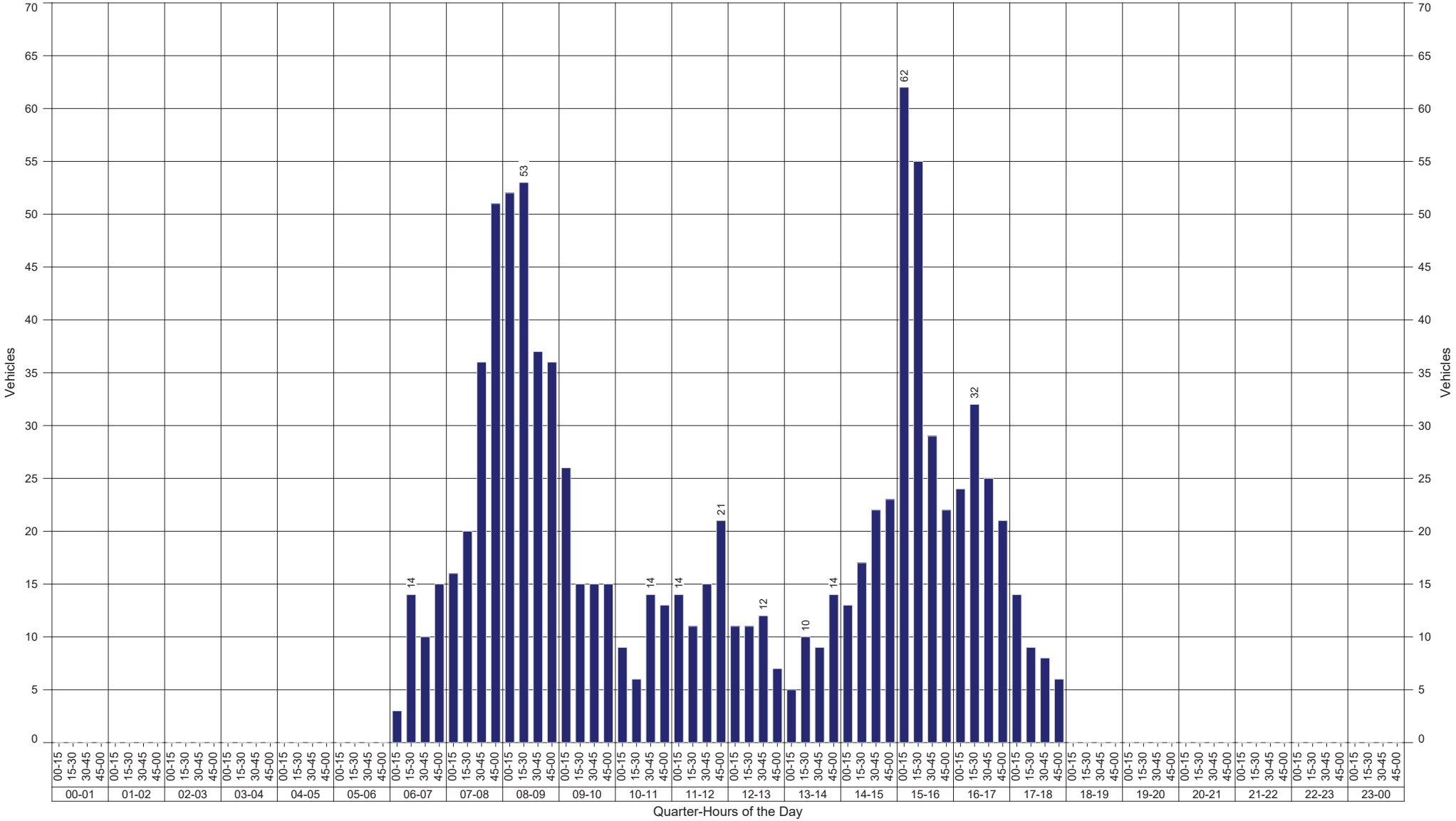
Intersection Analysis Report

Area 412 - Wide Bay/Burnett District Road Section 177 - BUNDABERG RING ROAD
Intersection 15647 - 177 & Telegraph Rd (L) &(R)
Wednesday 19-Feb-2020 06:00 - 18:00

Leg 2 Site 122287 Tdist 0.000 km TelegraghRd/Bundaberg RingRd(AshfieldRd)

Total volume 978

Quarter-Hour Volumes for All Vehicles Entering the Intersection - All Traffic Classes



Traffic Analysis and Reporting System

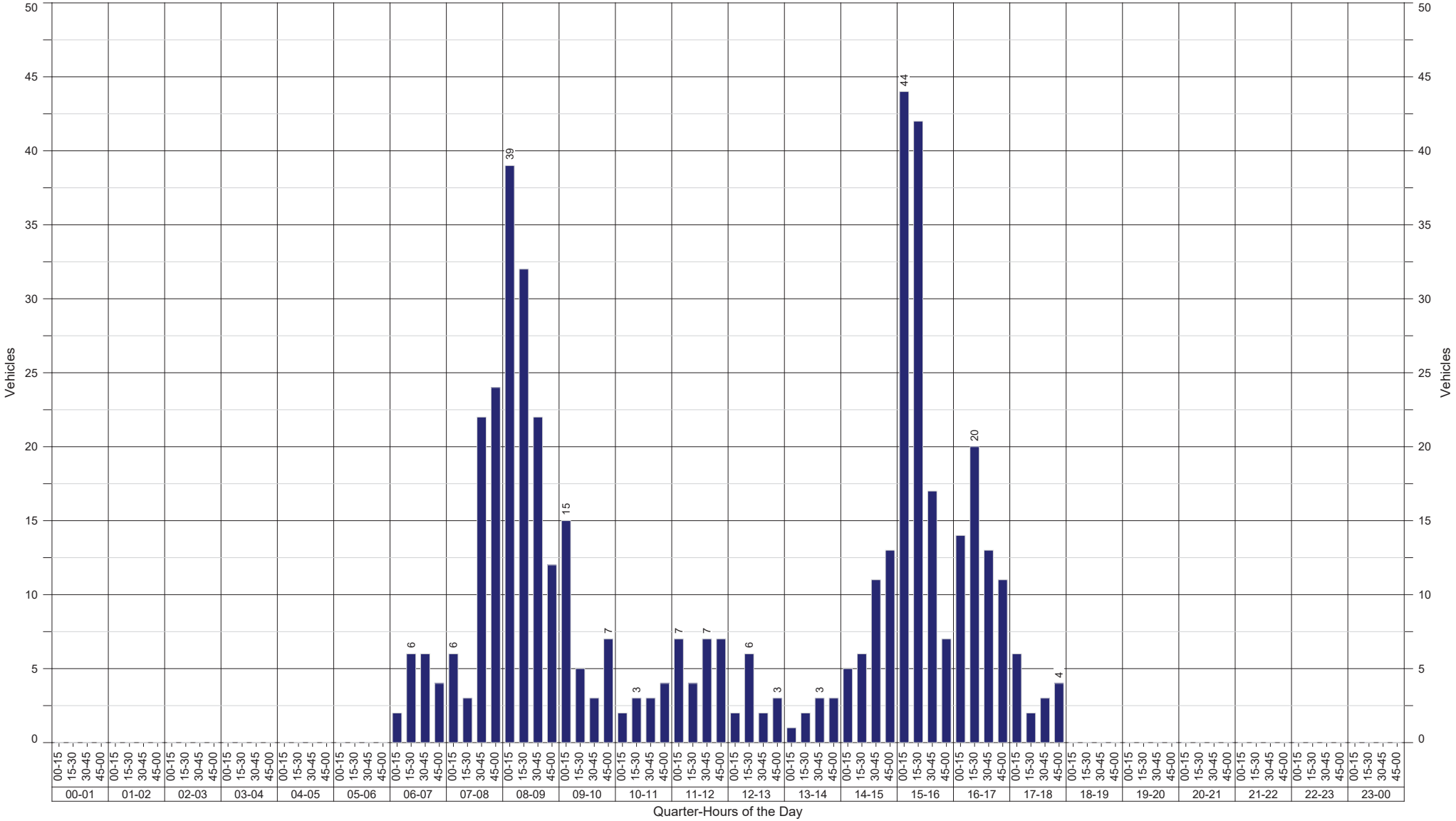
Intersection Analysis Report

Area 412 - Wide Bay/Burnett District Road Section 177 - BUNDABERG RING ROAD
Intersection 15647 - 177 & Telegraph Rd (L) &(R)
Wednesday 19-Feb-2020 06:00 - 18:00

Leg 2 Site 122287 Tdist 0.000 km TelegraghRd/Bundaberg RingRd(AshfieldRd)

Total volume 485

Quarter-Hour Volumes for Left-turning Vehicles - All Traffic Classes



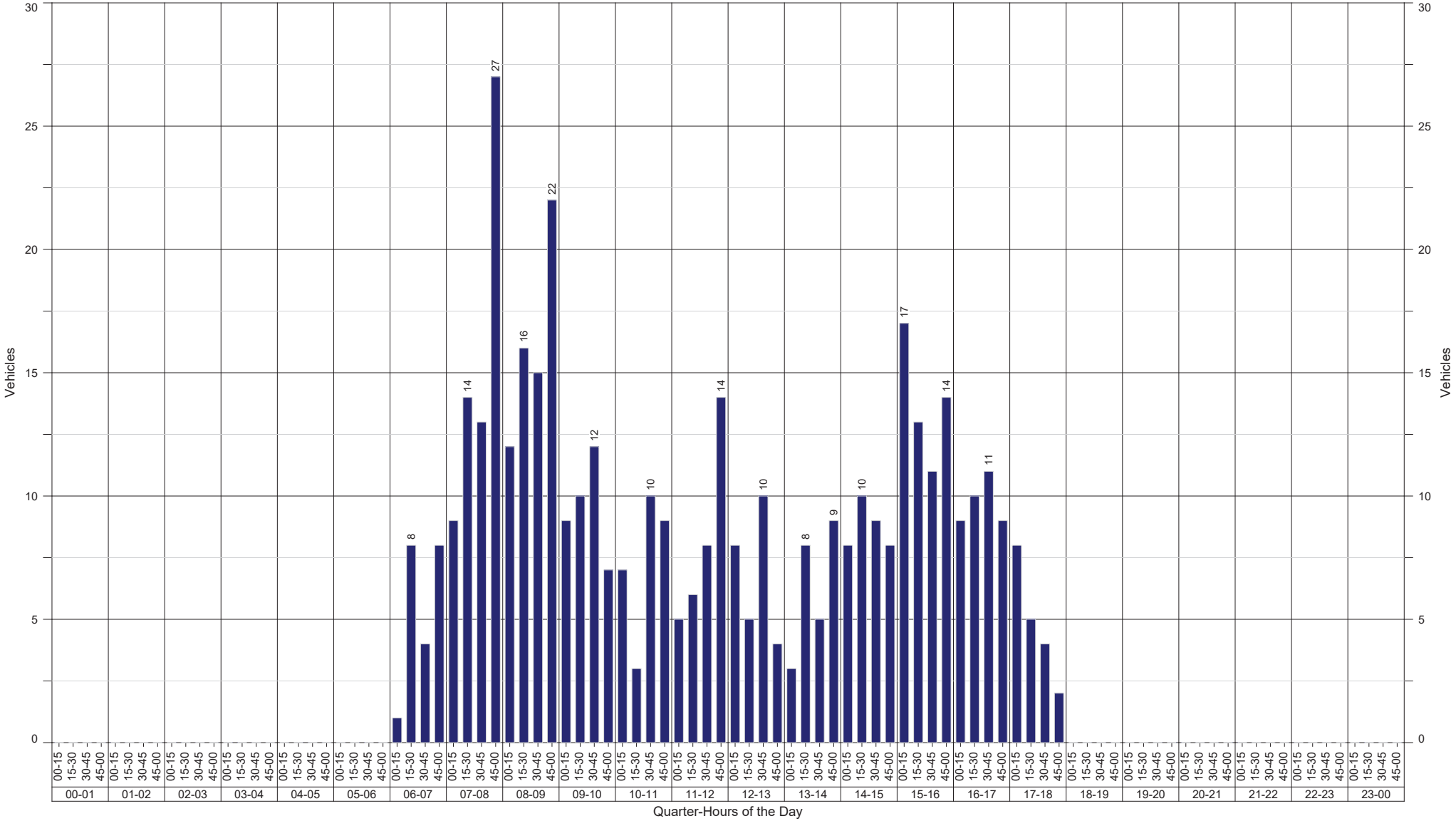
Intersection Analysis Report

Area 412 - Wide Bay/Burnett District Road Section 177 - BUNDABERG RING ROAD
Intersection 15647 - 177 & Telegraph Rd (L) &(R)
Wednesday 19-Feb-2020 06:00 - 18:00

Leg 2 Site 122287 Tdist 0.000 km TelegraghRd/Bundaberg RingRd(AshfieldRd)

Total volume 449

Quarter-Hour Volumes for Through Vehicles - All Traffic Classes

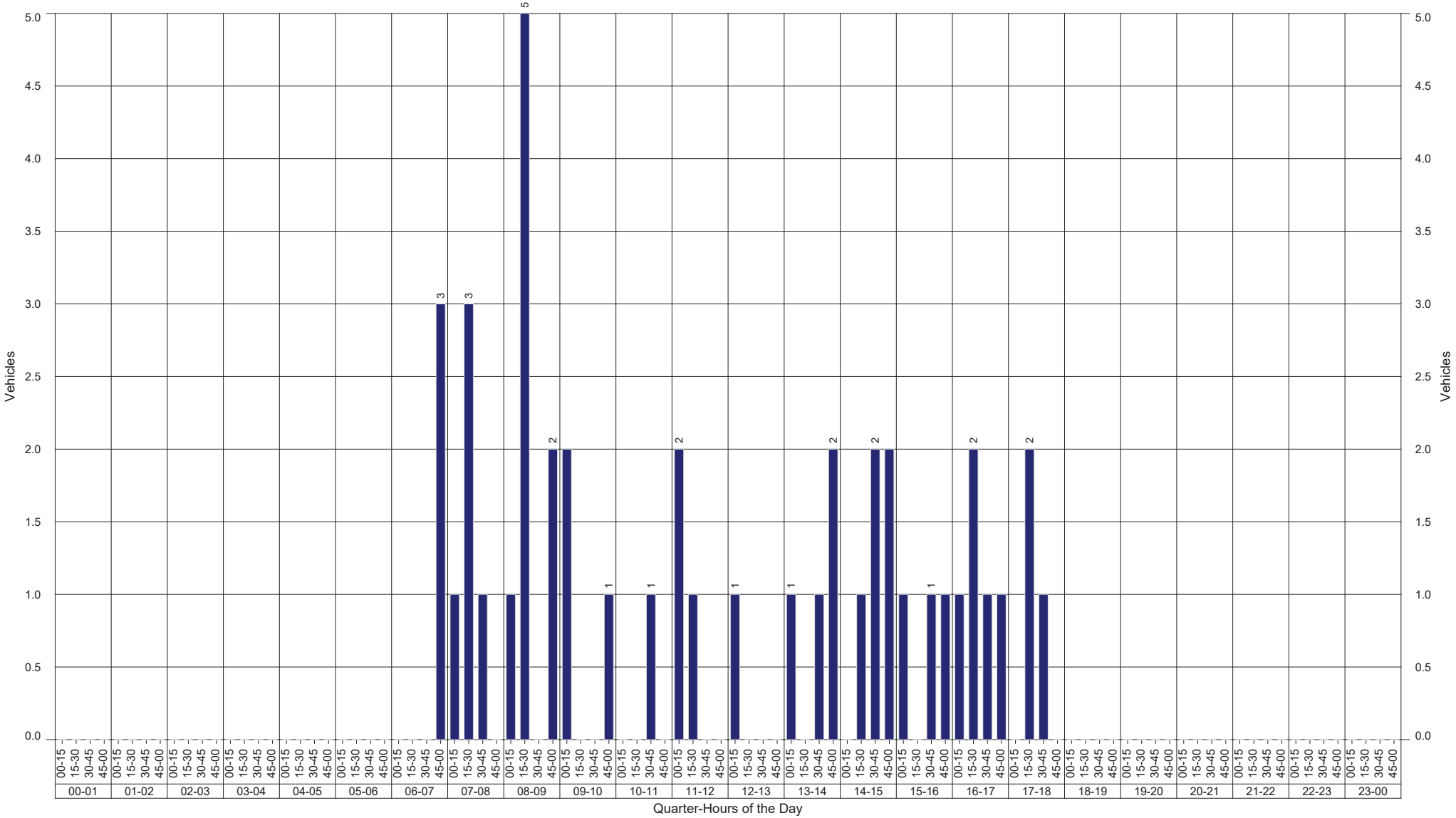


Traffic Analysis and Reporting System
Intersection Analysis Report
Area 412 - Wide Bay/Burnett District Road Section 177 - BUNDABERG RING ROAD
Intersection 15647 - 177 & Telegraph Rd (L) &(R)
Wednesday 19-Feb-2020 06:00 - 18:00

Leg 2 Site 122287 Tdist 0.000 km TelegraghRd/Bundaberg RingRd(AshfieldRd)

Total volume 44

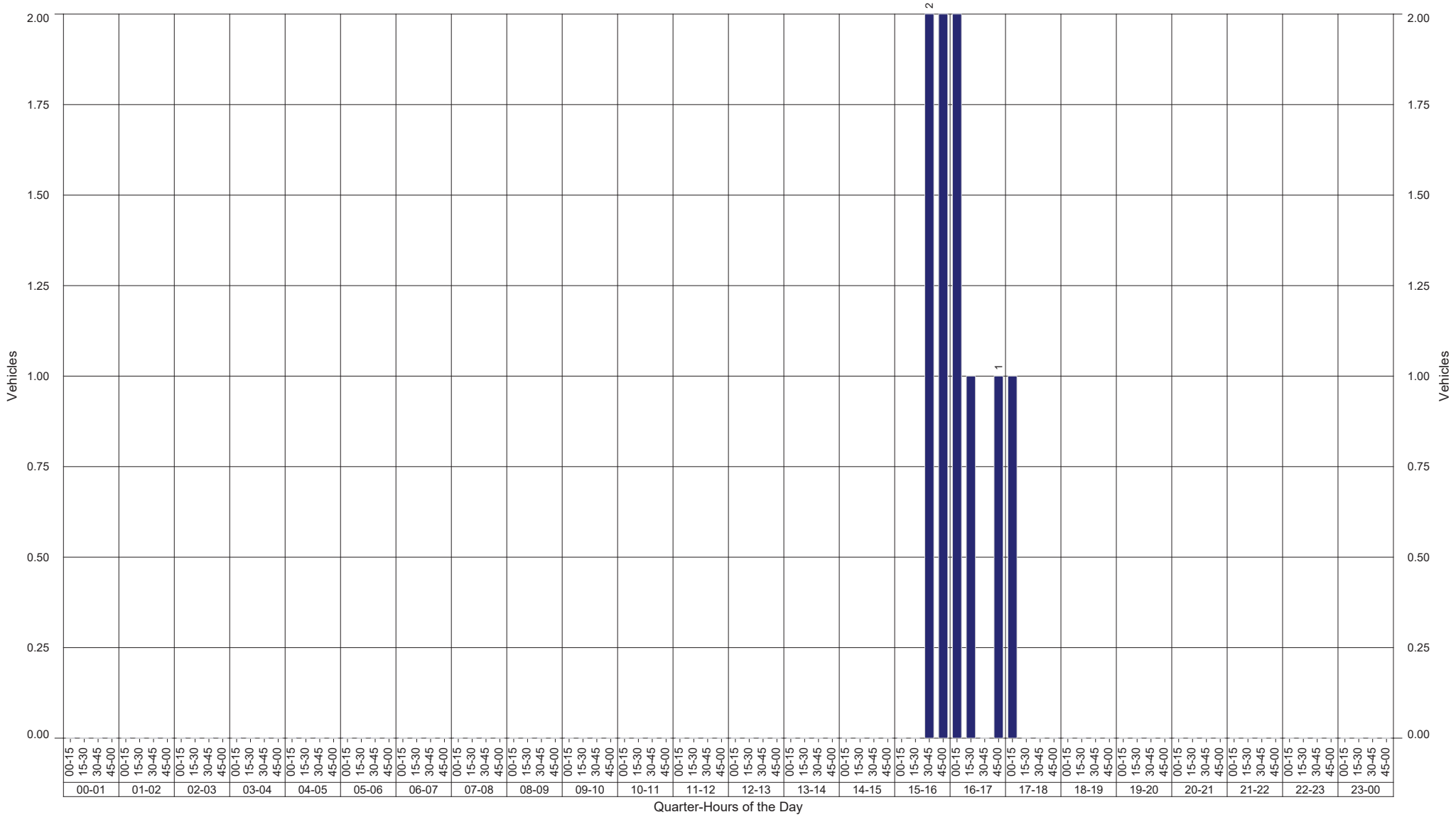
Quarter-Hour Volumes for Right-turning Vehicles - All Traffic Classes



Leg 2 Site 122287 Tdist 0.000 km TelegraghRd/Bundaberg RingRd(AshfieldRd)

Total volume 9

Quarter-Hour Volumes for Pedestrians



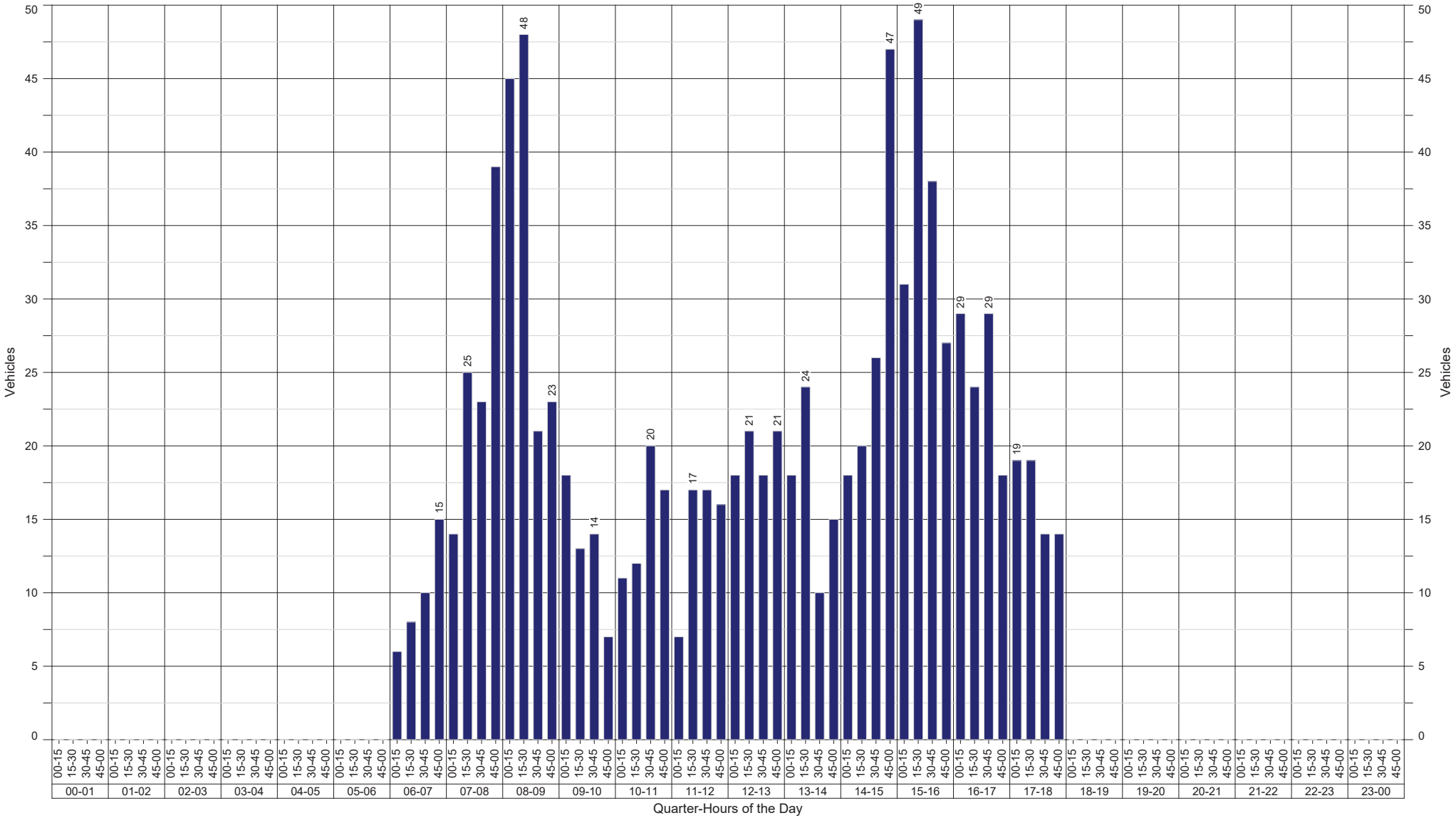
Intersection Analysis Report

Area 412 - Wide Bay/Burnett District Road Section 177 - BUNDABERG RING ROAD
Intersection 15647 - 177 & Telegraph Rd (L) &(R)
Wednesday 19-Feb-2020 06:00 - 18:00

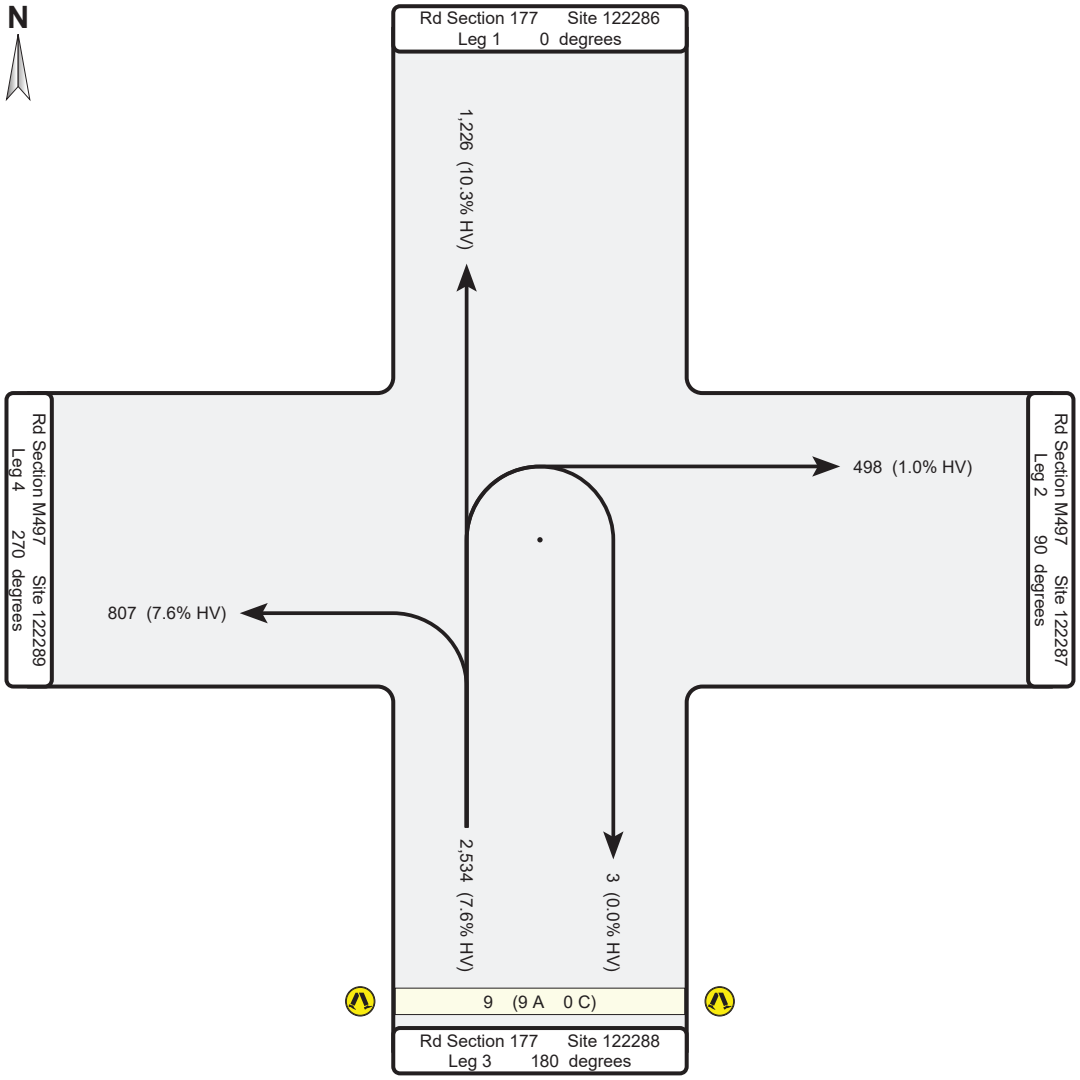
Leg 2 Site 122287 Tdist 0.000 km TelegraghRd/Bundaberg RingRd(AshfieldRd)

Total volume 1,013

Quarter-Hour Volumes for All Vehicles Exiting the Intersection - All Traffic Classes



Leg 3 Site 122288 Tdist 13.411 km Bundaberg Ring Rd/TelegraghRd (175 Side)



Leg 3 Site 122288 Tdist 13.411 km Bundaberg Ring Rd/TelegraghRd (175 Side)

Time	Left	Through	Right	U-Turn	Pedestrians
00:00-00:15					
00:15-00:30					
00:30-00:45					
00:45-01:00					
01:00-01:15					
01:15-01:30					
01:30-01:45					
01:45-02:00					
02:00-02:15					
02:15-02:30					
02:30-02:45					
02:45-03:00					
03:00-03:15					
03:15-03:30					
03:30-03:45					
03:45-04:00					
04:00-04:15					
04:15-04:30					
04:30-04:45					
04:45-05:00					
05:00-05:15					
05:15-05:30					
05:30-05:45					
05:45-06:00					
06:00-06:15	3	7	1	0	1
06:15-06:30	4	11	3	0	0
06:30-06:45	19	17	1	0	0
06:45-07:00	11	28	7	0	1
07:00-07:15	17	17	6	0	0
07:15-07:30	25	34	14	0	0
07:30-07:45	28	37	16	0	0
07:45-08:00	35	51	28	0	0

Time	Left	Through	Right	U-Turn	Pedestrians
08:00-08:15	22	41	36	0	0
08:15-08:30	30	55	40	0	0
08:30-08:45	35	34	14	0	0
08:45-09:00	23	43	11	0	0
09:00-09:15	14	26	9	0	5
09:15-09:30	10	20	2	1	0
09:30-09:45	13	20	5	1	0
09:45-10:00	10	25	2	1	0
10:00-10:15	10	19	2	0	0
10:15-10:30	13	17	4	0	0
10:30-10:45	11	18	5	0	0
10:45-11:00	19	20	2	0	0
11:00-11:15	13	26	3	0	0
11:15-11:30	13	16	3	0	0
11:30-11:45	7	20	3	0	0
11:45-12:00	9	27	4	0	1
12:00-12:15	4	16	8	0	0
12:15-12:30	15	16	9	0	0
12:30-12:45	14	28	9	0	0
12:45-13:00	15	21	10	0	0
13:00-13:15	9	9	6	0	0
13:15-13:30	13	21	7	0	0
13:30-13:45	9	22	2	0	0
13:45-14:00	9	17	6	0	0
14:00-14:15	14	29	6	0	0
14:15-14:30	17	25	12	0	0
14:30-14:45	31	31	9	0	0
14:45-15:00	14	27	35	0	0
15:00-15:15	28	27	19	0	0
15:15-15:30	50	72	30	0	0
15:30-15:45	28	41	19	0	1
15:45-16:00	13	22	15	0	0

Time	Left	Through	Right	U-Turn	Pedestrians
16:00-16:15	14	22	9	0	0
16:15-16:30	25	31	14	0	0
16:30-16:45	18	26	13	0	0
16:45-17:00	16	16	9	0	0
17:00-17:15	22	13	10	0	0
17:15-17:30	11	28	8	0	0
17:30-17:45	15	21	5	0	0
17:45-18:00	9	16	7	0	0
18:00-18:15					
18:15-18:30					
18:30-18:45					
18:45-19:00					
19:00-19:15					
19:15-19:30					
19:30-19:45					
19:45-20:00					
20:00-20:15					
20:15-20:30					
20:30-20:45					
20:45-21:00					
21:00-21:15					
21:15-21:30					
21:30-21:45					
21:45-22:00					
22:00-22:15					
22:15-22:30					
22:30-22:45					
22:45-23:00					
23:00-23:15					
23:15-23:30					
23:30-23:45					
23:45-24:00					

Blank cells indicate the non-collection of corresponding counts.

Traffic Analysis and Reporting System

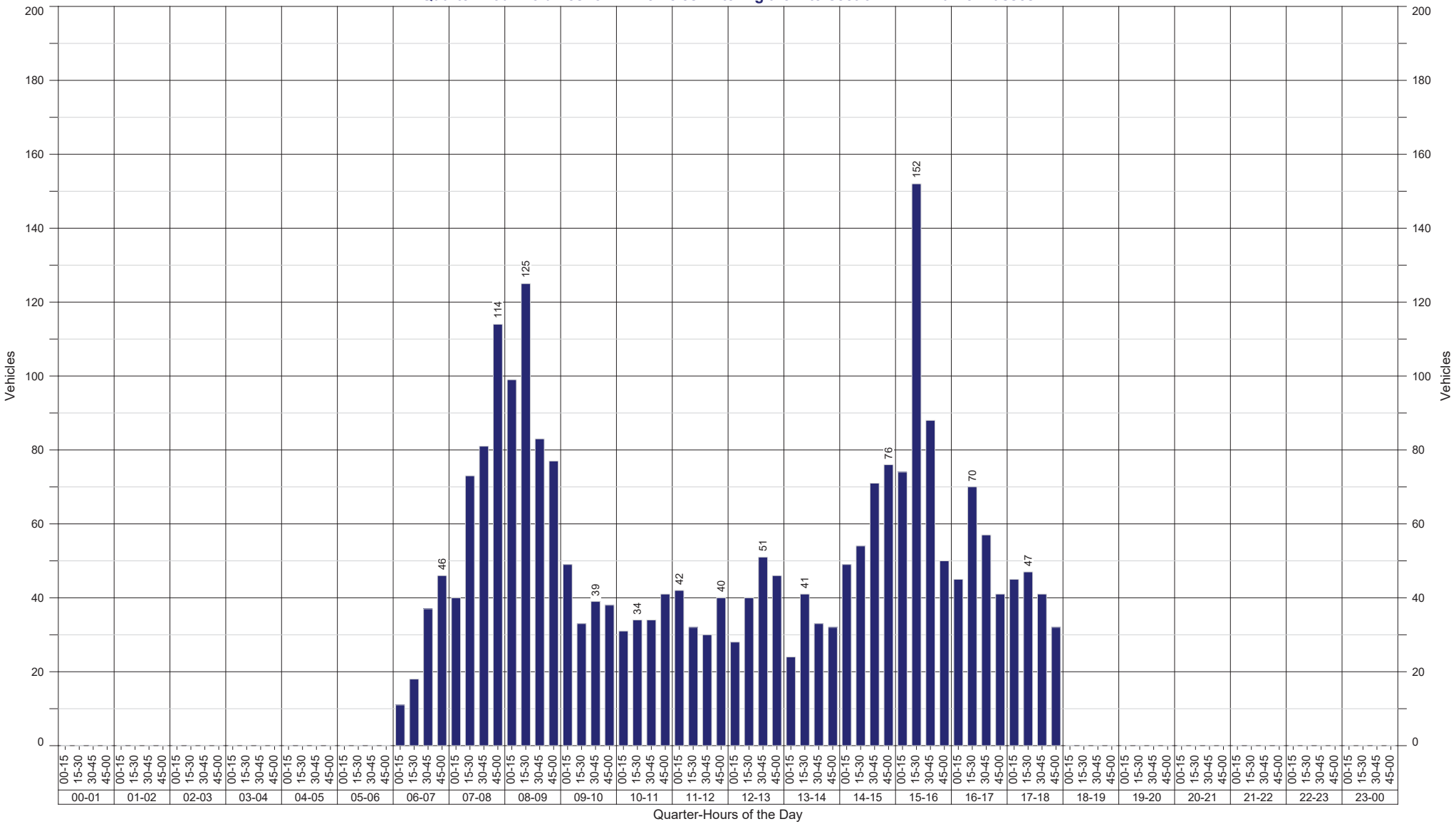
Intersection Analysis Report

Area 412 - Wide Bay/Burnett District Road Section 177 - BUNDABERG RING ROAD
Intersection 15647 - 177 & Telegraph Rd (L) &(R)
Wednesday 19-Feb-2020 06:00 - 18:00

Leg 3 Site 122288 Tdist 13.411 km Bundaberg Ring Rd/TelegraghRd (175 Side)

Total volume 2,534

Quarter-Hour Volumes for All Vehicles Entering the Intersection - All Traffic Classes



Traffic Analysis and Reporting System

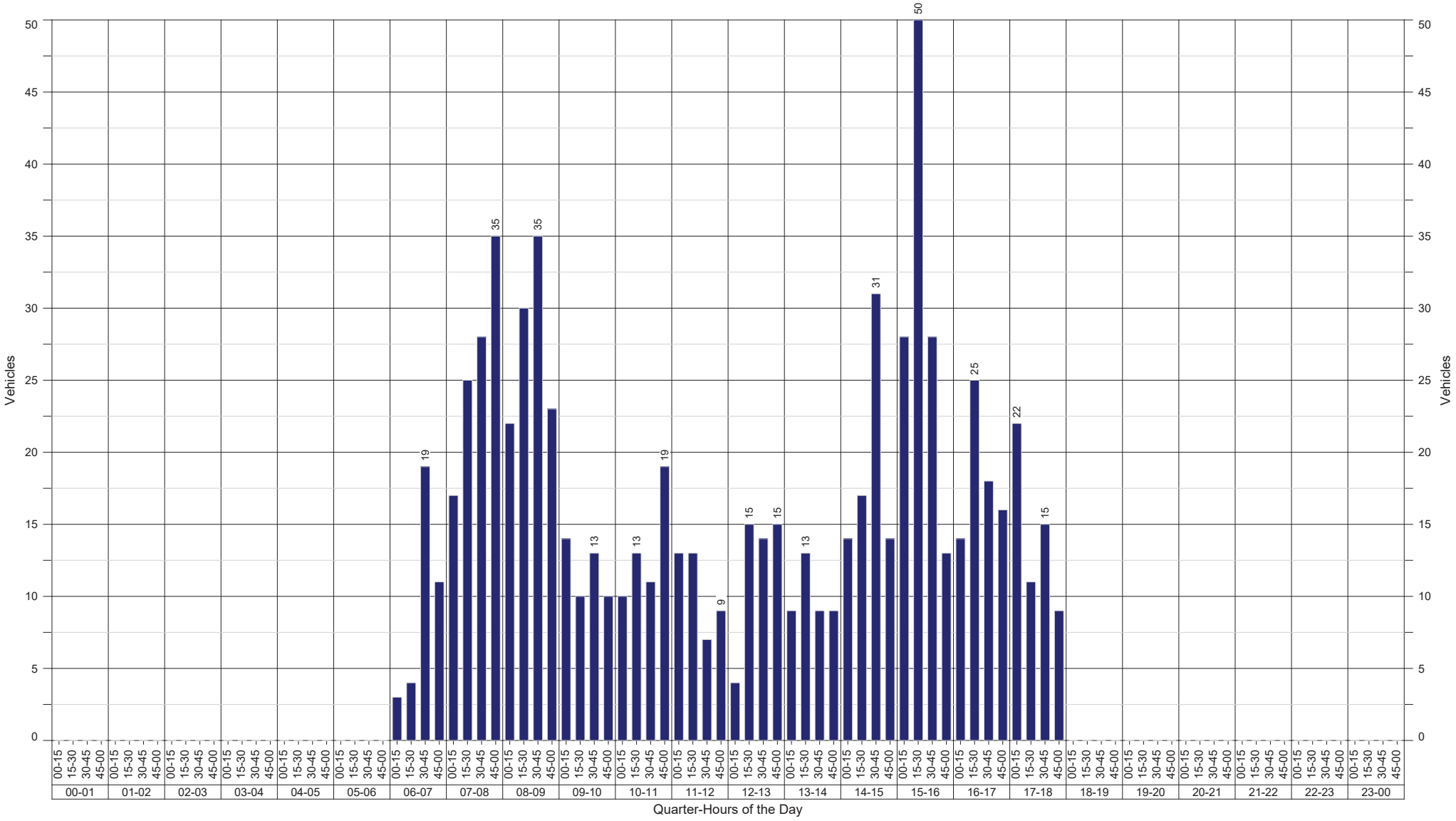
Intersection Analysis Report

Area 412 - Wide Bay/Burnett District Road Section 177 - BUNDABERG RING ROAD
Intersection 15647 - 177 & Telegraph Rd (L) &(R)
Wednesday 19-Feb-2020 06:00 - 18:00

Leg 3 Site 122288 Tdist 13.411 km Bundaberg Ring Rd/TelegraghRd (175 Side)

Total volume 807

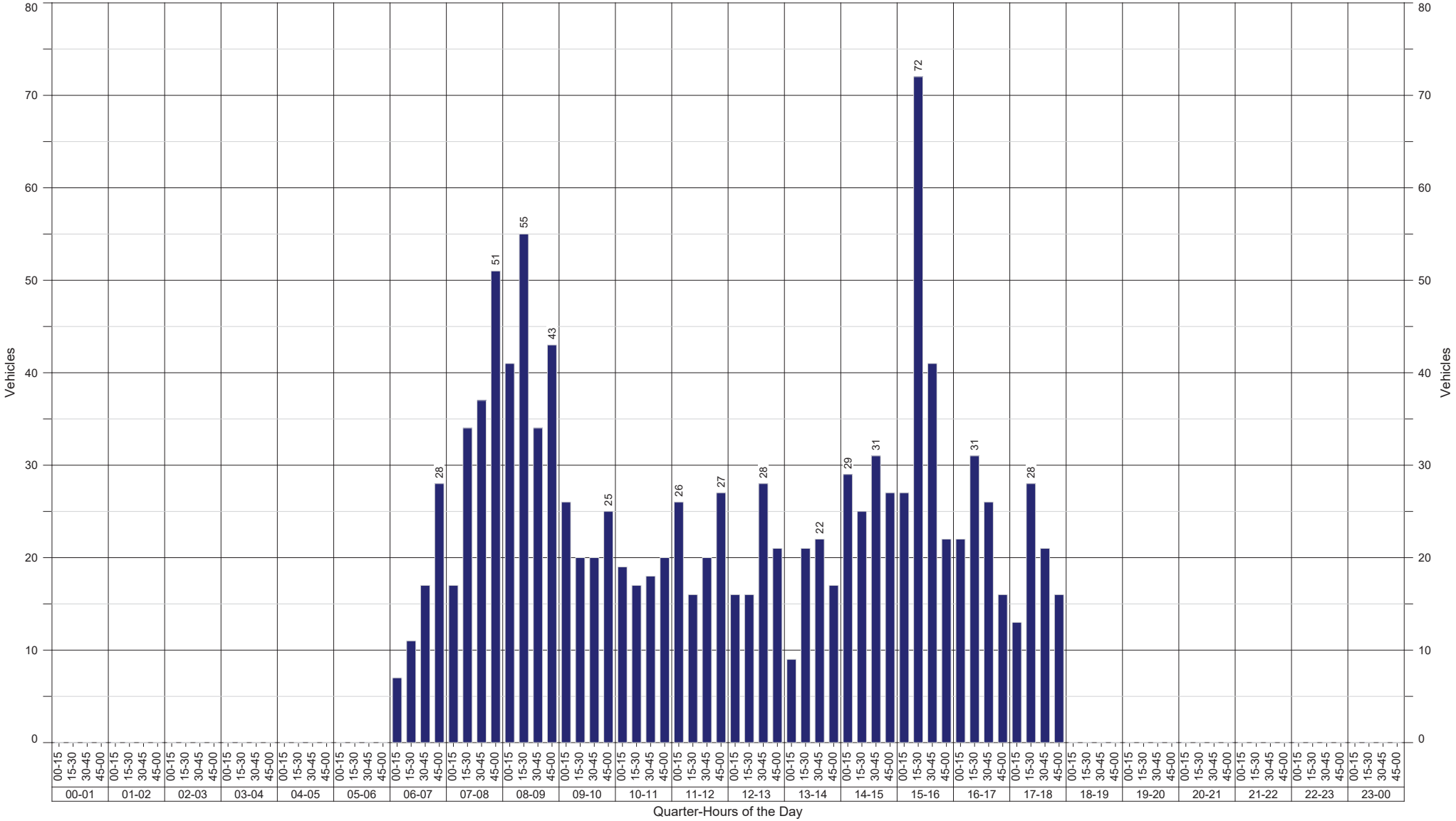
Quarter-Hour Volumes for Left-turning Vehicles - All Traffic Classes



Leg 3 Site 122288 Tdist 13.411 km Bundaberg Ring Rd/TelegraghRd (175 Side)

Total volume 1,226

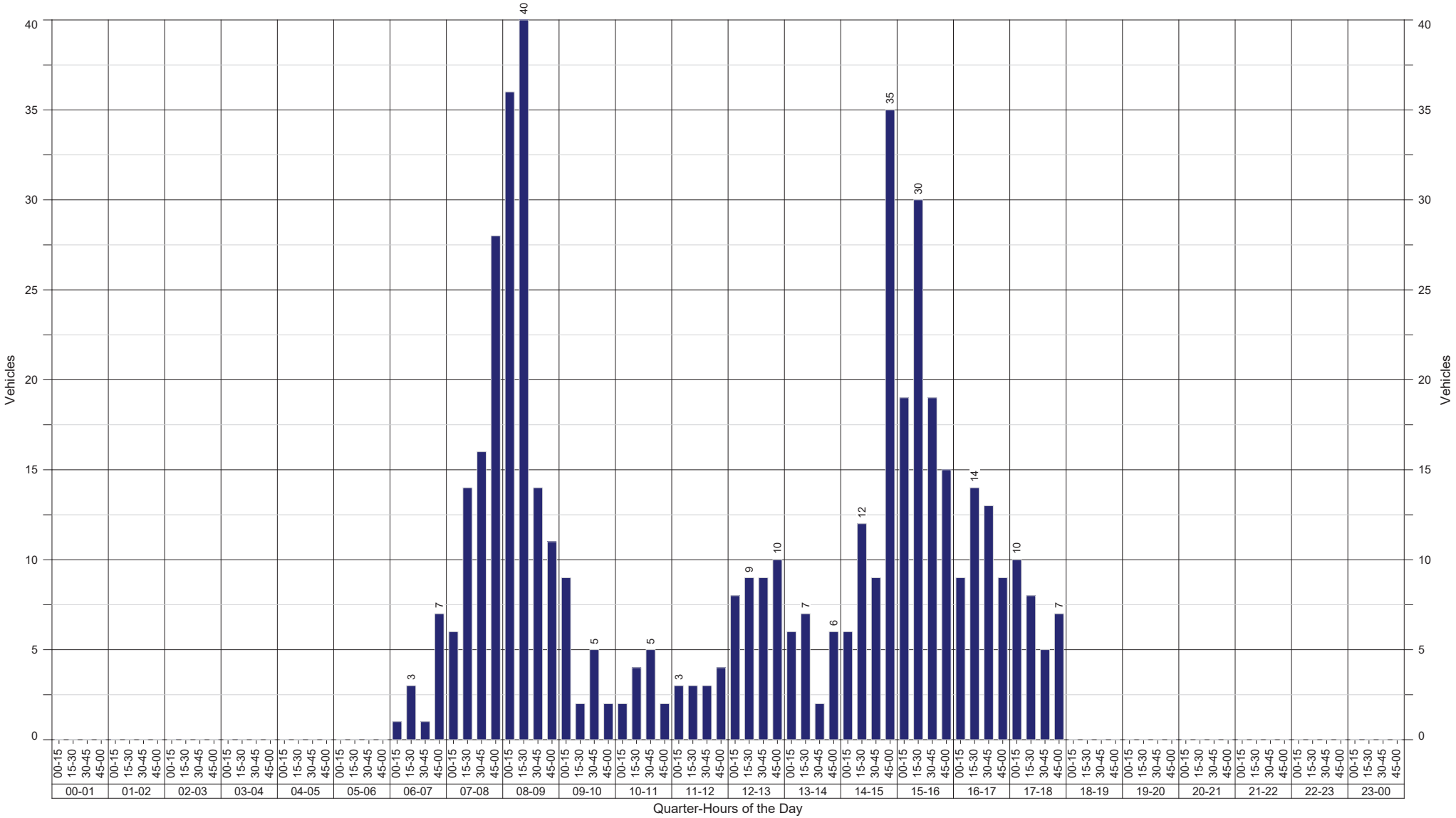
Quarter-Hour Volumes for Through Vehicles - All Traffic Classes



Leg 3 Site 122288 Tdist 13.411 km Bundaberg Ring Rd/TelegraghRd (175 Side)

Total volume 498

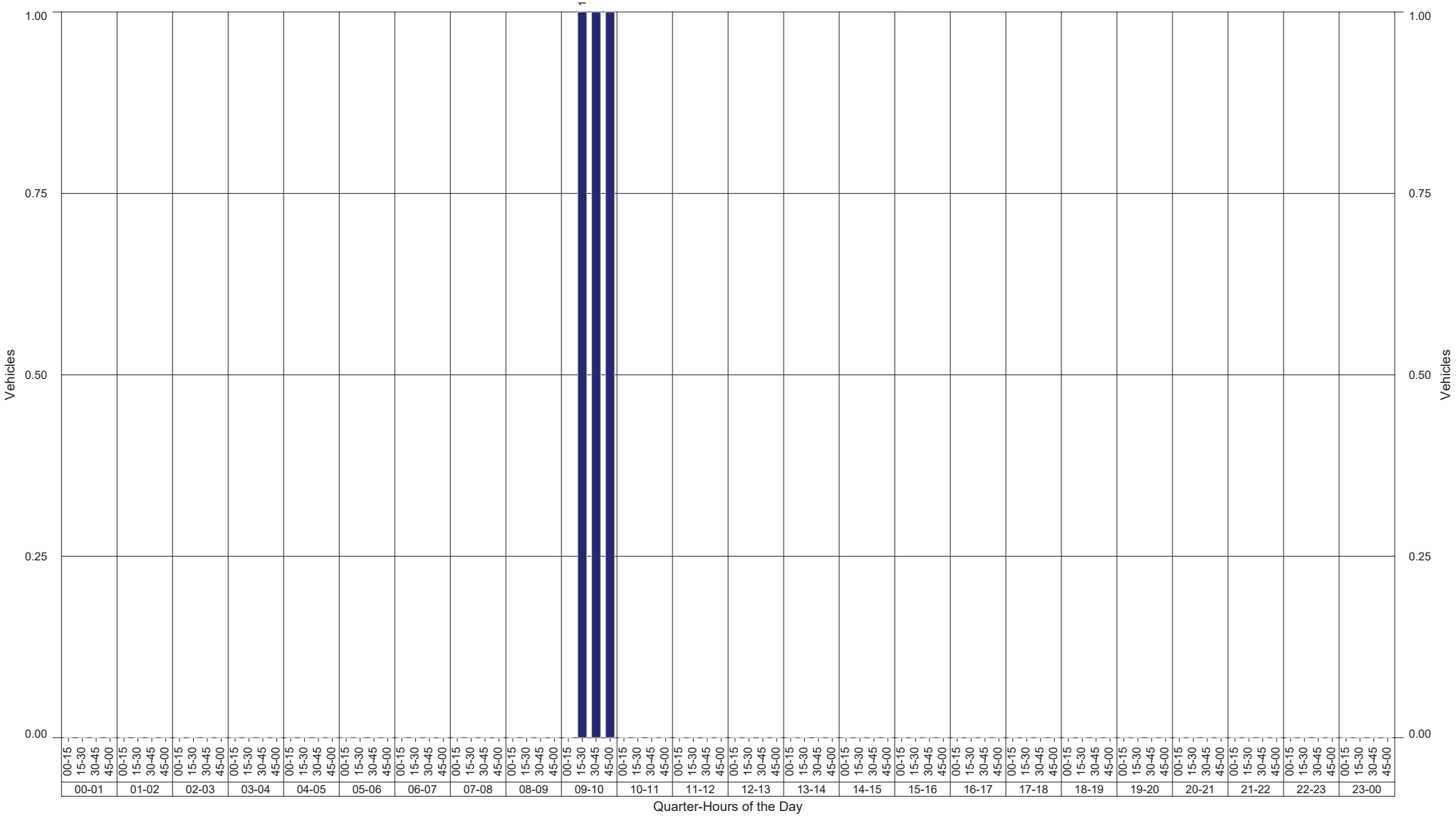
Quarter-Hour Volumes for Right-turning Vehicles - All Traffic Classes



Leg 3 Site 122288 Tdist 13.411 km Bundaberg Ring Rd/TelegraghRd (175 Side)

Total volume 3

Quarter-Hour Volumes for U-turning Vehicles - All Traffic Classes



Traffic Analysis and Reporting System

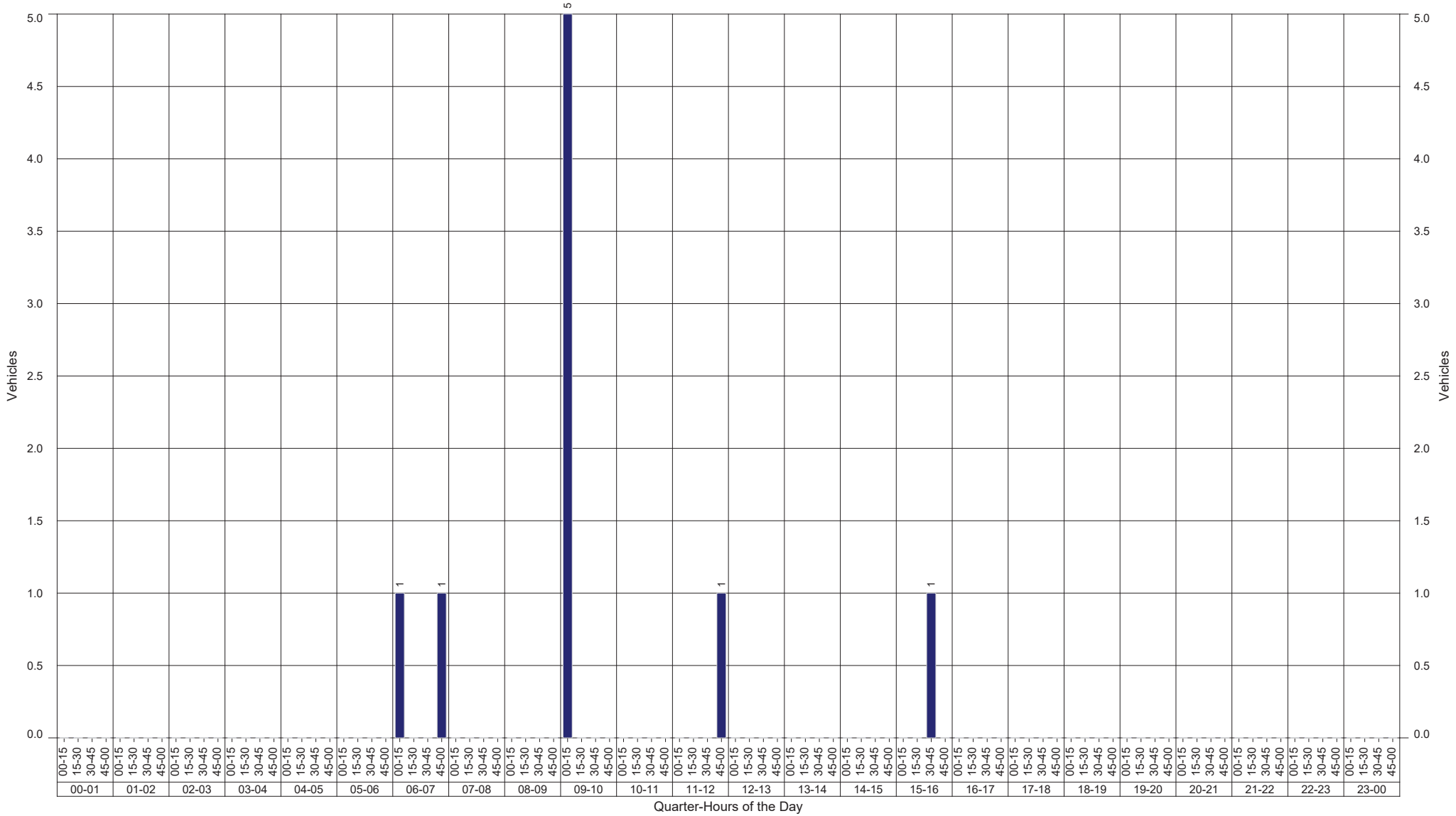
Intersection Analysis Report

Area 412 - Wide Bay/Burnett District Road Section 177 - BUNDABERG RING ROAD
Intersection 15647 - 177 & Telegraph Rd (L) &(R)
Wednesday 19-Feb-2020 06:00 - 18:00

Leg 3 Site 122288 Tdist 13.411 km Bundaberg Ring Rd/TelegraghRd (175 Side)

Total volume 9

Quarter-Hour Volumes for Pedestrians



Traffic Analysis and Reporting System

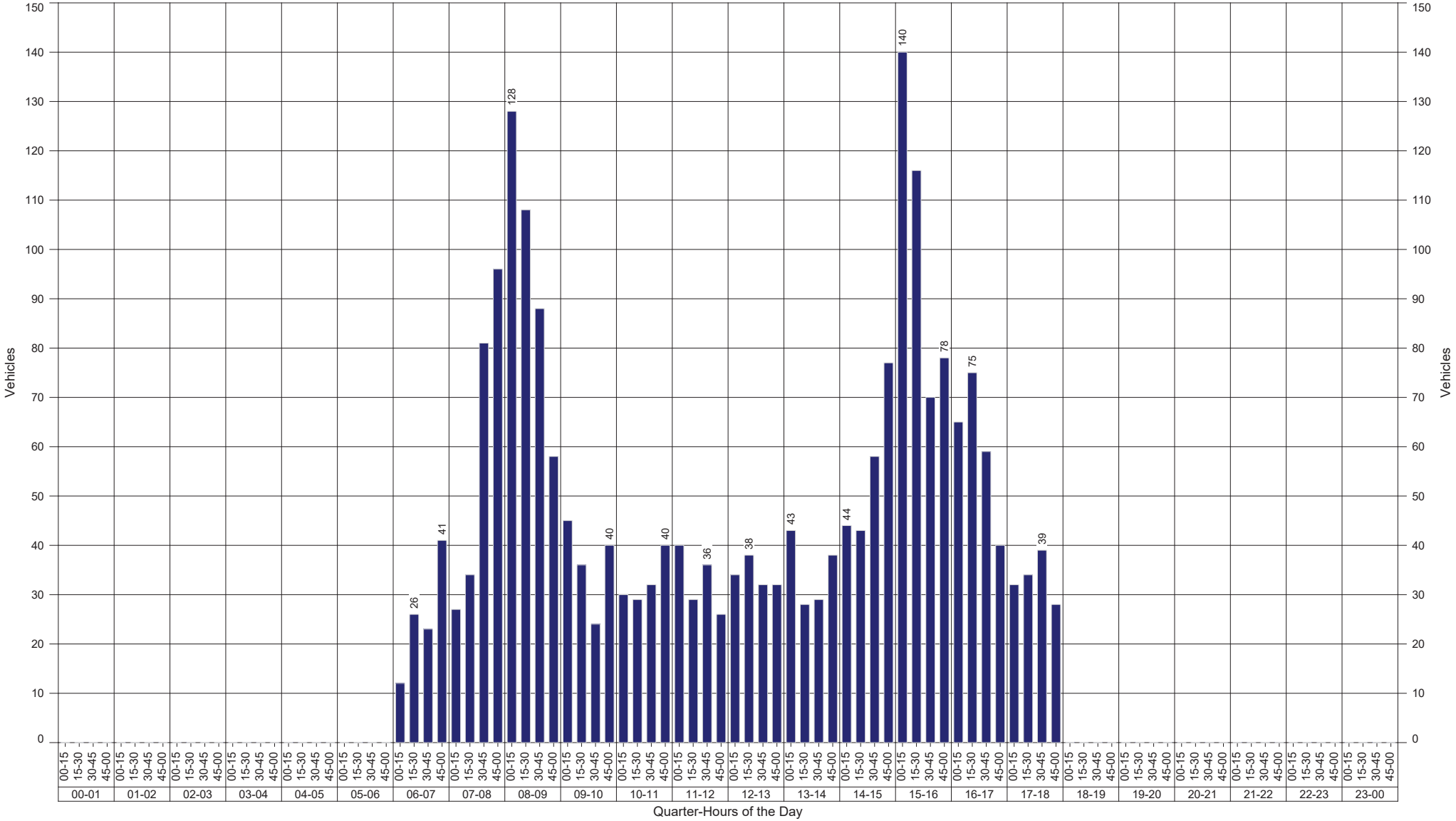
Intersection Analysis Report

Area 412 - Wide Bay/Burnett District Road Section 177 - BUNDABERG RING ROAD
Intersection 15647 - 177 & Telegraph Rd (L) &(R)
Wednesday 19-Feb-2020 06:00 - 18:00

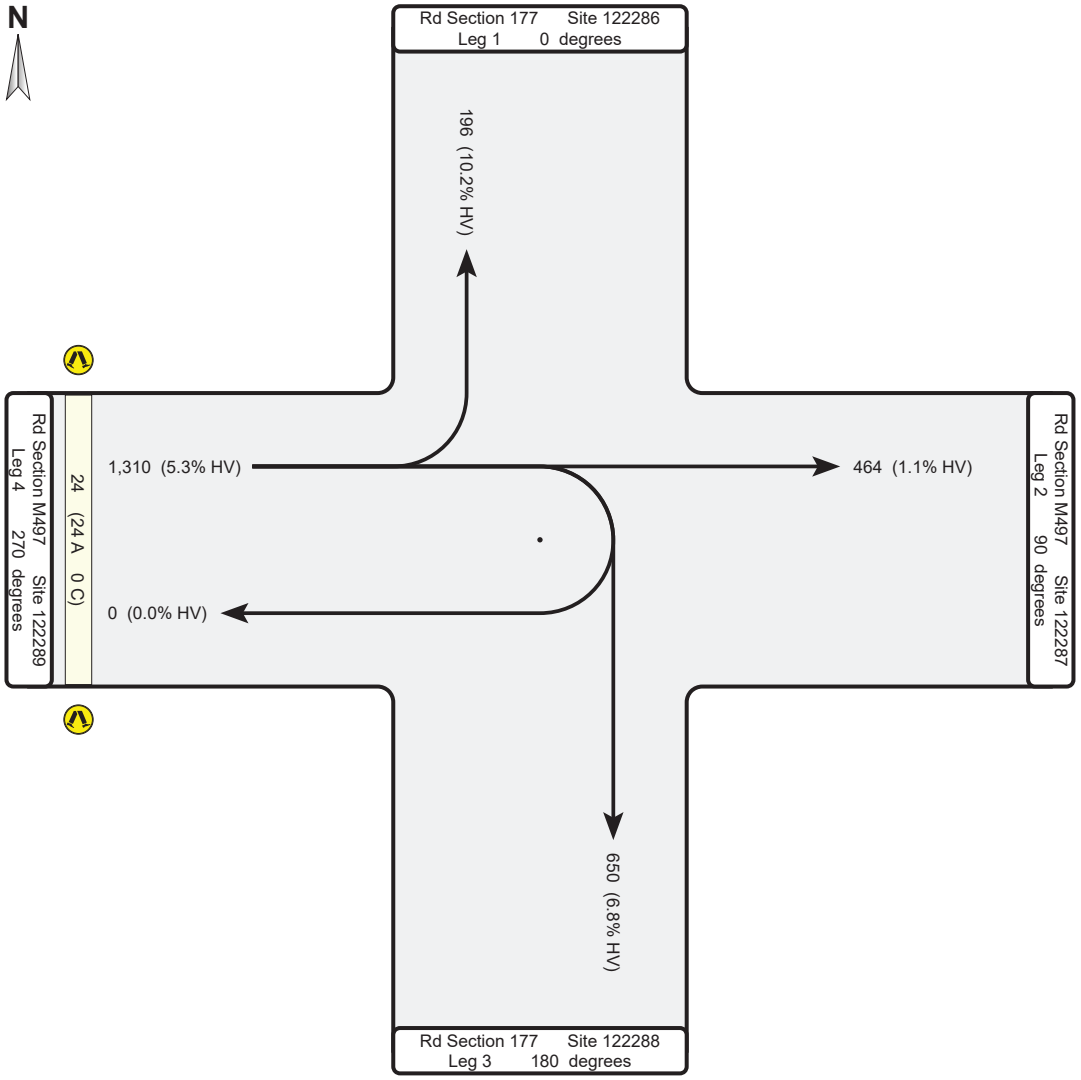
Leg 3 Site 122288 Tdist 13.411 km Bundaberg Ring Rd/TelegraghRd (175 Side)

Total volume 2,401

Quarter-Hour Volumes for All Vehicles Exiting the Intersection - All Traffic Classes



Leg 4 Site 122289 Tdist 0.000 km TelegraghRd/Bundaberg RingRd(ScotlandSt)



Leg 4 Site 122289 Tdist 0.000 km TelegraghRd/Bundaberg RingRd(ScotlandSt)

Time	Left	Through	Right	U-Turn	Pedestrians
00:00-00:15					
00:15-00:30					
00:30-00:45					
00:45-01:00					
01:00-01:15					
01:15-01:30					
01:30-01:45					
01:45-02:00					
02:00-02:15					
02:15-02:30					
02:30-02:45					
02:45-03:00					
03:00-03:15					
03:15-03:30					
03:30-03:45					
03:45-04:00					
04:00-04:15					
04:15-04:30					
04:30-04:45					
04:45-05:00					
05:00-05:15					
05:15-05:30					
05:30-05:45					
05:45-06:00					
06:00-06:15	2	4	4		8
06:15-06:30	3	5	8		3
06:30-06:45	3	9	6		3
06:45-07:00	6	4	15		1
07:00-07:15	1	7	4		1
07:15-07:30	7	11	8		5
07:30-07:45	3	6	19		0
07:45-08:00	8	9	26		3

Time	Left	Through	Right	U-Turn	Pedestrians
08:00-08:15	10	7	19		0
08:15-08:30	5	5	15		0
08:30-08:45	7	7	13		0
08:45-09:00	4	12	19		0
09:00-09:15	3	8	10		0
09:15-09:30	3	7	11		0
09:30-09:45	2	9	12		0
09:45-10:00	2	4	8		0
10:00-10:15	7	9	10		0
10:15-10:30	3	8	11		0
10:30-10:45	4	15	9		0
10:45-11:00	3	13	11		0
11:00-11:15	3	4	10		0
11:15-11:30	3	13	10		0
11:30-11:45	5	14	9		0
11:45-12:00	4	11	7		0
12:00-12:15	3	8	14		0
12:15-12:30	3	10	10		0
12:30-12:45	3	9	14		0
12:45-13:00	1	10	9		0
13:00-13:15	3	10	15		0
13:15-13:30	4	16	12		0
13:30-13:45	4	8	12		0
13:45-14:00	0	9	15		0
14:00-14:15	3	11	13		0
14:15-14:30	4	8	15		0
14:30-14:45	6	15	23		0
14:45-15:00	12	10	25		0
15:00-15:15	5	9	23		0
15:15-15:30	8	15	10		0
15:30-15:45	6	18	19		0
15:45-16:00	5	11	24		0

Time	Left	Through	Right	U-Turn	Pedestrians
16:00-16:15	5	20	21		0
16:15-16:30	5	10	23		0
16:30-16:45	3	15	20		0
16:45-17:00	5	8	15		0
17:00-17:15	2	9	13		0
17:15-17:30	1	11	13		0
17:30-17:45	2	7	9		0
17:45-18:00	2	6	9		0
18:00-18:15					
18:15-18:30					
18:30-18:45					
18:45-19:00					
19:00-19:15					
19:15-19:30					
19:30-19:45					
19:45-20:00					
20:00-20:15					
20:15-20:30					
20:30-20:45					
20:45-21:00					
21:00-21:15					
21:15-21:30					
21:30-21:45					
21:45-22:00					
22:00-22:15					
22:15-22:30					
22:30-22:45					
22:45-23:00					
23:00-23:15					
23:15-23:30					
23:30-23:45					
23:45-24:00					

Blank cells indicate the non-collection of corresponding counts.

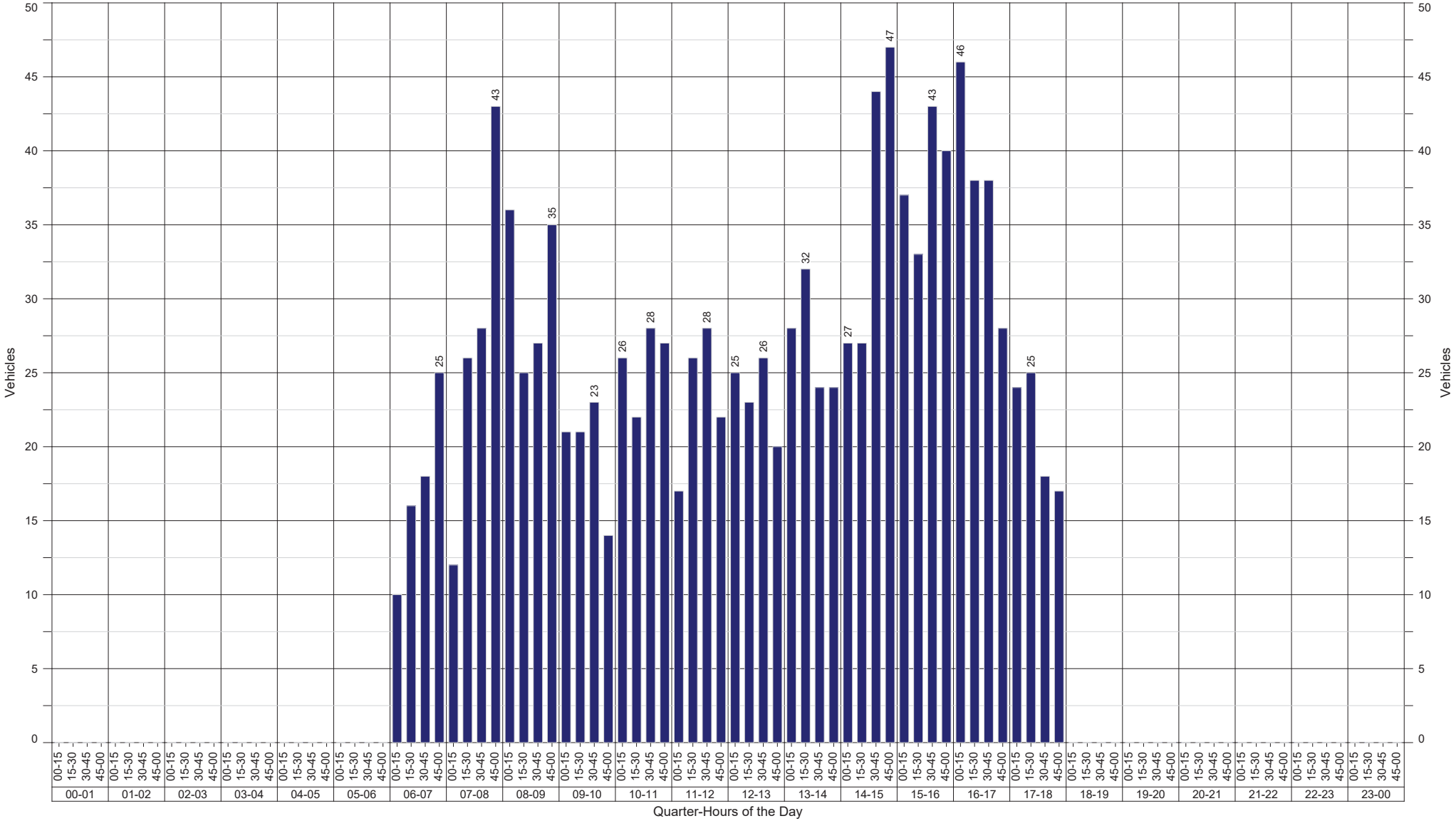
Intersection Analysis Report

Area 412 - Wide Bay/Burnett District Road Section 177 - BUNDABERG RING ROAD
Intersection 15647 - 177 & Telegraph Rd (L) &(R)
Wednesday 19-Feb-2020 06:00 - 18:00

Leg 4 Site 122289 Tdist 0.000 km TelegraghRd/Bundaberg RingRd(ScotlandSt)

Total volume 1,310

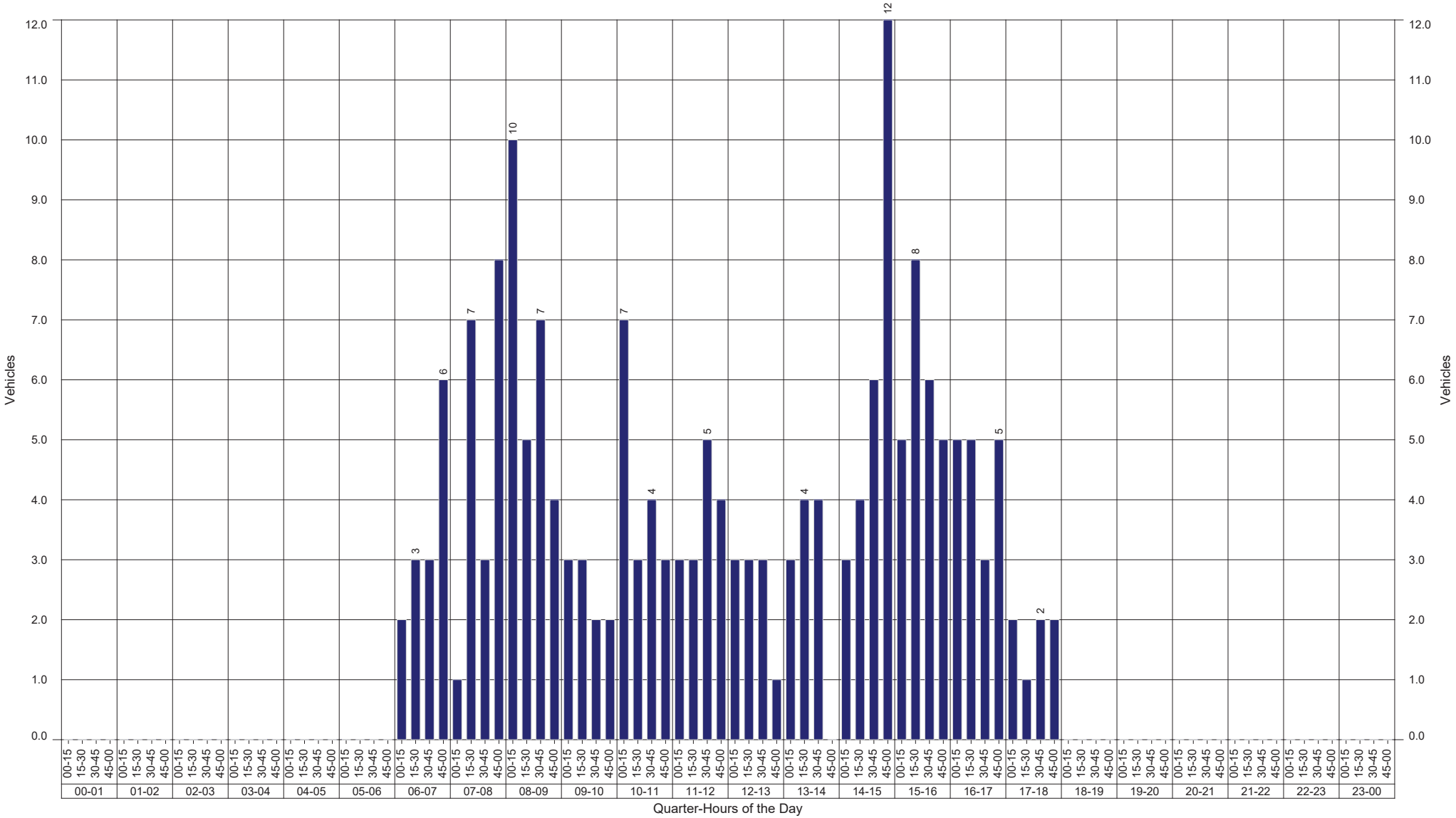
Quarter-Hour Volumes for All Vehicles Entering the Intersection - All Traffic Classes



Leg 4 Site 122289 Tdist 0.000 km TelegraghRd/Bundaberg RingRd(ScotlandSt)

Total volume 196

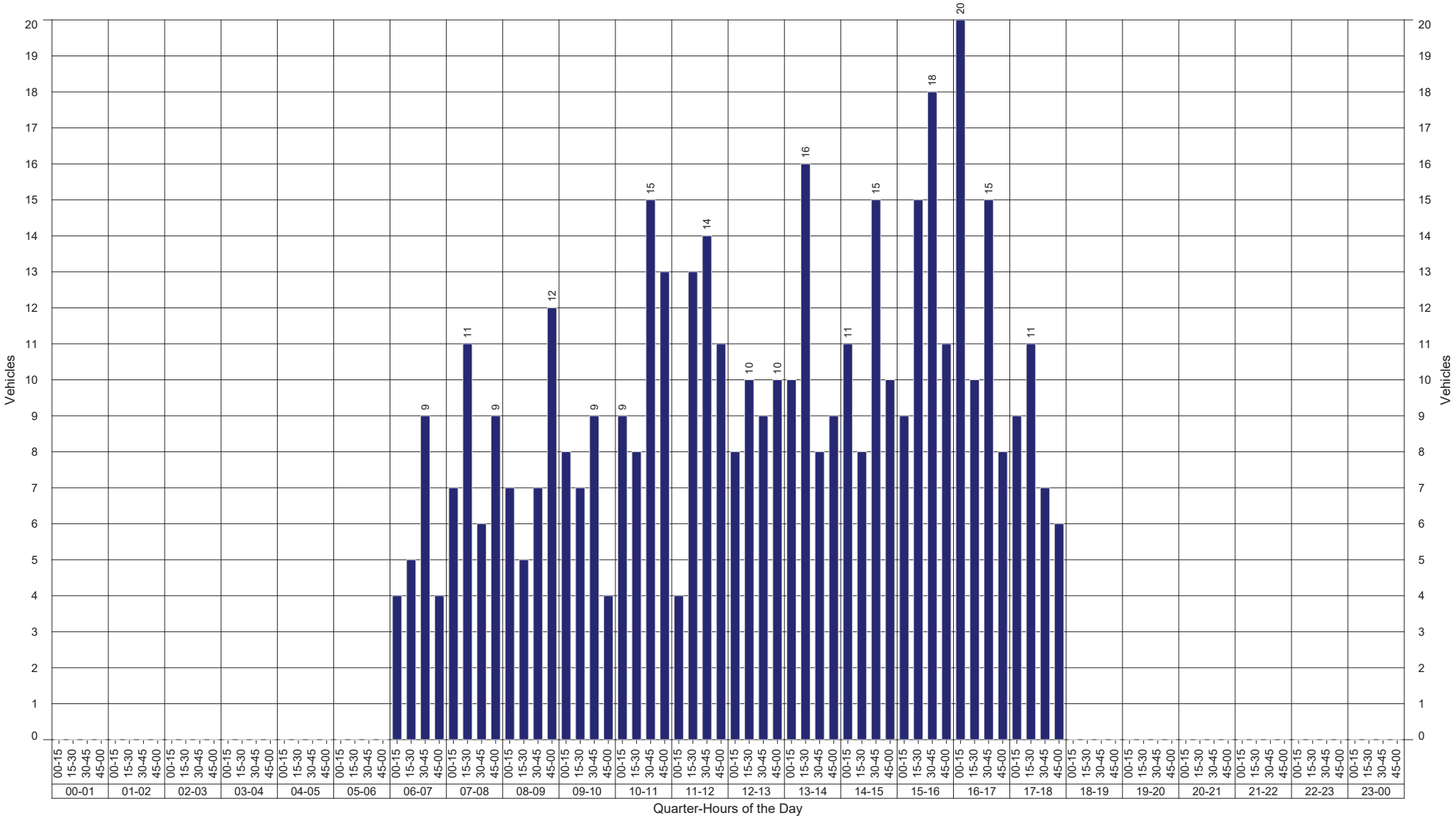
Quarter-Hour Volumes for Left-turning Vehicles - All Traffic Classes



Leg 4 Site 122289 Tdist 0.000 km TelegraghRd/Bundaberg RingRd(ScotlandSt)

Total volume 464

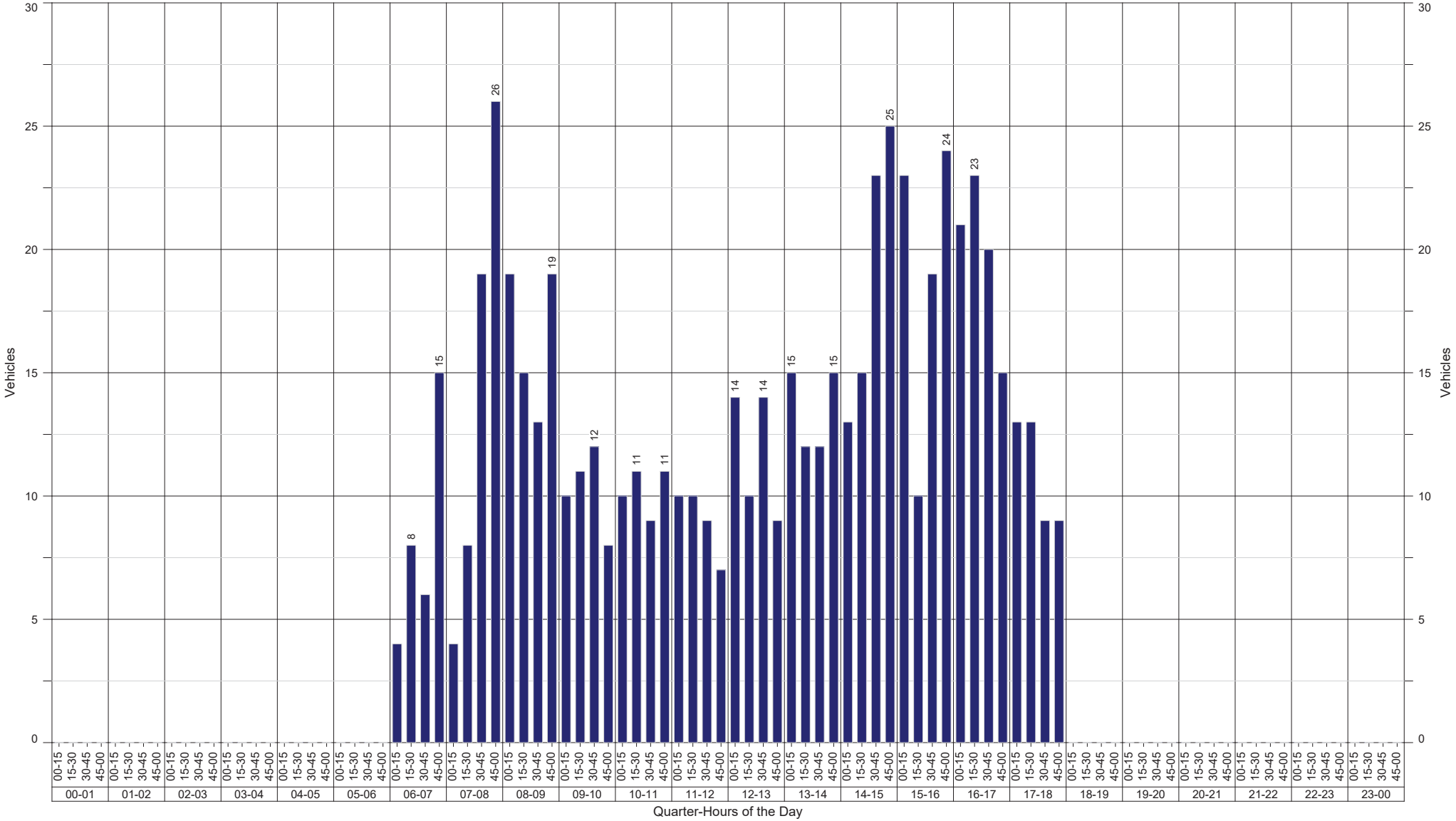
Quarter-Hour Volumes for Through Vehicles - All Traffic Classes



Leg 4 Site 122289 Tdist 0.000 km TelegraghRd/Bundaberg RingRd(ScotlandSt)

Total volume 650

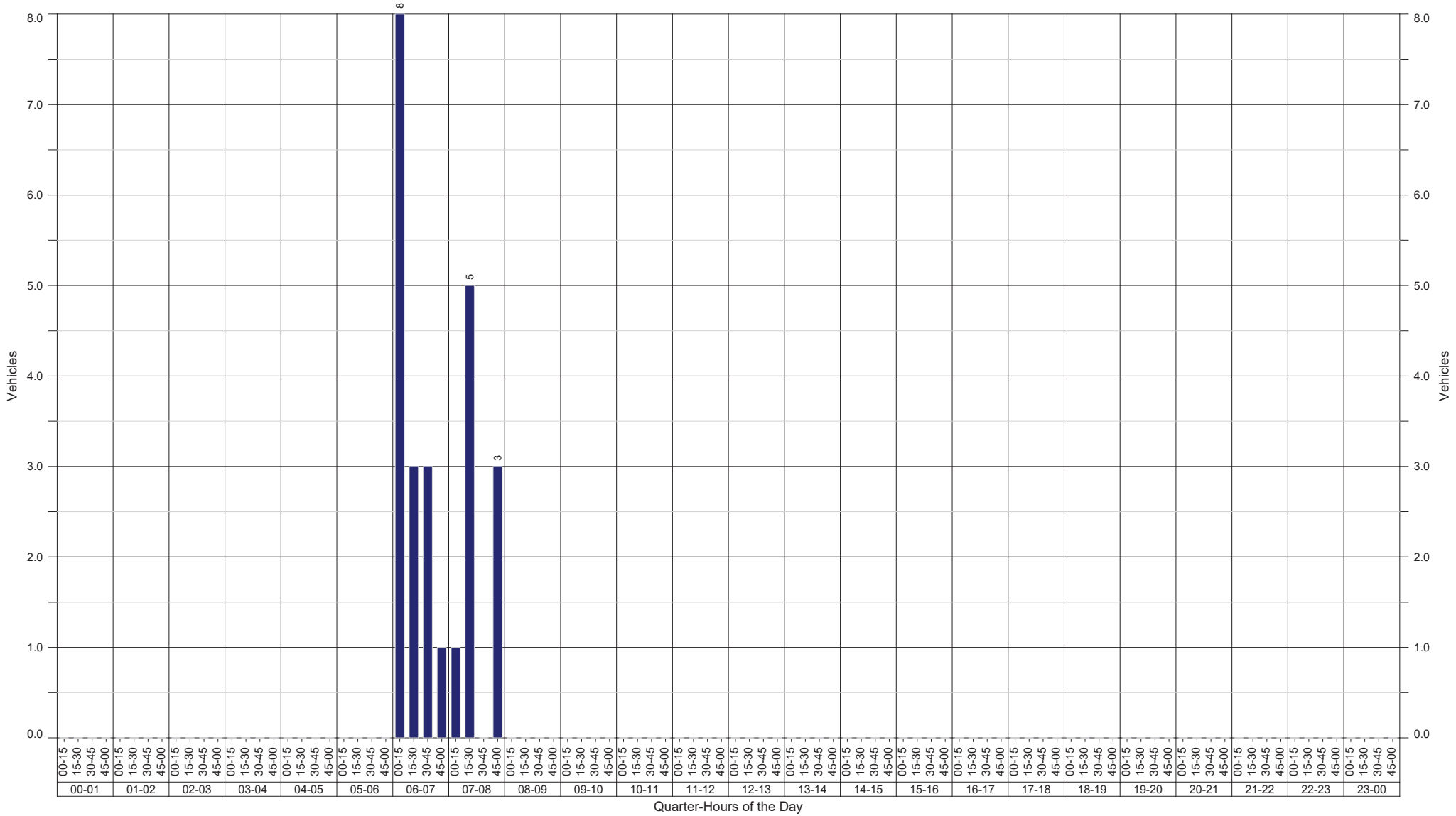
Quarter-Hour Volumes for Right-turning Vehicles - All Traffic Classes



Leg 4 Site 122289 Tdist 0.000 km TelegraghRd/Bundaberg RingRd(ScotlandSt)

Total volume 24

Quarter-Hour Volumes for Pedestrians



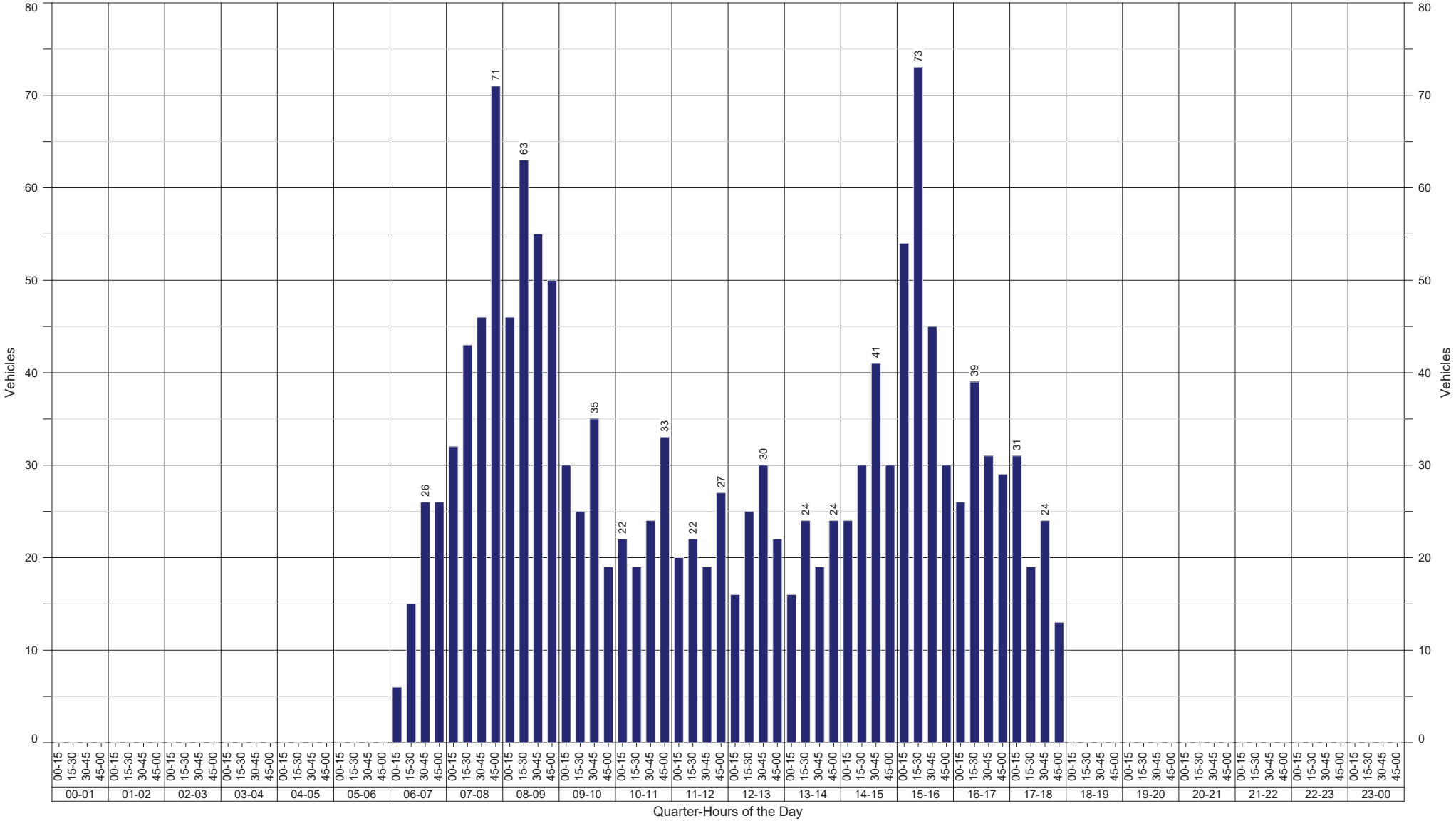
Intersection Analysis Report

Area 412 - Wide Bay/Burnett District Road Section 177 - BUNDABERG RING ROAD
Intersection 15647 - 177 & Telegraph Rd (L) &(R)
Wednesday 19-Feb-2020 06:00 - 18:00

Leg 4 Site 122289 Tdist 0.000 km TelegraghRd/Bundaberg RingRd(ScotlandSt)

Total volume 1,489

Quarter-Hour Volumes for All Vehicles Exiting the Intersection - All Traffic Classes



Intersection Analysis Report
Displays traffic and pedestrian flows in both diagram and tabular formats at an intersection on a particular day.

Content includes:
- Actual day counts.
- Traffic volume in, volume out and total volume for each leg.
- Pedestrian flows when available.

Please Note: This data is not averaged.

Important Information
It is important to note that data in this report are the actual traffic counts for the associated time interval on the date indicated. This report does not display an Annual Average Daily Traffic (AADT).

Annual Average Daily Traffic (AADT)
Annual Average Daily Traffic (AADT) is the number of vehicles passing a point on a road in a 24 hour period, averaged over a calendar year.

Angle
Specifies in degrees how far off north the northern most leg points.

Area
For administration purposes the Department of Transport and Main Roads has divided Queensland into 12 Districts. The Area field in TSDM reports displays the District Name and Number.

District Name	District
Central West District	401
Darling Downs District	402
Far North District	403
Fitzroy District	404
Mackay/Whitsunday District	405
Metropolitian District	406
North Coast District	407
North West District	409
Northern District	408
South Coast District	410
South West District	411
Wide Bay/Burnett District	412

Gazettal Direction
Is the direction of the traffic flow. It can be easily recognised by referring to the name of the road eg. Road Section: 10A Brisbane - Gympie denotes that the gazettal direction is from Brisbane to Gympie.

Intersection
The unique code and description of the Intersection.

Leg
The code that identifies each leg of the intersection.

Leg 1 North
Leg 2 East
Leg 3 South
Leg 4 West

The Traffic Analysis and Reporting System (TARS) database has a design limitation that restricts counts to 3way or 4way intersections.

Pedestrians
Pedestrian counts are collected where required and can be classed into Adult (A) and Children (C).

Percentage Heavy Vehicles
%HV are displayed for each turning movement when collected.

Road Section
Is the Gazetted road from which the traffic data is collected. Each Road Section is given a code, allocated sequentially in Gazettal Direction. Larger roads are broken down into sections and identified by an ID code with a suffix for easier data collection and reporting (eg. 10A, 10B, 10C). Road Sections are then broken into AADT Segments which are determined by traffic volume.

Site
The physical location of a traffic counting device. Sites are located at a specified Through Distance along a Road Section.

Site Description
The description of the physical location of the traffic counting device.

TDist
TDist or Through Distance is the physical location of the traffic count site measured in kilometres from the beginning of the Road Section.

Traffic Classes
Are the categories for which data can be captured at an intersection:

Volume
00 All vehicles.

2-Bin
0A Light vehicles
0B Heavy vehicles

4-Bin
1A Short vehicles
1B Truck or bus
1C Articulated vehicles
1D Road train

Vehicle Turning Movements
Turning movements describe the action of a vehicle at the intersection.

L Left hand turn
T Through traffic
R Right hand turn
U U-turn

Appendix B: Transport and Parking Code Tables

Performance outcomes	Acceptable outcomes	Comments
Strategic transport network		
PO2 Development, particularly where involving high trip generating land uses or the creation of new roads and other transport corridors, ensures provision of a transport network that:- (a) accords with the Strategic transport network as shown on **Strategic Framework Map SFM-003 (Transport and infrastructure elements)** and the **Local Government Infrastructure Plan**; (b) provides visible distinction of roads, with the design of streets and roads based on function, safety and efficiency; (c) provides convenient, safe and efficient movement for all modes of transport between land use activities with priority given to pedestrian movement and bicycle use over vehicle movements; (d) allows for unimpeded and practical access to the development site and each proposed lot; (e) facilitates and promotes the use of public and active transport, including access to cycle and pedestrian pathways; (f) facilitates a high standard of urban design which reflects a grid pattern (or modified grid pattern) to assist in connectivity and permeability, particularly for pedestrians and cyclists; (g) connects to and integrates with existing roads and other relevant facilities within and external to the land to be developed or subdivided; (h) provides for the dedication and construction of roads where required to allow access to, and proper development of, adjoining land that is intended for development; (i) provides for the construction and adequate drainage of all proposed roads, pathways, laneways and bikeways within and adjoining the land to be developed; (j) minimises any adverse impacts on the existing transport network, surrounding land uses, and the amenity of the surrounding environment; and (k) does not adversely impact on wildlife movement corridors.	**AO2** No acceptable outcome provided. Editor's note—**the Planning scheme policy for development works** specifies standards and provides guidance for the design and construction of roads and transport corridors. Editor's note—the Council may require submission of a traffic impact assessment report prepared in accordance with the **Planning scheme policy for information that Council may require** to demonstrate compliance with Performance outcome PO1.	The proposed development does create new roads and ensures the network is in accordance with Local Government Infrastructure Plan. The figures prepared for the development provide a masterplan overview of the design features including road geometry and connectivity with the existing transport networks. The proposed development is consistent in terms of traffic generation planned by Council as part of the Priority Infrastructure Planning for the Kalkie locality.

Performance outcomes	Acceptable outcomes	Comments
PO3 In Woodgate Beach, development provides for the extension and continuation of residential access streets between First Avenue and Seventh Avenue, including but not limited to Palm Court, Jacaranda Court, Oleander Court and Banksia Court, consistent with the established cadastral and road alignment pattern in the area, and so as not to preclude or prejudice access to and development of adjacent and nearby properties.	**AO3** No acceptable outcome provided.	NA
Pedestrian and bicycle network and facilities		
PO4 Development provides for the establishment of a safe and convenient network of pedestrian and bicycle paths that:- (a) provides a high level of permeability and connectivity; (b) provide for joint usage where appropriate; (c) maximises opportunities to link activity centres, employment areas, residential areas, community facilities, open space and public transport stops located internally and externally to the site; (d) have an alignment that maximises visual interest, allows for the retention of trees and other significant features and does not compromise the operation of or access to other infrastructure; (e) incorporates safe street crossings with adequate sight distances, pavement markings, warning signs and safety rails; and (f) is well lit and located where there is casual surveillance from nearby premises.	**AO4** No acceptable outcome provided. Editor's note—**the Planning scheme policy for development works** specifies standards and provides guidance for the design and construction of pedestrian and bicycle paths.	Complies
PO5 Appropriate on-site end of trip facilities are provided to encourage walking and cycling as an alternative to private car travel.	**AO5.1** Development for a business activity, community activity, sport and recreation activity, or for rooming accommodation, short-term accommodation, resort complex or air services provides residents, employees and visitors with shower cubicles and ancillary change rooms and lockers (including provision for both males and females) at the following rates:- (a) 1 cubicle and 5 lockers for the first 5,500m^2 of gross floor area, provided that the development exceeds a minimum gross floor area of 1,500m^2; plus (b) 1 additional cubicle and 5 additional lockers for that part of the development that exceeds 5,500m^2 gross floor area up to a maximum of 30,000m^2 gross floor area; plus (c) 2 additional cubicles and 10 additional lockers for that	NA

Performance outcomes	Acceptable outcomes	Comments
	part of the development that exceeds 30,000m² gross floor area. **AO5.2** Development provides bicycle access, parking and storage facilities that:- (a) are located close to the building's pedestrian entrance; (b) are obvious and easily and safely accessible from outside the site; (c) do not adversely impact on visual amenity; and (d) are designed in accordance with the **Planning scheme policy for development works**.	
Public transport facilities		
PO6 Development encourages the use of public transport through:- **(a)** appropriate development design which maximises accessibility via existing and planned public transport facilities; and **(b)** appropriate provision of on-site or off-site public transport facilities, having regard to the specific nature and scale of development, and the number of people or lots involved.	**AO6.1** Development is designed and arranged to provide safe, convenient and functional linkages to existing and proposed public transport facilities. **AO6.2** On-site public transport facilities are provided in conjunction with the following development:- (a) shopping centre, where having a gross floor area of greater than 10,000m²; (b) tourist attraction, having a total use area of greater than 10,000m²; (c) educational establishment, where accommodating more than 500 students; (d) major sport, recreation and entertainment facility; (e) indoor sport and recreation, where having a gross floor area of more than 1,000m² or for spectator sports; and (f) outdoor sport and recreation where for spectator sports. **AO6.3** On-street public transport facilities are provided as part of the following development:- (a) shopping centre, where having a gross floor area of 10,000m² or less; (b) tourist attraction, where having a gross floor area of 10,000m² or less; (c) educational establishment, where accommodating 500 or less students; and (d) indoor sport and recreation where having a gross floor	NA

Performance outcomes	Acceptable outcomes	Comments
	area of 500m^2 or less and not for spectator sports. **AO6.4** Where not otherwise specified above, on-street public transport facilities are provided where development is located on an existing or future public transport route. **AO6.5** Public transport facilities are located and designed in accordance with the standards specified in the **Planning scheme policy for development works.**	
Amenity and environmental impacts of transport infrastructure		
PO7 Development ensures that on-site vehicle access, manoeuvring and parking facilities do not have adverse impacts on people, properties or activities, with regard to light, noise, emissions or stormwater run-off.	**AO7** No acceptable outcome provided.	Complies
Transport corridor widths, pavement, surfacing and verges		
PO8 Development provides the reserve width and external road works along the full extent of the site frontage, and other transport corridors where appropriate, to support the function and amenity of the transport corridor, including where applicable:- (a) paved roadway; (b) kerb and channel; (c) safe vehicular access; (d) safe footpaths and bikeways; (e) safe on-road cycle lanes or verges for cycling. (f) stormwater drainage; (g) provision of public utility services; (h) streetscaping and landscaping; and (i) provision of street lighting systems, road signage and line marking.	**AO8** The design and construction of road works, including external road works, is:- (a) undertaken in accordance with the **Planning scheme policy for development works**; and consistent with the characteristics intended for the particular type of transport corridor specified in the **Planning scheme policy for development works.**	Complies

Intersections and traffic controls		
PO9 Development provides for traffic speeds and volumes to be catered for through the design and location of intersections and traffic controls so as to:- (a) ensure the function, safety and efficiency of the road network is maintained; **(b)** minimise unacceptable traffic noise to adjoining land uses; and **(c)** maintain convenience and safety levels for pedestrians, cyclists and public transport.	**AO9** Intersections and speed control devices are designed and constructed in accordance with the **Planning scheme policy for development works**	The site layout has been reviewed with swept path analysis undertaken at key locations across the development. This complies with the requirements of the Planning Scheme Policy for Development Works. Detailed design of the development will be documented as part of the future applications for Operational Works.
Development staging		
PO10 Staged development is planned, designed and constructed to ensure that:- (a) each stage of the development can be constructed without interruption to services and utilities provided to the previous stages; (b) transport infrastructure provided is capable of servicing the entire development; (c) early bus access and circulation is achieved through the connection of collector roads; and (d) materials used are consistent throughout the development.	**AO10** No acceptable outcome provided.	The proposed staging of works will allow for safe continuation of transport movements and also allow for separation of construction traffic through until Stage 5 of the work. From Stage 5 and Stage 6 the construction traffic can be directed along the trunk collector along the eastern boundary of the site to minimise impacts on the developed residential areas.

UES

Flood Study
134 Telegraph Rd, Kalkie, QLD 4670

Prepared for EMTOM Pty Ltd

15 October 2020

Document Information

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Document Control

Version	Date	Author	Reviewer	
1	10 May 2020	Jesse Stubbs & Gavin Fields	Gavin Fields	
2	15 October 2020	Jesse Stubbs & Gavin Fields	Gavin Fields	

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List of Figures

1 Introduction

Urban Environmental Solutions (UES) were engaged by EMTOM Pty Ltd to undertake a stormwater and flood assessment for the proposed residential development at 134 Telegraph Road, Kalkie (herein referred to as the site). This report has been prepared to support a development application to be submitted to Bundaberg Regional Council and assesses the impact of local overland flows adjacent to, and within, the proposed development.

2 Site Characteristics

The site is located at 134 Telegraph Road, Kalkie and is described as Lot 96 on SP187576. The site has an area of approximately 30.880ha. The site has boundary frontage on Telegraph Road to the north, with the Bundaberg Ring Road to the west. The site is adjacent to an agricultural property to the east and a rural property to the south. An aerial photograph showing the site locality is presented in Figure 1.

Figure 1: Site Location (Source Nearmap, 2020)

2.1 Site Topography

The existing terrain within the site ranges from a high elevation of approximately RL 19.12m AHD south and east of the internal area of the site with a low elevation of RL 11.30m AHD in the overland flow path at the north-western boundary. The average slope across the site is approximate 1.5% although there are some minor areas with steeper gradients. The site has been subject to survey by Straughair & Bent and Insite SJC, with the relevant survey plans included in **Appendix A**.

In addition to the site-based survey, we have obtained the regional LiDAR information from the ELVIS online database, which is for the aerial survey completed in 2016. This information has been used to verify external stormwater catchments and other indicative surface elevations for other infrastructure assets. We note that we also obtained the 2011 LiDAR data for comparison purposes as this

dataset was utilised in the Bundaberg Creeks Flood Analysis that was completed in 2013. The contours of the site and a cross section through the site are shown on Figure 2.

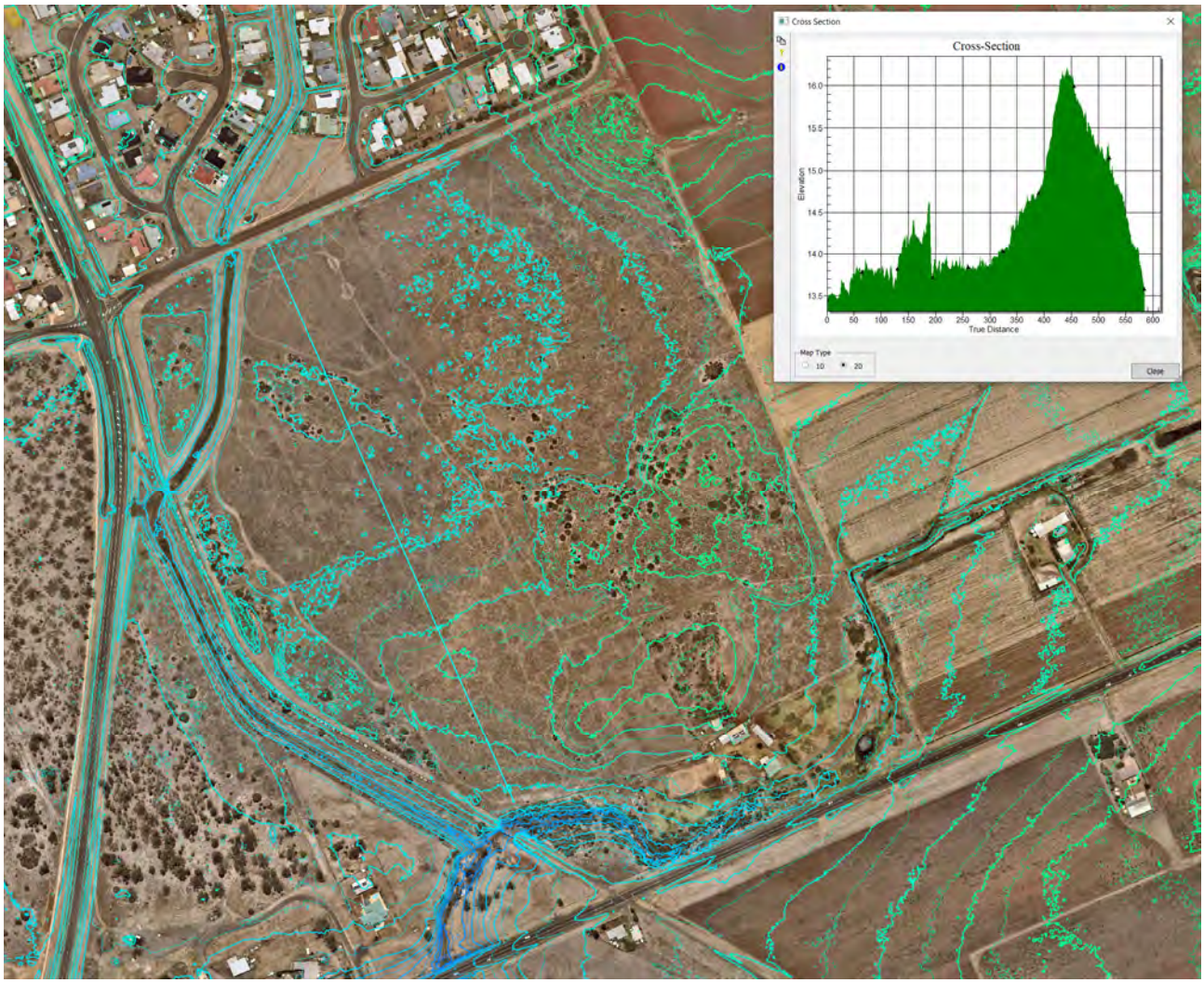


Figure 2: Site Contours

As part of the development of the site design documentation the layout was modified relative to the site survey data. Figure 3 presents the site layout and design contours for the proposed residential development.

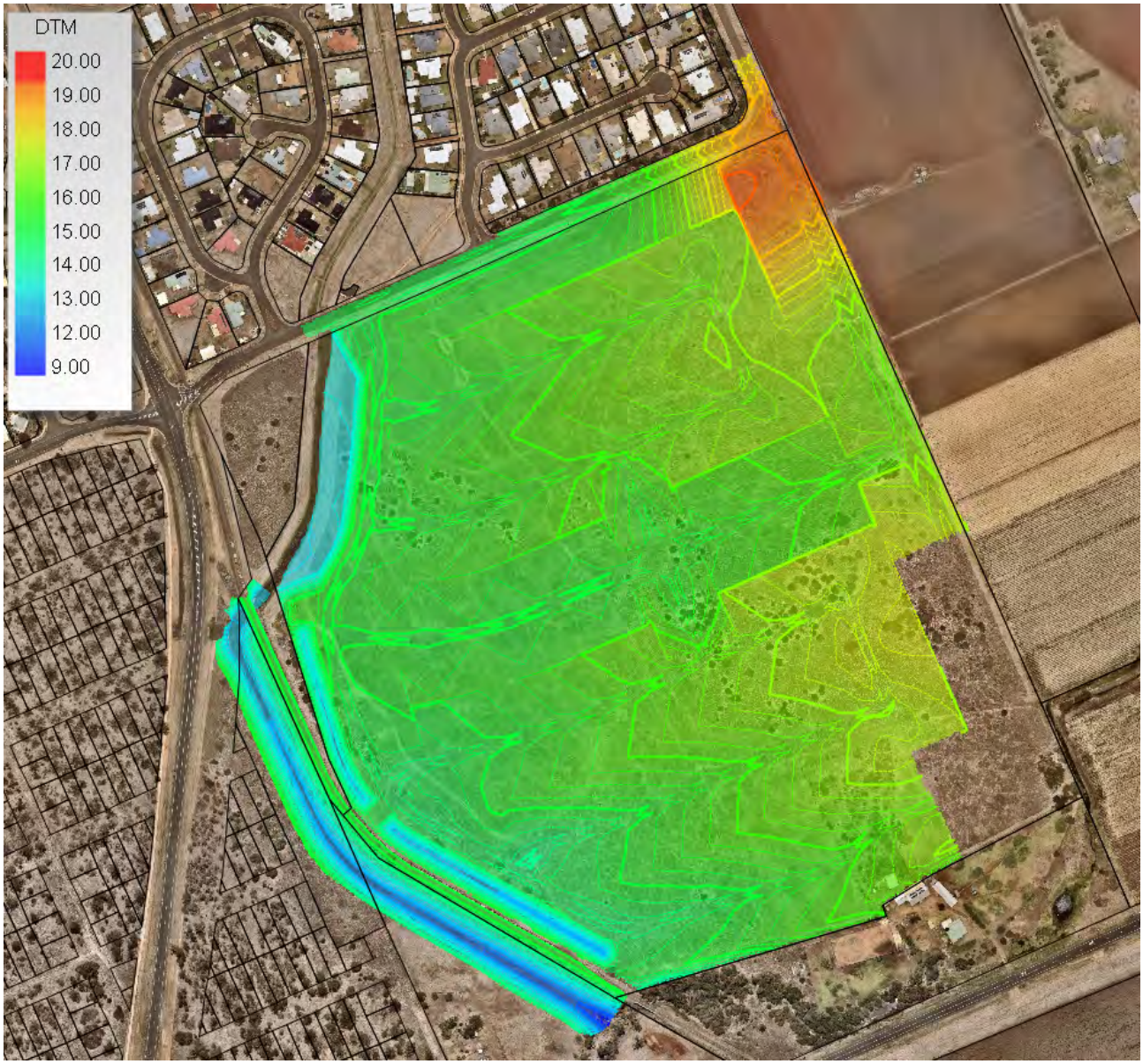


Figure 3: Proposed Site Layout and Design Contours

A review of the contour information confirms that there are external catchment areas that will ultimately contribute runoff from the east and north of the site. The external runoff from the east will be required to be collected and discharged through the proposed development via a combination of minor and major drainage infrastructure. The external runoff from the northern catchment areas will form a tailwater condition for the site minor drainage network as this runoff discharges through the existing overland flow channel that crosses Telegraph Road, via the existing road crossing culverts, towards the creek drainage network to the south and west of the site.

3 Stormwater Quantity

3.1 Previous Investigations

A previous study of the Bundaberg Creeks was undertaken by Cardno in 2013 on behalf of Council. This investigation aimed to determine the location and extents of flooding in the local creeks on the southern side of the Burnett River and the subsequent output has been used by Council for planning purposes in that area. The output from the previous assessment has been included in the 'Flood Hazard Assessment Report' prepared for Council, with the key reference inundation map included in **Appendix B**.

The Bundaberg Creeks assessment was undertaken using XPSWMM applying Laurenson's Method for the catchment hydrology and rainfall temporal patterns based on Australian Rainfall and Runoff 1987 (Pilgrim, 1987), which were available at the time of the investigation. The study also utilised LiDAR data taken during 2011.

3.2 Current Investigation

The objective of this current study is to investigate the potential impact of local and regional overland flow taking consideration of the proposed cut/fill within the site into account. The intent is to ensure that there is no adverse change to the inundation and drainage capacity both internally to the site itself and on the external contributing catchment and overland flow areas. The results will also be used to establish the minimum floor elevations for the future buildings within the site.

To complete the study a hydrodynamic XPSWMM 2019.1 model has been prepared for the site that has applied 1D hydrographs from the upstream catchments to the north and east in conjunction with a hydrographs over the local catchment areas that contribute to the proposed internal minor drainage network. This approach provides an efficient assessment of the catchments using Laurenson's Method to determine peak flow hydrographs to dynamically assess all of the local overland flows in fine detail.

Flood modelling has been carried out for the 18.39%, 10%, 5%, 2%, 1% and 1% plus climate change annual exceedance probability (AEP) design storm events to determine the critical duration event. The internal network being analysed for the 18.39% AEP and 10% AEP design storm events using the Rational Method in 12d. The following scenarios have been investigated:

1. Existing Scenario
2. Developed (Post Site Cut/Fill) Scenario

3.3 Existing Model Setup

Given that the proposed method of analysis is of the 1D catchment hydrology each of the respective catchment area was required to be defined. The existing model catchment extent was interpolated from the 2016 LiDAR data available via the Elevation – Foundation Spatial Data database (www.elevation.fsdf.org.au) and is shown on Figure 4. We confirm that these catchments are slightly different to those utilised as part of the 2013 Cardno flood study.

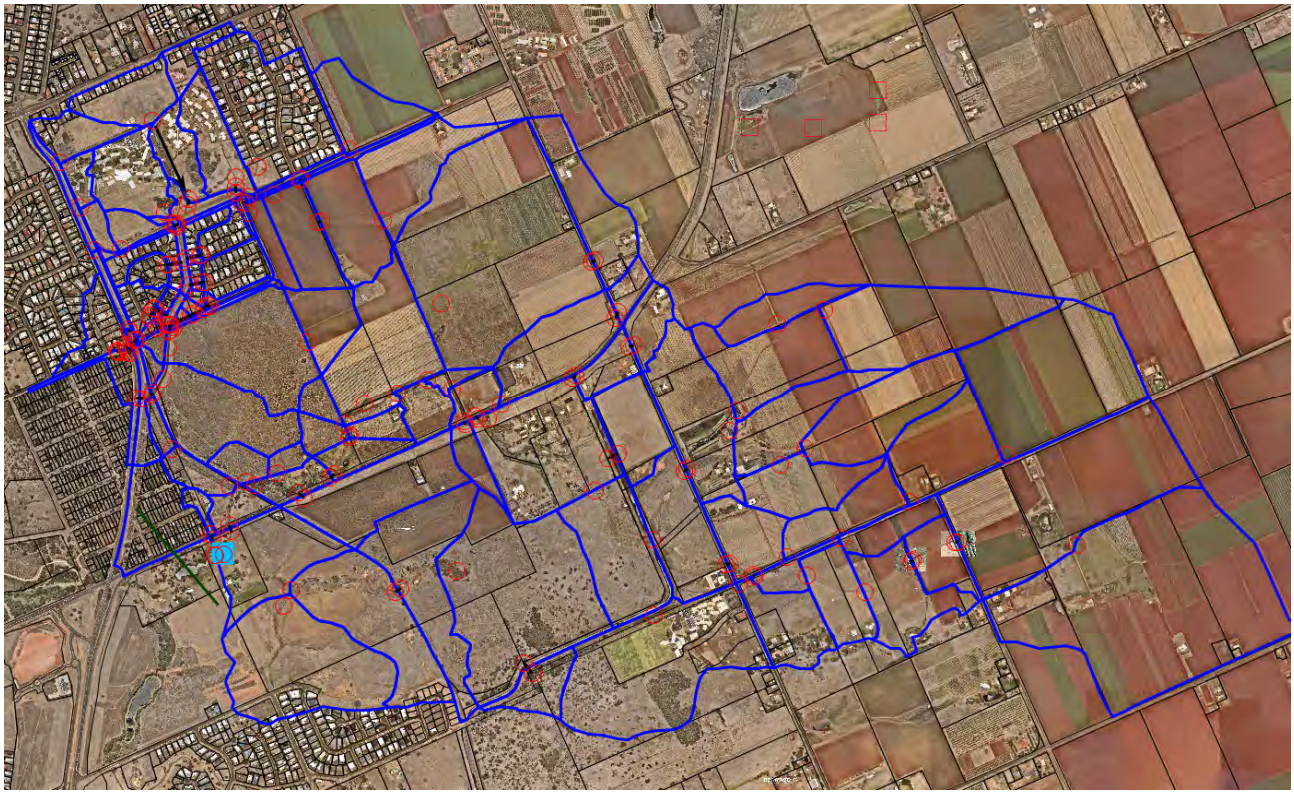


Figure 4: Existing Catchment Extents

Given that the total catchment area is less than 10km^2 uniform area distribution 'point' design storms have been applied in the hydrological analysis. Therefore, no area reduction factors have been applied to the analysis.

After the LiDAR data was supplied to the model a 4m x 4m resolution elevation grid was then established. We consider that this resolution was suitable for the assessment of the local overland flows and the creek network. To assist this process the model features were included in accordance with the Australian Rainfall and Runoff Project 15 2D Modelling Guidelines, which included roads, dense vegetation, water bodies and grassed areas. These features were digitised into the XPSWMM model and were given suitable Manning's values. The model did not require buildings to be defined given that the hydrology was being input via 1D nodes rather than a direct rainfall approach. The 2D surface roughness values are as follows:

- Roads 0.03
- Waterways and bodies 0.01
- Concrete Drains 0.015
- Short Vegetation 0.04
- Dense Vegetation 0.12

3.4 Rainfall Losses

Infiltration loss data was only applied to the pervious land use areas within the 1D nodes. No initial loss and a continuing loss value of 2.5mm/hr to allow for a conservative assessment of the catchment in a saturated state, which is a requirement of the BRC Planning Scheme. Given that the design rainfall data for this project was based on Australian Rainfall and Runoff 1987 (ARR'87), the proposed temporal patterns are considered to be 'burst' patterns and it is inappropriate to allow for initial losses in this circumstance.

3.5 Intensity Frequency Duration (IFD)

Intensity Frequency Duration (IFD) data for the site was derived from the parameters in ARR'87. The IFD data was applied to the ARR'87 temporal patterns to generate the catchment runoff for the various design storm events.

3.6 1D Catchment Hydrology Results

Sample results from the external upstream 4.0ha catchment to the east of the site, for a range of the 1% AEP design storm events, are shown in the following figure.

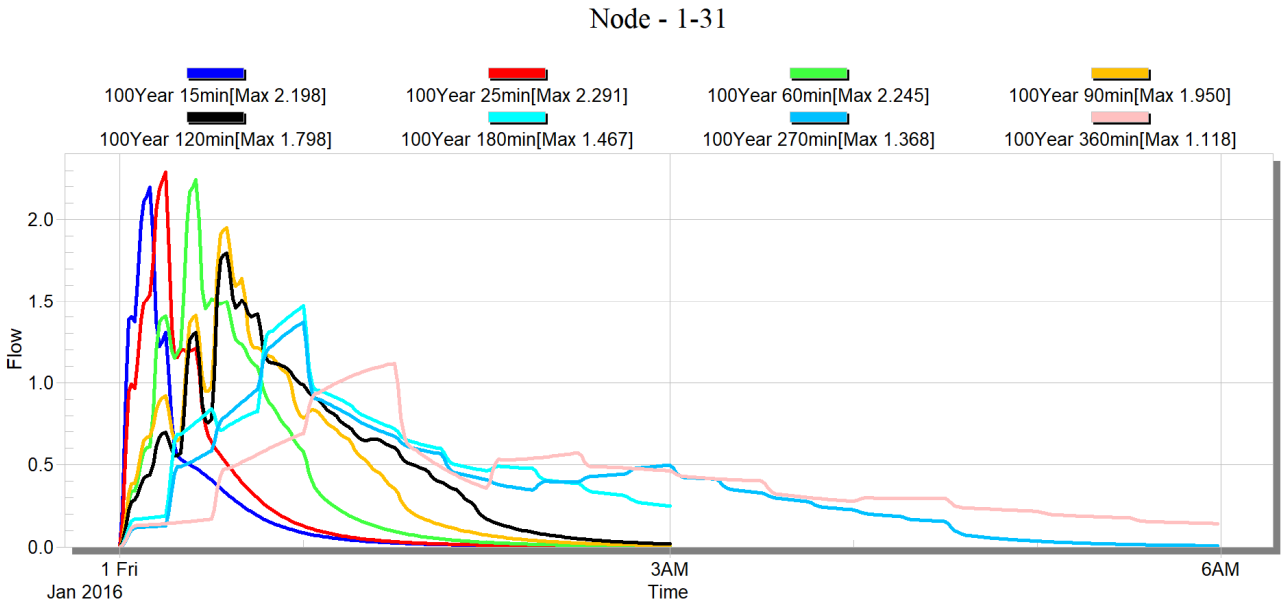


Figure 5: Existing Scenario External Upstream Catchment (East of 134 Telegraph Road) Hydrograph from a Range of 1% AEP Design Storm Events

The above figure highlights that the critical duration for the external 4.0ha catchment to the east is the 25 minute duration based on the ARR'87 temporal patterns. This is attributed to the relatively small catchment area and the slope of the agricultural land.

The following figure presents the results from the larger internal site catchment that discharges into the western overland flow path south of the Telegraph Road culverts.

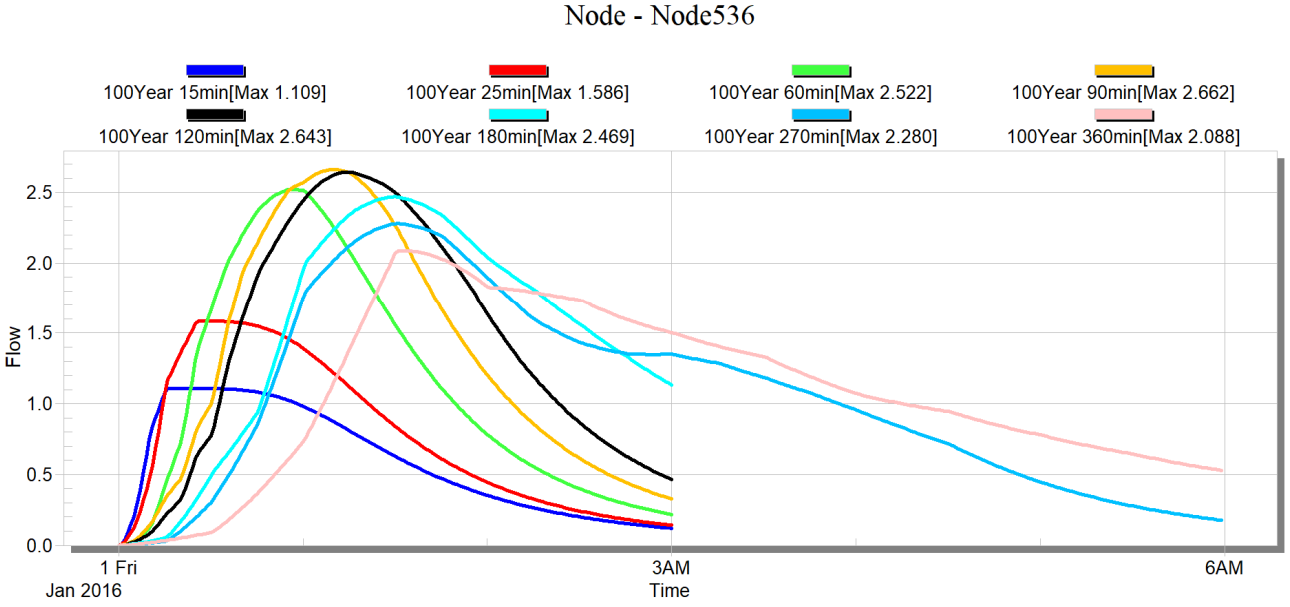


Figure 6: Existing Scenario Internal Catchment Hydrograph from a Range of 1% AEP Design Storm Events

The above graphs are from the internal catchment indicate that the critical duration is the 90 minute duration, with the 120 minute design storm generating a similar peak.

To ensure that the analysis fairly assessed the potential for variation in the timing of runoff from different durations it was determined that the 1D/2D hydraulic analysis should consider events ranging in duration between the 15 minute through to the 360 minute given the overall length of individual and overall catchment extents.

3.7 Developed Model Results

The developed model was based on the existing model with key changes to reflect the proposed earthworks across the site. The fraction impervious for each internal sub-catchment was generally set at 50%, which is based on the average lot area and road extents within each sub-catchment. Figure 7 presents a sample result from an internal catchment from within Stage 1 for a range of durations that were analysed for the developed scenario for comparison against the existing regional hydrologic results.

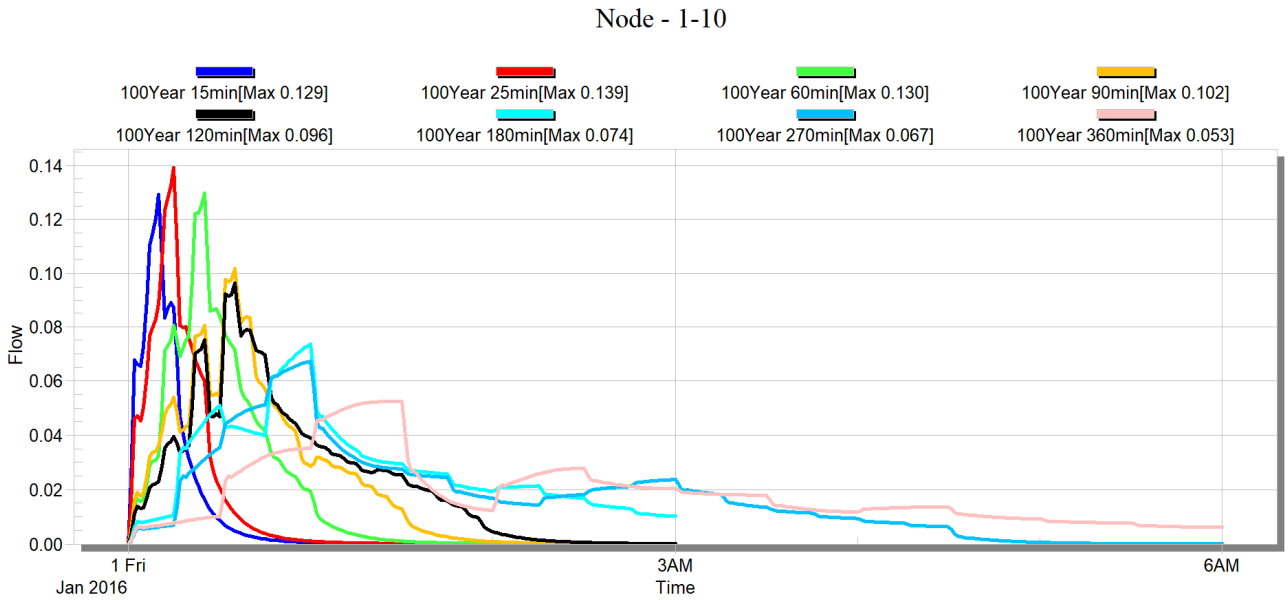


Figure 7: Developed Scenario Internal Catchment 1-10 Hydrograph from a Range of 1% AEP Design Storm Event Durations

The above results indicate that the shorter 25 minute duration dominates the smaller developed sub-catchment in Stage 1. This is consistent with the balance of the internal developed sub-catchments. These results however are only based on the local sub-catchment conditions and do not interact with each other – and as such, the critical duration storm is to be determined hydraulically.

4 Hydraulic Modelling

The hydraulic analysis was completed as a linked 1D/2D model within XPSWMM. In the existing case only major road crossing culvert details were included within the model. Figure 8 shows the locations of the key culverts that were included in the XPSWMM model.

Figure 8: Existing Culvert Locations

In the developed scenario, the LiDAR based terrain was supplemented by the design surface that was developed in 12d. The design has included the geometry of the internal roadways and detention areas recommended for the site. Additionally, the developed model introduced a field inlet and pipe connection to cater for the external catchment overland flow from the east, which is to be conveyed to the west via the internal drainage network as part of the Stage 4 works. Figure 9 presents the layout for the developed scenario minor drainage infrastructure and the design surface.

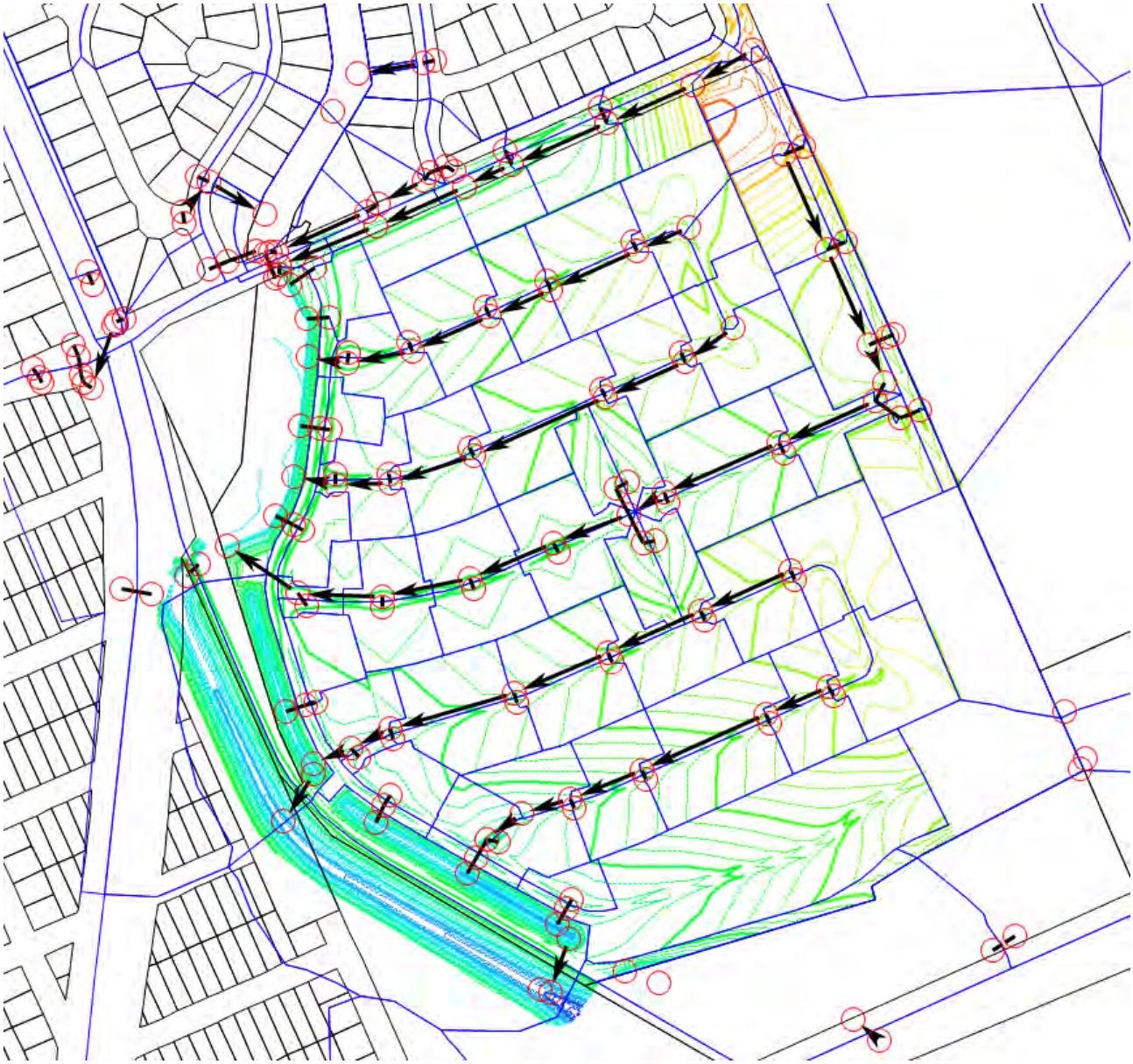


Figure 9: Internal Stormwater Network Layout

The downstream boundary condition that was applied to each scenario was a fixed head elevation at RL 9.0m AHD. This reflects equivalent major water elevations observed during the 2013 flood event and is considered to be conservative – particularly for more frequent events than the 1% AEP design storm events.

4.1 Hydraulic Model Results

The 2D analysis shows inundation across the entire model extent catchment. Figure 10 shows the existing depth-based inundation extent without any depth filters applied.

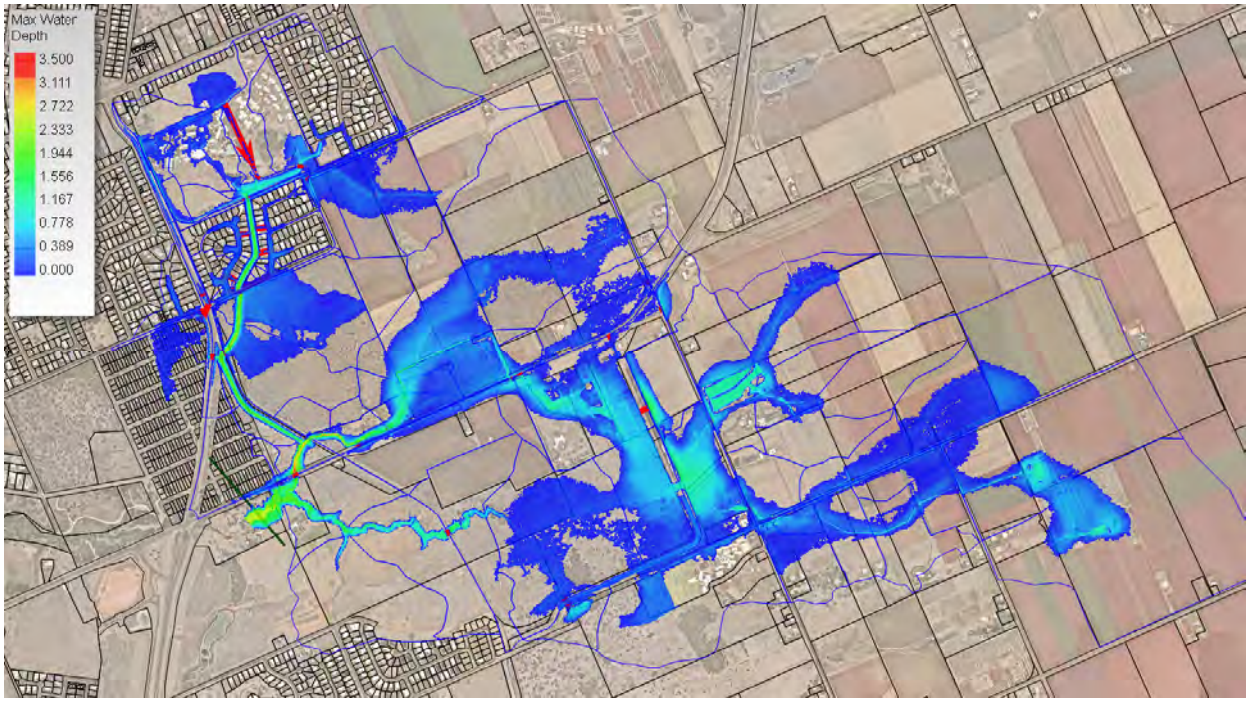


Figure 10: Existing Scenario Inundation Depth During a 1% AEP 120 Minute Duration Design Storm Event

To assist the review of the site characteristics, Figure 11 presents a 'zoomed' in view of the site location.

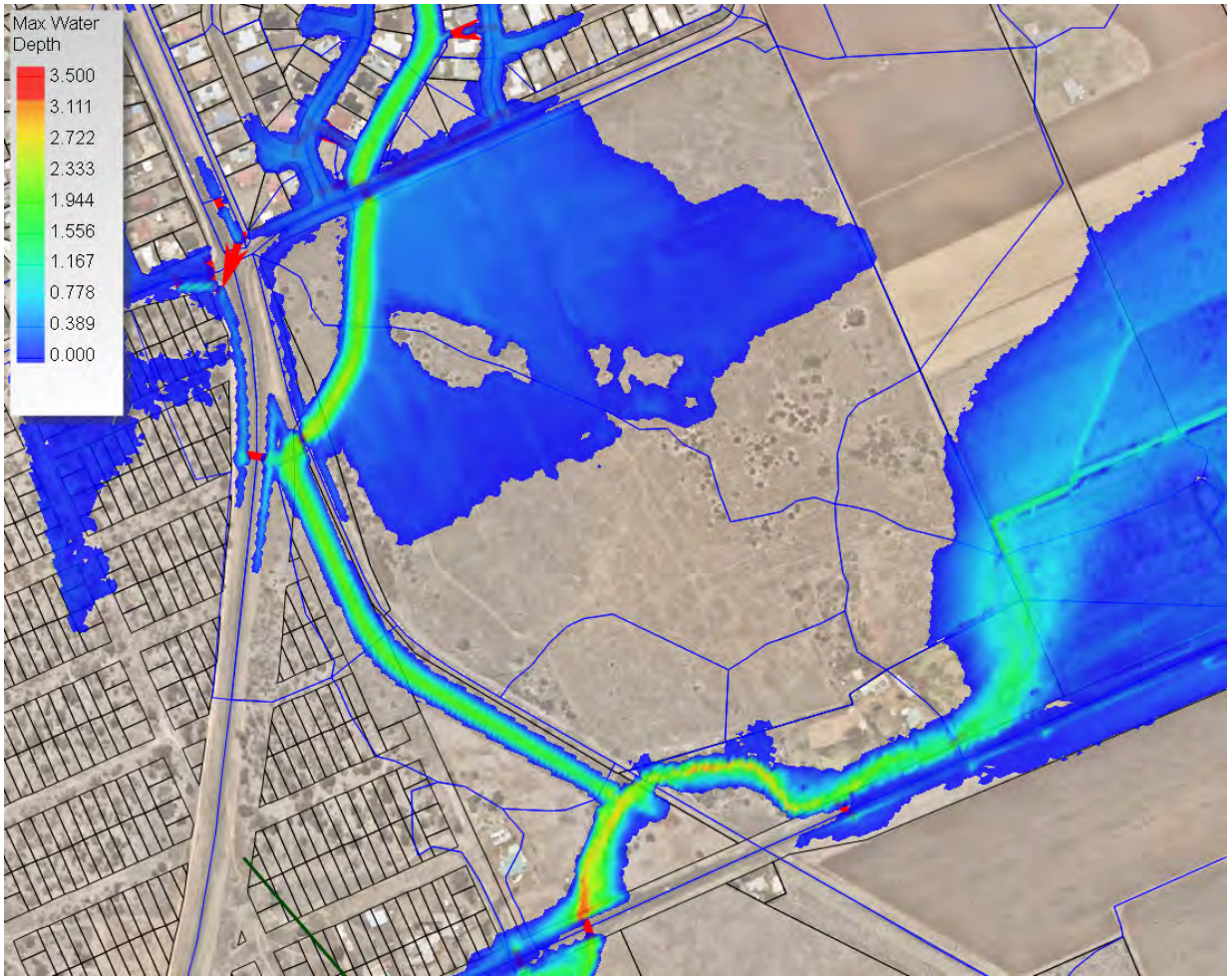


Figure 11: Existing Scenario Inundation Depth During a 1% AEP 120 Minute Duration Design Storm Event at the Site

In addition to the inundation depths, a review of the existing scenario flood water elevation is presented in Figure 12.

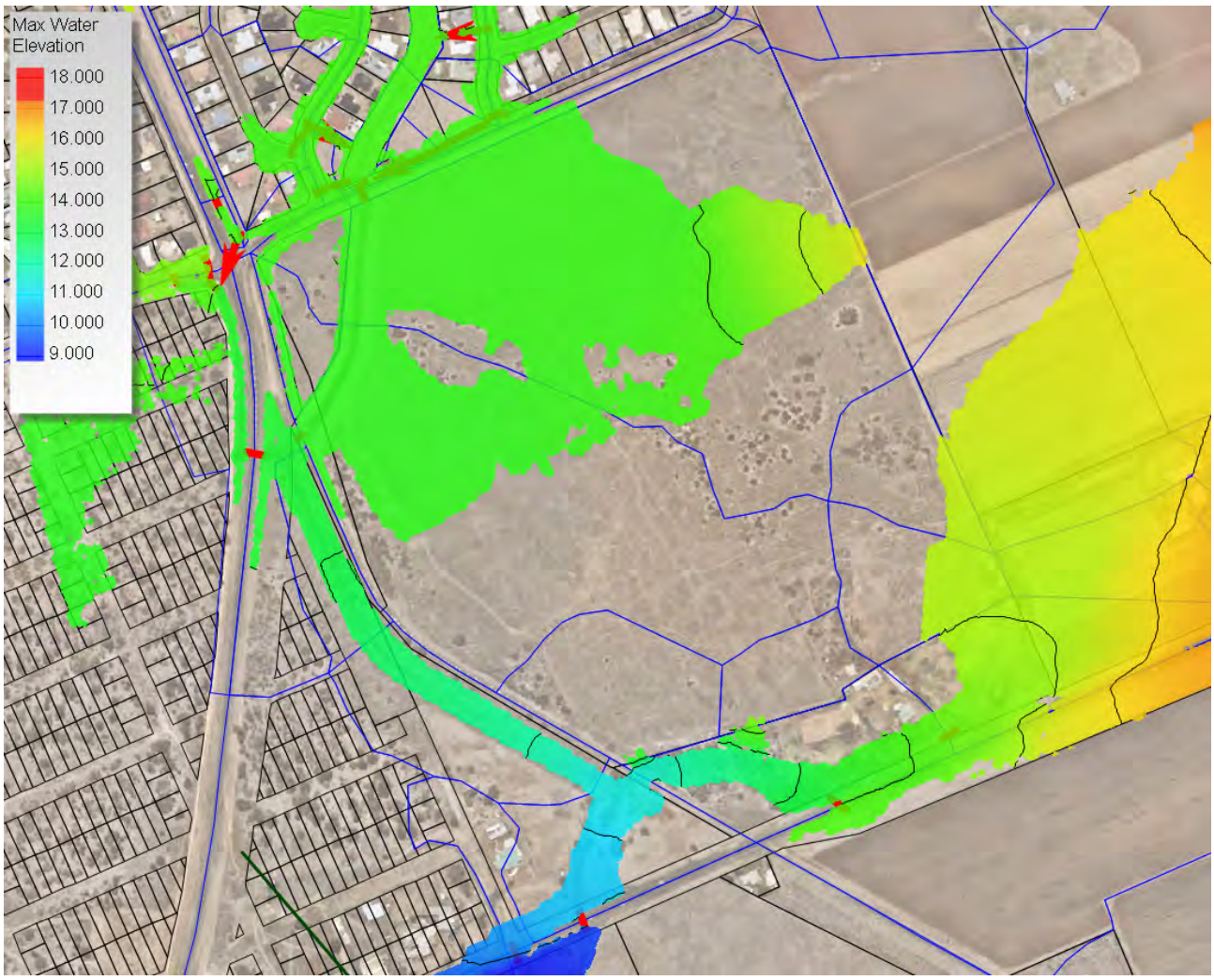


Figure 12: Existing Scenario Flood Water Elevation During a 1% AEP 120 Minute Duration Design Storm Event at the Site

The results shown in Figure 12 above highlight that there water elevation at the Telegraph Road frontage has a relatively flat hydraulic gradient that becomes very pronounced as discharge is conveyed along the overland flow path to the south. This is a function of the throttling effect of the existing culverts located under the cane rail line adjacent to the Bundaberg Ring Road.

The following figures present the stage elevations at the downstream end of the Telegraph Road culverts to the north, a reporting location at the southern end of the overland flow path and the upstream headwall at FE Walker Street.

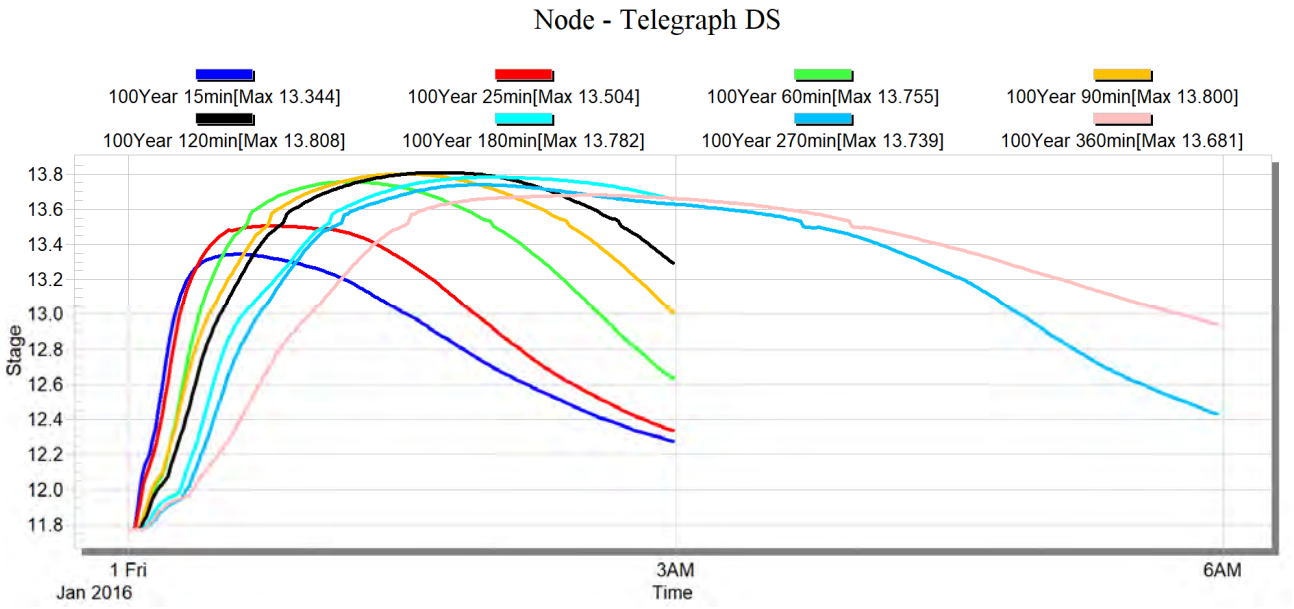


Figure 13: Existing Scenario Stage Elevation Results at the Downstream End of the Telegraph Road Culverts During a Range of 1% AEP Design Storm Events

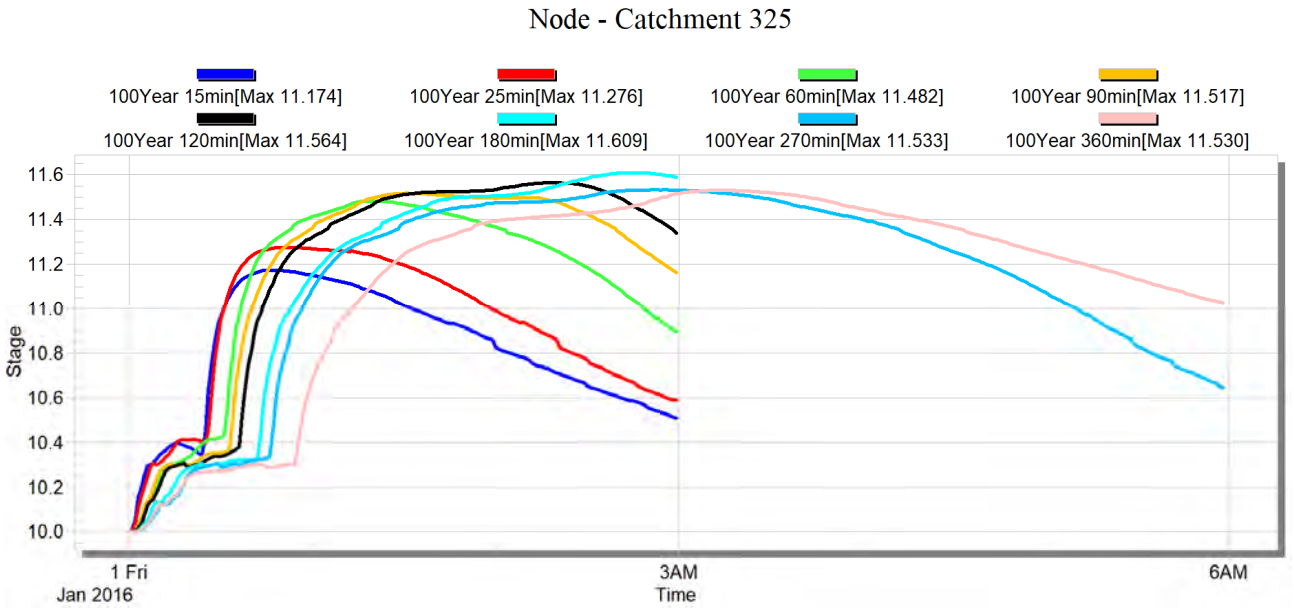


Figure 14: Existing Scenario Stage Elevation Results at the Southern End of the Overland Flow Path During a Range of 1% AEP Design Storm Events

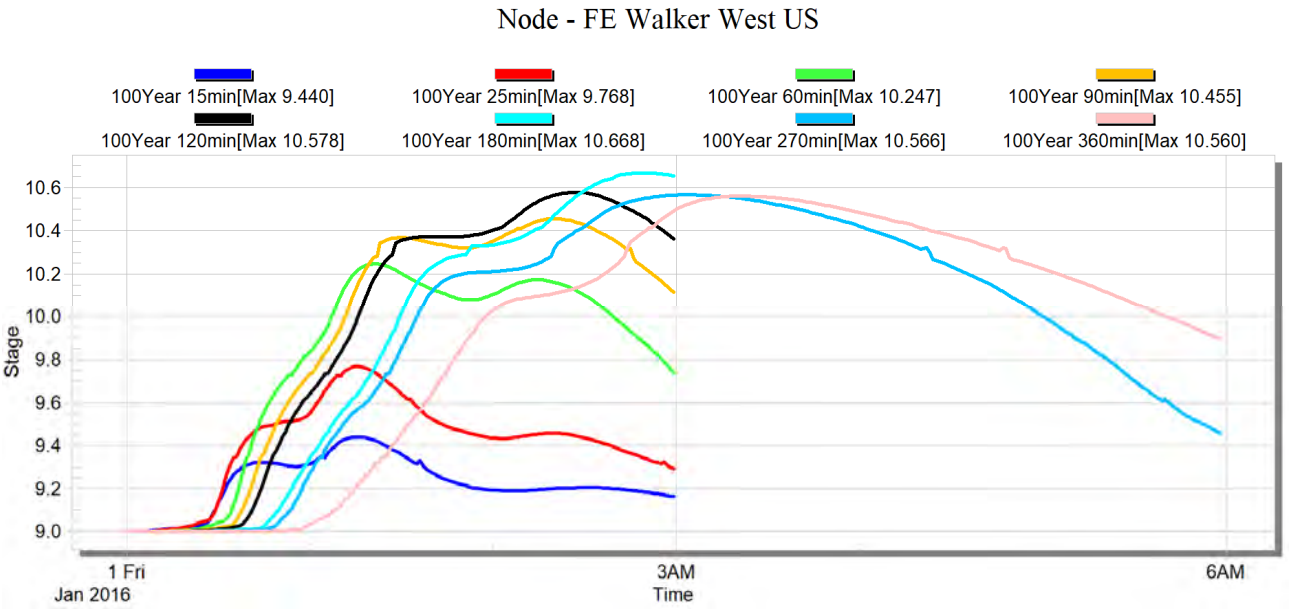


Figure 15: Existing Scenario Stage Elevation Results at the Upstream End of FE Walker Street Culverts During a Range of 1% AEP Design Storm Events

The results in Figures 13-15 show that the peak water elevation changes from RL13.808m AHD down to RL 11.609m AHD in the overland flow path, with the elevation at the upstream end of the FE Walker Street culverts being at RL10.668m.

The above results also highlight that the maximum depths of inundation are caused by varying design storms across the model with the Telegraph Road section being dominated by the 90 and 120 minute events, and the lower end of the model being dominated by the 180 minute design storm events. By comparison, the 2013 Cardno model identified that the critical duration for the lower sections of the Bundaberg Creeks model was the 540 minute event, however that model encompassed a much larger extent compared to the current modelling undertaken for this project.

The following figure presents the inundation depths during a 120 minute design storm event from the developed scenario.

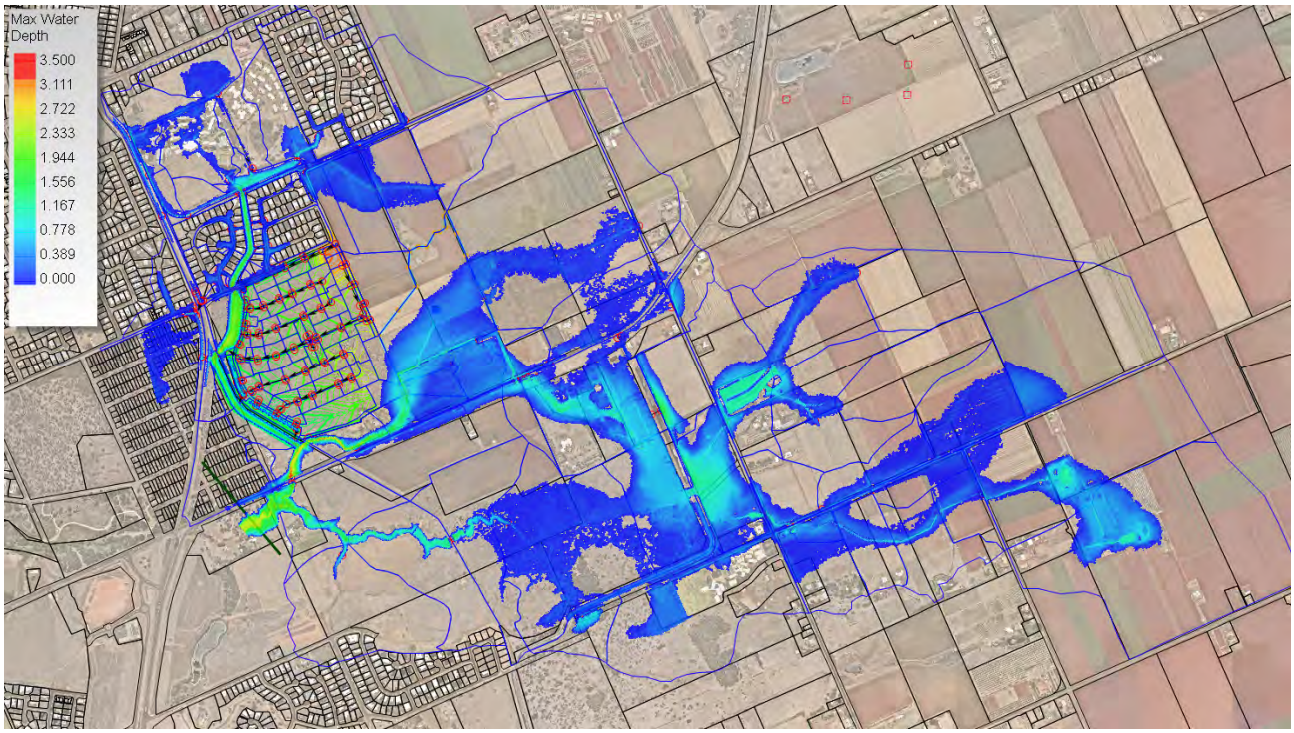


Figure 16: Developed Scenario Inundation Depth During a 1% AEP 180 Minute Duration Design Storm Event

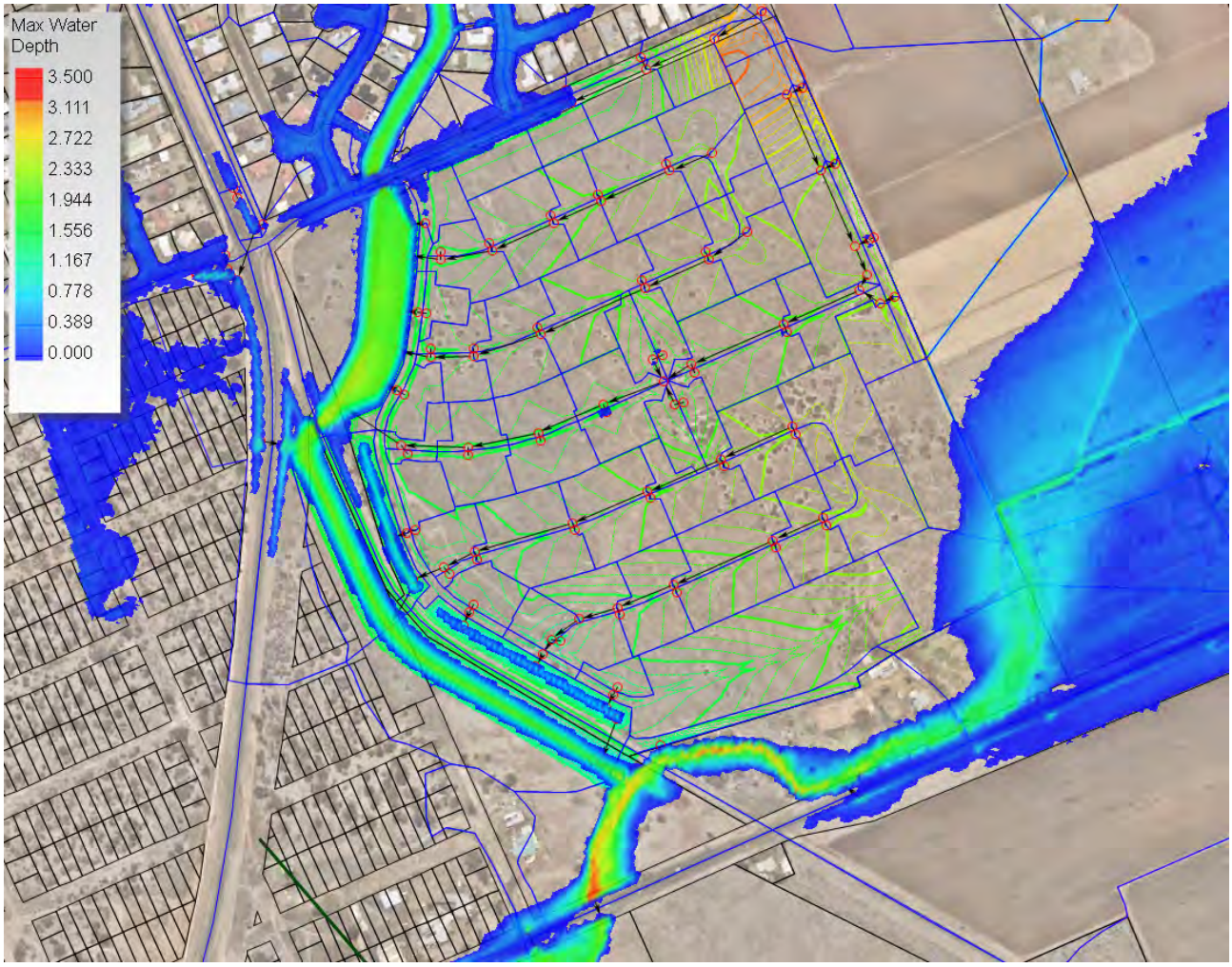


Figure 17: Developed Scenario Inundation Depth During a 1% AEP 180 Minute Duration Design Storm Event at the Site

Similar to the existing results it was determined that the peak depths of inundation varied across the model based on the catchment extents relative to the given point of interest. The following figures present the water elevation results and the stage elevations at the downstream end of the Telegraph Road culverts, the overland flow path and the upstream end of the FE Walker Street culverts for reference purposes.

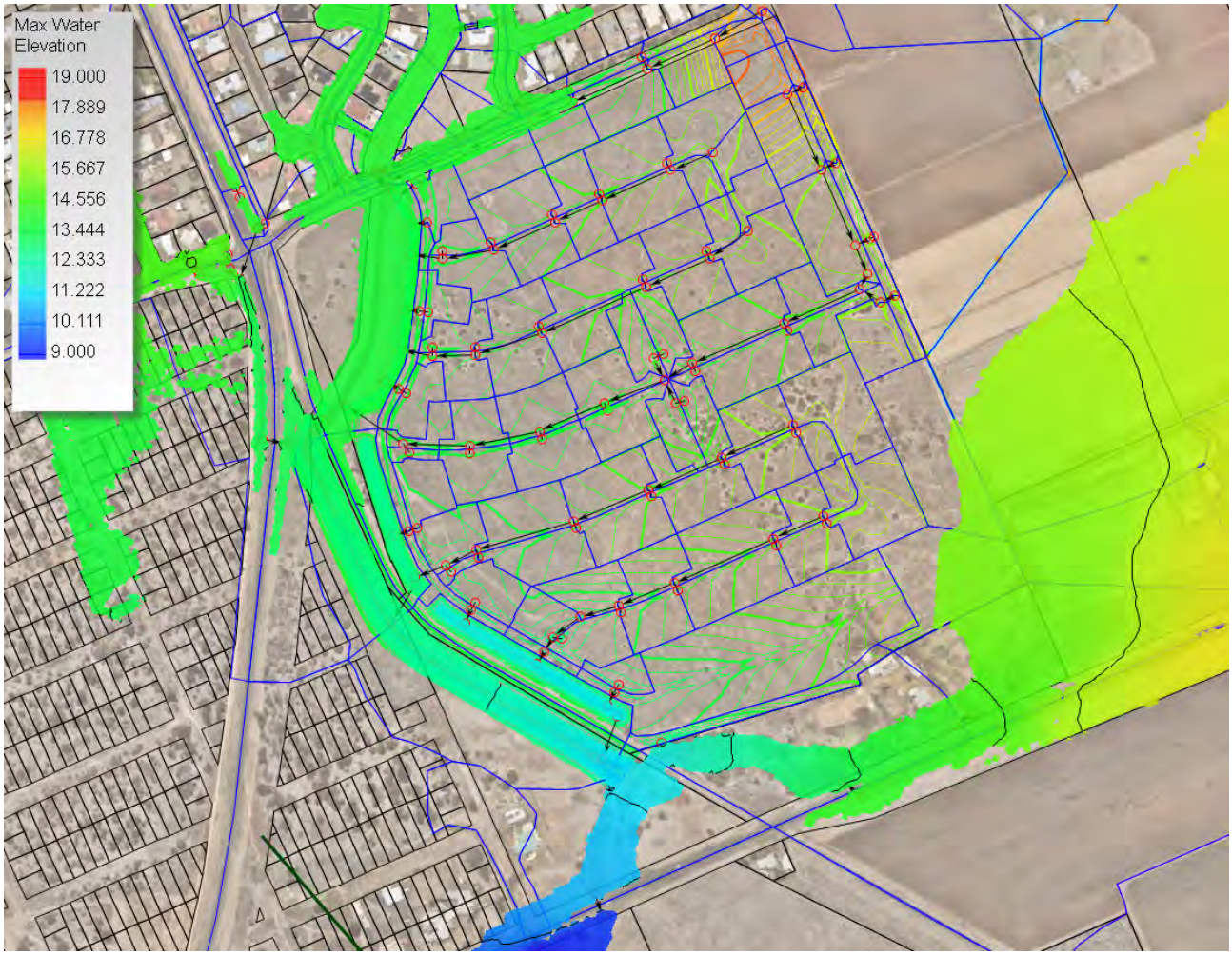


Figure 18: Developed Scenario Flood Water Elevation During a 1% AEP 180 Minute Duration Design Storm Event at the Site

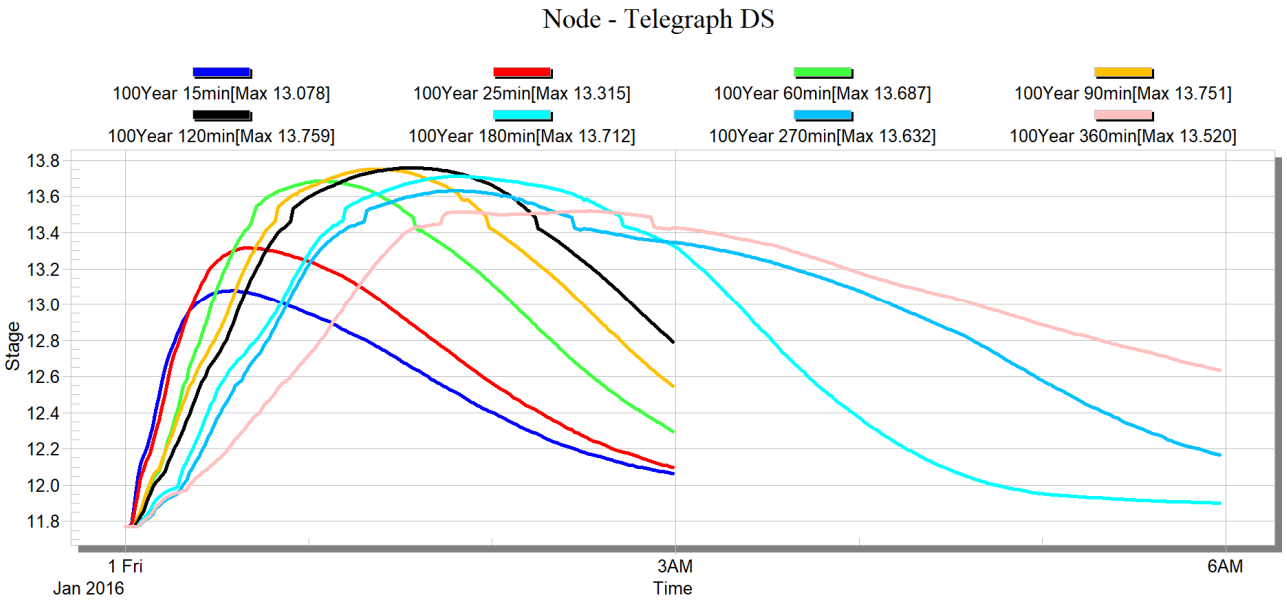


Figure 19: Developed Scenario Stage Elevation Results at the Downstream End of the Telegraph Road Culverts During a Range of 1% AEP Design Storm Events

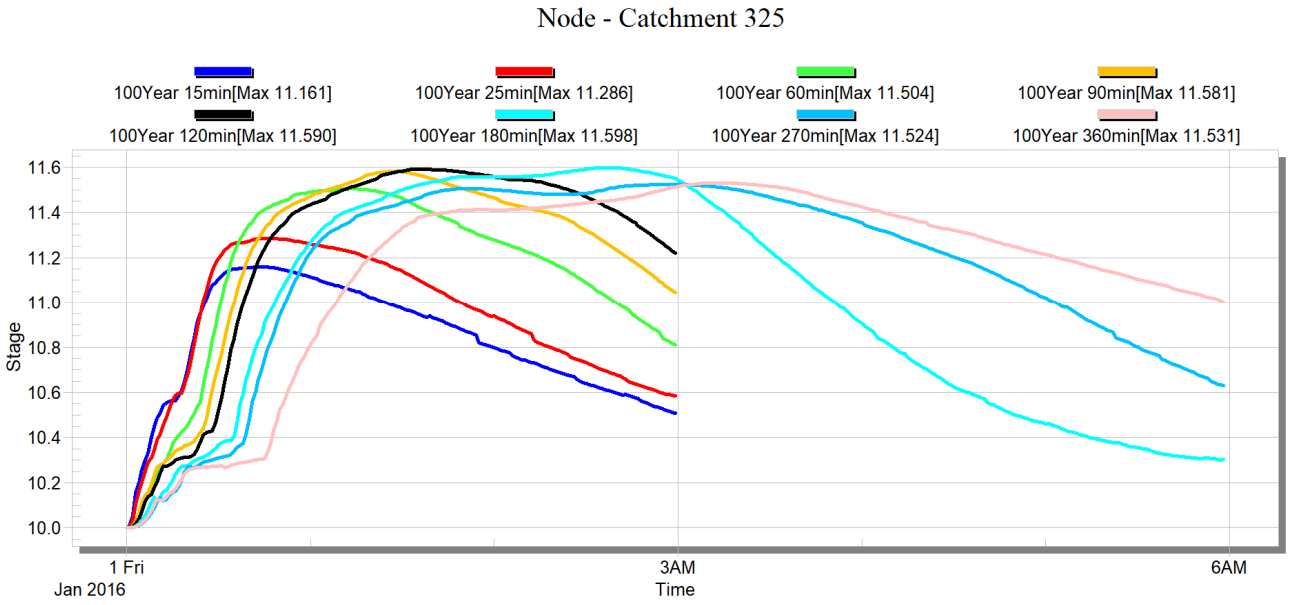


Figure 20: Developed Scenario Stage Elevation Results at the Southern End of the Overland Flow Path During a Range of 1% AEP Design Storm Events

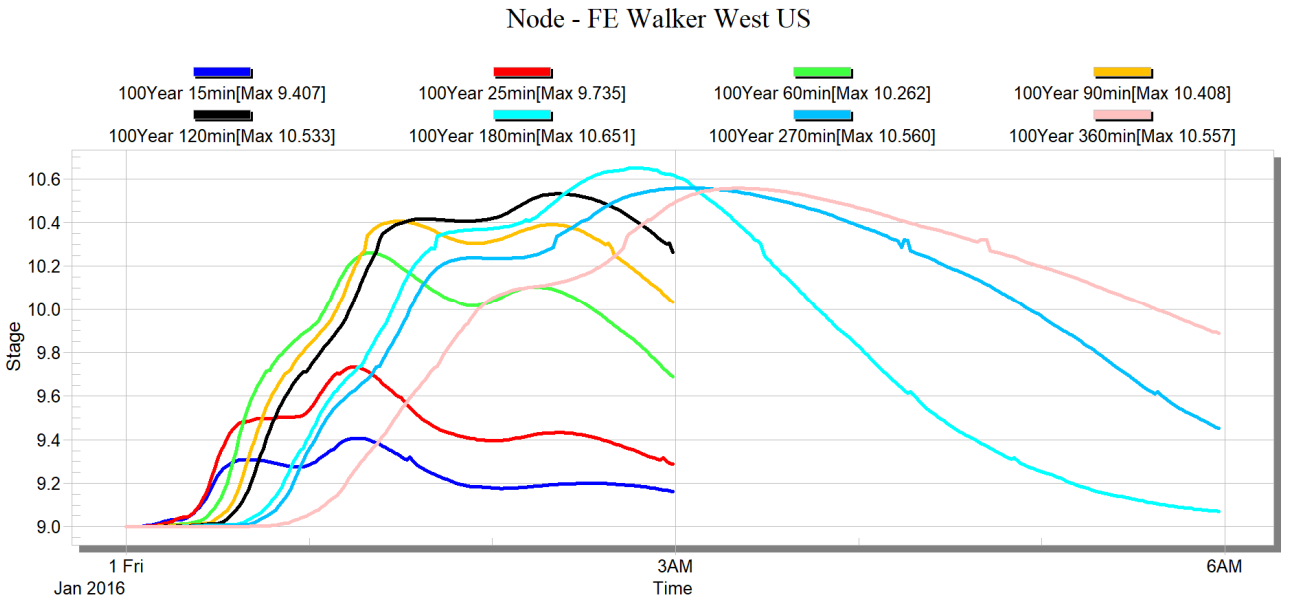


Figure 21: Existing Scenario Stage Elevation Results at the Upstream End of FE Walker Street Culverts During a Range of 1% AEP Design Storm Events

Comparing the results in Figure 19 with those presented in Figure 14 indicates that both the water elevations at the Telegraph Road culverts and the southern end of the overland flow path are both lower in the developed scenario – with the Telegraph Road values reducing by 0.049m (13.808 – 13.759) and at the southern end of the overland flow path by 0.011m (11.609 – 11.598). Equally, at the upstream end of FE Walker Street the water elevation reduced by 0.017m (10.668 – 10.651). To further support these localised values that confirm that the proposed works do not result in a worsening of the external catchment we have undertaken an afflux analysis of the 2D model results.

The results for the additional design storm analysis for the varying AEP's (i.e. 10%, 5%, etc.) are enclosed in **Appendix C**.

The minor drainage network analysis was undertaken using 12d and the longitudinal plans and relevant details are presented in **Appendix D**.

5 Water Quality

To address the water quality requirements it is proposed to implement a channel naturalisation programme rather than introduce additional water quality assets with high maintenance obligations to the community. The existing overland flow path south of Telegraph Road and the linear drainage zones along the western boundary of the site are prime locations for naturalisation works.

The overland flow path between the Telegraph Road culverts and the can rail culverts has a generally uniform profile in its existing state. This has been grassed and is subject to mowing on a regular basis, which provides limited environmental and habitat benefits to the locality. It is proposed that the channel be modified through widening and the creation of a riffle/pool system similar to the following diagram.

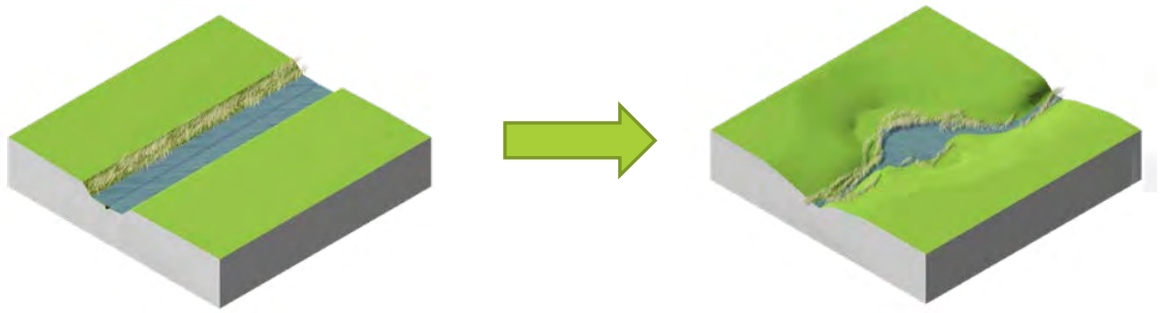


Figure 22: Overland Flow Path Proposed Widening Options to Enhance Vegetation and Habitat Opportunities

The above configuration still provides adequate flood conveyance potential with the additional storage associated with the widening of the channel being able to reduce upstream flood elevations. This is generally depicted in the following image.

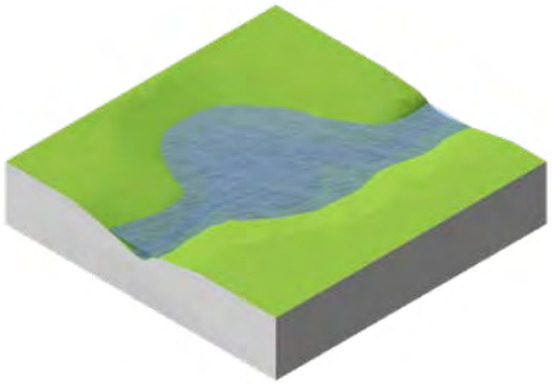


Figure 23: Flood Storage Potential within Overland Flow Path with Proposed Widening

This configuration not only addresses the potential impacts associated with the proposed residential development, but also will assist in the long-term management of risks associated with climate change on increased rainfall.

5.1 Naturalisation Area Requirements

Water quality activities typically require treatment areas between 0.7% to 1% of the total catchment areas – particularly for dense urban developments. The proposed development of 134 Telegraph Road however is a low density development given that the minimum allotment size is 800m^2. Consequently, there is a higher potential for general infiltration of runoff and improved water quality conditions within the site prior to treatment devices being required.

It is would therefore be a minimum requirement that the channel naturalisation works cover an equivalent area of 1% of the developed site area to achieve the desired water quality objectives for the site. The area available for naturalisation is shown in the following figure.

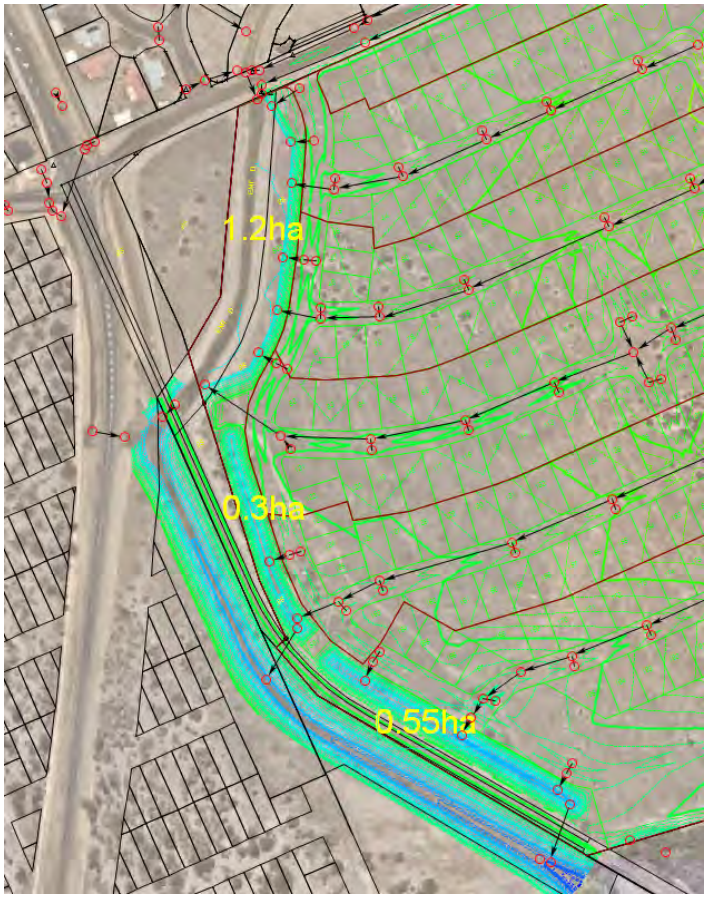


Figure 24: Potential Area Extent of Channel Naturalisation Within the Site

Based on the areas available shown in Figure 24, there is approximately 2.15ha of area that can be subject to naturalisation works. This covers a proportional area approximately equal to 7% of the total site area. This is significantly higher than the minimum area required of 1%. We propose that the design of the works be undertaken by a landscape architect to provide a balance of features and vegetation requirements to enhance the existing and future drainage within 134 Telegraph Road and the greater Kalkie area.

6 Conclusions

This flood study has been prepared to support a Development Application for a Subdivisional Development at 134 Telegraph Road, Kalkie. This study has investigated the local and regional catchment runoff to determine the inundation depths and extents from the eastern tributary of the Bundaberg Creeks relative to the site. This assessment then compared the impact of the proposed development and has confirmed that the proposed layout is consistent with the requirements of Bundaberg Regional Council and community expectations.

The results have confirmed that the proposed works will reduce the peak water elevations, both upstream and downstream of the site, which is considered a benefit to the local drainage network.

Appendix A: Site Survey Data

TELEGRAPH ROAD

Permanent
Survey Mark
45766
EL 18·409

Engineering services
and constructed features
are not shown

Contours are to
feasibility standard
only

Dumped earth
not measured

96

SP187576

Engineering services and constructed features
are not shown

Contours are to
feasibility standard
only

Dumped earth
not measured

Contours are to
feasibility standard
only

n

Survey by Straughair & Bent
Surveyors, Bundaberg
Ph. (07)4152 3811
Mob. 0400 810 735
Reference 497910

Datum for Directions : SP187576

Datum for Levels : AHD by PSM43439 at 16·279m from NRM
and PSM45766 at 18·409m from NRM

Contour interval 0·5 metres

NOTES RE PURPOSES & LIMITATIONS

This survey data has been prepared for John Gorza and Norm East for the purpose of assessing feasibility of constructing development works but not for carrying out a detailed design on the land and we take no responsibility for its use for any other purpose.

Any discrepancies should be clarified with Straughair & Bent, Surveyors, prior to the commencement, or recommencement as the case may be, of work for confirmation of this survey.

No underground or surface constructed features or services have been located.

These notes are an integral part of this plan. If others use this information, they should be advised of its purposes and limitations.

Scale 1:1250 at A1

10m 0m 20m 40m 60m 80m 100m 120m 140m 160m 180m

JOHN GORZA & NORM EAST

SUMMARY PLAN OF CONTOUR SURVEY OF THE UNFILLED AREAS OF LOT 96 ON SP187576

03/09/2012

Drawing No. 497920

TELEGRAPH ROAD

Survey Mark 202

Crown bitumen

Lip of channel

Edge bitumen

Power pole

Elec.Peg "Site 2"

Elec.Peg "Site 3"

Elec.Peg "Site 4"

Elec.Peg "Pole 6"

Sewer MH IL 9·31 /9·28 Top 13·98

Culvert Four cells & 3 gaps IL 11·82 Obvert 13·03 & 13·13

Sewer MH IL 10·01 /9·99 Top 13·51

RCP 0·375

Survey Mark 200 Sewer MH IL 10·62 /10·59 Top 13·18

Culvert Four cells & 3 gaps IL 11·76 Obverts 12·97 & 13·07

Poly 0·090

Easement D SP115327

Survey Mark 1120

Survey Mark 1121

Survey Mark 1440

Survey Mark 209

1 (PROPOSED)

2 (PROPOSED)

Culvert Three cells & two gaps IL 11·29 Obverts 12·79 & 12·93

Piles of earth and rocks with tall grass and trees. Scattered levels only.

Some rock piles amongst trees within fence. Scattered levels only.

Rails

Easement B RP150654

Easement A RP91379

n

ROAD FURNITURE DETAILS

DIGITAL POINT NO.	FEATURE AT POINT
2975	Crossroads
3018	Tram crossing with lights
3064	Guide post
3065	Guide post

SURVEY MARK DETAILS

MARK	DESCRIPTION	ELEVATION
"200"	Screw in MH	13·188
"202"	Bolt in kerb	13·917
"209"	Bolt in concrete	13·629
1120	Pin	13·677
1121	Pin	14·203
1440	Pin	15·698

Survey by Straughair & Bent
Surveyors, Bundaberg
Ph. (07)4152 3811
Mob. 0400 810 735

Datum for Directions : MGA Zone 56

Datum for Levels :
AHD by PSM 45766 at 18·409m
with a check measurement
to PSM 43439

Contour interval 0·25 metres

NOTES RE PURPOSES & LIMITATIONS

This survey data has been prepared for John Gorza & Norm East for the purpose of designing new constructions on the land and we take no responsibility for its use for any other purpose.

Any discrepancies should be clarified with Straughair & Bent, Surveyors, prior to the commencement, or recommencement as the case may be, of work for confirmation of this survey.

The positions of land boundaries have been plotted from minimum connections to survey marks and then from the measurements shown on existing survey plans. The boundaries were not fully measured and marked during this survey.

Whilst evidence of some underground services has been located by field measurements to visible evidence of such services and also following consultation with the relevant authorities, you would agree that the relevant authorities should be contacted prior to any excavation or construction on the site to check for possible location of further underground services and detailed locations of all services.

Sub-surface structures, if any, originating from previous internal or external works have not been located.

You would agree that any future construction contractor should note the possibility that survey marks can be disturbed subsequent to the surveyor leaving the site and that additional marks can be placed by others.

These notes are an integral part of this plan. If others use this information, they should be advised of its purposes and limitations.

Amendment A 12/12/2013
Labels added for
Easements A, B & D

Scale 1:1000 at A1

10m 0m 20m 40m 60m 80m 100m 120m 140m

JOHN GORZA & NORM EAST

SUMMARY PLAN OF CONTOUR AND DETAIL SURVEY OF NEW LOT 1 IN LOT 96 ON SP187576

17/08/2013

Drawing No. 497930A

Appendix B: Bundaberg Regional Council Flood Hazard Assessment Mapping

Flood Hazard Assessment Report - Series 1 Inset Map

BUNDABERG REGIONAL COUNCIL

- Zoning - urban area
- Zoning - rural residential area
- Locality boundary
- Burnett River riverine high hazard area
- Riverine - Baffle Creek 1% Draft Result
- Riverine - Burnett River DFE
- Riverine - Burrum River 1% AEP CC
- Riverine - Kolan River / Gin Gin Creek DFE
- Local DFE - Apple Tree Creek Study
- Local DFE - Bundaberg Creek Study
- Local DFE - BCC Drainage Scheme
- Local DFE - Coastal Small Streams Study
- Local DFE - McCoy Creek Study
- Local DFE - Saltwater Creek Study
- Non-urban creeks / overland flow

State planning policy flood hazard area

- State planning policy flood hazard area

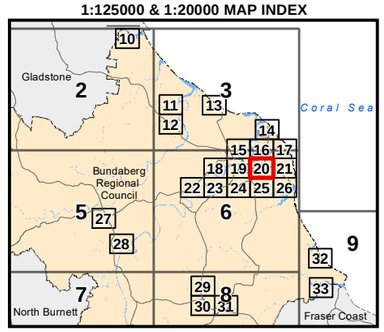
Scale at A3 1:20000

0 500 1,000

Metres

Co-ordinate System:- GDA94 MGA Zone 56

1:125000 & 1:20000 MAP INDEX



Revision 6.0

S:\Business Information Services\GIS\Projects\2019\68487 - Flood Hazard Assessment Report Maps v6.0\Flood Hazard Assessment Report Series 1 2019 20000.mxd

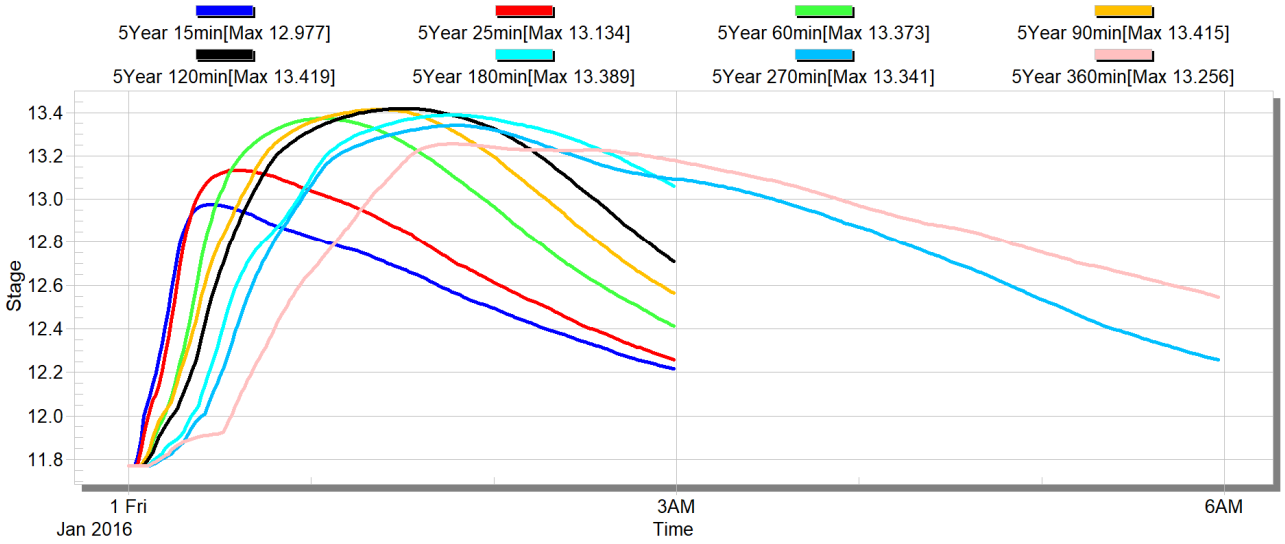
BRC Drawing No.120316

Appendix C: XPSWMM Model Results

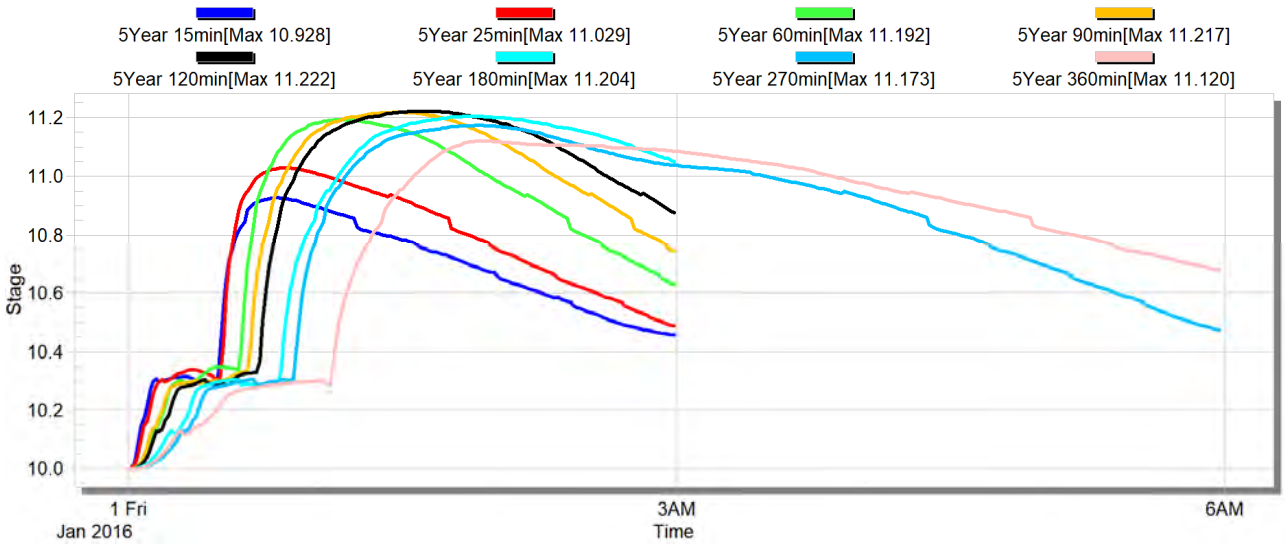
Existing Scenario Results

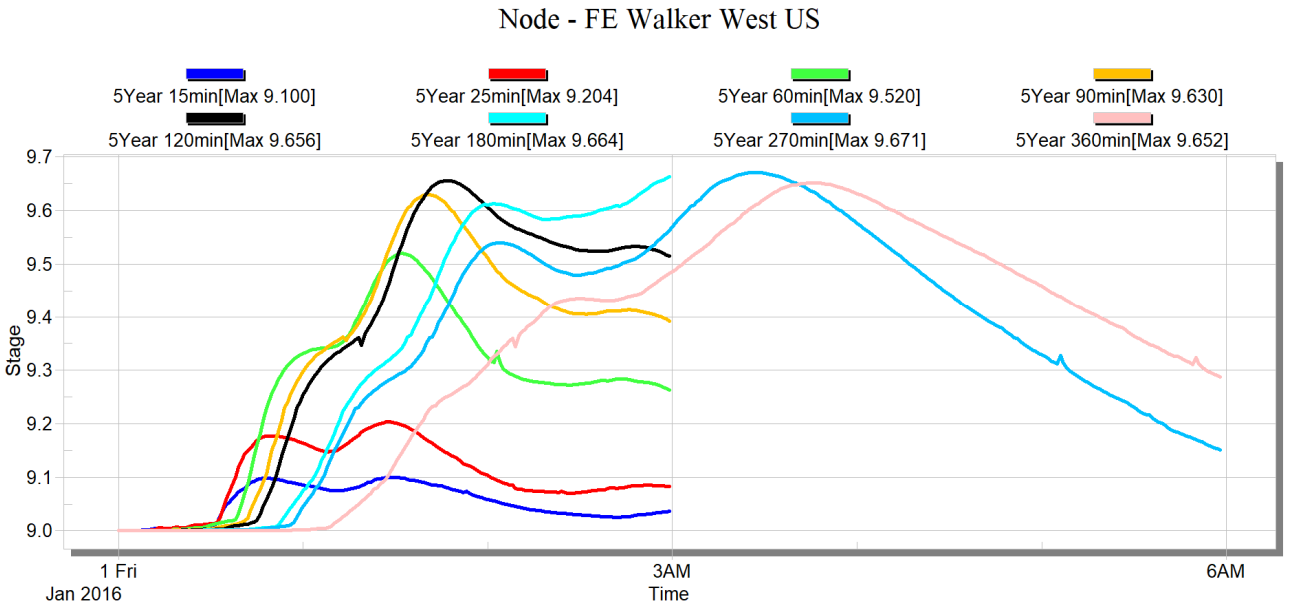
5 Year ARI

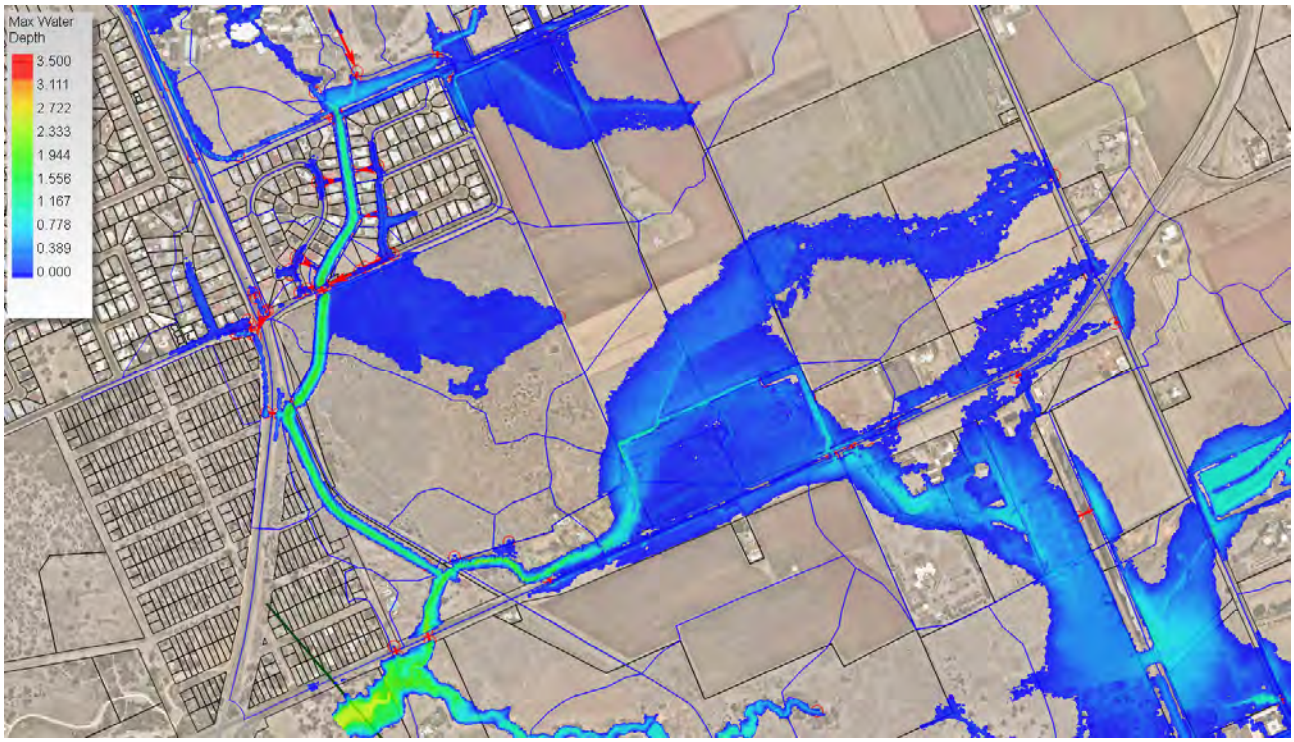
Node - Telegraph DS



Node - Catchment 325

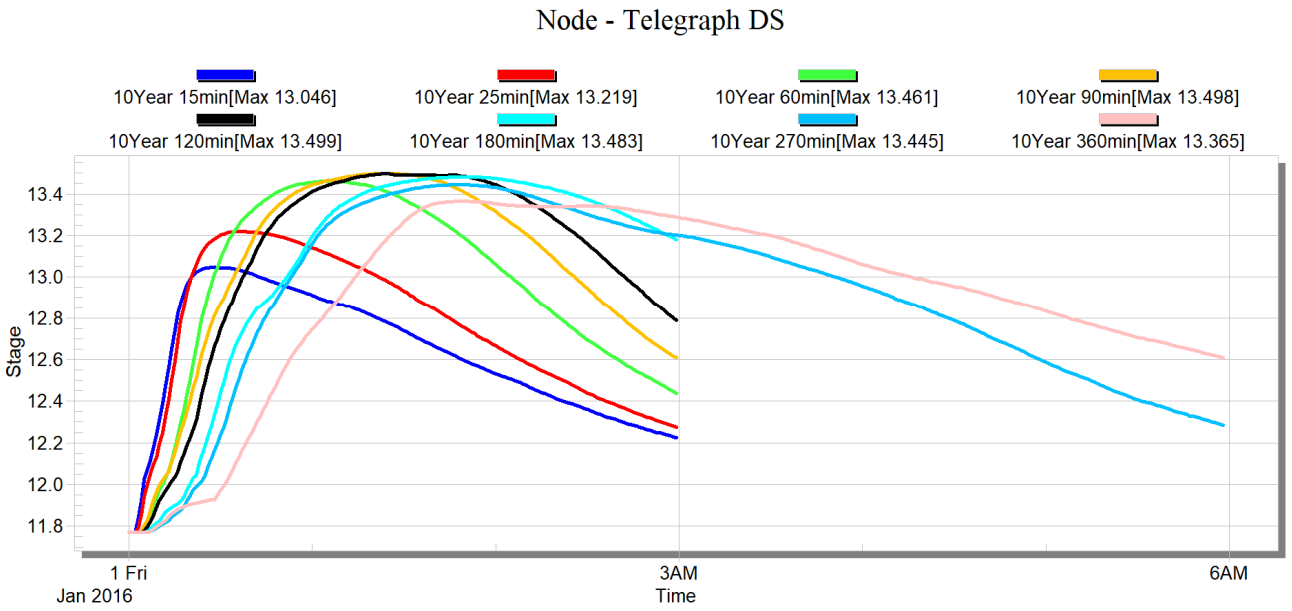






Existing Scenario 5 Year ARI Maximum Inundation Depth and Extents During a 120 Minute Design Storm Event

10 Year ARI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10Year 120min[Max 13.499]
10Year 180min[Max 13.483]
10Year 270min[Max 13.445]
10Year 360min[Max 13.365]
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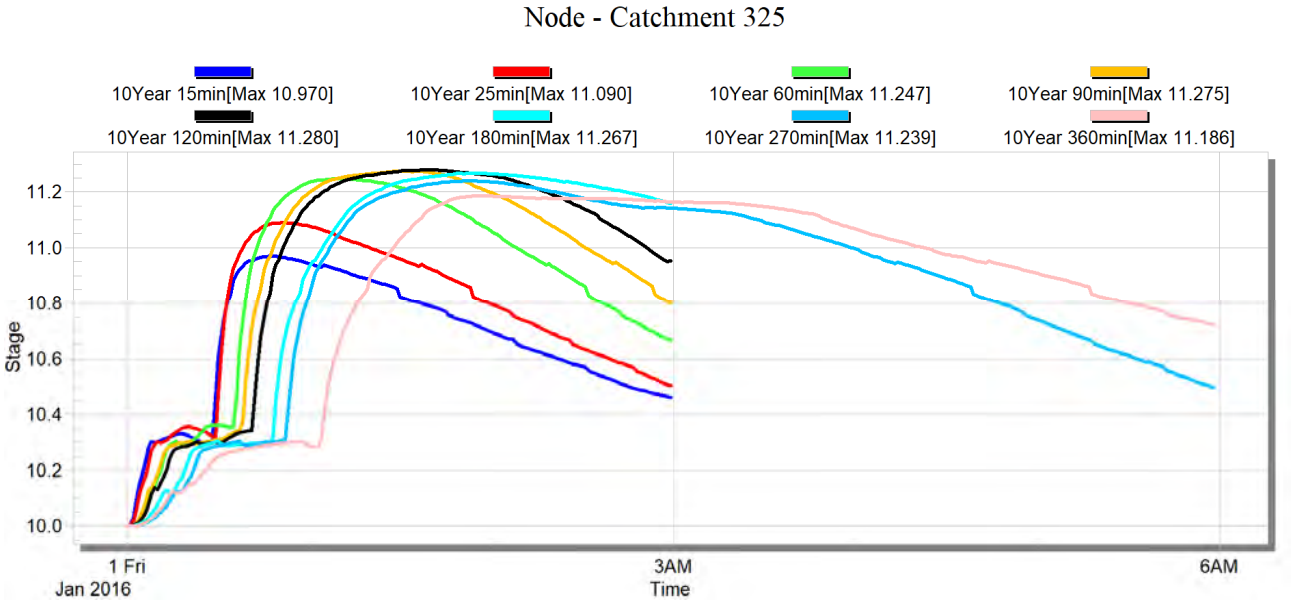
13.0
12.8
12.6
12.4
12.2
12.0
11.8
1 Fri
Jan 2016
3AM
Time
6AM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10.6
10.4
10.2
10.0
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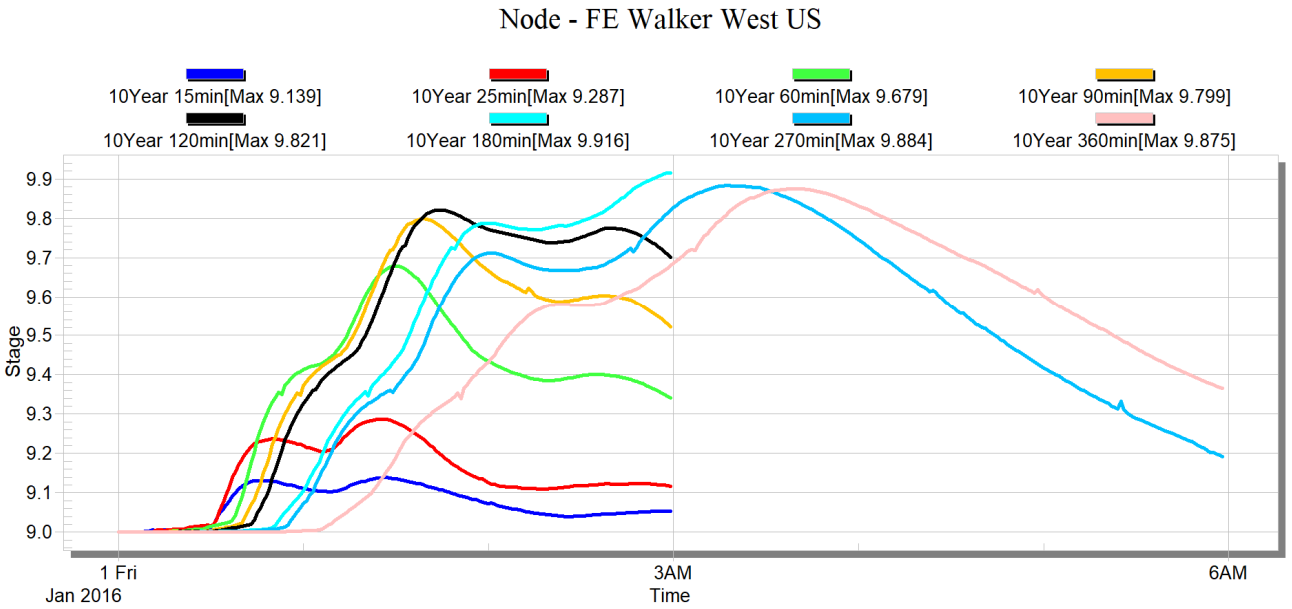
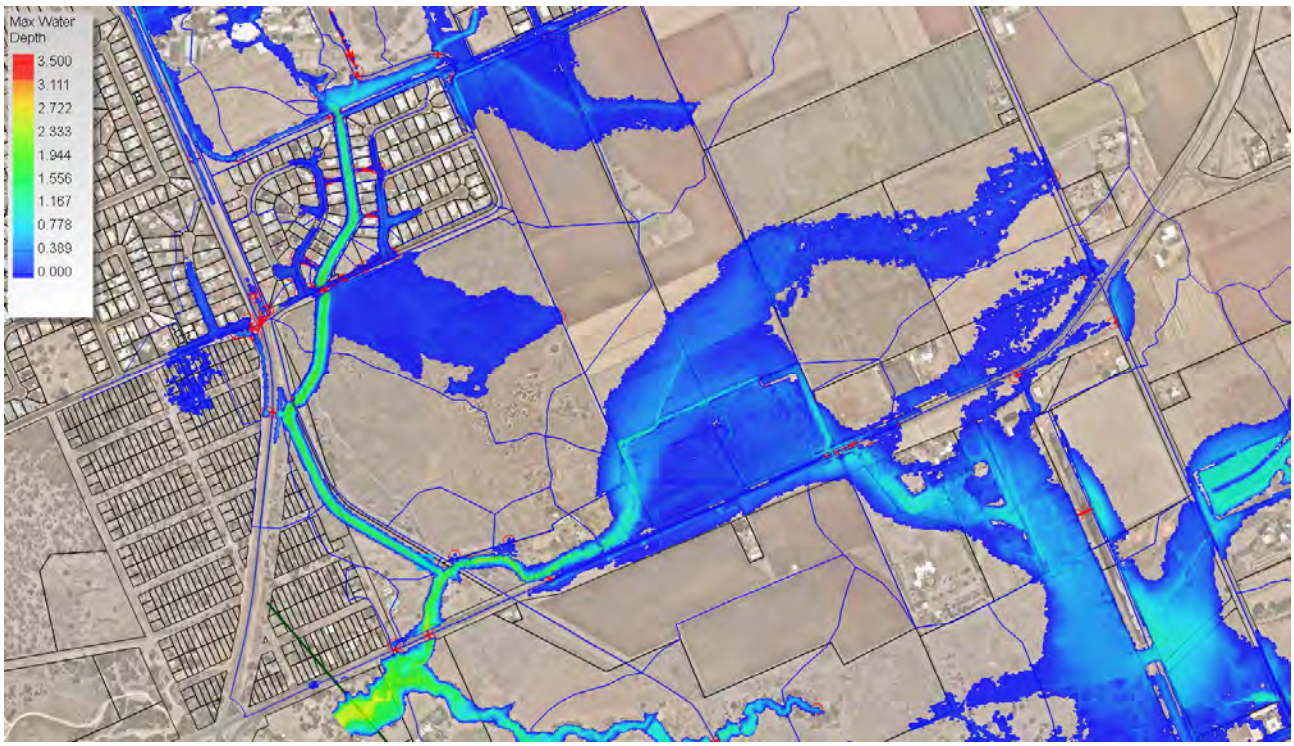
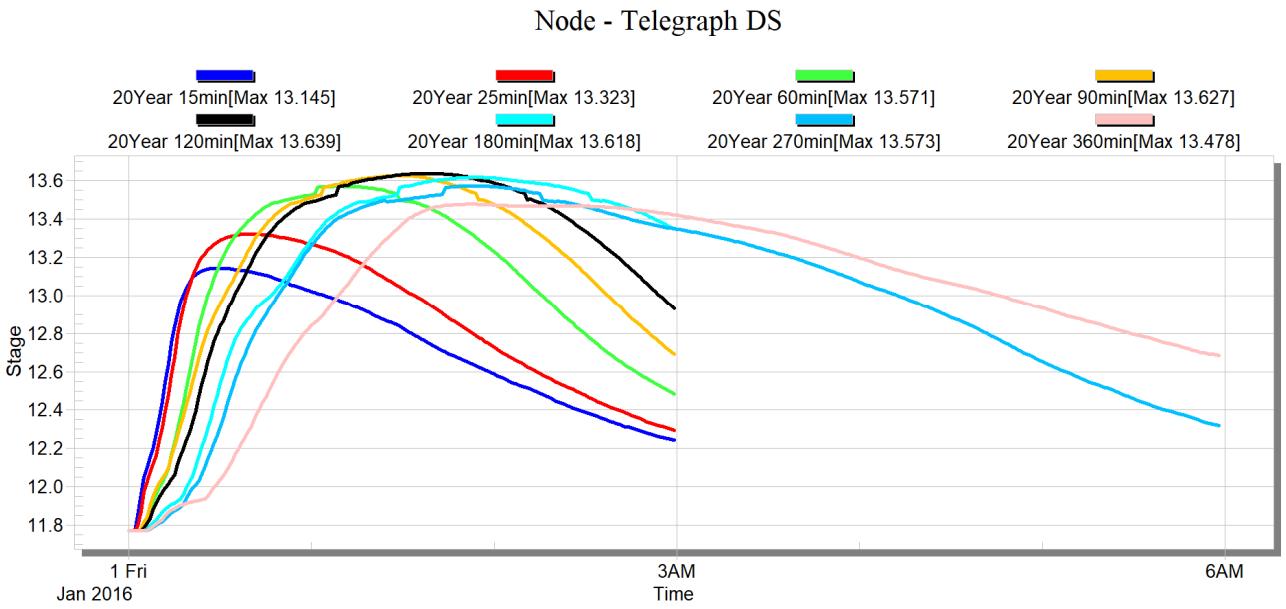
Jan 2016
3AM
Time
6AM





Existing Scenario 10 Year ARI Maximum Inundation Depth and Extents During a 120 Minute Design Storm Event

20 Year ARI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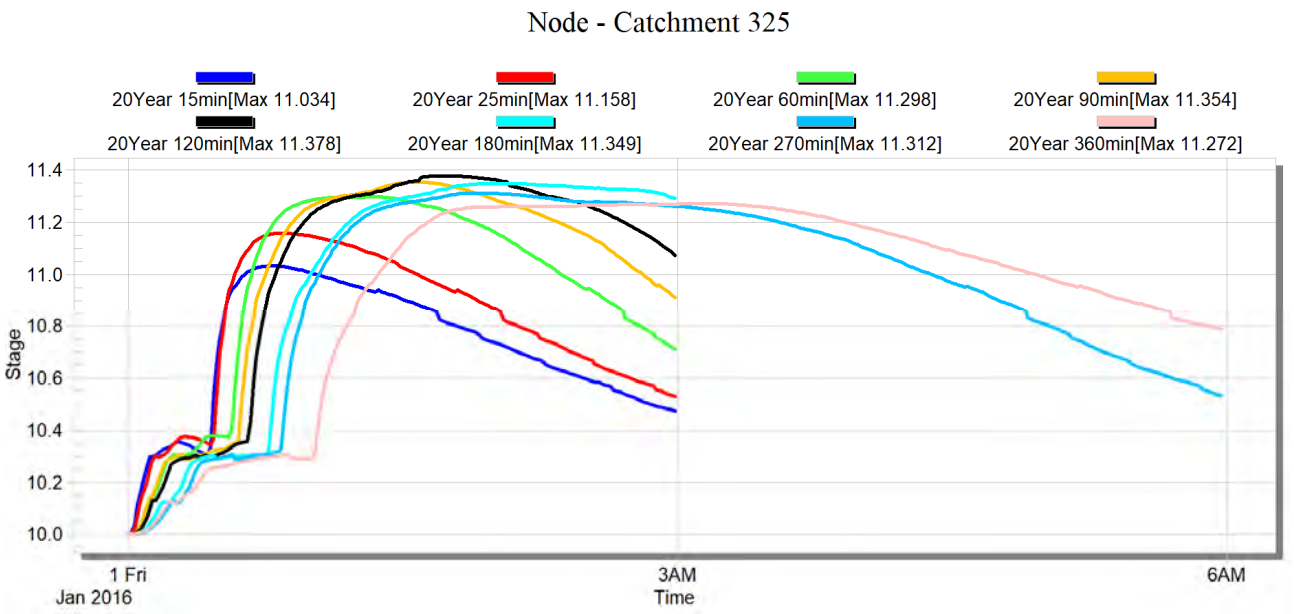
12.0
11.8
1 Fri
Jan 2016
3AM
Time
6AM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10.4
10.2
10.0
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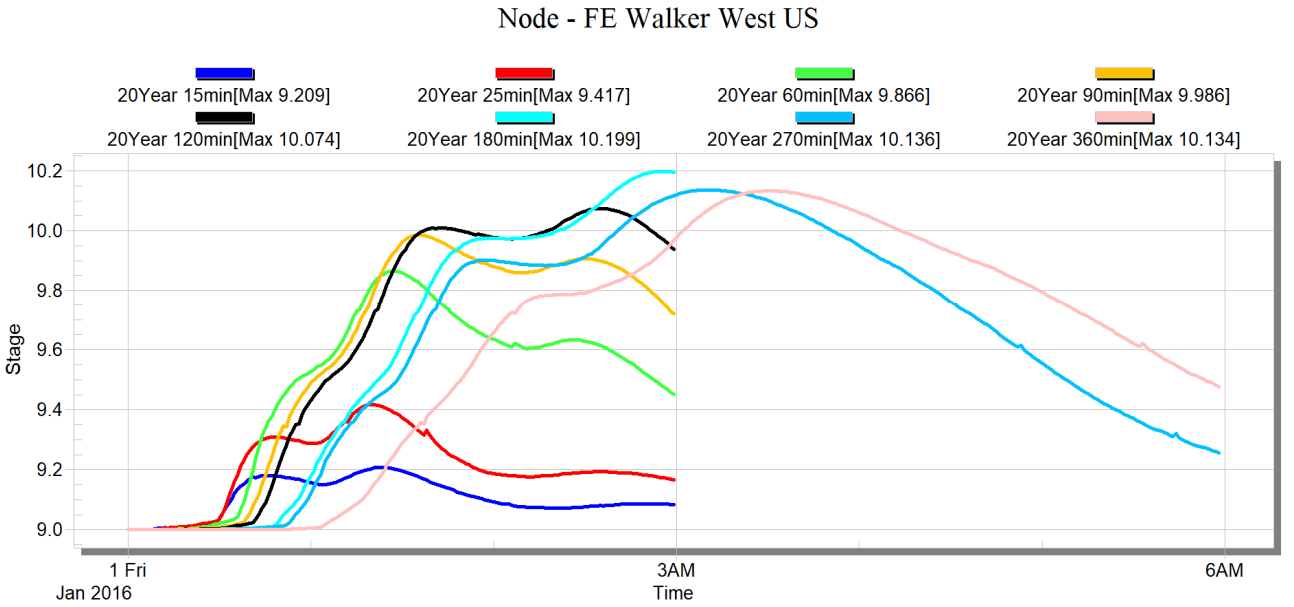
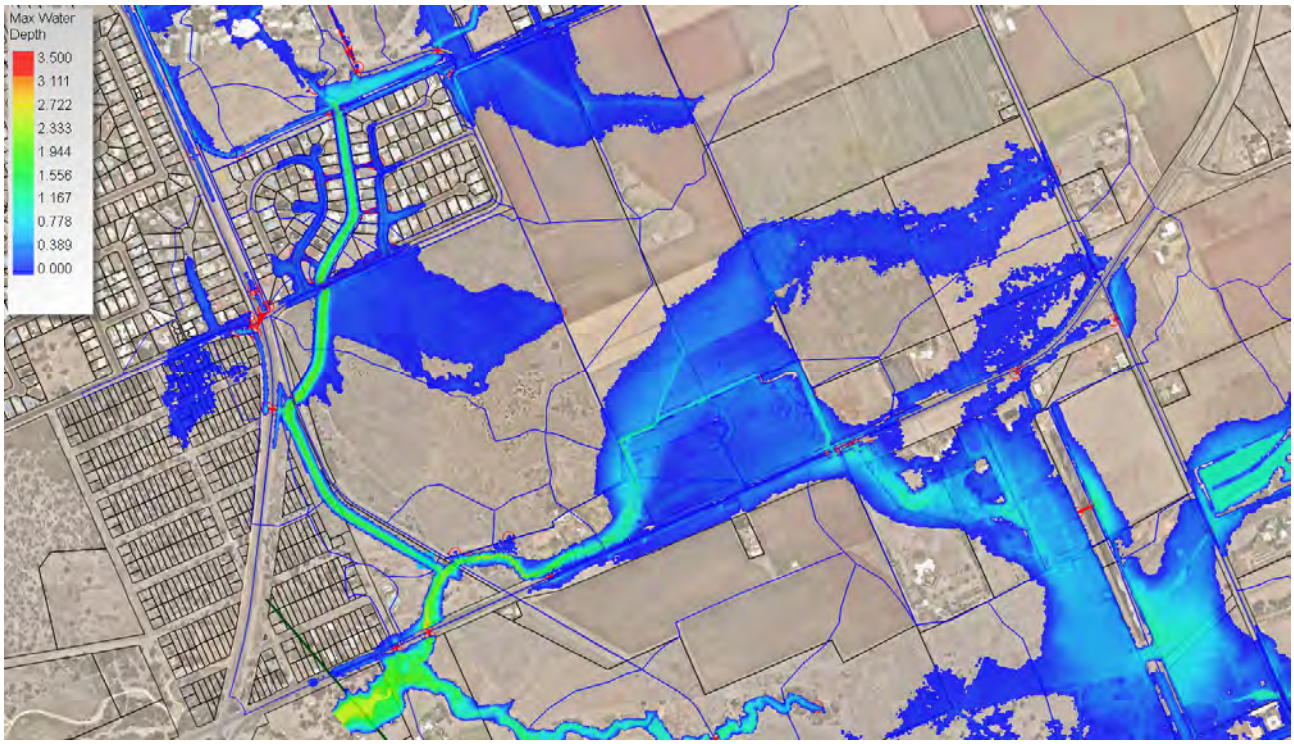
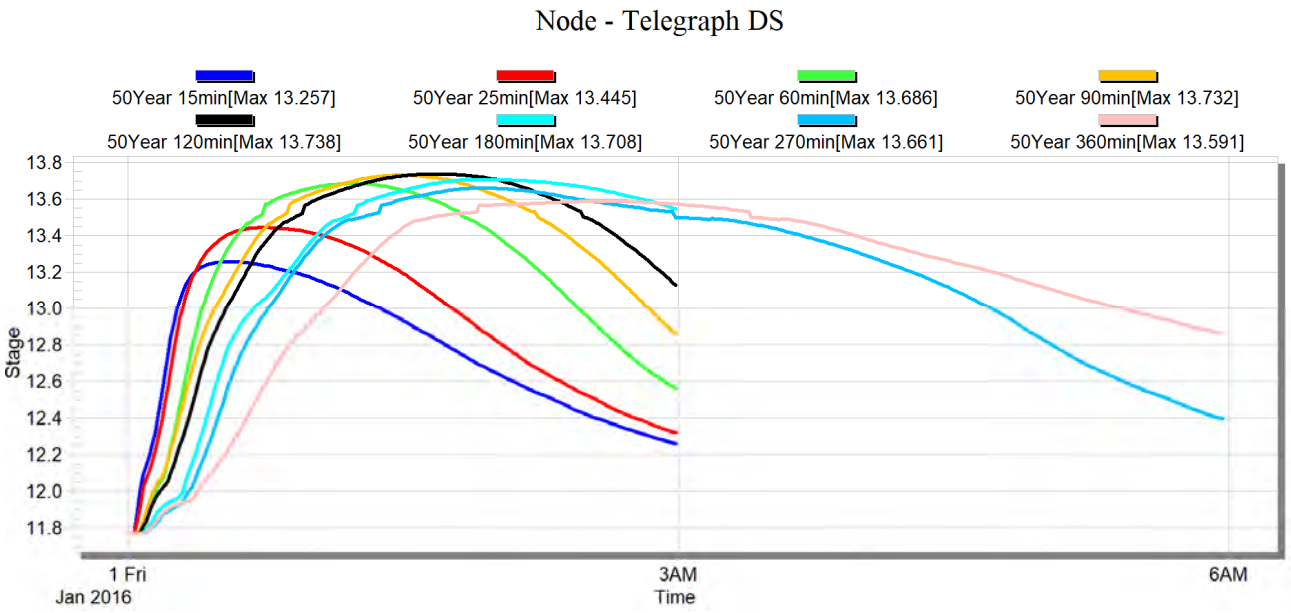
Jan 2016
3AM
Time
6AM





Existing Scenario 20 Year ARI Maximum Inundation Depth and Extents During a 120 Minute Design Storm Event

50 Year ARI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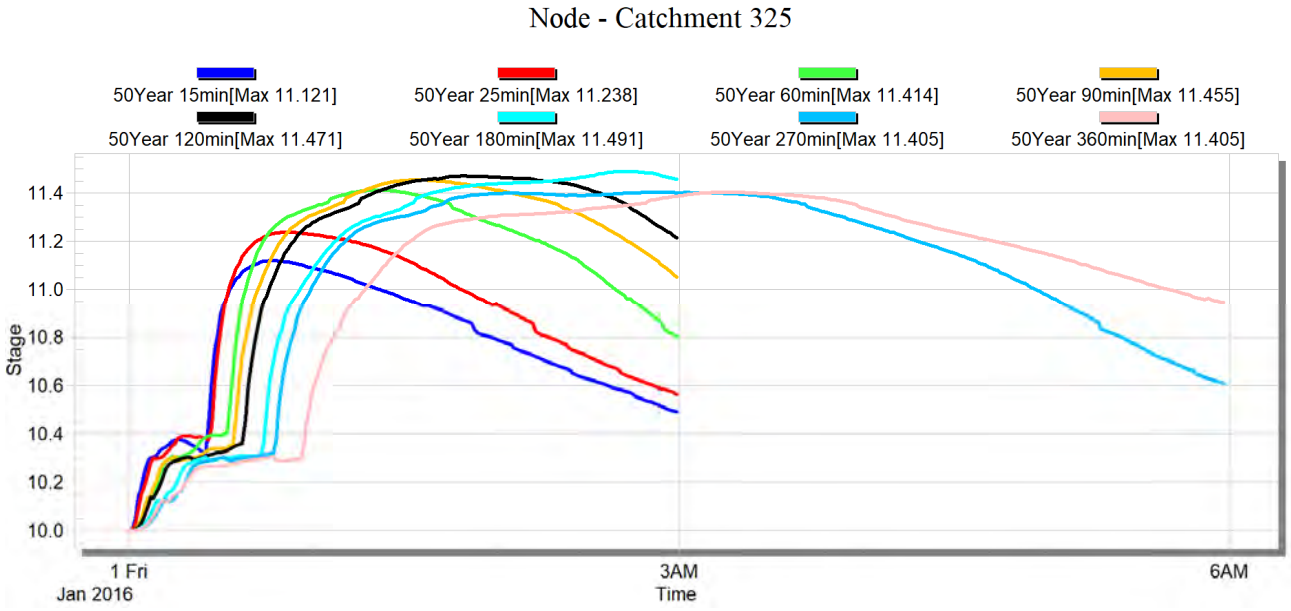
50Year 60min[Max 13.686]
50Year 90min[Max 13.732]
50Year 120min[Max 13.738]
50Year 180min[Max 13.708]
50Year 270min[Max 13.661]
50Year 360min[Max 13.591]
Stage
13.8
13.6
13.4
13.2
13.0
12.8
12.6
12.4
12.2
12.0
11.8
1 Fri
Jan 2016
3AM
Time
6AM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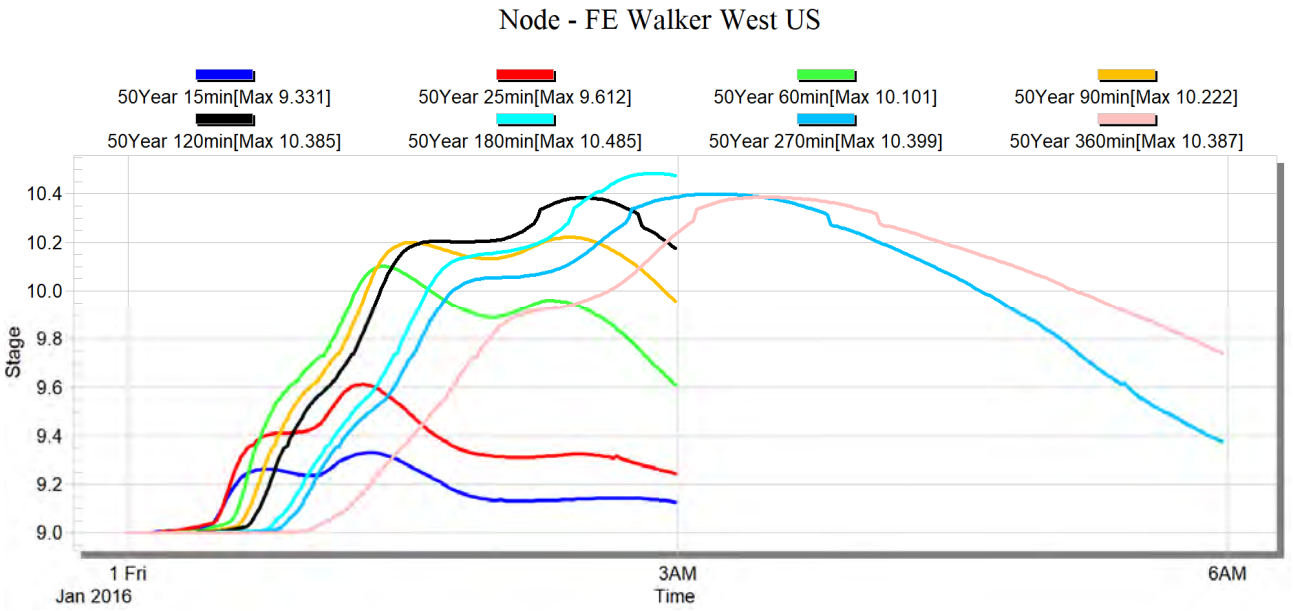
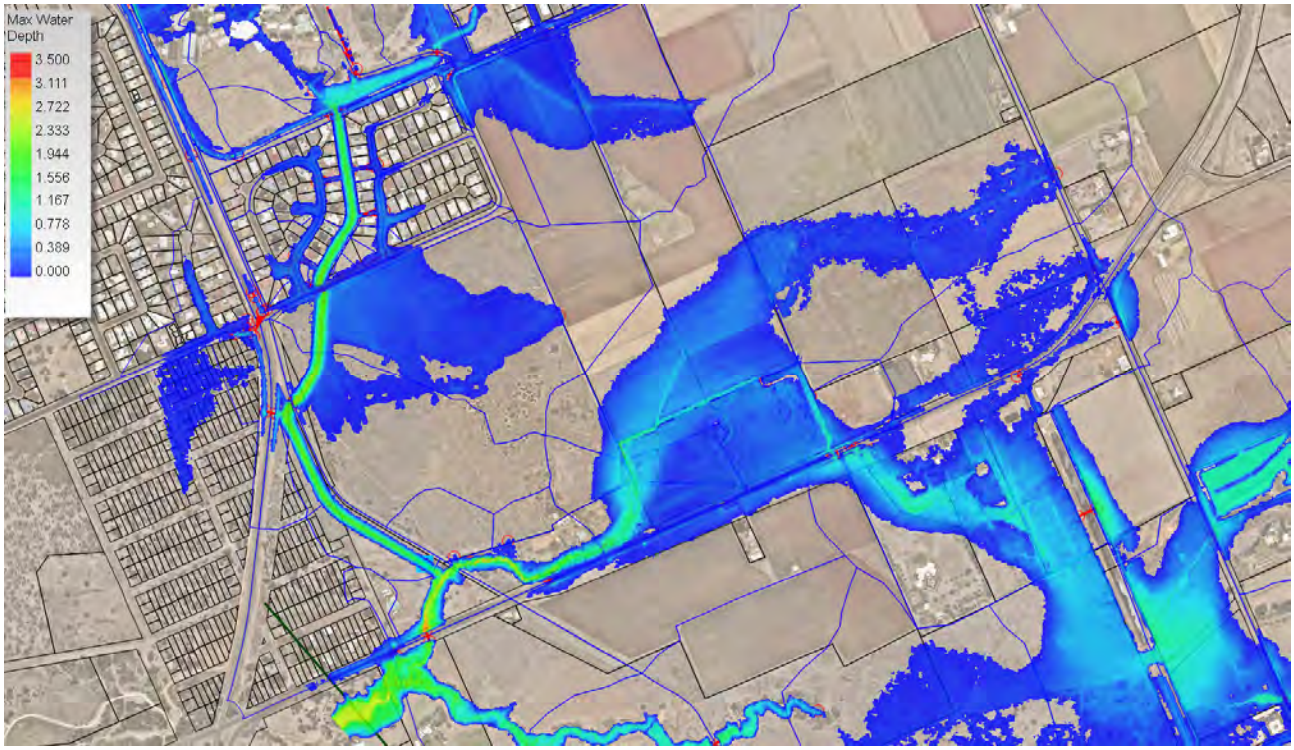
50Year 25min[Max 11.238]
50Year 60min[Max 11.414]
50Year 90min[Max 11.455]
50Year 120min[Max 11.471]
50Year 180min[Max 11.491]
50Year 270min[Max 11.405]
50Year 360min[Max 11.405]
Stage
11.4
11.2
11.0
10.8
10.6
10.4
10.2
10.0
1 Fri
Jan 2016
3AM
Time
6AM

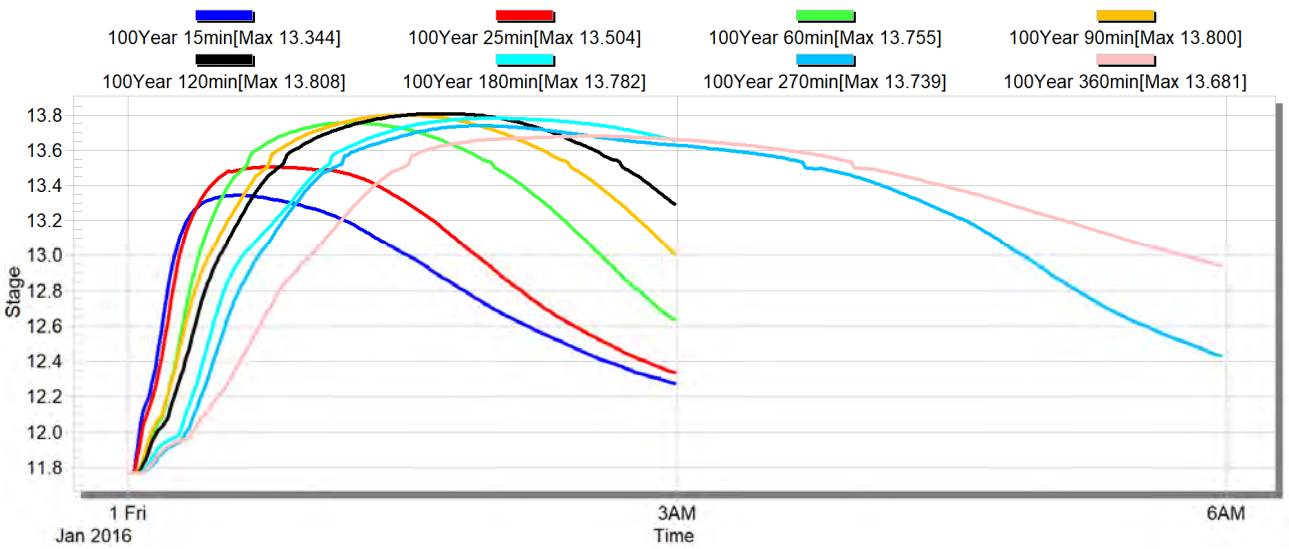




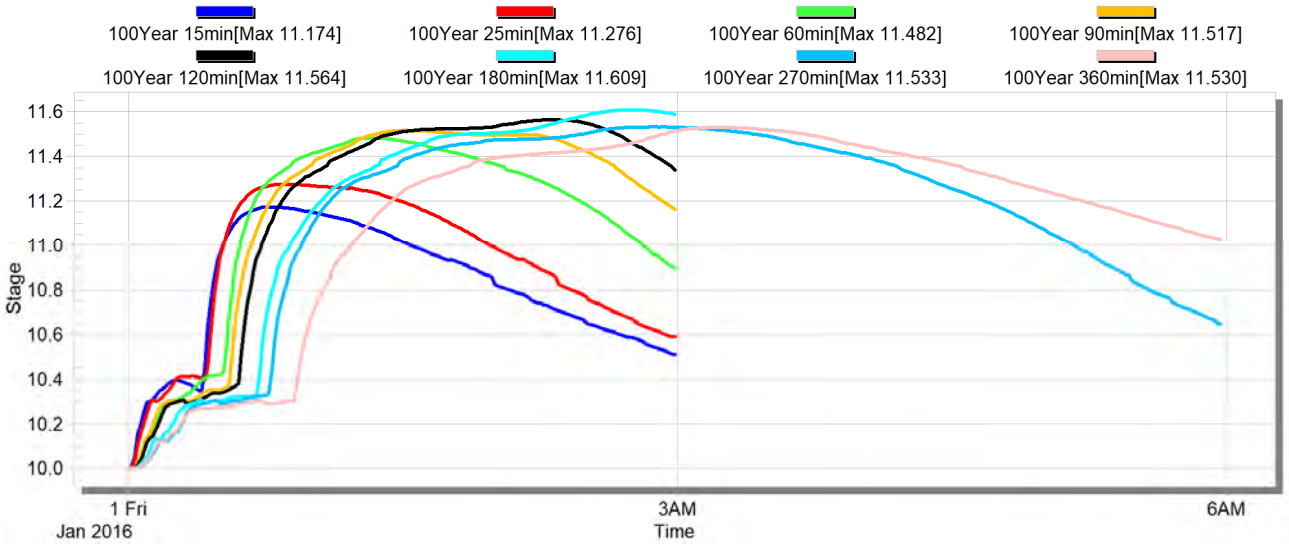
Existing Scenario 50 Year ARI Maximum Inundation Depth and Extents During a 120 Minute Design Storm Event

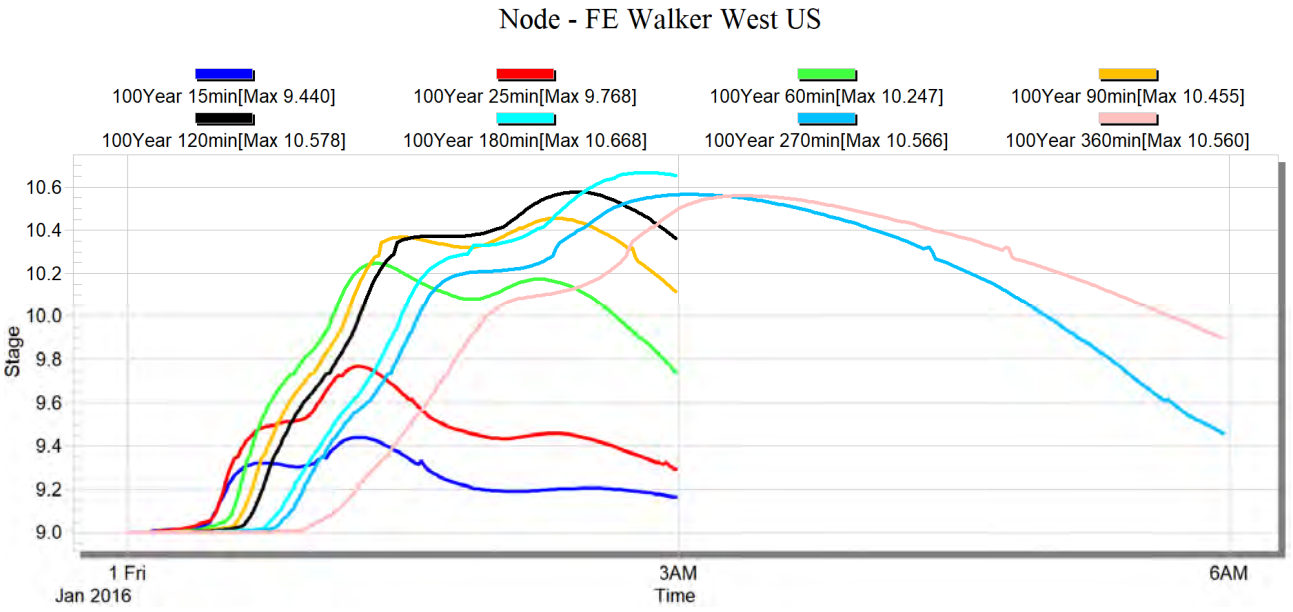
100 Year ARI

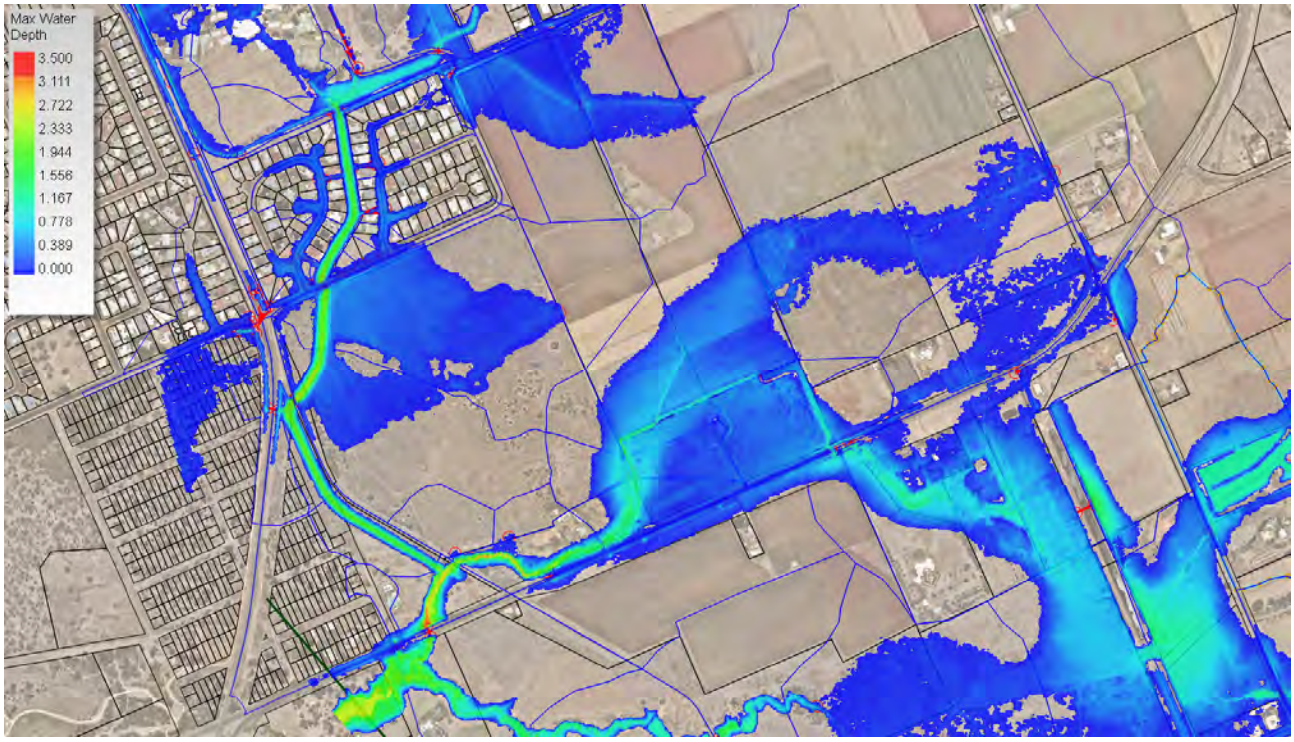
Node - Telegraph DS



Node - Catchment 325



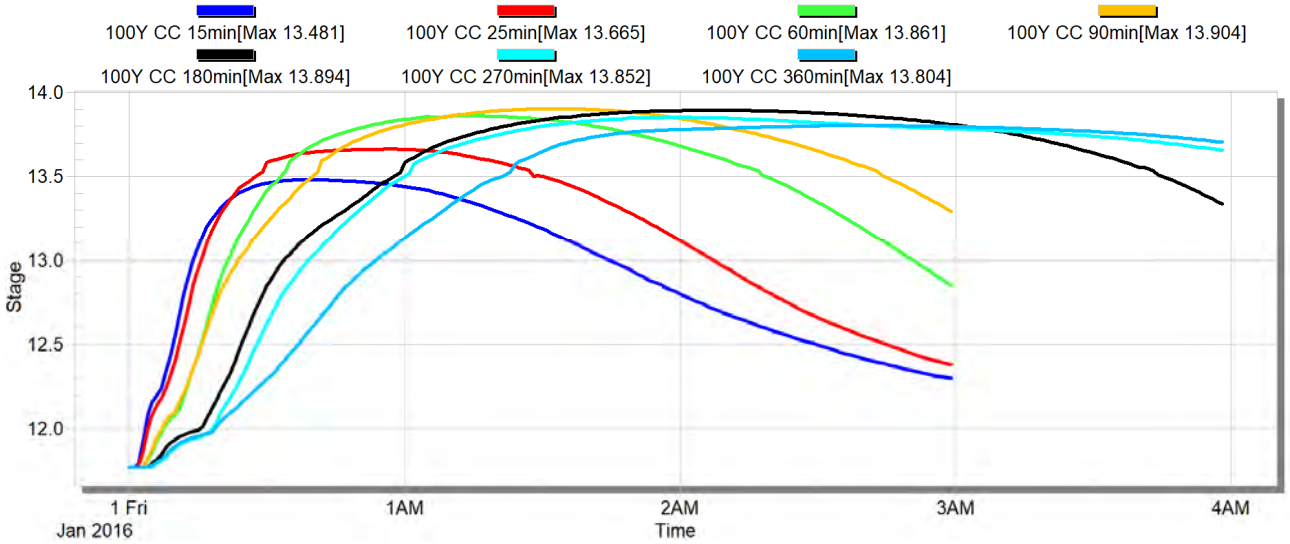




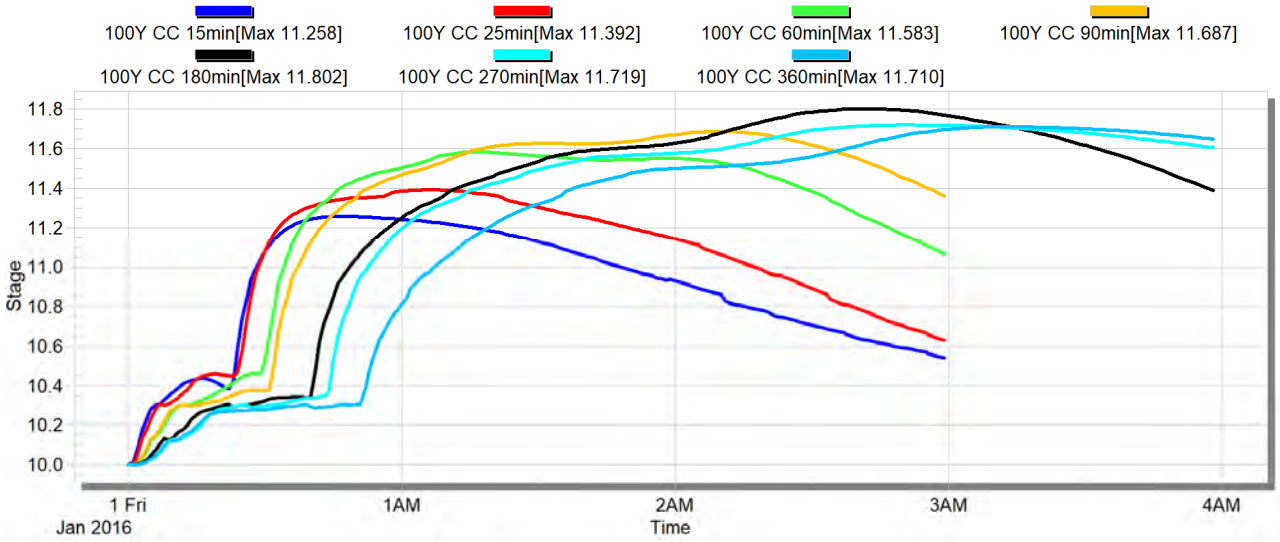
Existing Scenario 100 Year ARI Maximum Inundation Depth and Extents During a 120 Minute Design Storm Event

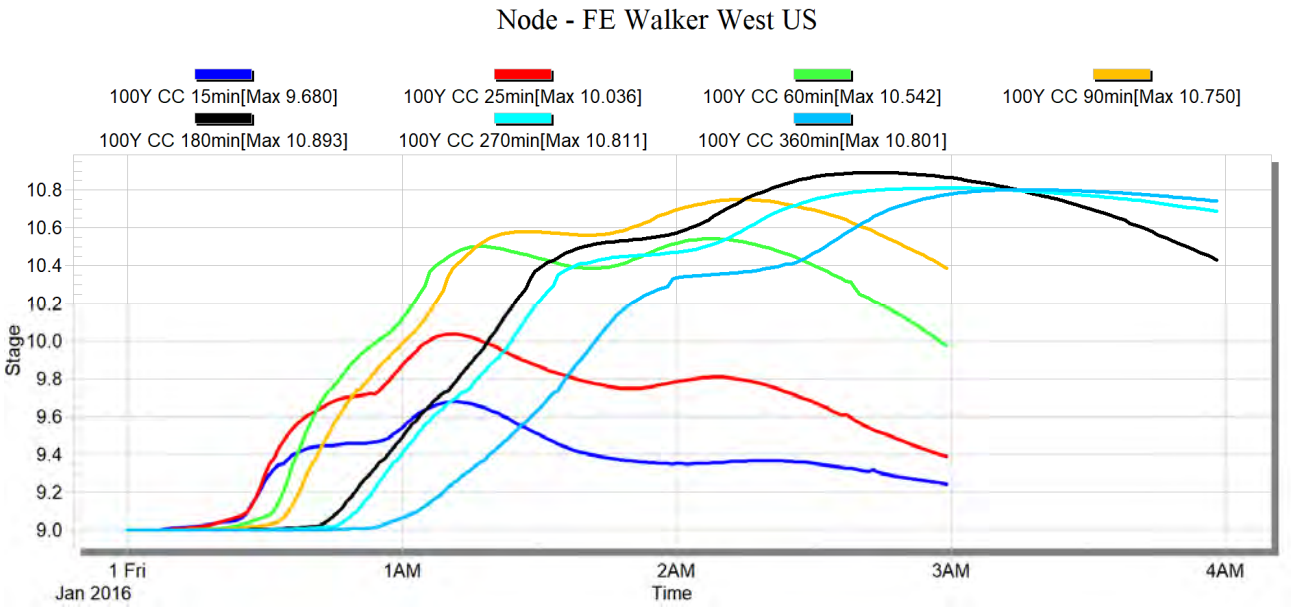
100 Year ARI (With Climate Change)

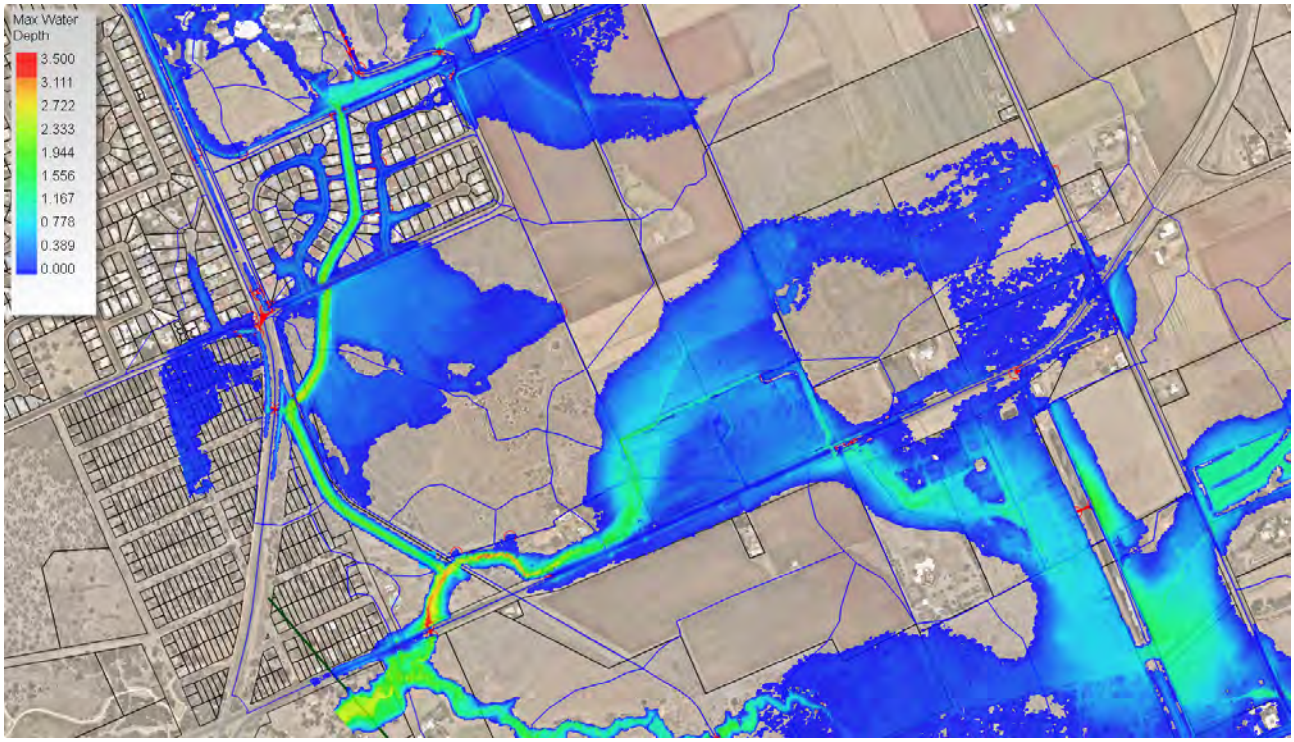
Node - Telegraph DS



Node - Catchment 325



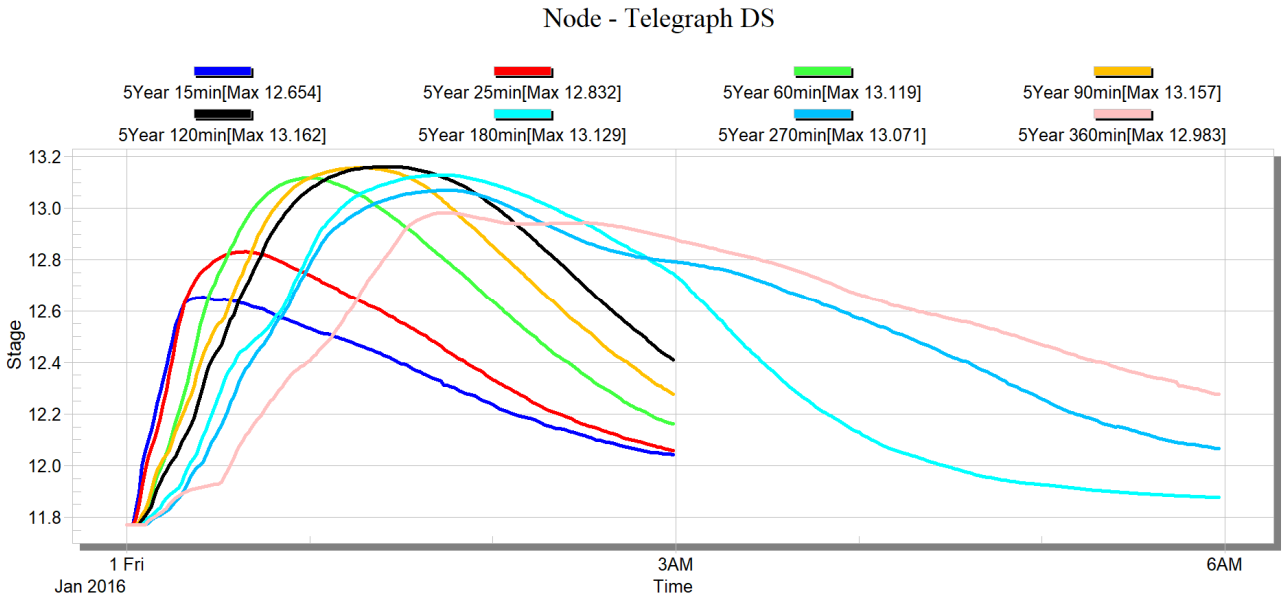


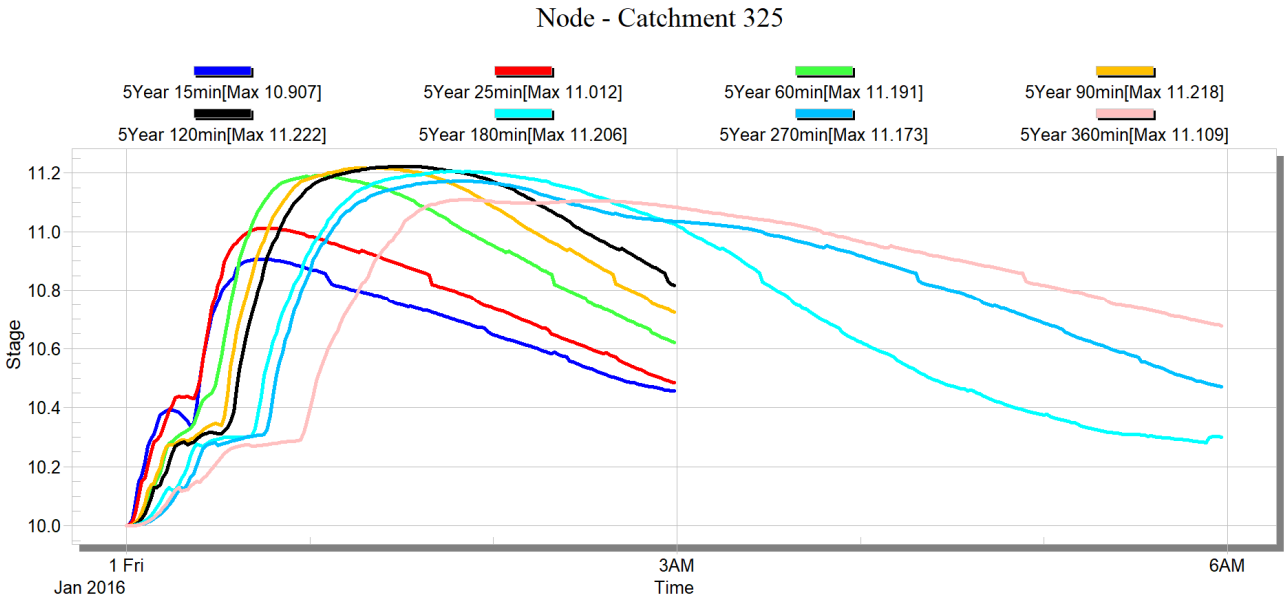


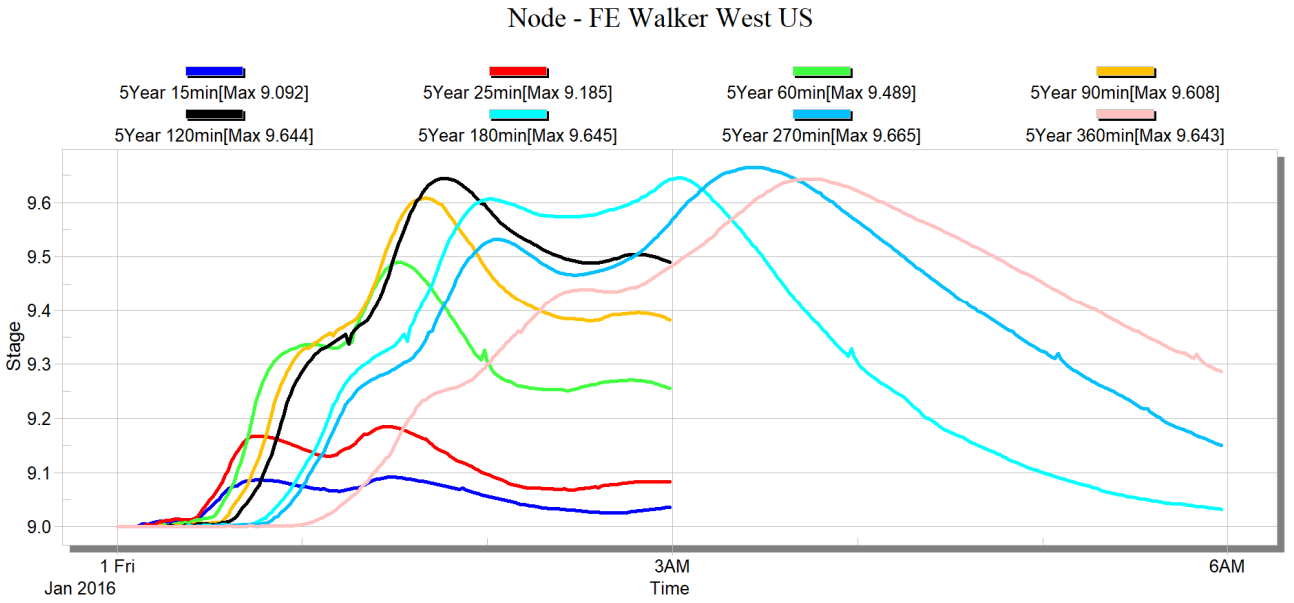
Existing Scenario 100 Year ARI with Climate Change Maximum Inundation Depth and Extents During a 180 Minute Design Storm Event

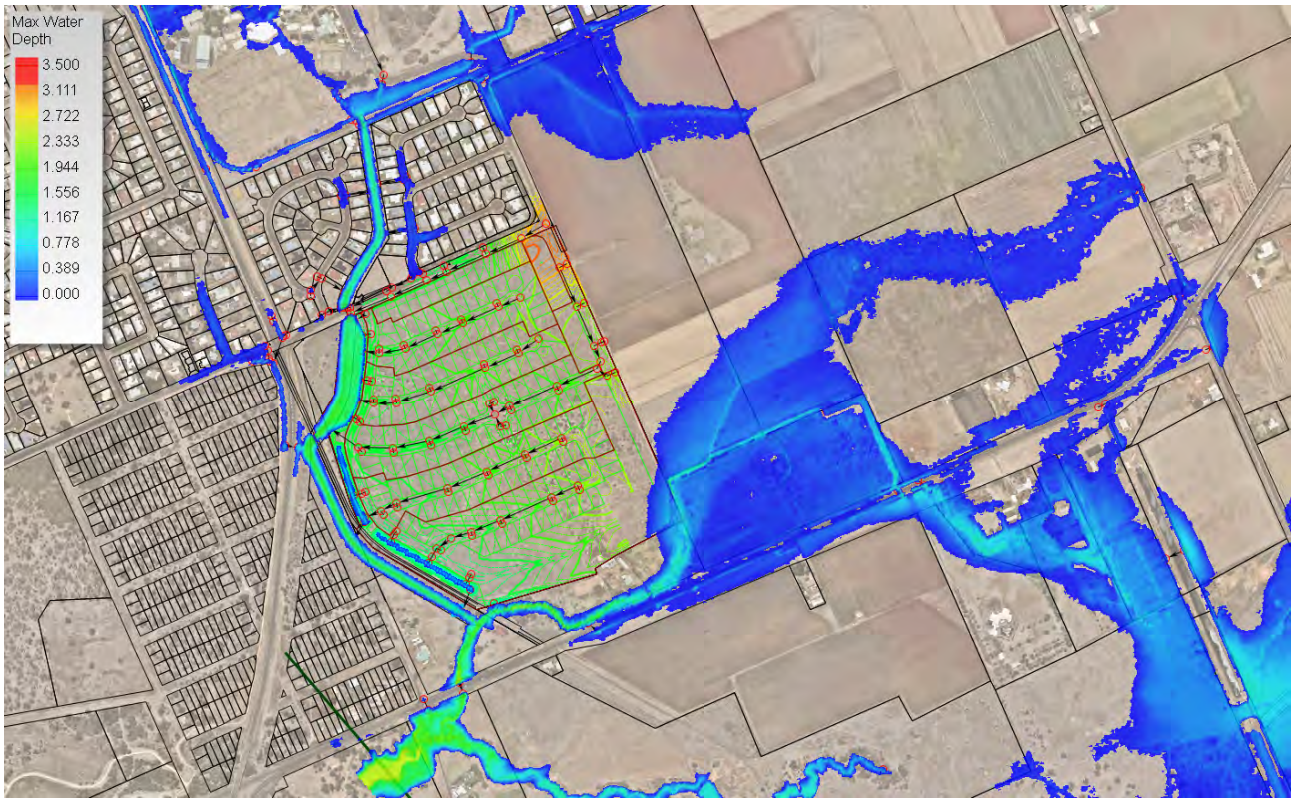
Developed Scenario Results

5 Year ARI



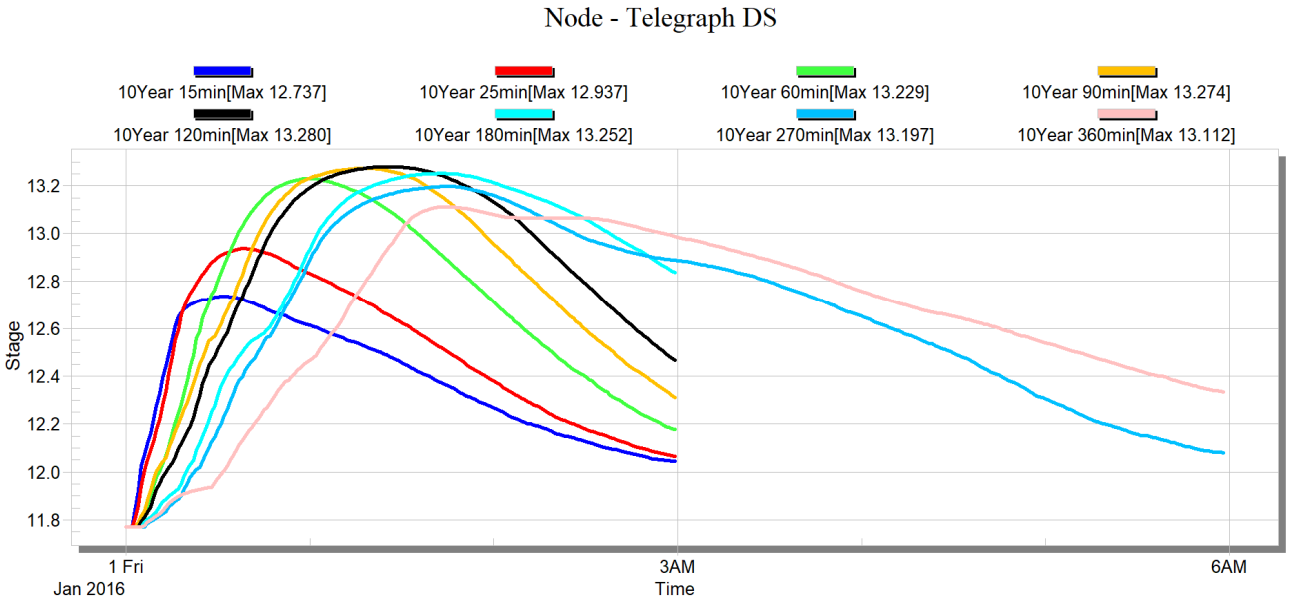


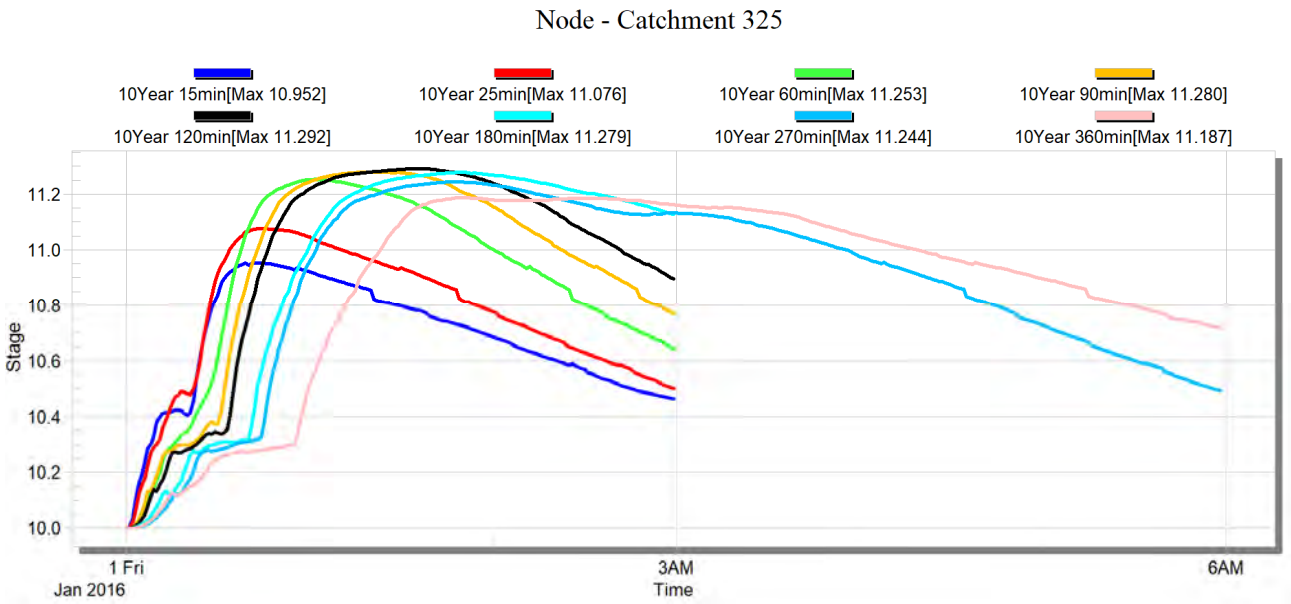


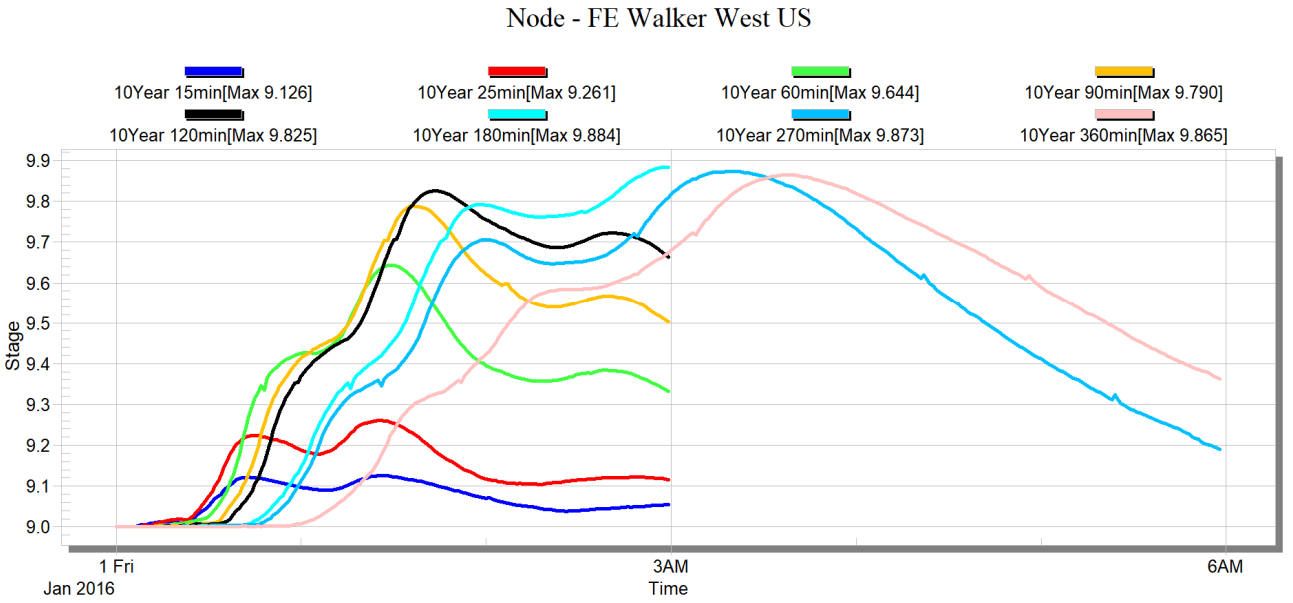


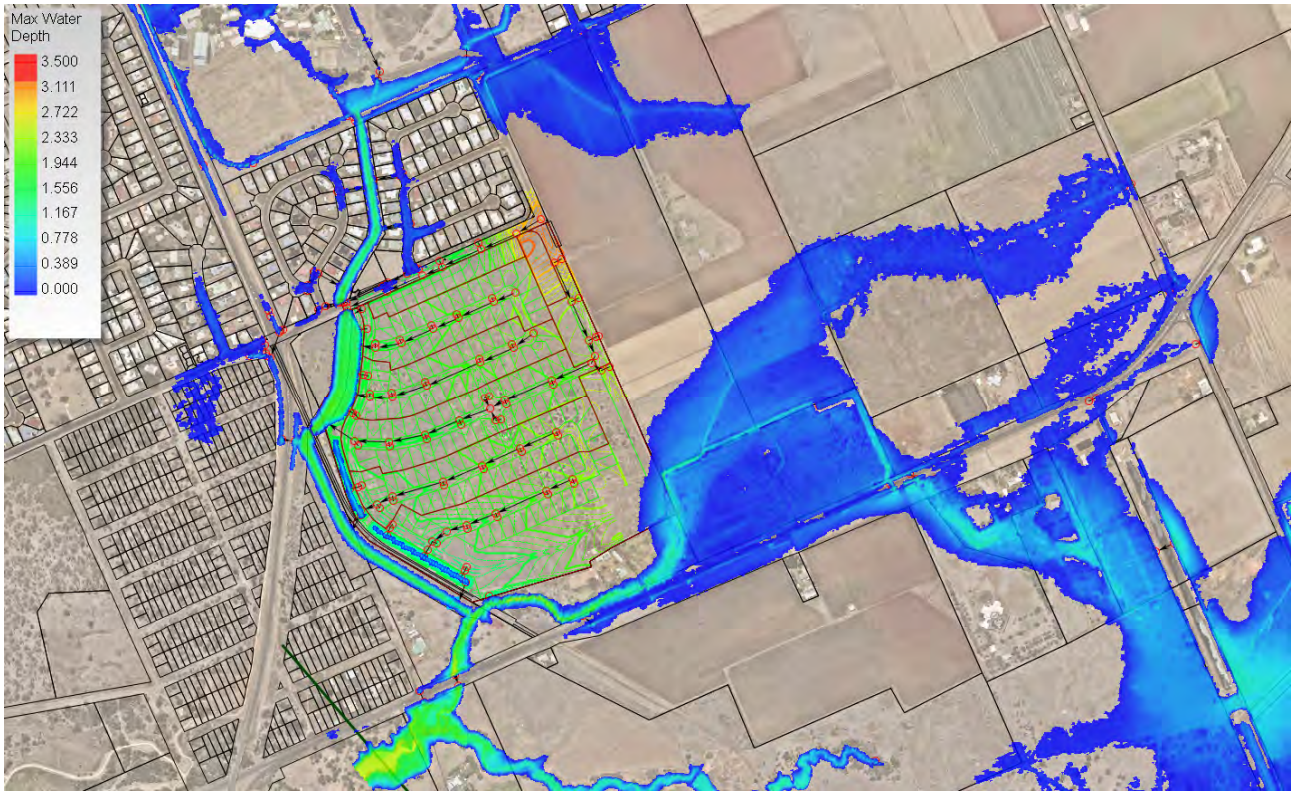
Developed Scenario 5 Year ARI Maximum Inundation Depth and Extents During a 120 Minute Design Storm Event

10 Year ARI


Node - Telegraph DS
10Year 15min[Max 12.737]
10Year 25min[Max 12.937]
10Year 60min[Max 13.229]
10Year 90min[Max 13.274]
10Year 120min[Max 13.280]
10Year 180min[Max 13.252]
10Year 270min[Max 13.197]
10Year 360min[Max 13.112]
Stage
13.2
13.0
12.8
12.6
12.4
12.2
12.0
11.8
1 Fri
Jan 2016
3AM
Time
6AM

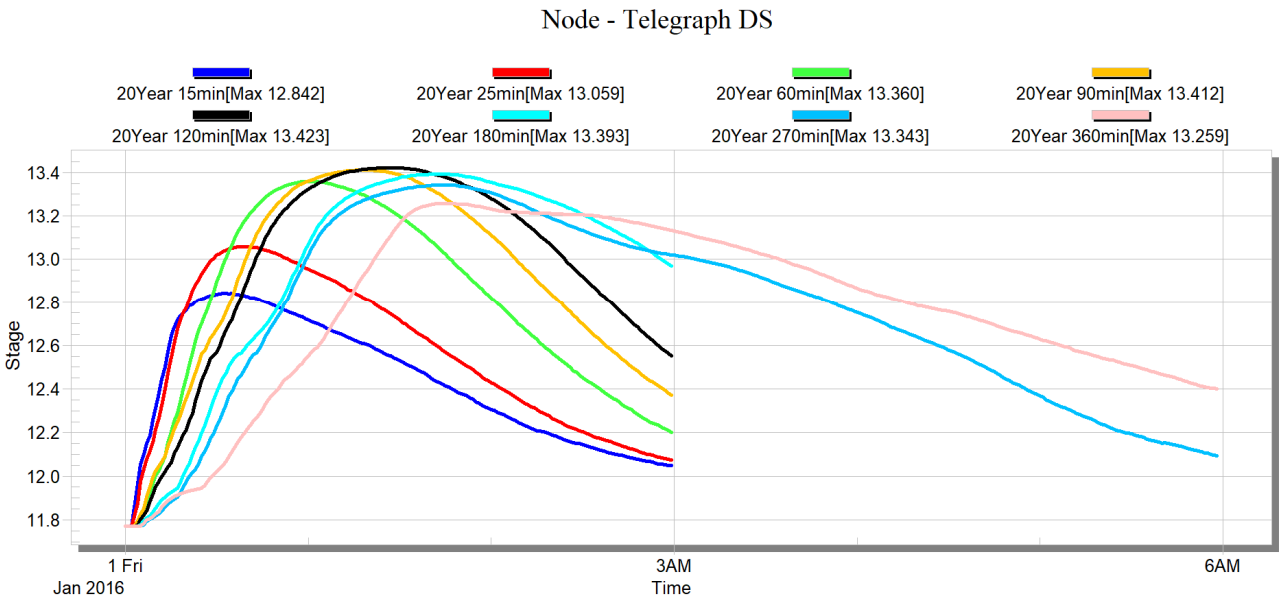

Node - Catchment 325
10Year 15min[Max 10.952]
10Year 25min[Max 11.076]
10Year 60min[Max 11.253]
10Year 90min[Max 11.280]
10Year 120min[Max 11.292]
10Year 180min[Max 11.279]
10Year 270min[Max 11.244]
10Year 360min[Max 11.187]
Stage
11.2
11.0
10.8
10.6
10.4
10.2
10.0
1 Fri
Jan 2016
3AM
Time
6AM

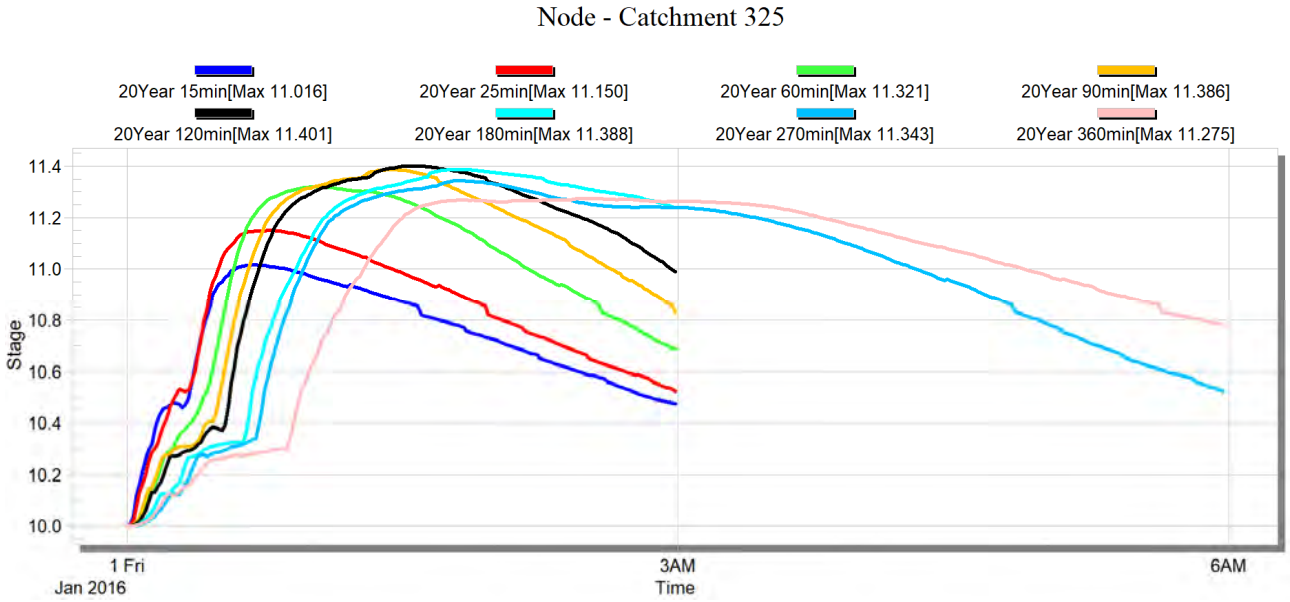


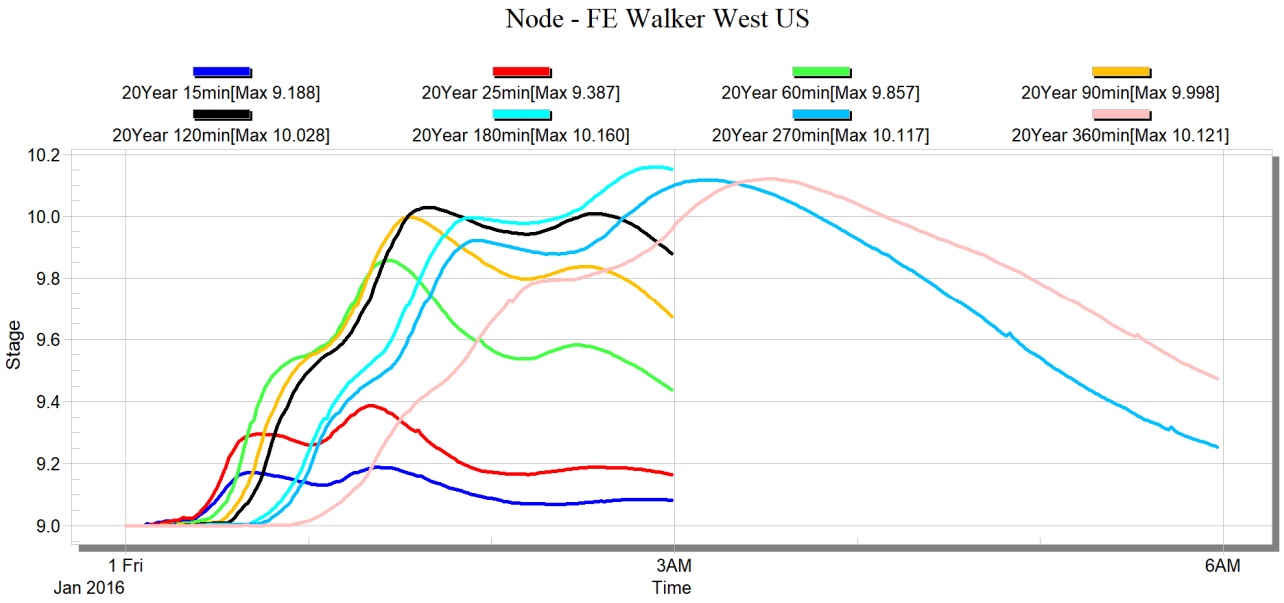


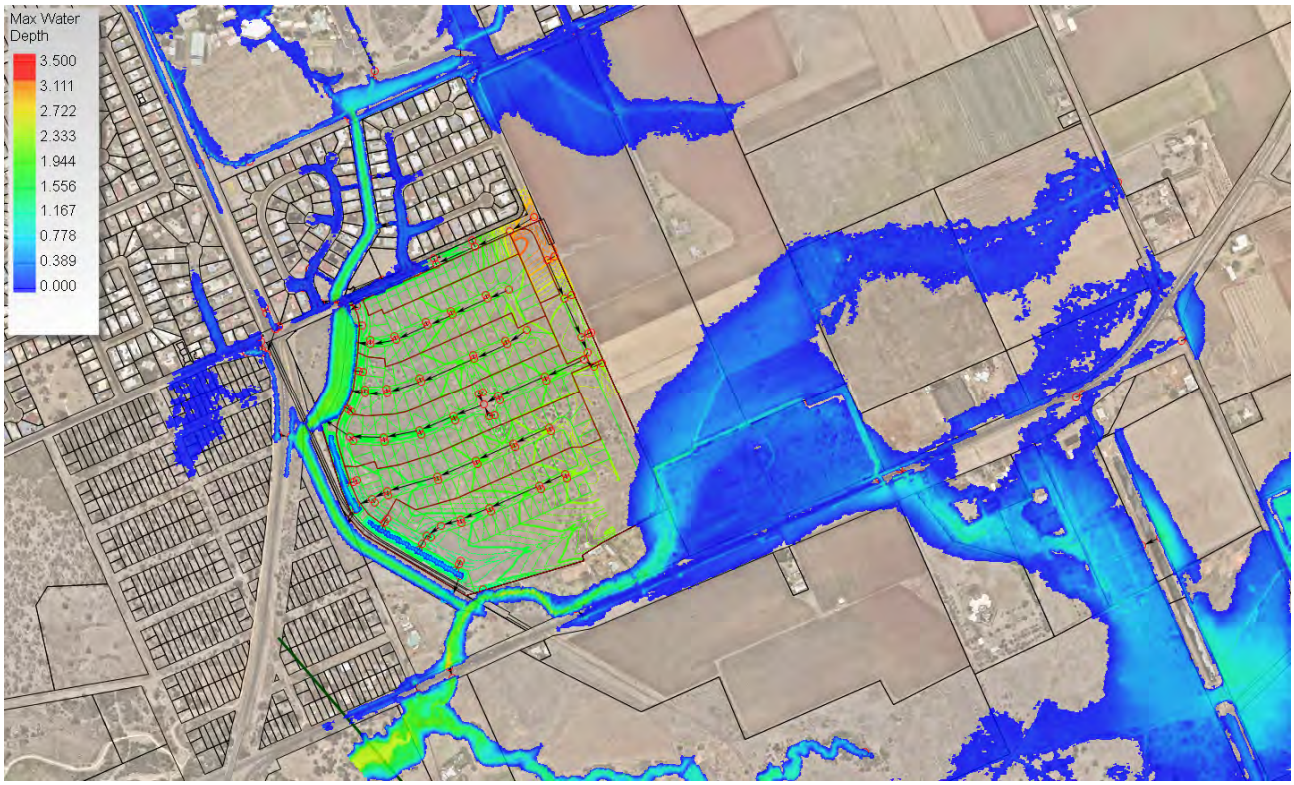
Developed Scenario 10 Year ARI Maximum Inundation Depth and Extents During a 120 Minute Design Storm Event

20 Year ARI


Node - Telegraph DS
20Year 15min[Max 12.842]
20Year 25min[Max 13.059]
20Year 60min[Max 13.360]
20Year 90min[Max 13.412]
20Year 120min[Max 13.423]
20Year 180min[Max 13.393]
20Year 270min[Max 13.343]
20Year 360min[Max 13.259]
Stage
13.4
13.2
13.0
12.8
12.6
12.4
12.2
12.0
11.8
1 Fri
Jan 2016
3AM
Time
6AM


Node - Catchment 325
20Year 15min[Max 11.016]
20Year 25min[Max 11.150]
20Year 60min[Max 11.321]
20Year 90min[Max 11.386]
20Year 120min[Max 11.401]
20Year 180min[Max 11.388]
20Year 270min[Max 11.343]
20Year 360min[Max 11.275]
Stage
11.4
11.2
11.0
10.8
10.6
10.4
10.2
10.0
1 Fri
Jan 2016
3AM
Time
6AM

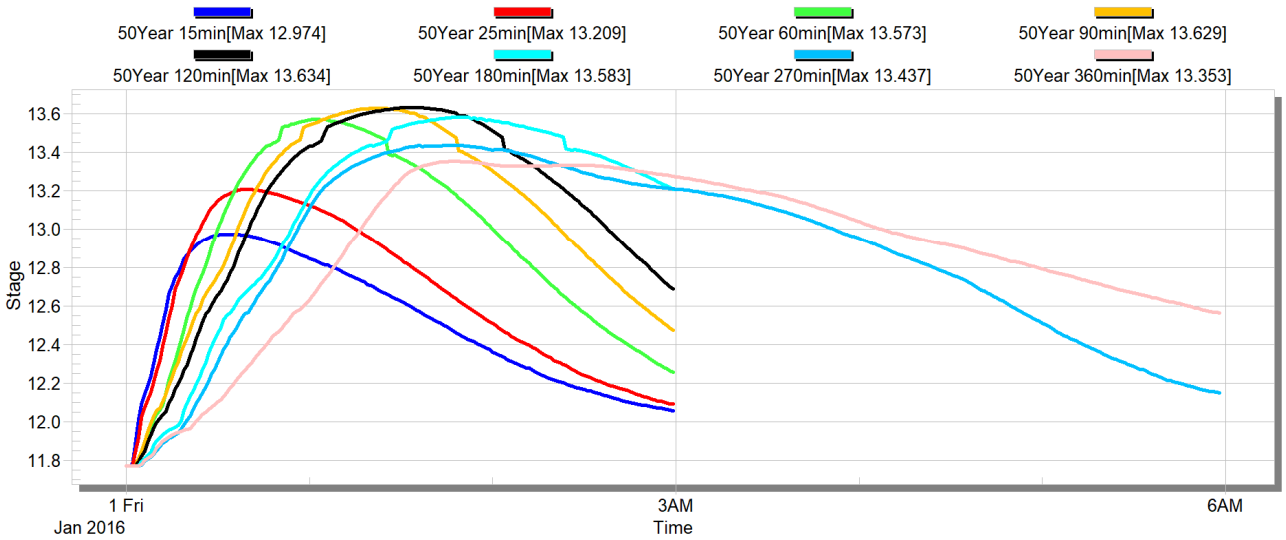




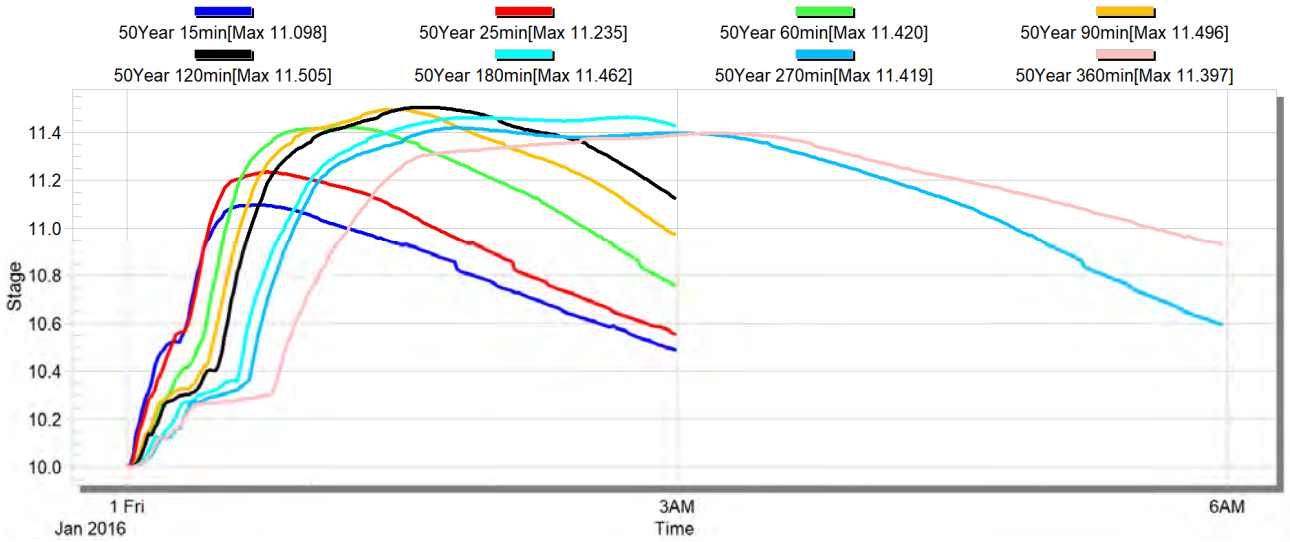
Developed Scenario 20 Year ARI Maximum Inundation Depth and Extents During a 120 Minute Design Storm Event

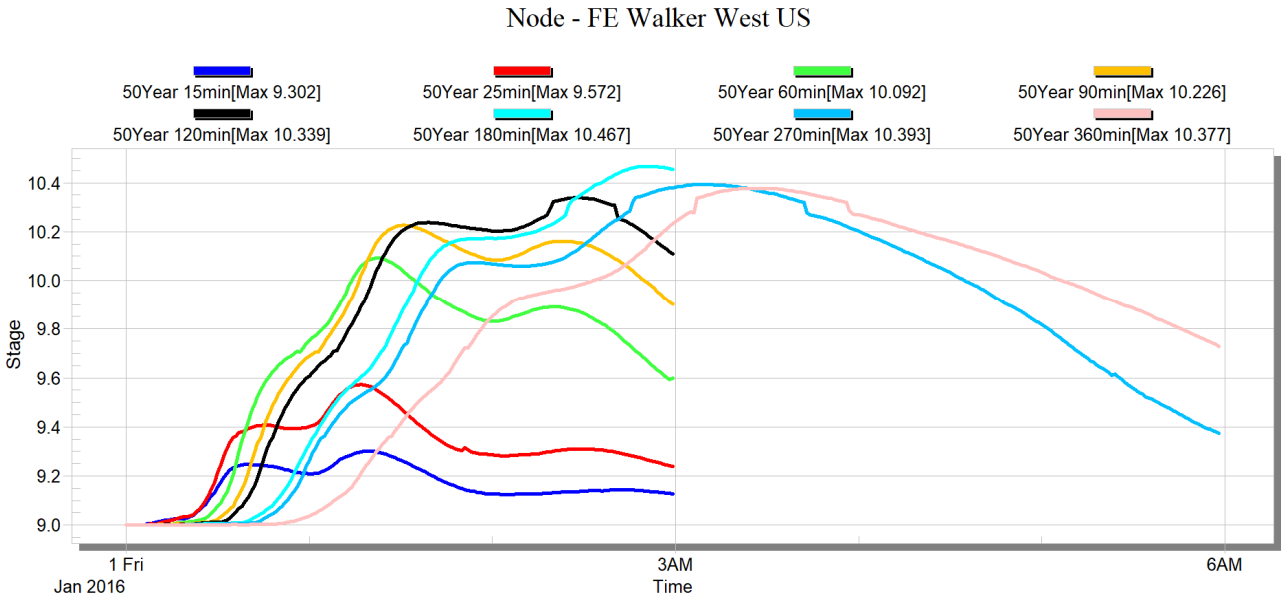
50 Year ARI

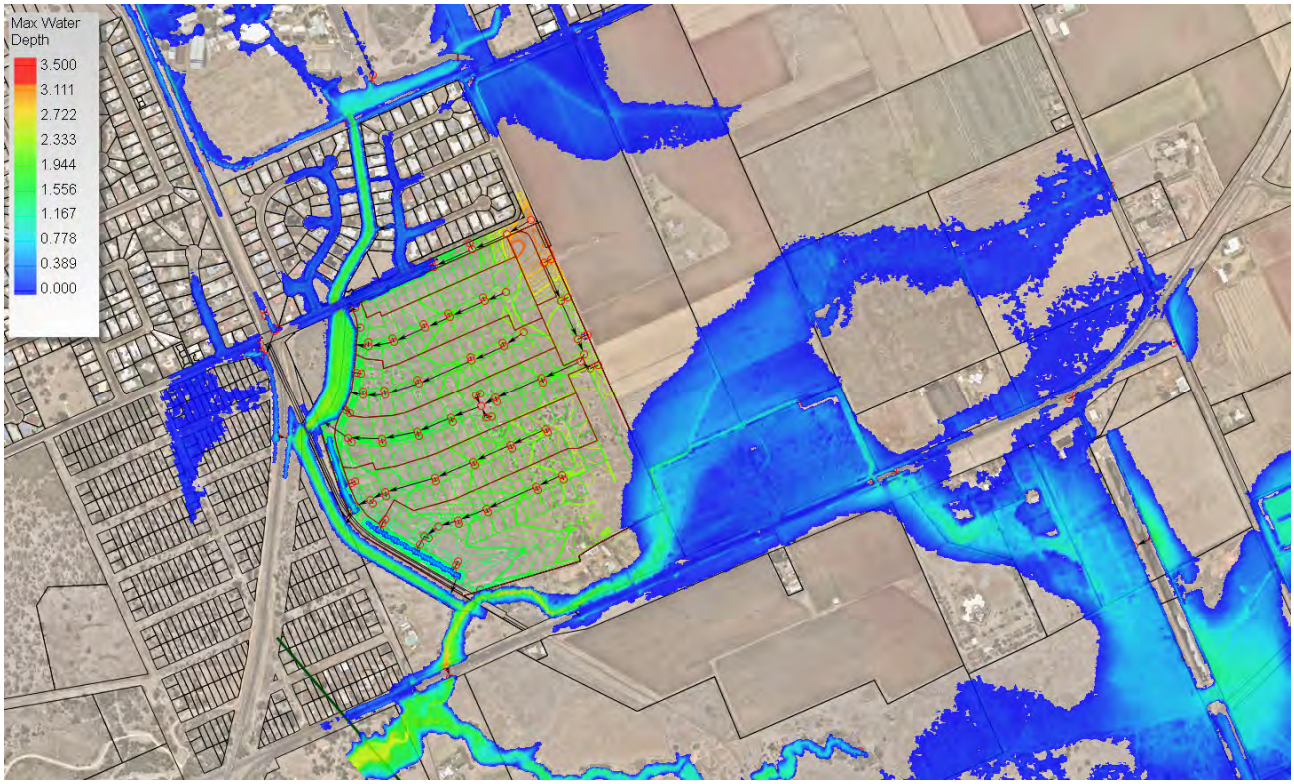
Node - Telegraph DS



Node - Catchment 325

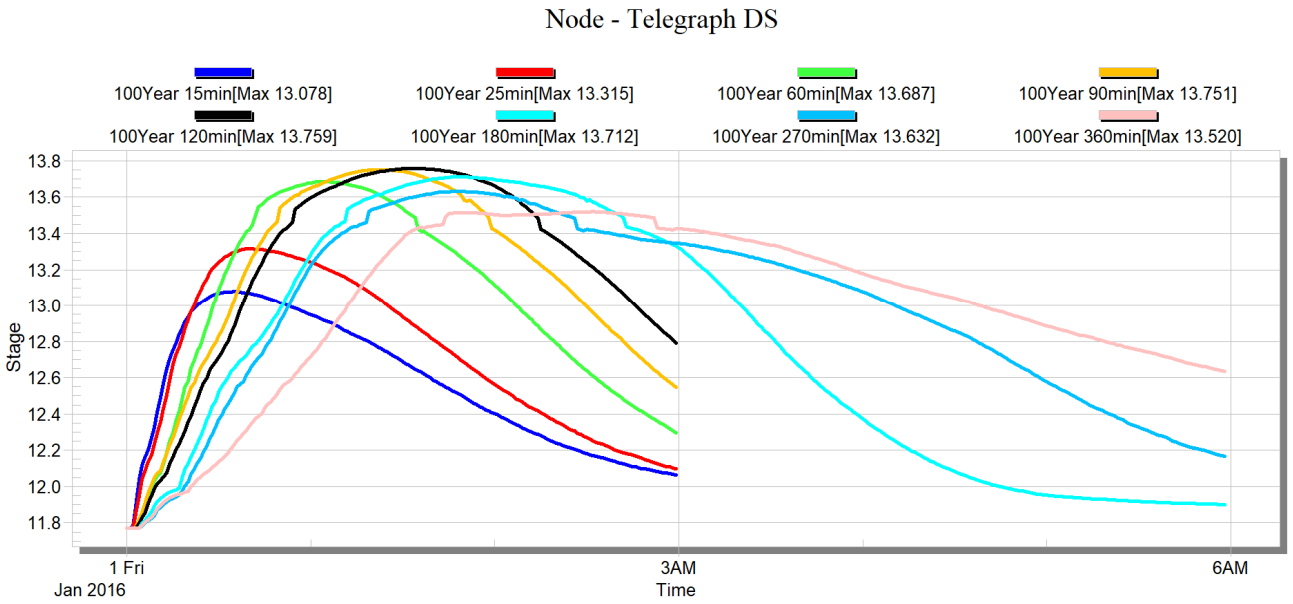






Developed Scenario 50 Year ARI Maximum Inundation Depth and Extents During a 120 Minute Design Storm Event

100 Year ARI


Node - Telegraph DS
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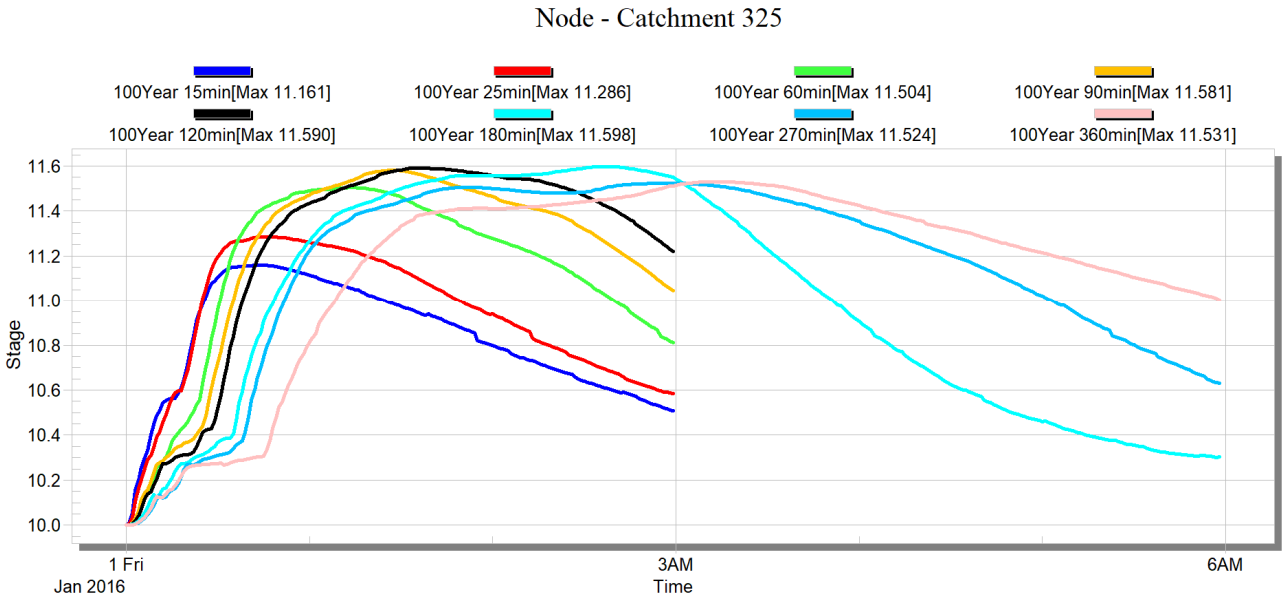
100Year 25min[Max 13.315]
100Year 60min[Max 13.687]
100Year 90min[Max 13.751]
100Year 120min[Max 13.759]
100Year 180min[Max 13.712]
100Year 270min[Max 13.632]
100Year 360min[Max 13.520]
Stage
13.8
13.6
13.4
13.2
13.0
12.8
12.6
12.4
12.2
12.0
11.8
1 Fri
Jan 2016
3AM
Time
6AM


Node - Catchment 325
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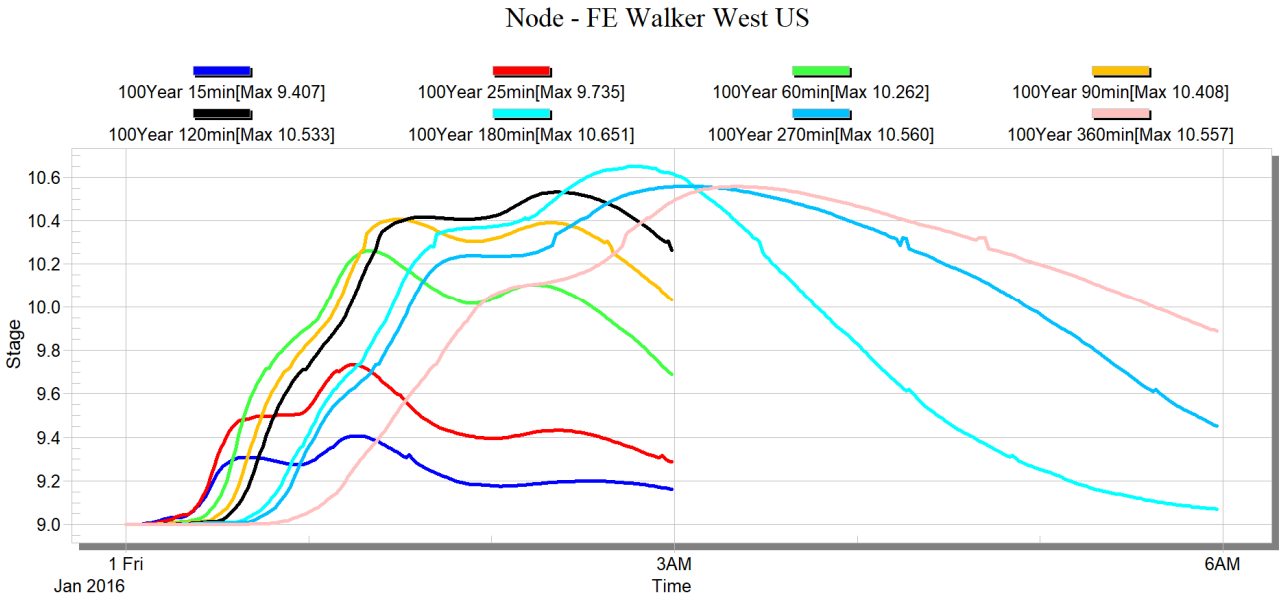
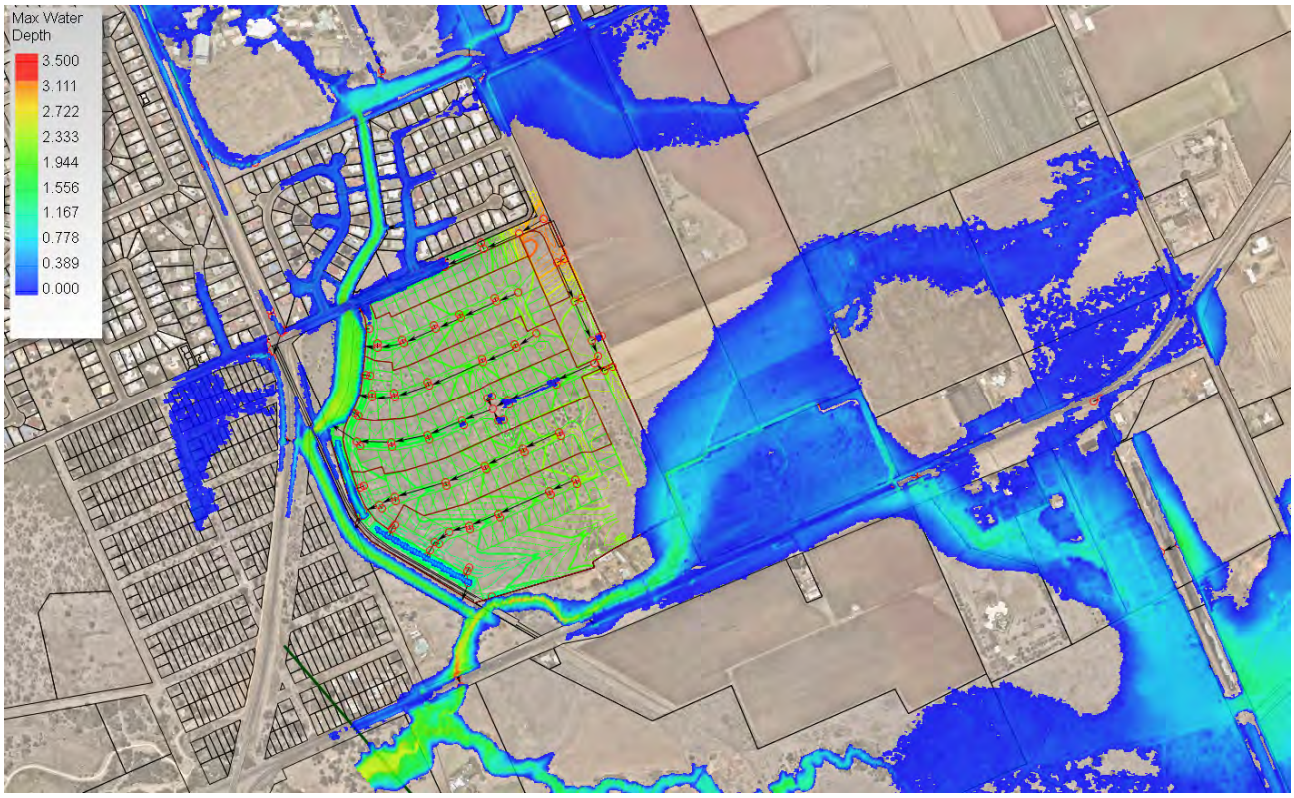
100Year 25min[Max 11.286]
100Year 60min[Max 11.504]
100Year 90min[Max 11.581]
100Year 120min[Max 11.590]
100Year 180min[Max 11.598]
100Year 270min[Max 11.524]
100Year 360min[Max 11.531]
Stage
11.6
11.4
11.2
11.0
10.8
10.6
10.4
10.2
10.0
1 Fri
Jan 2016
3AM
Time
6AM

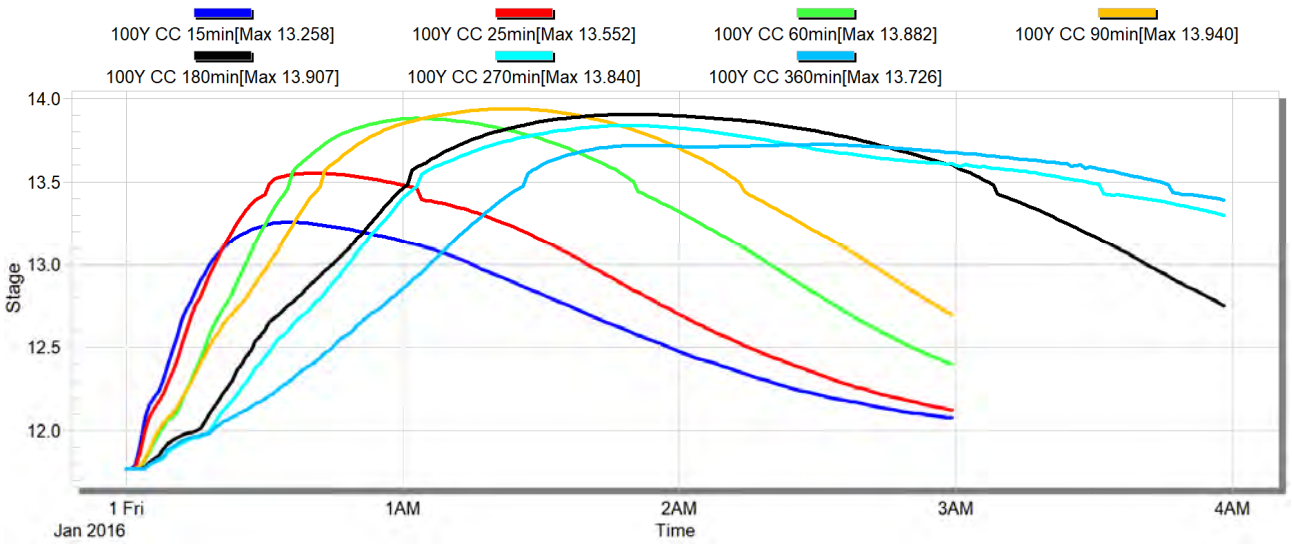




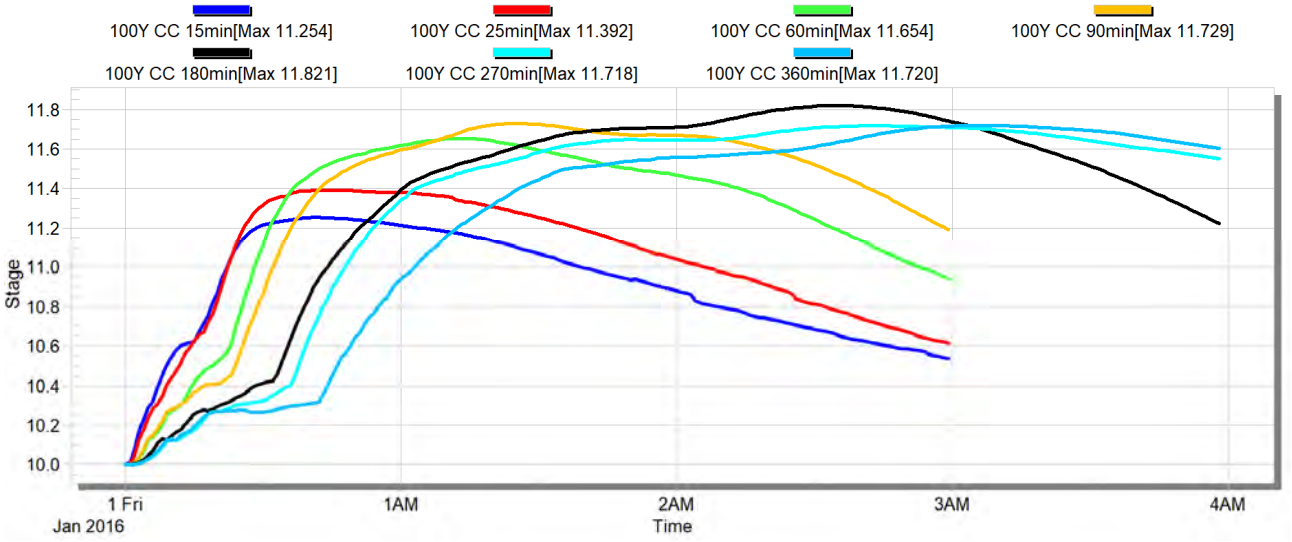
Developed Scenario 100 Year ARI Maximum Inundation Depth and Extents During a 120 Minute Design Storm Event

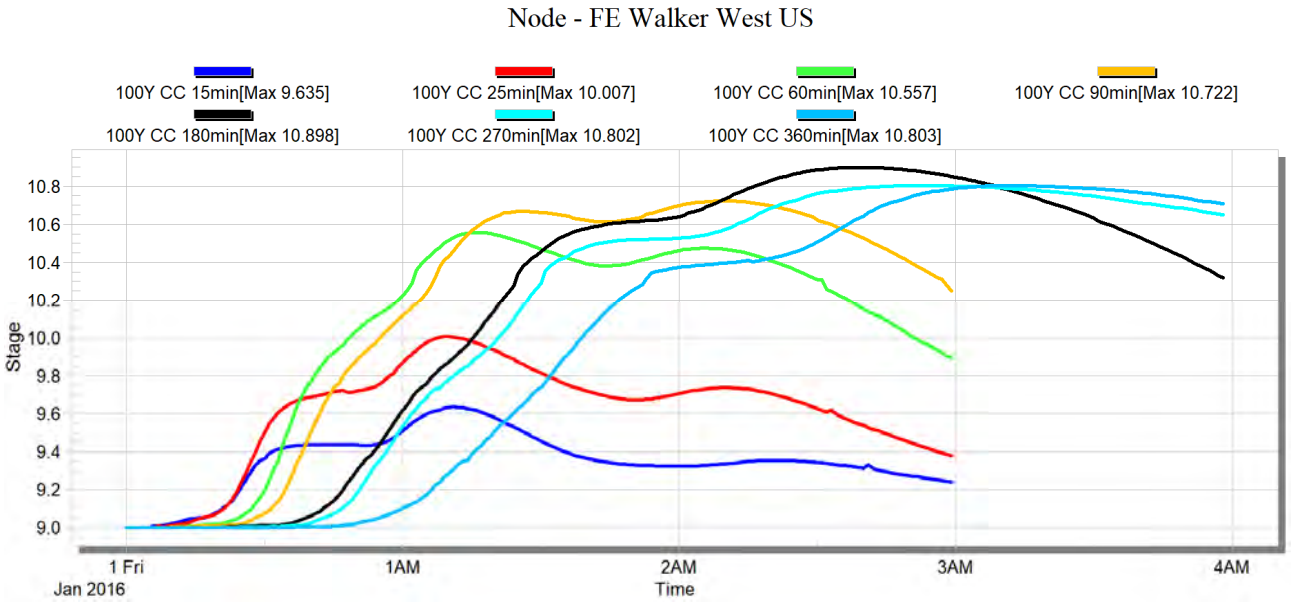
100 Year ARI (Climate Change Affected)

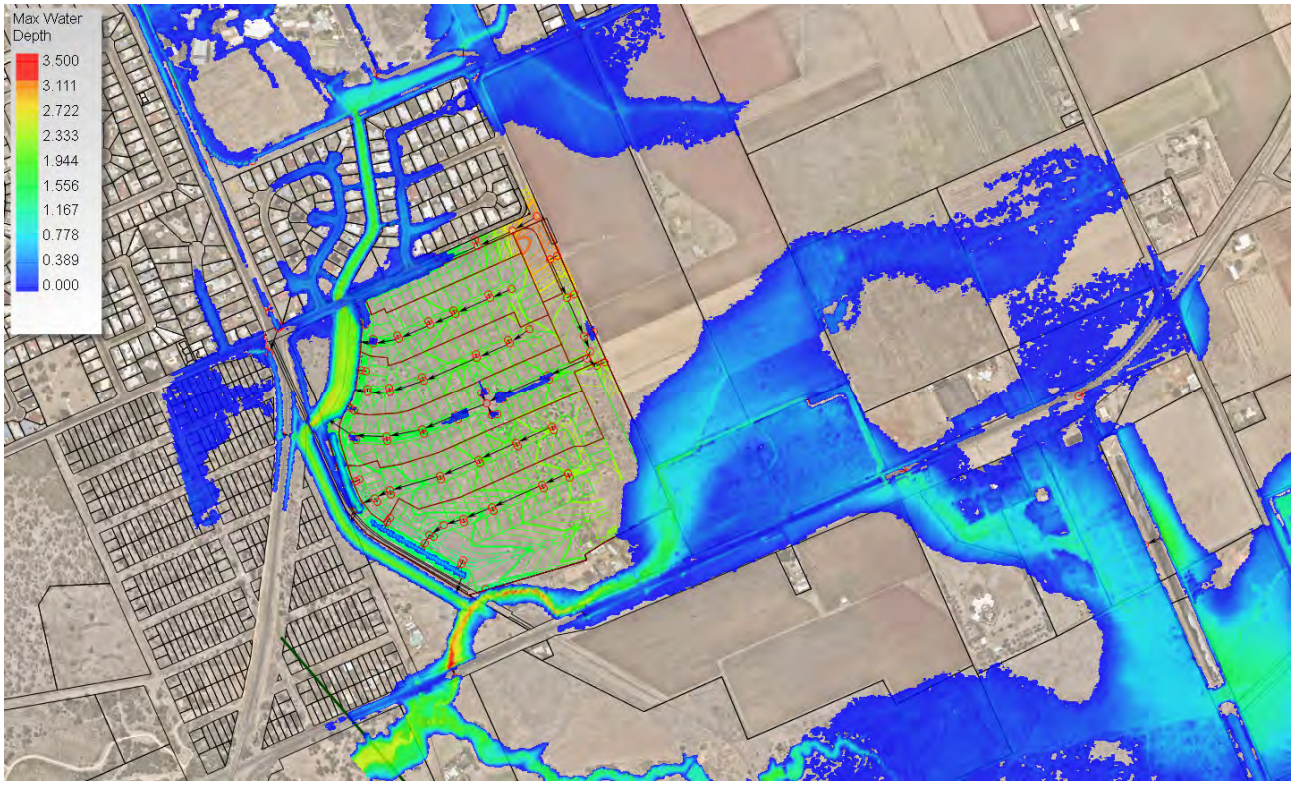
Node - Telegraph DS



Node - Catchment 325

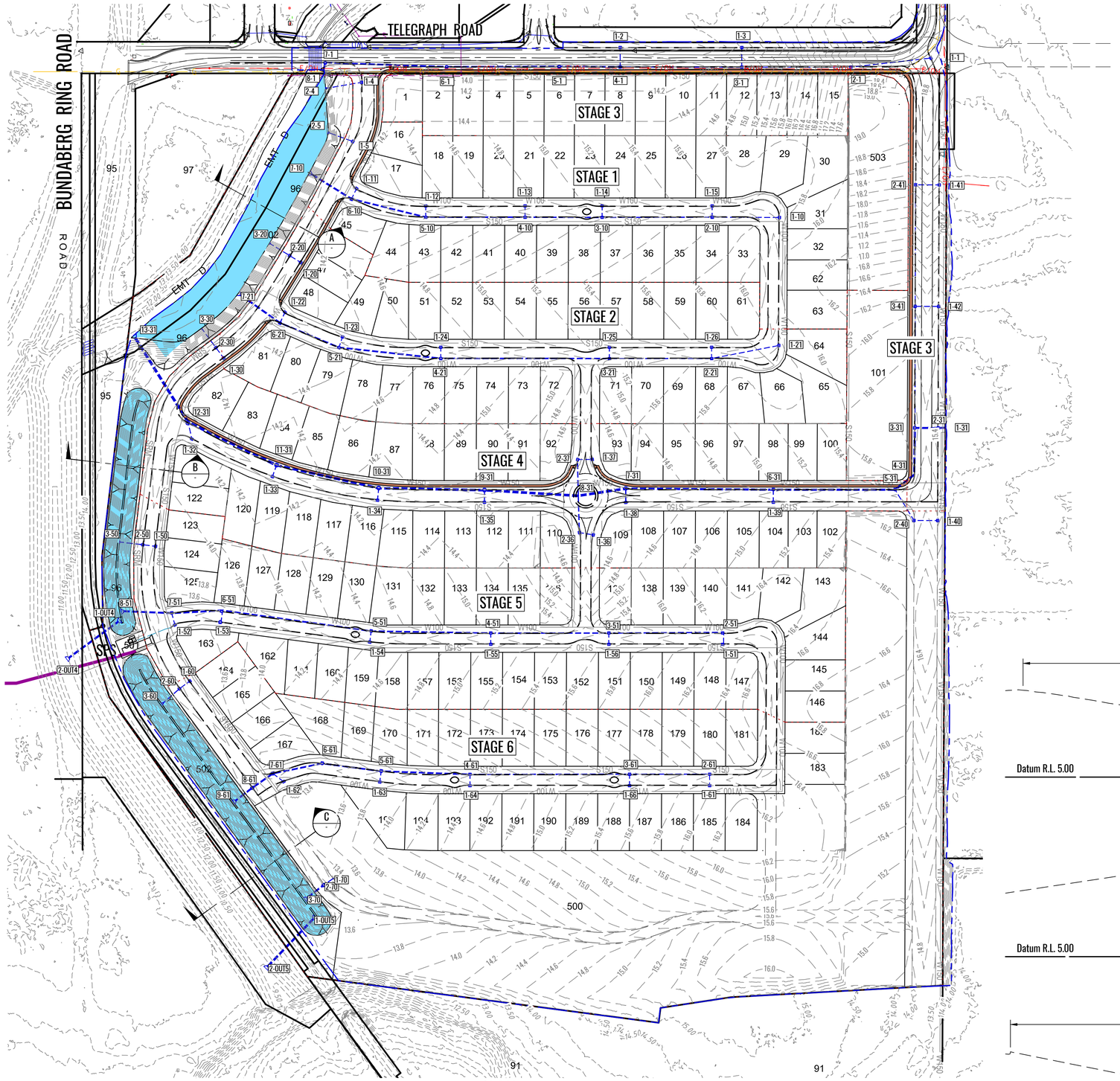






Developed Scenario 100 Year ARI Climate Change Affected Maximum Inundation Depth and Extents During a 120 Minute Design Storm Event

Appendix D: Minor Drainage Engineering Plans

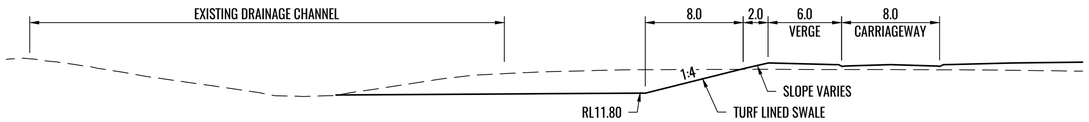


PLAN

SCALE A1 - 1 : 1500
A3 - 1 : 3000

LEGEND:

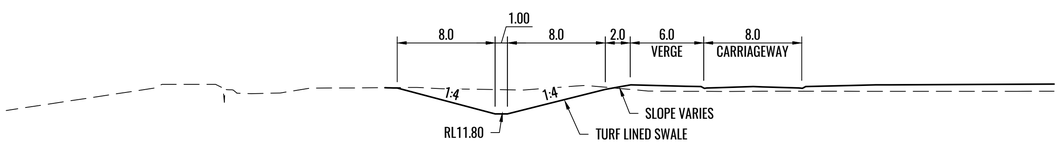
- STORMWATER CATCHMENT (EXTERNAL)
- DRAINAGE SWALE
- STORMWATER PIPES AND PITS
- 14-43 MANHOLE No. - LINE No.
- DETENTION BASIN (INDICATIVE ONLY)
- S150 SEWER MAIN AND STRUCTURE
- SEWER RISING MAIN
- W100 WATERMAIN AND PIPE DIAMETER
- STAGE BOUNDARY



Datum R.L. 5.00

SECTION A

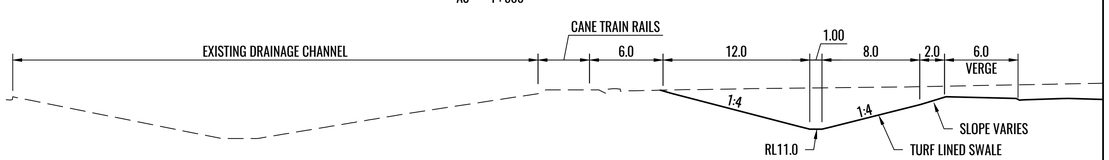
SCALE A1 - 1 : 250
A3 - 1 : 500



Datum R.L. 5.00

SECTION B

SCALE A1 - 1 : 250
A3 - 1 : 500



Datum R.L. 5.00

SECTION C

SCALE A1 - 1 : 250
A3 - 1 : 500

0 50 100 150m
SCALE 1:1500 @A1

Urban Environmental Solutions
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Hamilton QLD 4007
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admin@urbanenvironmentalsolutions.com.au
ABN 81 428 134 679

Project: 134 TELEGRAPH ROAD KALKIE
TITLE: MASTERPLAN - SW DRAINAGE PLAN
Figure Number: UES003003-FIG-10
Revision: C
Size: A1

DATE PLOTTED: 13 October 2020 11:59 AM BY : MARK TABER
CAD File: C:\Users\tabsa\Dropbox\UES Projects\UES003003 134 Telegraph Rd\Design\Acad\UES003003-FIG-10 DRAINAGE MASTERPLAN.dwg

DATE PLOTTED: 8 September 2020 9:23 AM BY : MARK TABER

STRUCTURE NAME

STRUCTURE DESCRIPTION

	1-1	2-1	3-1	4-1	5-1	6-1	7-1	8-1	1-2	4-1	1-3	3-1	1-4	2-4	1-5	2-5
	LIP IN LINE GULLY TYPE S (SAG)	LIP IN LINE GULLY TYPE S (GRADE)	LIP IN LINE GULLY TYPE S (GRADE) 1050 DIA.	LIP IN LINE GULLY TYPE S (GRADE) 1200 DIA.	LIP IN LINE GULLY TYPE S (SAG) 1200 DIA.	LIP IN LINE GULLY TYPE S (SAG) 1350 DIA.	LIP IN LINE GULLY TYPE S (SAG) 1350 DIA.	HEADWALL	LIP IN LINE GULLY TYPE S (SAG)	LIP IN LINE GULLY TYPE S (GRADE) 1200 DIA.	LIP IN LINE GULLY TYPE S (SAG)	LIP IN LINE GULLY TYPE S (GRADE) 1050 DIA.	LIP IN LINE GULLY TYPE S (SAG)	HEADWALL	LIP IN LINE GULLY TYPE S (SAG)	HEADWALL
PIPE SIZE (mm)	375	375	600	900	900	900	900		375		375		375		375	
PIPE CLASS	(RCP)	(RCP)	(RCP)	(RCP)	(RCP)	(RCP)	(RCP)		(RCP)		(RCP)		(RCP)		(RCP)	
PIPE GRADE	2.69%	4.31%	0.20%	0.12%	0.12%	0.12%	0.12%		1.02%		5.30%		1.00%		2.51%	
	1:37	1:23	1:500	1:833	1:833	1:833	1:833		1:98		1:19		1:100		1:40	
FULL PIPE VELOCITY (m/s)	0.16	0.83	1.09	0.83	1.01	1.24	1.24		0.57		0.78		0.99		0.19	
PART FULL VELOCITY (m/s)	1.45	2.74	1.09	1.10	1.12	1.24	1.24		1.47		2.90		1.67		1.48	
DATUM RL	0.0								-1.0		0.0		-1.0		-1.0	
W.S.E IN STRUCTURE	17.429	16.275	13.852	13.543	13.458	13.307	13.059	12.937	13.650	13.560	14.136	13.883	13.190	12.892	12.911	12.892
H.G.L IN PIPE	17.420	16.278	13.860	13.552	13.491	13.310	13.080	12.937		13.552		13.860				
PIPE FLOW (cumecs)	0.018	0.091	0.308	0.527	0.644	0.790	0.790		0.063		0.086		0.109		0.021	
FLOW CAPACITY (cumecs)	0.288	0.364	0.275	0.627	0.627	0.627	0.630		0.177		0.404		0.176		0.279	
							Qx=0.160									
DEPTH TO INVERT	1.26	1.54	1.56	1.74	1.97	1.26	1.56	1.46	1.48	1.47	1.49	1.67	1.69	0.90	0.90	
													1.03	1.04	1.14	1.74	1.64	0.38	1.60	0.38
INVERT LEVELS	17.324	15.898	15.878	12.785	12.560	12.400	12.100	12.052	12.032	11.943	11.923	11.827	11.807	11.800	11.800	
													12.755	12.625	13.474	12.785	12.133	11.900	12.318	11.900
SURFACE LEVELS	18.587								13.782		14.610		13.777		13.917	
FINISHED	(18.479)	17.435	(17.525)	14.529	(14.412)	13.663	(13.575)	13.513	(13.469)	13.410	(13.308)	13.502	(13.711)	12.700	(12.973)	
(EXISTING)													(13.794)	13.663	(14.595)	14.529	(13.333)	12.275	(13.433)	12.275
STRUCTURE	E 438586.389	E 438540.702	E 438475.127	E 438401.994	E 438365.246	E 438297.649	E 438223.622		E 438396.767		E 438469.829		E 438250.603		E 438261.273	
SETOUT	N 7250704.675	N 7250677.779	N 7250648.514	N 7250616.067	N 7250599.914	N 7250569.582	N 7250539.501		N 7250627.779		N 7250660.385		N 7250537.399		N 7250499.557	
COORDINATES							E 438224.848		E 438401.994		E 438475.127		E 438231.188		E 438244.625	
							N 7250533.707		N 7250616.067		N 7250648.514		N 7250524.437		N 7250498.386	
LENGTH m	53.016	71.809	80.008	40.141	74.090	79.906	5.923		12.825		13.000		23.344		16.689	
DISTANCE ALONG DRAIN	0.000	53.016	124.825	204.833	244.974	319.064	398.970	404.892	0.000	12.825	0.000	13.000	0.000	23.344	0.000	16.689
LINE	1								2		3		4		5	

150 SEW IL 9.95

C2.0: 1.305

LEGEND

- EXISTING SURFACE LEVEL
- FINISHED SURFACE LEVEL
- HGL (Q5)
- SWD PIPE

0 20 40 60 80 100m

SCALE 1:1000 @A1

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Project: 134 TELEGRAPH ROAD KALKIE

TITLE: SWD LONG SECTIONS - SHEET 1

Figure Number: UES003003-FIG-11 | Revision: B | Size: A1

CAD File: C:\Users\tahan\Dropbox\UES Projects\UES003003 134 Telegraph Rd\Design\Acad\UES003003-FIG-11 DRAINAGE LONG SEC.dwg

DATE PLOTTED: 8 September 2020 9:24 AM BY: MARK TABER

CAD File: E:\Users\tabat\Dropbox\UES Projects\UES003003 134 Telegraph Rd\Design\Acad\UES003003-FIG 11 DRAINAGE LONG SEC.dwg

STRUCTURE NAME	1-10	2-10	3-10	4-10	5-10	6-10	7-10	1-11	6-10	1-12	5-10	1-13	4-10	1-14	3-10	1-15	2-10	1-20	2-20	3-20
STRUCTURE DESCRIPTION	LIP IN LINE GULLY TYPE S (GRADE)	LIP IN LINE GULLY TYPE S (GRADE) 1050 DIA.	LIP IN LINE GULLY TYPE S (GRADE) 1200 DIA.	LIP IN LINE GULLY TYPE S (GRADE) 1200 DIA.	LIP IN LINE GULLY TYPE S (GRADE) 1350 DIA.	LIP IN LINE GULLY TYPE S (SAG) 1500 DIA.	HEADWALL	LIP IN LINE GULLY TYPE S (SAG)	LIP IN LINE GULLY TYPE S (SAG) 1500 DIA.	LIP IN LINE GULLY TYPE S (GRADE)	LIP IN LINE GULLY TYPE S (GRADE) 1350 DIA.	LIP IN LINE GULLY TYPE S (SAG)	LIP IN LINE GULLY TYPE S (GRADE) 1200 DIA.	LIP IN LINE GULLY TYPE S (GRADE)	LIP IN LINE GULLY TYPE S (GRADE) 1200 DIA.	LIP IN LINE GULLY TYPE S (SAG)	LIP IN LINE GULLY TYPE S (GRADE) 1050 DIA.	LIP IN LINE GULLY TYPE S (SAG)	LIP IN LINE GULLY TYPE S (SAG)	HEADWALL
PIPE SIZE (mm)	375	525	675	750	900	1050		375	375	375	375	375	375	375	375	375	375	375	375	375
PIPE CLASS	(RCP)	(RCP)	(RCP)	(RCP)	(RCP)	(RCP)		(RCP)	(RCP)	(RCP)	(RCP)	(RCP)	(RCP)	(RCP)	(RCP)	(RCP)	(RCP)	(RCP)	(RCP)	(RCP)
PIPE GRADE	0.40%	0.25%	1.59%	0.15%	0.12%	0.10%		1.00%	1.00%	1.00%	1.00%	1.48%	1.48%	2.90%	2.90%	1.10%	1.10%	1.00%	1.00%	1.00%
	1:250	1:400	1:63	1:667	1:833	1:1000		1:100	1:100	1:100	1:100	1:67	1:67	1:34	1:34	1:91	1:91	1:100	1:100	1:100
FULL PIPE VELOCITY (m/s)	0.81	1.41	1.70	1.71	1.56	1.32		0.55	1.49	0.81	1.85	0.81	1.85	1.51	2.78	1.46	1.88	0.72	1.02	1.55	1.69
PART FULL VELOCITY (m/s)	1.12	1.41	3.06	1.71	1.56	1.32		1.44	1.80	1.85	2.78	1.88	1.55	1.69
DATUM RL	-1.0							-1.0		-1.0		-1.0		0.0		0.0		-1.0		
W.S.E IN STRUCTURE	15.121	15.022	14.906	14.730	14.366	14.109	13.843	13.686	13.385	13.163	13.011	12.923	12.892	12.892	13.141	13.070	13.030	13.820	13.451	13.386	13.422	13.163	14.136	13.857	13.843	13.861	13.686	14.830	14.438	14.366	14.400	14.109	15.379	14.861	14.806	14.321	14.730	13.131	13.021	13.004	12.950	12.887
H.G.L IN PIPE		14.921		14.400		13.861										13.030																								
PIPE FLOW (cumecs)	0.090	0.305	0.609	0.755	0.995	1.141		0.061	0.164	0.089	0.167	0.161	0.080	0.113
FLOW CAPACITY (cumecs)	0.111	0.215	1.061	0.431	0.627	0.867		0.175	0.175	0.214	0.299	0.184	0.175	0.176
						Qx=0.273						Qx=0.011																												
DEPTH TO INVERT	1.94	1.89	2.04	1.78	1.93	2.35	2.42	2.08	2.23	1.91	1.93	1.05	1.05	1.41	1.39	1.67	1.33	1.11	1.17	2.42	1.41	1.63	1.93	1.11	1.14	2.04	1.89	1.94	1.96	0.38	0.38
INVERT LEVELS	13.700	13.523	13.373	13.192	13.042	12.235	12.160	12.062	11.912	11.851	11.831	11.800	11.800	12.447	12.371	12.511	11.831	13.520	13.410	12.160	13.564	13.342	13.042	14.355	14.273	13.373	12.058	11.971	11.951	11.800	11.800
SURFACE LEVELS	15.641							13.855		14.186		14.629		14.973		15.464		13.951		
FINISHED (EXISTING)	(14.571)	15.415	(13.862)	14.973	(13.601)	14.580	(13.561)	14.137	(13.500)	13.756	(13.446)	12.850	(13.427)	(13.444)	13.756	(13.497)	14.137	(13.535)	14.580	(13.561)	(13.583)	14.973	(13.601)	(13.934)	15.415	(13.862)	(14.269)	13.911	(14.198)	12.175	(13.647)
STRUCTURE SETOUT COORDINATES	E 438538.139 N 7250568.287	E 438497.551 N 7250550.410	E 438431.499 N 7250520.745	E 438385.116 N 7250500.231	E 438325.432 N 7250473.595	E 438275.983 N 7250464.690	E 438245.014 N 7250468.864	E 438276.128 N 7250472.330	E 438275.983 N 7250464.690	E 438222.382 N 7250480.430	E 438325.432 N 7250473.595	E 438382.065 N 7250507.066	E 438385.116 N 7250500.231	E 438428.381 N 7250527.741	E 438431.499 N 7250520.745	E 438494.501 N 7250557.245	E 438491.551 N 7250550.410	E 438262.586 N 7250412.859	E 438254.011 N 7250414.000	E 438239.033 N 7250415.993
LENGTH m	44.351	72.408	50.717	65.358	50.245	31.249		7.642	7.485	7.485	7.485	7.485	7.659	7.485	8.650	15.110
DISTANCE ALONG DRAIN	0.000	44.351	116.758	167.475	232.833	283.078	314.327	0.000	7.642	0.000	7.485	0.000	7.485	0.000	7.659	0.000	7.485	0.000	8.650	23.760
LINE	10							11		12		13		14		15		20		

150 SEW IL 11.05

QLR 0.548

LEGEND

- EXISTING SURFACE LEVEL
- FINISHED SURFACE LEVEL
- HGL (Q5)
- SWD PIPE

0 20 40 60 80 100m

SCALE 1:1000 @A1

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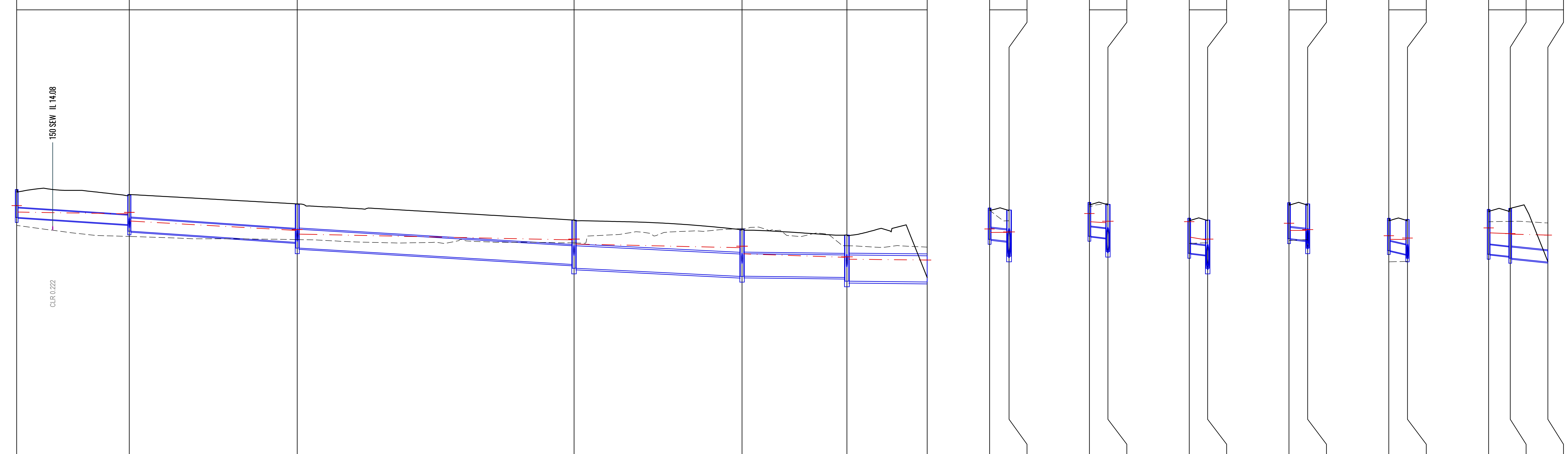
Project	134 TELEGRAPH ROAD KALKIE
TITLE	SWD LONG SECTIONS - SHEET 2
Figure Number	UES003003-FIG-12
Revision	B
Size	A1

DATE PLOTTED: 17 September 2020 11:57 AM BY : MARK TABER



STRUCTURE NAME	1-21		2-21		3-21		4-21		5-21		6-21		7-21	
STRUCTURE DESCRIPTION	LIP IN LINE GULLY TYPE S (GRADE)		LIP IN LINE GULLY TYPE S (GRADE) 1050 DIA.		LIP IN LINE GULLY TYPE S (GRADE) 1200 DIA.		LIP IN LINE GULLY TYPE S (GRADE) 1350 DIA.		LIP IN LINE GULLY TYPE S (GRADE) 1350 DIA.		LIP IN LINE GULLY TYPE S (SAG) 1500 DIA.		HEADWALL	
PIPE SIZE (mm)		375		525		750		900		900		1050		
PIPE CLASS		(RCP)		(RCP)		(RCP)		(RCP)		(RCP)		(RCP)		
PIPE GRADE		0.64% 1:157		0.67% 1:149		0.59% 1:168		0.49% 1:204		0.12% 1:833		0.10% 1:1000		
FULL PIPE VELOCITY (m/s)		0.77		1.53		1.27		1.33		1.64		1.37		
PART FULL VELOCITY (m/s)		1.33		1.85		2.07		2.13		1.64		1.37		
DATUM RL		0.0												
W.S.E IN STRUCTURE H.G.L IN PIPE	15.060	14.800	14.732 14.788	14.441	14.067 14.101	13.918	13.688 13.720	13.520	13.374 13.433	13.128	12.989 13.005	12.912	12.881	12.881
PIPE FLOW (cumecs)		0.085		0.331		0.563		0.845		1.042		1.183		
FLOW CAPACITY (cumecs)		0.140		0.352		0.859		1.266		0.627		0.867 Qx=0.315		
DEPTH TO INVERT		1.12	1.20	1.47	1.54	1.77	1.78	1.93	1.89	1.88	1.70	1.85	1.05	1.05
INVERT LEVELS		14.587	14.300	14.036	13.585	13.360	12.701	12.551	12.222	12.233	12.182	12.032	12.000	12.000
SURFACE LEVELS FINISHED (EXISTING)	15.704	(14.265)	15.505	(13.826)	15.129	(13.698)	14.480	(13.564)	14.111	(14.150)	13.882	(13.451)	13.050	(13.398)
STRUCTURE SETOUT COORDINATES	E 438572.086	N 7250491.214	E 438535.119	N 7250465.334	E 438473.652	N 7250437.902	E 438372.330	N 7250392.771	E 438308.249	N 7250372.059	E 438266.248	N 7250371.009	E 438234.661	N 7250377.248
LENGTH m		45.126		67.311		110.919		67.345		42.014		32.197		
DISTANCE ALONG DRAIN	0.000		45.126		112.437		223.355		290.700		332.714		364.912	
LINE							21							

STRUCTURE NAME	1-22		6-21	
STRUCTURE DESCRIPTION	LIP IN LINE GULLY TYPE S (SAG)		LIP IN LINE GULLY TYPE S (SAG) 1500 DIA.	
PIPE SIZE (mm)		450		
PIPE CLASS		(RCP)		
PIPE GRADE		1.00% 1:100		
FULL PIPE VELOCITY (m/s)		0.53		
PART FULL VELOCITY (m/s)		1.56		
DATUM RL		-1.0		
W.S.E IN STRUCTURE H.G.L IN PIPE	13.124	12.984	12.989 13.005	12.912
PIPE FLOW (cumecs)		0.085		
FLOW CAPACITY (cumecs)		0.285		
DEPTH TO INVERT		1.25	1.25	1.85
INVERT LEVELS		12.710	12.632	12.032
SURFACE LEVELS FINISHED (EXISTING)	13.962	(13.865)	13.882	(13.451)
STRUCTURE SETOUT COORDINATES	E 438266.311	N 7250378.803	E 438266.248	N 7250371.009
LENGTH m		7.794		
DISTANCE ALONG DRAIN	0.000		7.794	
LINE		22		

STRUCTURE NAME	1-23		5-21	
STRUCTURE DESCRIPTION	LIP IN LINE GULLY TYPE S (GRADE)		LIP IN LINE GULLY TYPE S (GRADE) 1350 DIA.	
PIPE SIZE (mm)		375		
PIPE CLASS		(RCP)		
PIPE GRADE		1.00% 1:100		
FULL PIPE VELOCITY (m/s)		1.12		
PART FULL VELOCITY (m/s)		1.72		
DATUM RL		-1.0		
W.S.E IN STRUCTURE H.G.L IN PIPE	13.743	13.411	13.374 13.433	13.128
PIPE FLOW (cumecs)		0.124		
FLOW CAPACITY (cumecs)		0.175		
DEPTH TO INVERT		1.35	1.35	1.88
INVERT LEVELS		12.832	12.758	12.233
SURFACE LEVELS FINISHED (EXISTING)	14.186	(14.009)	14.111	(14.150)
STRUCTURE SETOUT COORDINATES	E 438307.453	N 7250379.426	E 438308.249	N 7250372.059
LENGTH m		7.410		
DISTANCE ALONG DRAIN	0.000		7.410	
LINE		23		

STRUCTURE NAME	1-24		4-21	
STRUCTURE DESCRIPTION	LIP IN LINE GULLY TYPE S (GRADE)		LIP IN LINE GULLY TYPE S (GRADE) 1350 DIA.	
PIPE SIZE (mm)		375		
PIPE CLASS		(RCP)		
PIPE GRADE		1.00% 1:100		
FULL PIPE VELOCITY (m/s)		1.90		
PART FULL VELOCITY (m/s)		1.90		
DATUM RL		0.0		
W.S.E IN STRUCTURE H.G.L IN PIPE	14.416	13.793	13.688 13.720	13.520
PIPE FLOW (cumecs)		0.210		
FLOW CAPACITY (cumecs)		0.175		
DEPTH TO INVERT		1.41	1.40	1.93
INVERT LEVELS		13.150	13.076	12.551
SURFACE LEVELS FINISHED (EXISTING)	14.558	(13.545)	14.480	(13.564)
STRUCTURE SETOUT COORDINATES	E 438369.314	N 7250399.529	E 438372.330	N 7250392.771
LENGTH m		7.400		
DISTANCE ALONG DRAIN	0.000		7.400	
LINE		24		

STRUCTURE NAME	1-25		3-21	
STRUCTURE DESCRIPTION	LIP IN LINE GULLY TYPE S (GRADE)		LIP IN LINE GULLY TYPE S (GRADE) 1200 DIA.	
PIPE SIZE (mm)		450		
PIPE CLASS		(RCP)		
PIPE GRADE		1.00% 1:100		
FULL PIPE VELOCITY (m/s)		0.79		
PART FULL VELOCITY (m/s)		1.74		
DATUM RL		0.0		
W.S.E IN STRUCTURE H.G.L IN PIPE	14.352	14.065	14.067 14.101	13.918
PIPE FLOW (cumecs)		0.126		
FLOW CAPACITY (cumecs)		0.285		
DEPTH TO INVERT		1.44	1.47	1.77
INVERT LEVELS		13.735	13.660	13.360
SURFACE LEVELS FINISHED (EXISTING)	15.178	(13.664)	15.129	(13.698)
STRUCTURE SETOUT COORDINATES	E 438470.601	N 7250444.737	E 438473.652	N 7250437.902
LENGTH m		7.485		
DISTANCE ALONG DRAIN	0.000		7.485	
LINE		25		

STRUCTURE NAME	1-26		2-21	
STRUCTURE DESCRIPTION	LIP IN LINE GULLY TYPE S (SAG)		LIP IN LINE GULLY TYPE S (GRADE) 1050 DIA.	
PIPE SIZE (mm)		375		
PIPE CLASS		(RCP)		
PIPE GRADE		2.00% 1:50		
FULL PIPE VELOCITY (m/s)		0.55		
PART FULL VELOCITY (m/s)		1.85		
DATUM RL		1.0		
W.S.E IN STRUCTURE H.G.L IN PIPE	14.853	14.711	14.702 14.759	14.411
PIPE FLOW (cumecs)		0.061		
FLOW CAPACITY (cumecs)		0.248		
DEPTH TO INVERT		1.30	1.40	1.55
INVERT LEVELS		14.256	14.106	13.956
SURFACE LEVELS FINISHED (EXISTING)	15.554	(13.808)	15.505	(13.826)
STRUCTURE SETOUT COORDINATES	E 438532.068	N 7250472.169	E 438535.119	N 7250465.334
LENGTH m		7.485		
DISTANCE ALONG DRAIN	0.000		7.485	
LINE		26		

STRUCTURE NAME	1-30		2-30		3-30	
STRUCTURE DESCRIPTION	LIP IN LINE GULLY TYPE S (SAG)		LIP IN LINE GULLY TYPE S (SAG)		HEADWALL	
PIPE SIZE (mm)		375		450		
PIPE CLASS		(RCP)		(RCP)		
PIPE GRADE		1.00% 1:100		1.00% 1:100		
FULL PIPE VELOCITY (m/s)		0.96		0.88		
PART FULL VELOCITY (m/s)		1.66		1.78		
DATUM RL		-1.0				
W.S.E IN STRUCTURE H.G.L IN PIPE	13.169	12.969	12.938	12.916	12.880	12.880
PIPE FLOW (cumecs)		0.106		0.140		
FLOW CAPACITY (cumecs)		0.175		0.286		
DEPTH TO INVERT		1.79	1.93	2.00	0.45	0.45
INVERT LEVELS		12.113	12.026	11.951	11.800	11.800
SURFACE LEVELS FINISHED (EXISTING)	13.906	(13.414)	13.952	(13.428)	12.250	(13.364)
STRUCTURE SETOUT COORDINATES	E 438241.661	N 7250334.825	E 438234.120	N 7250339.062	E 438220.947	N 7250346.464
LENGTH m		8.650		15.110		
DISTANCE ALONG DRAIN	0.000		8.650		23.760	
LINE			30			

LEGEND

- - - - -	EXISTING SURFACE LEVEL
———	FINISHED SURFACE LEVEL
— · —	HGL (Q5)
═══	SWD PIPE

0 20 40 60 80 100m
SCALE 1:1000 @A1

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Project	134 TELEGRAPH ROAD KALKIE		
TITLE	SWD LONG SECTIONS - SHEET 3		
Figure Number	UES003003-FIG-13	Revision B	Size A1

CAD File: C:\Users\tabsi\Dropbox\UES Projects\UES003003 134 Telegraph Rd\Design\Acad\UES003003-FIG 11 DRAINAGE LONG SEC.dwg

DATE PLOTTED: 8 September 2020 9:24 AM BY: MARK TABER

STRUCTURE NAME	1-31	2-31	3-31	4-31	5-31	6-31	7-31	8-31	9-31	10-31	11-31	12-31	13-31	1-32	12-31	1-33	11-31
STRUCTURE DESCRIPTION	CAP PIPE	LIP IN LINE GULLY TYPE S (SAG) 1500 DIA.	LIP IN LINE GULLY TYPE S (SAG) 1800 DIA.	ACCESS CHAMBER 1650 DIA.	LIP IN LINE GULLY TYPE S (GRADE) 1650 DIA.	LIP IN LINE GULLY TYPE S (GRADE) 1650 DIA.	LIP IN LINE GULLY TYPE S (SAG) 2100 DIA.	ACCESS CHAMBER 2100 DIA.	LIP IN LINE GULLY TYPE S (GRADE) 2100 DIA.	LIP IN LINE GULLY TYPE S (SAG) 2100 DIA.	LIP IN LINE GULLY TYPE S (SAG) 2100 DIA.	LIP IN LINE GULLY TYPE S (SAG) 2100 DIA.	HEADWALL	LIP IN LINE GULLY TYPE S (SAG) LIP IN LINE GULLY TYPE S (SAG) 2100 DIA.	LIP IN LINE GULLY TYPE S (SAG) LIP IN LINE GULLY TYPE S (SAG) 2100 DIA.		
PIPE SIZE (mm)		1050	1050	1200	1200	1200	1200	1500	1500	1500	1500	1650	1650		375		450
PIPE CLASS		(RCP)	(RCP)	(RCP)	(RCP)	(RCP)	(RCP)	(RCP)	(RCP)	(RCP)	(RCP)	(RCP)	(RCP)		(RCP)		(RCP)
PIPE GRADE		0.10%	0.10%	0.10%	0.10%	0.87%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%		1.00%		1.00%
		1:1000	1:1000	1:1000	1:1000	1:115	1:1000	1:1000	1:1000	1:1000	1:1000	1:1000	1:1000		1:100		1:100
FULL PIPE VELOCITY (m/s)		1.42	1.48	1.46	1.45	1.55	1.63	1.17	1.29	1.37	1.45	1.26	1.26		0.21		0.87
PART FULL VELOCITY (m/s)		1.42	1.48	1.46	1.45	3.19	1.63	1.44	1.44	1.37	1.45	1.53	1.53		1.10		1.78
DATUM RL		0.0													-1.0		-1.0
W.S.E IN STRUCTURE	14.636	14.636	14.636	14.634	14.612	14.384	14.227	14.134	13.917	13.819	13.792	13.640	13.576	13.491	13.409	13.260	13.169	13.060	13.003	13.026	13.008	13.482	13.188
H.G.L IN PIPE		14.636	14.636	14.633	14.610		14.234		13.935		13.823		13.588		13.440		13.190		13.033		13.033		13.190
PIPE FLOW (cumecs)		1.233	1.279	1.654	1.642	1.757		1.846		2.062		2.286		2.420		2.569		2.690		2.696		0.023		0.139	
FLOW CAPACITY (cumecs)		0.864	0.864	1.233	1.233	3.637		1.233		2.236		2.236		2.236		2.236		2.883		2.895		0.175		0.285	
		Qx=1.156	Qx=1.219	Qx=1.505	Qx=1.137	Qx=0.030																			
DEPTH TO INVERT		2.74	2.56	2.58	2.60	2.75	3.10	3.12	2.76	2.78	2.94	2.96	2.42	2.44	2.82	2.84	2.36	2.38	2.40	2.42	2.44	2.46	2.61	2.63	1.65	1.65	1.28	1.35	2.63	1.29	1.26	2.46
INVERT LEVELS		12.773	12.768	12.748	12.733	12.583	12.552	12.532	12.516	12.496	11.799	11.779	11.682	11.662	11.631	11.611	11.549	11.529	11.459	11.439	11.370	11.350	11.286	11.266	11.200	11.200	12.654	12.541	11.266	12.631	12.550	11.350
SURFACE LEVELS	15.512																															
FINISHED		(15.512)	15.324	(15.339)	15.331	(15.162)	15.650	(15.469)	15.278	(15.497)	14.736	(14.360)	14.105	(13.849)	14.454	(13.747)	13.912	(13.723)	13.862	(13.611)	13.811	(13.535)	13.895	(13.444)	12.850	(11.969)	13.932	(13.500)	13.895	(13.444)	13.922	(13.517)	13.811	(13.535)
(EXISTING)																																
STRUCTURE SETOUT COORDINATES	E 438694.487	N 7250486.599	E 438689.713	N 7250484.206	E 438675.871	N 7250478.108	E 438688.006	N 7250449.775	E 438680.540	N 7250435.686	E 438607.354	N 7250403.024	E 438518.371	N 7250364.117	E 438491.781	N 7250347.059	E 438433.913	N 7250325.291	E 438369.812	N 7250298.160	E 438302.256	N 7250284.538	E 438237.635	N 7250286.691	E 438183.015	N 7250323.327	E 438244.353	N 7250277.520	E 438237.635	N 7250286.691	E 438302.874	N 7250276.502	E 438302.256	N 7250284.538
LENGTH m		5.341	15.125	30.822	15.945	80.144		97.117		31.592		61.826		69.606		68.916		64.656		65.769			11.368				8.060						
DISTANCE ALONG DRAIN	0.000	5.341	20.466	51.288	67.233	147.376		244.493		276.085		337.911		407.518		476.434		541.090		606.859			0.000	11.368			0.000	8.060						
LINE									31																			32				33		

159.5LW IL 14.07

C&D 0.5SD

LEGEND

- EXISTING SURFACE LEVEL
- FINISHED SURFACE LEVEL
- HGL (Q5)
- SWD PIPE

0 20 40 60 80 100m

SCALE 1:1000 @A1

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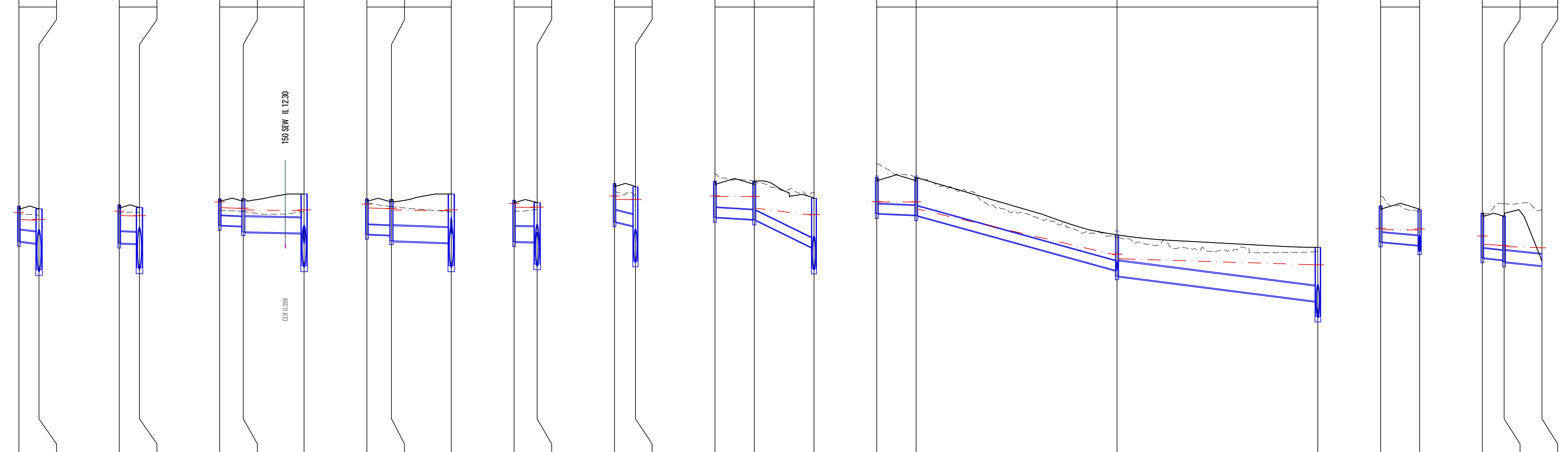
Project: 134 TELEGRAPH ROAD KALKIE

TITLE: SWD LONG SECTIONS - SHEET 4

Figure Number: UES003003-FIG-14 | Revision: B | Size: A1

CAD File: C:\Users\tabs\Dropbox\UES Projects\UES003003 134 Telegraph Rd\Design\Acad\UES003003-FIG 11 DRAINAGE LONG SEC.dwg

DATE PLOTTED: 8 September 2020 9:25 AM BY : MARK TABER



LINE 34

	1-34		
STRUCTURE NAME	1-34	10-31	
STRUCTURE DESCRIPTION	LIP IN LINE GULLY	TYPE S (SAG) LIP IN LINE GULLY	TYPE S (SAG) 2100 DIA.
PIPE SIZE (mm)		450	
PIPE CLASS		(RCP)	
PIPE GRADE		1.00% 1:100	
FULL PIPE VELOCITY (m/s)		1.06	
PART FULL VELOCITY (m/s)		1.87	
DATUM RL		-1.0	
W.S.E IN STRUCTURE H.G.L IN PIPE	13.712	13.437 13.409 13.440	13.260
PIPE FLOW (cumecs)		0.168	
FLOW CAPACITY (cumecs)		0.285	
DEPTH TO INVERT		1.40 1.37	2.42
INVERT LEVELS		12.570 12.489	11.439
SURFACE LEVELS FINISHED (EXISTING)	13.972	(13.649) 13.862	(13.611)
STRUCTURE SETOUT COORDINATES	E 438372.354	N 7250290.538 E 438369.812	N 7250298.160
LENGTH m		8.035	
DISTANCE ALONG DRAIN	0.000	8.035	
LINE		34	

LINE 35

STRUCTURE NAME	1-35	9-31	
STRUCTURE DESCRIPTION	LIP IN LINE GULLY	TYPE S (SAG) LIP IN LINE GULLY	TYPE S (GRADE) 2100 DIA.
PIPE SIZE (mm)		450	
PIPE CLASS		(RCP)	
PIPE GRADE		0.30% 1:333	
FULL PIPE VELOCITY (m/s)		0.89	
PART FULL VELOCITY (m/s)		1.11	
DATUM RL		-1.0	
W.S.E IN STRUCTURE H.G.L IN PIPE	13.766	13.596 13.576 13.588	13.491
PIPE FLOW (cumecs)		0.142	
FLOW CAPACITY (cumecs)		0.156	
DEPTH TO INVERT		1.52 1.44	2.38
INVERT LEVELS		12.499 12.475	11.529
SURFACE LEVELS FINISHED (EXISTING)	14.022	(13.695) 13.912	(13.723)
STRUCTURE SETOUT COORDINATES	E 438437.188	N 7250317.953 E 438433.913	N 7250325.291
LENGTH m		8.035	
DISTANCE ALONG DRAIN	0.000	8.035	
LINE		35	

LINE 36

STRUCTURE NAME	1-36	2-36	8-31	
STRUCTURE DESCRIPTION	LIP IN LINE GULLY	TYPE S (SAG) LIP IN LINE GULLY	TYPE S (SAG) 1050 DIA. ACCESS CHAMBER	2100 DIA.
PIPE SIZE (mm)		375	600	
PIPE CLASS		(RCP)	(RCP)	
PIPE GRADE		0.40% 1:250	0.20% 1:500	
FULL PIPE VELOCITY (m/s)		0.93	0.71	
PART FULL VELOCITY (m/s)		1.14	1.06	
DATUM RL		-1.0		
W.S.E IN STRUCTURE H.G.L IN PIPE	14.135	13.911 13.879 13.889	13.818 13.792 13.823	13.640
PIPE FLOW (cumecs)		0.103	0.202	
FLOW CAPACITY (cumecs)		0.111	0.275	
DEPTH TO INVERT		1.05 1.09	1.32 1.55	2.84
INVERT LEVELS		13.211 13.173	12.948 12.900	11.611
SURFACE LEVELS FINISHED (EXISTING)	14.260	(13.827) 14.268	(13.788) 14.454	(13.747)
STRUCTURE SETOUT COORDINATES	E 438511.398	N 7250327.609 E 438502.298	N 7250325.245 E 438491.781	N 7250347.059
LENGTH m		9.403	24.217	
DISTANCE ALONG DRAIN	0.000	9.403	33.620	
LINE		36		

LINE 37

STRUCTURE NAME	1-37	2-37	8-31	
STRUCTURE DESCRIPTION	LIP IN LINE GULLY	TYPE S (SAG) LIP IN LINE GULLY	TYPE S (SAG) 1050 DIA. ACCESS CHAMBER	2100 DIA.
PIPE SIZE (mm)		375	600	
PIPE CLASS		(RCP)	(RCP)	
PIPE GRADE		0.40% 1:250	0.33% 1:305	
FULL PIPE VELOCITY (m/s)		0.91	0.71	
PART FULL VELOCITY (m/s)		1.14	1.28	
DATUM RL		-1.0		
W.S.E IN STRUCTURE H.G.L IN PIPE	14.052	13.900 13.868 13.881	13.818 13.792 13.823	13.640
PIPE FLOW (cumecs)		0.101	0.201	
FLOW CAPACITY (cumecs)		0.111	0.352	
DEPTH TO INVERT		1.41 1.42	1.65 1.94	2.84
INVERT LEVELS		12.853 12.814	12.589 12.511	11.611
SURFACE LEVELS FINISHED (EXISTING)	14.261	(14.103) 14.237	(13.956) 14.454	(13.747)
STRUCTURE SETOUT COORDINATES	E 438490.510	N 7250372.711 E 438481.617	N 7250368.642 E 438491.781	N 7250347.059
LENGTH m		9.779	23.856	
DISTANCE ALONG DRAIN	0.000	9.779	33.635	
LINE		37		

LINE 38

STRUCTURE NAME	1-38	7-31	
STRUCTURE DESCRIPTION	LIP IN LINE GULLY	TYPE S (SAG) LIP IN LINE GULLY	TYPE S (SAG) 2100 DIA.
PIPE SIZE (mm)		600	
PIPE CLASS		(RCP)	
PIPE GRADE		0.20% 1:500	
FULL PIPE VELOCITY (m/s)		0.76	
PART FULL VELOCITY (m/s)		1.08	
DATUM RL		-1.0	
W.S.E IN STRUCTURE H.G.L IN PIPE	14.072	13.928 13.917 13.935	13.819
PIPE FLOW (cumecs)		0.216	
FLOW CAPACITY (cumecs)		0.275	
DEPTH TO INVERT		1.64 1.56	2.44
INVERT LEVELS		12.562 12.544	11.662
SURFACE LEVELS FINISHED (EXISTING)	14.204	(13.778) 14.105	(13.849)
STRUCTURE SETOUT COORDINATES	E 438522.173	N 7250355.746 E 438518.371	N 7250364.117
LENGTH m		9.194	
DISTANCE ALONG DRAIN	0.000	9.194	
LINE		38	

LINE 39

STRUCTURE NAME	1-39	6-31	
STRUCTURE DESCRIPTION	LIP IN LINE GULLY	TYPE S (GRADE) LIP IN LINE GULLY	TYPE S (GRADE) 1650 DIA.
PIPE SIZE (mm)		450	
PIPE CLASS		(RCP)	
PIPE GRADE		2.05% 1:49	
FULL PIPE VELOCITY (m/s)		0.67	
PART FULL VELOCITY (m/s)		2.16	
DATUM RL		-1.0	
W.S.E IN STRUCTURE H.G.L IN PIPE	14.374	14.238 14.227 14.234	14.134
PIPE FLOW (cumecs)		0.107	
FLOW CAPACITY (cumecs)		0.409	
DEPTH TO INVERT		1.52 1.56	2.96
INVERT LEVELS		13.351 13.179	11.779
SURFACE LEVELS FINISHED (EXISTING)	14.873	(14.591) 14.736	(14.360)
STRUCTURE SETOUT COORDINATES	E 438610.751	N 7250395.412 E 438607.354	N 7250403.024
LENGTH m		8.335	
DISTANCE ALONG DRAIN	0.000	8.335	
LINE		39	

LINE 40

STRUCTURE NAME	1-40	2-40	5-31	
STRUCTURE DESCRIPTION	LIP IN LINE GULLY	TYPE S (GRADE) LIP IN LINE GULLY	TYPE S (GRADE) LIP IN LINE GULLY	TYPE S (GRADE) 1650 DIA.
PIPE SIZE (mm)		375	375	
PIPE CLASS		(RCP)	(RCP)	
PIPE GRADE		0.56% 1:177	4.64% 1:22	
FULL PIPE VELOCITY (m/s)		0.31	1.72	
PART FULL VELOCITY (m/s)		1.00	3.43	
DATUM RL		0.0		
W.S.E IN STRUCTURE H.G.L IN PIPE	15.379	15.357 15.351 15.357	14.889 14.610 14.636	14.384
PIPE FLOW (cumecs)		0.035	0.190	
FLOW CAPACITY (cumecs)		0.132	0.378	
DEPTH TO INVERT		1.43 1.52	1.54 1.96	2.78
INVERT LEVELS		14.531 14.443	14.423 13.321	12.496
SURFACE LEVELS FINISHED (EXISTING)	15.963	(16.273) 15.963	(15.974) 15.278	(15.497)
STRUCTURE SETOUT COORDINATES	E 438714.494	N 7250428.580 E 438700.137	N 7250422.254 E 438680.540	N 7250435.686
LENGTH m		15.689	23.758	
DISTANCE ALONG DRAIN	0.000	15.689	39.447	
LINE		40		

LINE 41

STRUCTURE NAME	1-41	2-41	3-41	3-31	
STRUCTURE DESCRIPTION	LIP IN LINE GULLY	TYPE S (GRADE) LIP IN LINE GULLY	TYPE S (GRADE) LIP IN LINE GULLY	TYPE S (GRADE) 1050 DIA. LIP IN LINE GULLY	TYPE S (SAG) 1800 DIA.
PIPE SIZE (mm)		375	375	600	
PIPE CLASS		(RCP)	(RCP)	(RCP)	
PIPE GRADE		0.40% 1:250	2.73% 1:37	1.26% 1:80	
FULL PIPE VELOCITY (m/s)		0.22	1.12	1.19	
PART FULL VELOCITY (m/s)		0.80	2.52	2.42	
DATUM RL		2.0			
W.S.E IN STRUCTURE H.G.L IN PIPE	17.155	17.138 17.135 17.145	16.855 15.023 15.061	14.875 14.636	14.634
PIPE FLOW (cumecs)		0.024	0.124	0.336	
FLOW CAPACITY (cumecs)		0.111	0.290	0.688	
DEPTH TO INVERT		1.43 1.49	1.51 1.42	1.64 2.15	2.75
INVERT LEVELS		16.678 16.615	16.595 14.412	14.187 13.183	12.583
SURFACE LEVELS FINISHED (EXISTING)	18.110	(18.680) 18.110	(18.102) 15.828	(15.731) 15.331	(15.162)
STRUCTURE SETOUT COORDINATES	E 438625.431	N 7250630.723 E 438611.064	N 7250624.393 E 438643.479	N 7250551.256 E 438675.871	N 7250478.108
LENGTH m		15.700	79.999	79.999	
DISTANCE ALONG DRAIN	0.000	15.700	95.699	175.698	
LINE			41		

LINE 42

STRUCTURE NAME	1-42	3-41	
STRUCTURE DESCRIPTION	LIP IN LINE GULLY	TYPE S (GRADE) LIP IN LINE GULLY	TYPE S (GRADE) 1050 DIA.
PIPE SIZE (mm)		375	
PIPE CLASS		(RCP)	
PIPE GRADE		0.85% 1:118	
FULL PIPE VELOCITY (m/s)		0.38	
PART FULL VELOCITY (m/s)		1.23	
DATUM RL		1.0	
W.S.E IN STRUCTURE H.G.L IN PIPE	15.085	15.033 15.023 15.061	14.875
PIPE FLOW (cumecs)		0.042	
FLOW CAPACITY (cumecs)		0.162	
DEPTH TO INVERT		1.43 1.42	1.64
INVERT LEVELS		14.544 14.412	14.187
SURFACE LEVELS FINISHED (EXISTING)	15.976	(16.386) 15.828	(15.731)
STRUCTURE SETOUT COORDINATES	E 438657.686	N 7250557.515 E 438643.479	N 7250551.256
LENGTH m		15.525	
DISTANCE ALONG DRAIN	0.000	15.525	
LINE		42	

LINE 50

STRUCTURE NAME	1-50	2-50	3-50	
STRUCTURE DESCRIPTION	LIP IN LINE GULLY	TYPE S (SAG) LIP IN LINE GULLY	TYPE S (SAG) HEADWALL	
PIPE SIZE (mm)		375	450	
PIPE CLASS		(RCP)	(RCP)	
PIPE GRADE		1.00% 1:100	1.00% 1:100	
FULL PIPE VELOCITY (m/s)		1.07	1.01	
PART FULL VELOCITY (m/s)		1.70	1.85	
DATUM RL		-1.0		
W.S.E IN STRUCTURE H.G.L IN PIPE	12.780	12.446 12.406	12.359 12.311	12.311
PIPE FLOW (cumecs)		0.118	0.161	
FLOW CAPACITY (cumecs)		0.175	0.286	
DEPTH TO INVERT		1.78 1.76	1.84 0.45	0.45
INVERT LEVELS		11.913 11.826	11.751 11.600	11.600
SURFACE LEVELS FINISHED (EXISTING)	13.693	(13.684) 13.586	(14.063) 12.050	(13.818)
STRUCTURE SETOUT COORDINATES	E 438251.648	N 7250203.512 E 438243.387	N 7250200.948 E 438228.956	N 7250196.469
LENGTH m		8.650	15.110	
DISTANCE ALONG DRAIN	0.000	8.650	23.760	
LINE		50		

LEGEND

- – – – – EXISTING SURFACE LEVEL
- ——— FINISHED SURFACE LEVEL
- — · — HGL (Q5)
- ═══ SWD PIPE

0 20 40 60 80 100m
SCALE 1:1000 @A1

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Project 134 TELEGRAPH ROAD KALKIE		
TITLE SWD LONG SECTIONS - SHEET 5		
Figure Number UES003003-FIG-15	Revision B	Size A1

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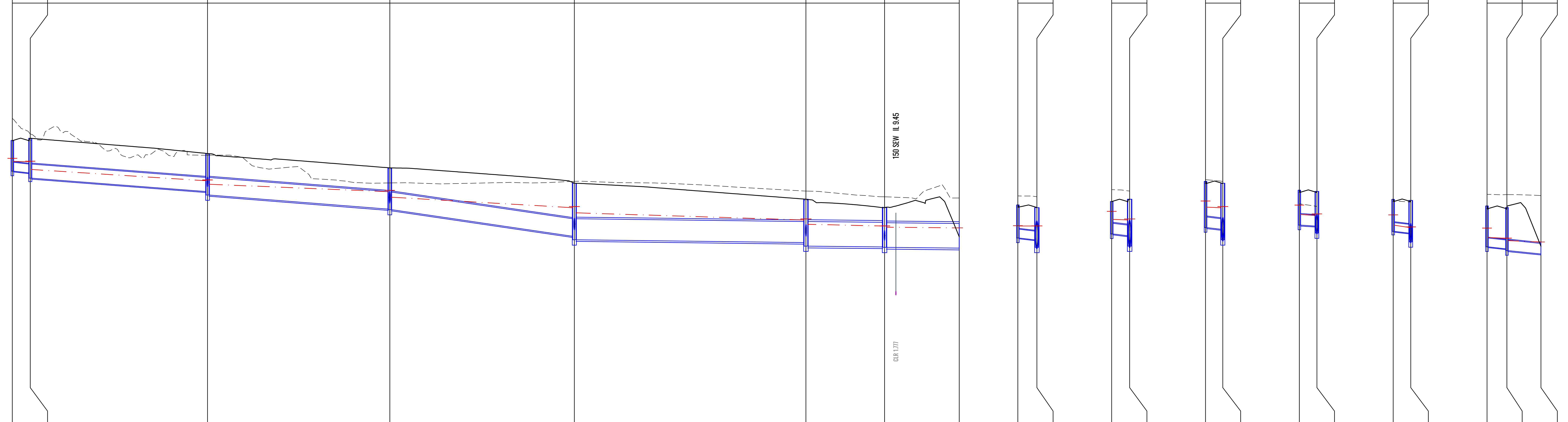

STRUCTURE NAME	1-51		2-51		3-51		4-51		5-51		6-51		7-51		8-51
STRUCTURE DESCRIPTION	LIP IN LINE GULLY TYPE S (GRADE)		LIP IN LINE GULLY TYPE S (GRADE) 1050 DIA.		LIP IN LINE GULLY TYPE S (GRADE) 1200 DIA.		LIP IN LINE GULLY TYPE S (GRADE) 1200 DIA.		LIP IN LINE GULLY TYPE S (GRADE) 1350 DIA.		LIP IN LINE GULLY TYPE S (GRADE) 1500 DIA.		LIP IN LINE GULLY TYPE S (SAG) 1500 DIA.		HEADWALL
PIPE SIZE (mm)		375		600		750		750		900		1050		1050	
PIPE CLASS		(RCP)		(RCP)		(RCP)		(RCP)		(RCP)		(RCP)		(RCP)	
PIPE GRADE		1.00% 1:100		0.75% 1:133		0.78% 1:129		1.45% 1:69		0.12% 1:833		0.10% 1:1000		0.10% 1:1000	
FULL PIPE VELOCITY (m/s)		0.51		1.14		1.26		1.66		1.58		1.45		1.58	
PART FULL VELOCITY (m/s)		1.42		1.97		2.29		3.10		1.58		1.45		1.58	
DATUM RL		-1.0													
W.S.E IN STRUCTURE H.G.L IN PIPE	15.279	15.150 15.142 15.156		14.805 14.322 14.357		14.176 13.859 13.912		13.623 13.175 13.225		12.956 12.651 12.694		12.467 12.393 12.399		12.344 12.312	12.312
PIPE FLOW (cumecs)		0.057		0.322		0.557		0.735		1.006		1.254		1.366	
FLOW CAPACITY (cumecs)		0.175		0.533		0.981		1.339		0.627		0.864		0.867 Qx=0.499	
DEPTH TO INVERT		1.31 1.48		1.70 1.62		1.77 1.76		1.78 2.26		2.41 1.85		2.00 1.67		1.69 1.05	1.05
INVERT LEVELS		14.736 14.659		14.434 13.865		13.715 13.112		13.092 11.954		11.804 11.685		11.535 11.502		11.482 11.450	11.450
SURFACE LEVELS FINISHED (EXISTING)	16.043	(16.983) 16.135		(16.316) 15.485		(15.414) 14.873		(14.230) 14.219		(14.297) 13.537		(13.883) 13.175		(13.639) 12.500	(13.589)
STRUCTURE SETOUT COORDINATES	E 438618.915	N 7250296.970 E 438615.801		N 7250303.957 E 438546.974		N 7250272.757 E 438476.014		N 7250241.083 E 438403.637		N 7250210.228 E 438308.802		N 7250182.804 E 438278.941		N 7250167.547 E 438249.389	N 7250155.756
LENGTH m		7.650		75.568		77.708		78.679		98.721		33.534		31.817	
DISTANCE ALONG DRAIN	0.000	7.650		83.218		160.927		239.606		338.326		371.860		403.677	
LINE								51							

STRUCTURE NAME	1-52		7-51
STRUCTURE DESCRIPTION	LIP IN LINE GULLY TYPE S (SAG)		LIP IN LINE GULLY TYPE S (SAG) 1500 DIA.
PIPE SIZE (mm)		375	
PIPE CLASS		(RCP)	
PIPE GRADE		1.00% 1:100	
FULL PIPE VELOCITY (m/s)		0.17	
PART FULL VELOCITY (m/s)		1.04	
DATUM RL		-1.0	
W.S.E IN STRUCTURE H.G.L IN PIPE	12.408	12.394 12.393 12.399	12.344
PIPE FLOW (cumecs)		0.019	
FLOW CAPACITY (cumecs)		0.175	
DEPTH TO INVERT		1.41 1.37	1.69
INVERT LEVELS		11.882 11.801	11.482
SURFACE LEVELS FINISHED (EXISTING)	13.290	(13.675) 13.175	(13.639)
STRUCTURE SETOUT COORDINATES	E 438284.047	N 7250161.265 E 438278.941	N 7250167.547
LENGTH m		8.095	
DISTANCE ALONG DRAIN	0.000	8.095	
LINE		52	

STRUCTURE NAME	1-53		6-51
STRUCTURE DESCRIPTION	LIP IN LINE GULLY TYPE S (GRADE)		LIP IN LINE GULLY TYPE S (GRADE) 1500 DIA.
PIPE SIZE (mm)		450	
PIPE CLASS		(RCP)	
PIPE GRADE		1.00% 1:100	
FULL PIPE VELOCITY (m/s)		1.03	
PART FULL VELOCITY (m/s)		1.85	
DATUM RL		-1.0	
W.S.E IN STRUCTURE H.G.L IN PIPE	13.022	12.676 12.651 12.694	12.467
PIPE FLOW (cumecs)		0.164	
FLOW CAPACITY (cumecs)		0.285	
DEPTH TO INVERT		1.37 1.56	2.00
INVERT LEVELS		12.057 11.981	11.535
SURFACE LEVELS FINISHED (EXISTING)	13.431	(13.941) 13.537	(13.883)
STRUCTURE SETOUT COORDINATES	E 438310.977	N 7250175.470 E 438308.802	N 7250182.804
LENGTH m		7.650	
DISTANCE ALONG DRAIN	0.000	7.650	
LINE		53	

STRUCTURE NAME	1-54		5-51
STRUCTURE DESCRIPTION	LIP IN LINE GULLY TYPE S (GRADE)		LIP IN LINE GULLY TYPE S (GRADE) 1350 DIA.
PIPE SIZE (mm)		450	
PIPE CLASS		(RCP)	
PIPE GRADE		1.00% 1:100	
FULL PIPE VELOCITY (m/s)		1.02	
PART FULL VELOCITY (m/s)		1.85	
DATUM RL		-1.0	
W.S.E IN STRUCTURE H.G.L IN PIPE	13.459	13.199 13.175 13.225	12.956
PIPE FLOW (cumecs)		0.163	
FLOW CAPACITY (cumecs)		0.285	
DEPTH TO INVERT		1.97 1.96	2.41
INVERT LEVELS		12.328 12.254	11.804
SURFACE LEVELS FINISHED (EXISTING)	14.301	(14.371) 14.219	(14.297)
STRUCTURE SETOUT COORDINATES	E 438405.740	N 7250203.165 E 438403.637	N 7250210.228
LENGTH m		7.369	
DISTANCE ALONG DRAIN	0.000	7.369	
LINE		54	

STRUCTURE NAME	1-55		4-51
STRUCTURE DESCRIPTION	LIP IN LINE GULLY TYPE S (GRADE)		LIP IN LINE GULLY TYPE S (GRADE) 1200 DIA.
PIPE SIZE (mm)		450	
PIPE CLASS		(RCP)	
PIPE GRADE		0.56% 1:180	
FULL PIPE VELOCITY (m/s)		1.03	
PART FULL VELOCITY (m/s)		1.47	
DATUM RL		0.0	
W.S.E IN STRUCTURE H.G.L IN PIPE	14.288	13.883 13.859 13.912	13.623
PIPE FLOW (cumecs)		0.163	
FLOW CAPACITY (cumecs)		0.213	
DEPTH TO INVERT		1.49 1.48	1.78
INVERT LEVELS		13.433 13.392	13.092
SURFACE LEVELS FINISHED (EXISTING)	14.924	(14.336) 14.873	(14.230)
STRUCTURE SETOUT COORDINATES	E 438479.061	N 7250234.255 E 438476.014	N 7250241.083
LENGTH m		7.477	
DISTANCE ALONG DRAIN	0.000	7.477	
LINE		55	

STRUCTURE NAME	1-56		3-51
STRUCTURE DESCRIPTION	LIP IN LINE GULLY TYPE S (SAG)		LIP IN LINE GULLY TYPE S (GRADE) 1200 DIA.
PIPE SIZE (mm)		375	
PIPE CLASS		(RCP)	
PIPE GRADE		1.00% 1:100	
FULL PIPE VELOCITY (m/s)		1.17	
PART FULL VELOCITY (m/s)		1.73	
DATUM RL		1.0	
W.S.E IN STRUCTURE H.G.L IN PIPE	14.866	14.429 14.328 14.357	14.176
PIPE FLOW (cumecs)		0.129	
FLOW CAPACITY (cumecs)		0.175	
DEPTH TO INVERT		1.37 1.40	1.77
INVERT LEVELS		14.165 14.090	13.715
SURFACE LEVELS FINISHED (EXISTING)	15.534	(15.488) 15.485	(15.414)
STRUCTURE SETOUT COORDINATES	E 438550.023	N 7250265.924 E 438546.974	N 7250272.757
LENGTH m		7.482	
DISTANCE ALONG DRAIN	0.000	7.482	
LINE		56	

STRUCTURE NAME	1-60		2-60		3-60
STRUCTURE DESCRIPTION	LIP IN LINE GULLY TYPE S (SAG)		LIP IN LINE GULLY TYPE S (SAG)		HEADWALL
PIPE SIZE (mm)		375		450	
PIPE CLASS		(RCP)		(RCP)	
PIPE GRADE		1.00% 1:100		1.00% 1:100	
FULL PIPE VELOCITY (m/s)		1.10		1.17	
PART FULL VELOCITY (m/s)		1.71		1.91	
DATUM RL		-1.0			
W.S.E IN STRUCTURE H.G.L IN PIPE	12.306	11.909 11.868 11.876		11.770 11.713	11.713
PIPE FLOW (cumecs)		0.121		0.187	
FLOW CAPACITY (cumecs)		0.175		0.286	
DEPTH TO INVERT		1.74 1.77		1.84 0.45	0.45
INVERT LEVELS		11.505 11.420		11.345 11.200	11.200
SURFACE LEVELS FINISHED (EXISTING)	13.248	(13.743) 13.187		(13.730) 11.650	(13.688)
STRUCTURE SETOUT COORDINATES	E 438308.097	N 7250131.627 E 438303.889		N 7250124.259 E 438297.803	N 7250111.077
LENGTH m		8.485		14.520	
DISTANCE ALONG DRAIN	0.000	8.485		23.005	
LINE			60		

LEGEND

- - - - EXISTING SURFACE LEVEL
— FINISHED SURFACE LEVEL
— · — HGL (Q5)
═ SWD PIPE

0 20 40 60 80 100m
SCALE 1:1000 @A1

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Project 134 TELEGRAPH ROAD KALKIE		
TITLE SWD LONG SECTIONS - SHEET 6		
Figure Number UES003003-FIG-16	Revision B	Size A1

CAD File: C:\Users\tabsi\Dropbox\UES Projects\UES003003 134 Telegraph Rd\Design\Acad\UES003003-FIG 11 DRAINAGE LONG SEC.dwg

DATE PLOTTED: 8 September 2020 9:26 AM BY: MARK TABER

STRUCTURE NAME	1-61	2-61	3-61	4-61	5-61	6-61	7-61	8-61	9-61	1-62	7-61	1-63	5-61	1-64	4-61	1-66	3-61	1-70	2-70	3-70	1-OUT4	2-OUT4	1-OUT5	2-OUT5
STRUCTURE DESCRIPTION	LIP IN LINE GULLY	TYPE S (GRADE) LIP IN LINE GULLY	TYPE S (GRADE)	TYPE S (GRADE) LIP IN LINE GULLY 1200 DIA.	TYPE S (GRADE) LIP IN LINE GULLY 1350 DIA.	TYPE S (GRADE) LIP IN LINE GULLY 1650 DIA.	TYPE S (GRADE) LIP IN LINE GULLY 1350 DIA.	TYPE S (SAG) LIP IN LINE GULLY 1800 DIA.	TYPE S (SAG) LIP IN LINE GULLY 1650 DIA. HEADWALL	LIP IN LINE GULLY	TYPE S (SAG) LIP IN LINE GULLY	LIP IN LINE GULLY	TYPE S (GRADE) LIP IN LINE GULLY	LIP IN LINE GULLY	TYPE S (GRADE) LIP IN LINE GULLY	LIP IN LINE GULLY	TYPE S (GRADE) LIP IN LINE GULLY	CAP PIPE	LIP IN LINE GULLY	TYPE S (SAG) LIP IN LINE GULLY	HEADWALL	HEADWALL	HEADWALL	HEADWALL
PIPE SIZE (mm)	375	450	600	900	900	900	1050	1050		375		450		450		375		450	450	1050	1200		1350	
PIPE CLASS	(RCP)	(RCP)	(RCP)	(RCP)	(RCP)	(RCP)	(RCP)	(RCP)		(RCP)		(RCP)		(RCP)		(RCP)		(RCP)	(RCP)	(RCP)	(RCP)		(RCP)	
PIPE GRADE	1.00%	0.92%	0.97%	1.77%	0.12%	0.12%	0.10%	0.10%		1.00%		1.00%		1.00%		0.40%		1.00%	1.00%	0.10%	0.25%		0.10%	
	1:100	1:108	1:103	1:56	1:833	1:833	1:1000	1:1000		1:100		1:100		1:100		1:250		1:100	1:100	1:1000	1:405		1:1000	
FULL PIPE VELOCITY (m/s)	2.21	1.92	1.76	1.34	1.65	1.80	1.53	1.55		1.14		0.77		1.30		1.09		0.27	1.25		0.00		0.00	
PART FULL VELOCITY (m/s)	2.21	1.92	2.38	3.46	1.65	1.80	1.53	1.55		1.73		1.72		1.96		1.09		1.28	1.25		0.00		0.00	
DATUM RL	0.0									-1.0		0.0		0.0		1.0		-1.0			-1.0		-2.0	
W.S.E IN STRUCTURE	15.792	15.436	15.024	14.423	14.141	13.080	12.909	12.795	12.600	12.468	12.204	12.072	11.852	11.767	11.741	11.717	11.717	12.503	12.077	12.955	12.809	12.795	13.747	13.210	13.108	12.909	14.804	14.459	14.423	14.487	14.141	12.153	12.153	12.151	12.198	12.198	12.198	11.008	11.008	11.008
H.G.L IN PIPE		15.370		14.487		13.108		12.831		12.528		12.109	11.769						12.072		12.831																			
		15.431																																					
PIPE FLOW (cumecs)	0.244	0.305	0.498	0.853	1.049	1.144	1.321	1.342		0.126		0.122		0.207		0.121		0.042	1.084		0.000		0.000	
FLOW CAPACITY (cumecs)	0.175	0.274	0.604	2.413	0.627	0.627	0.864	0.867		0.175		0.285		0.285		0.111		0.285	0.867		1.945		1.695	
	Qx=0.082							Qx=0.475											Qx=0.217					
DEPTH TO INVERT	1.41	1.49	1.56	1.51	1.66	1.56	1.86	2.26	2.28	1.93	1.95	1.69	1.84	2.09	2.11	1.05	1.05	1.22	1.16	1.84	1.85	1.83	2.28	1.39	1.41	1.86	1.41	1.44	1.66	1.52	1.60	2.20	1.05	1.20		1.20	1.35		1.35	1.35
INVERT LEVELS	14.468	14.392	14.317	13.829	13.679	12.665	12.365	11.327	11.307	11.260	11.240	11.200	11.050	11.034	11.014	11.000	11.000	11.815	11.725	11.050	11.830	11.757	11.307	12.890	12.815	12.365	13.935	13.904	13.679	11.594	11.514	10.914	10.900	10.900	11.800	11.700	11.700	11.004	10.960	10.960
SURFACE LEVELS	15.877									13.030		13.682		14.280		15.343		13.112			13.000		12.354	
FINISHED (EXISTING)	(16.565)	15.877	(16.560)	15.343	(15.947)	14.229	(15.344)	13.583	(15.827)	13.186	(15.584)	12.888	(14.944)	13.125	(14.717)	12.050	(14.296)	(14.963)	12.888	(14.944)	(15.684)	13.583	(15.827)	(15.383)	14.229	(15.344)	(15.885)	15.343	(15.947)	(14.542)	13.116	(14.425)	11.950	(14.177)	(13.580)	12.900	(11.026)	(13.981)	12.310	(10.146)
STRUCTURE SETOUT COORDINATES	E 4386648.462	E 4386645.336	E 4386597.230	E 4385501.416	E 4384409.621	E 4383882.723	E 4383374.297	E 4383367.544	E 4383071.878	E 4383391.455	E 4383382.723	E 4383449.259	E 4383447.191	E 4383504.462	E 4383501.416	E 4383600.347	E 4383597.230	E 4383447.357	E 4383443.237	E 4383436.483	E 4382249.127	E 4382239.011	E 4383446.084	E 4383431.256
	N 7250208.010	N 7250215.005	N 7250193.530	N 7250150.577	N 7250128.705	N 7250098.256	N 7250084.345	N 7250071.878		N 7250096.270	N 7250098.256	N 7250121.745	N 7250128.705	N 7250143.751	N 7250150.577	N 7250186.544	N 7250193.530	N 7250051.771	N 7250044.969	N 7250032.502	N 7250148.170	N 7250112.995	N 7250021.988	N 7249980.723
LENGTH m	7.662	52.682	105.001	58.469	39.194	33.097	16.264	14.179		8.956		7.260		7.475		7.650		7.952	14.179		40.520		43.848	
DISTANCE ALONG DRAIN	0.000	7.662	60.344	165.345	223.815	263.008	296.106	312.370	326.549	0.000	8.956	0.000	7.260	0.000	7.475	0.000	7.650	0.000	7.952	22.131	0.000	40.520	0.000	43.848
LINE	61									62		63		64		66		70			OUT4		OUT5	

150 SEW IL 10.40

C28.0419

LEGEND

- EXISTING SURFACE LEVEL
- FINISHED SURFACE LEVEL
- HGL (Q5)
- SWD PIPE

0 20 40 60 80 100m

SCALE 1:1000 @A1

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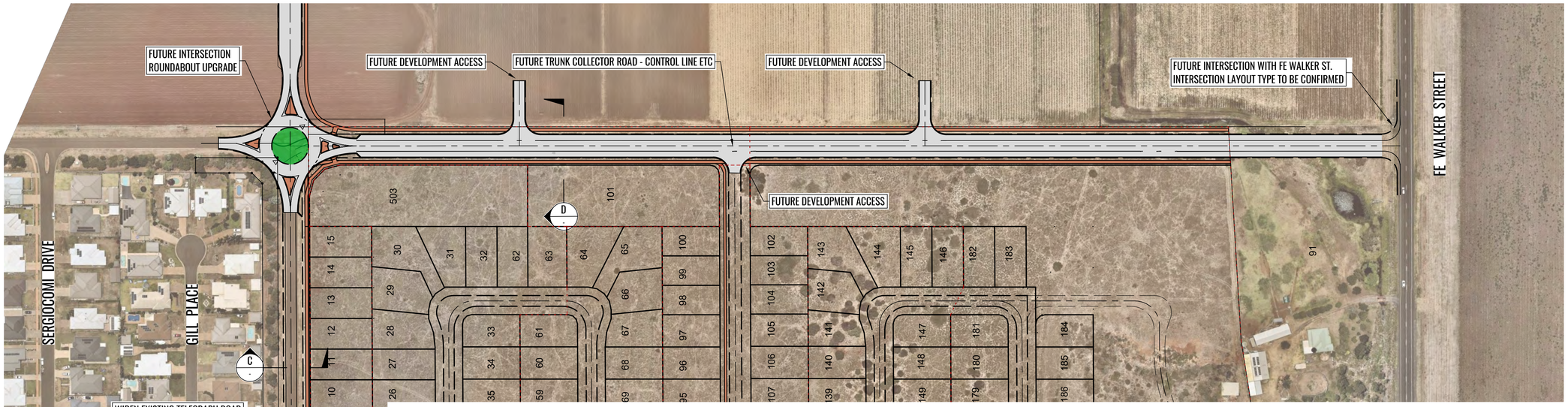
Project: 134 TELEGRAPH ROAD KALKIE

TITLE: SWD LONG SECTIONS - SHEET 7

Figure Number: UES003003-FIG-17 | Revision: B | Size: A1

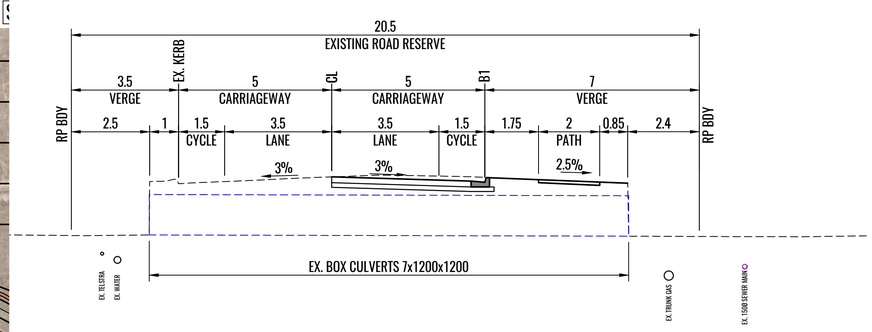
CAD File: C:\Users\taber\Dropbox\UES Projects\UES003003 134 Telegraph Rd\Design\Acad\UES003003-FIG 11 DRAINAGE LONG SEC.dwg

DATE PLOTTED: 13 October 2020 11:55 AM BY: MARK TABER



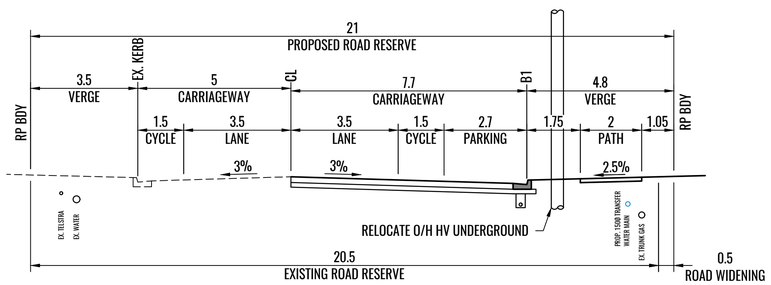
PLAN

SCALE A1 - 1 : 1500
A3 - 1 : 3000



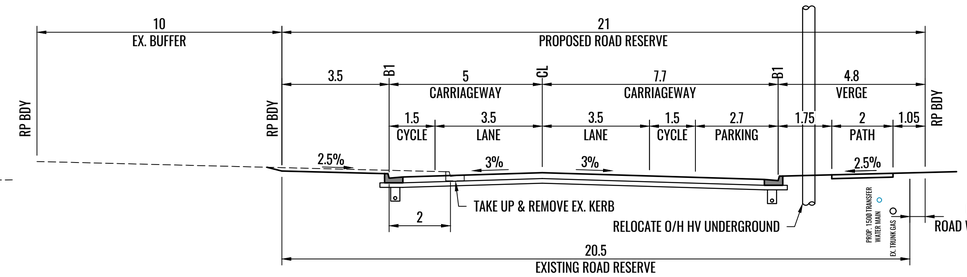
TELEGRAPH RD
SECTION A

SCALE A1 - 1 : 100
A3 - 1 : 200



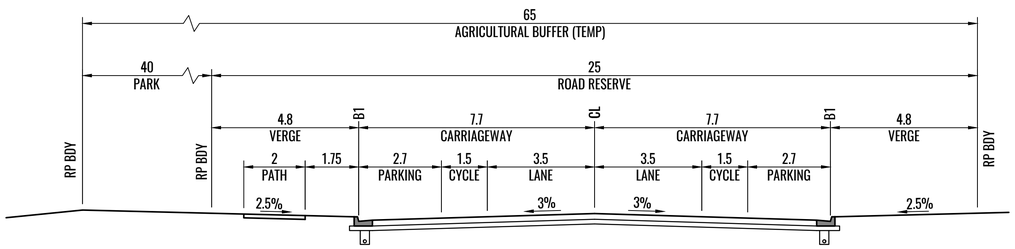
TELEGRAPH RD.
SECTION B

SCALE A1 - 1 : 100
A3 - 1 : 200



TELEGRAPH RD.
SECTION C

SCALE A1 - 1 : 100
A3 - 1 : 200



TRUNK COLLECTOR - EASTERN BDY
SECTION D

SCALE A1 - 1 : 100
A3 - 1 : 200

LEGEND - PROPOSED:

- ROAD CENTRELINE
- NOMINAL KERB LINE
- AC SURFACING
- TRAFFIC ISLANDS/PATHS
- LANDSCAPING
- STAGE BOUNDARY

0 50 100 150m
SCALE 1:1500 @A1

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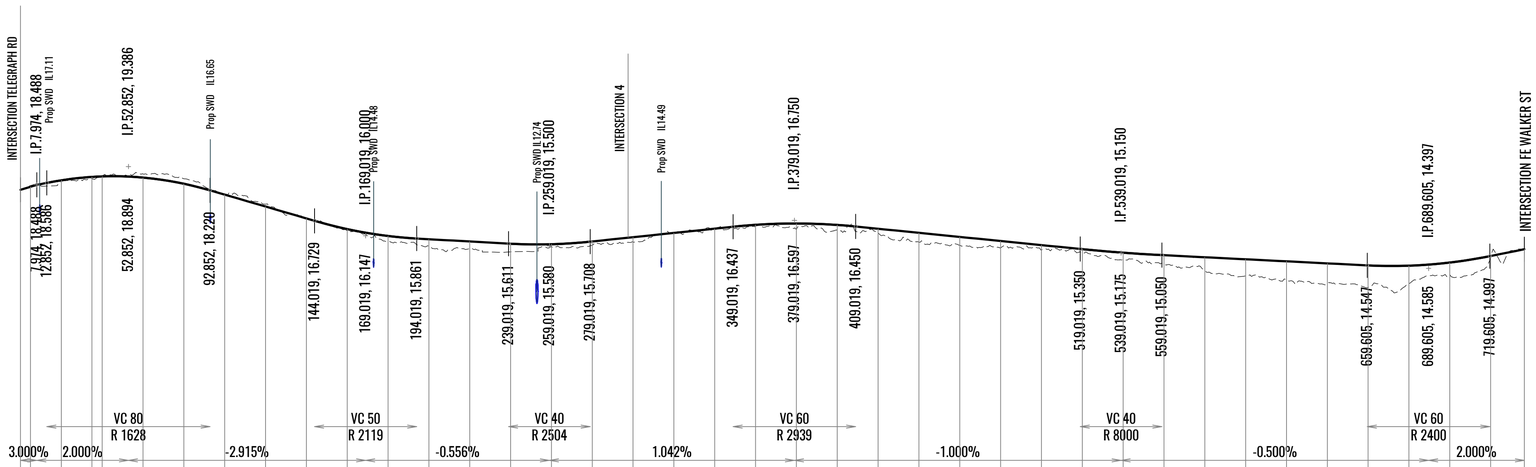
Project	134 TELEGRAPH ROAD KALKIE
TITLE	TRUNK ROAD INFRASTRUCTURE
Figure Number	UES003003-FIG-01
Revision	C
Size	A1

CAD File: C:\Users\taba\Dropbox\UES Projects\UES003003 134 Telegraph Rd\Design\Acad\UES003003-FIG 01 ROADWORKS TRUNK PLAN.dwg

DATE PLOTTED: 23 September 2020 12:02 PM BY - MARK TABER



DATUM RL 2.0

LIP LEVELS LHS			18.505	18.661	18.685	18.629	18.326	17.794	17.211	16.628	16.106	15.768
LIP LEVELS RHS			18.496	18.661	18.685	18.629	18.326	17.794	17.211	16.628	16.106	15.768
CUT/FILL (Depth of)	0.037	-0.057	0.063	0.085	-0.016	-0.178	-0.244	0.002	-0.113	0.024	0.083	0.243
DESIGN LEVELS	18.249	18.395	18.713	18.878	18.902	18.846	18.544	18.012	17.429	16.846	16.323	15.985
EXISTING SURFACE LEVELS	18.212	18.452	18.650	18.793	18.918	19.024	18.787	18.010	17.541	16.821	16.240	15.742
CHAINAGE	0.000	4.871	20.000	34.993	40.000	60.000	80.000	100.000	120.000	140.000	160.000	180.000
HC DATA		R 50										

LIP LEVELS LHS	15.610	15.499	15.388	15.365	15.501	15.709	15.918	16.126	16.314	16.379	16.309	16.123
LIP LEVELS RHS	15.610	15.499	15.388	15.365	15.501	15.709	15.918	16.126	16.314	16.379	16.309	16.123
CUT/FILL (Depth of)	0.351	0.335	0.396	0.119	0.182	0.234	0.018	0.035	0.065	0.275	0.223	0.200
DESIGN LEVELS	15.828	15.717	15.606	15.582	15.719	15.927	16.135	16.344	16.531	16.597	16.526	16.340
EXISTING SURFACE LEVELS	15.477	15.382	15.209	15.464	15.537	15.693	16.117	16.309	16.466	16.322	16.303	16.140
CHAINAGE	200.000	220.000	240.000	260.000	280.000	300.000	320.000	340.000	360.000	380.000	400.000	420.000
HC DATA												

LIP LEVELS LHS	15.923	15.723	15.523	15.323	15.123	14.950	14.828	14.728	14.628							
LIP LEVELS RHS	15.923	15.723	15.523	15.323	15.123	14.950	14.828	14.728	14.628							
CUT/FILL (Depth of)	0.456	0.410	0.344	0.238	0.196	0.342	0.431	0.656	0.817	0.896	0.989	1.080	0.871	0.593	0.053	-0.001
DESIGN LEVELS	16.140	15.940	15.740	15.540	15.340	15.168	15.045	14.945	14.845	14.745	14.645	14.545	14.532	14.685	15.005	15.335
EXISTING SURFACE LEVELS	15.684	15.530	15.397	15.302	15.144	14.826	14.614	14.289	14.028	13.849	13.656	13.465	13.660	14.092	14.952	15.336
CHAINAGE	440.000	460.000	480.000	500.000	520.000	540.000	560.000	580.000	600.000	620.000	640.000	660.000	680.000	700.000	720.000	736.519
HC DATA																

ETC

LONGITUDINAL SECTIONS

SCALE A1 - 1 : 1500
A3 - 1 : 3000

CAD File: C:\Users\tabsi\Dropbox\UES Projects\UES003003 134 Telegraph Rd\Design\Acad\UES003003-FIG 01 ROADWORKS TRUNK PLAN.dwg

0 50 100 150m
SCALE 1:1500 @A1

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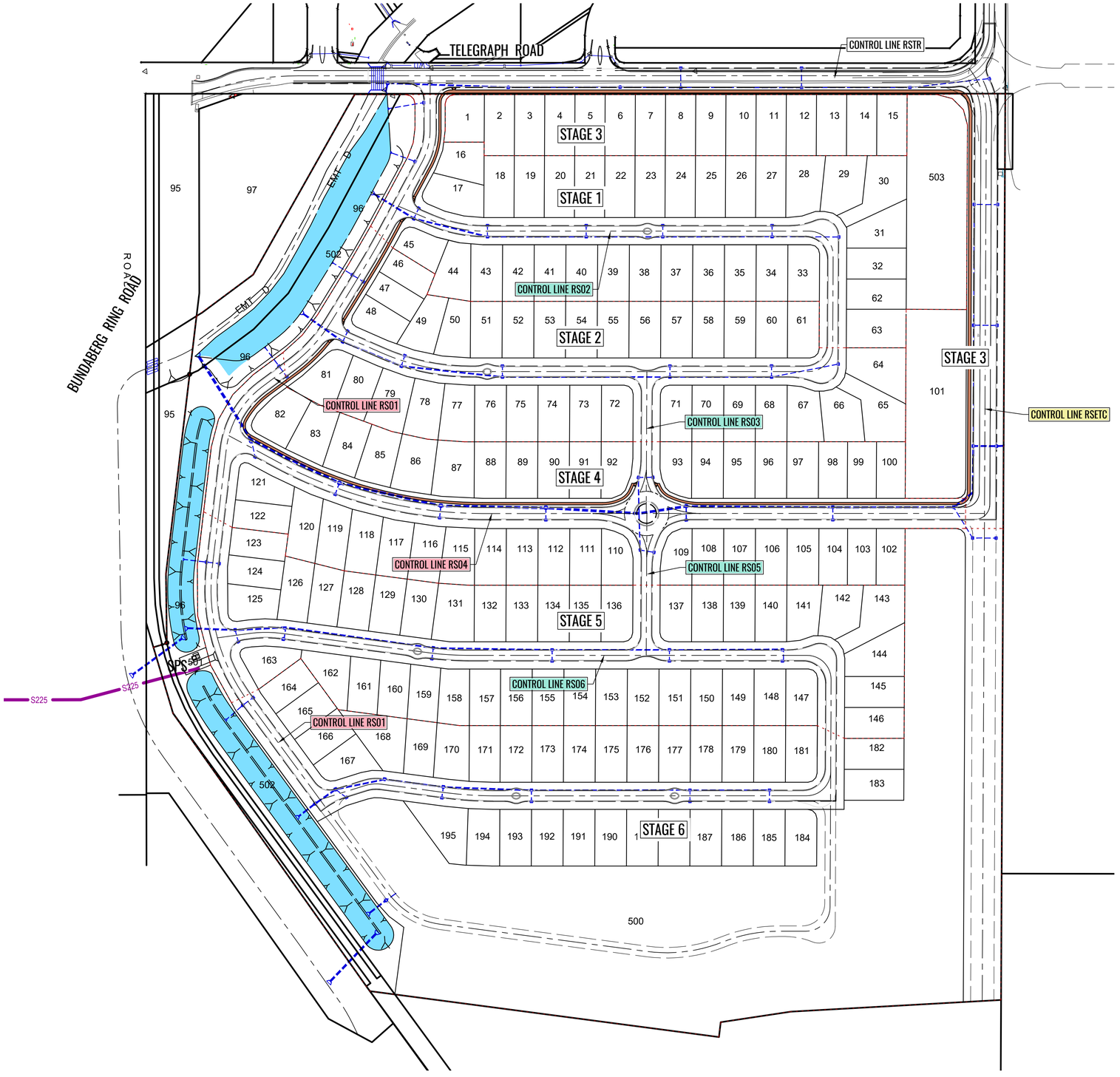
Project
134 TELEGRAPH ROAD KALKIE
TITLE
TRUNK COLLECTOR LONGITUDINAL SECTION
Figure Number
UES003003-FIG-02
Revision
C
Size
A1

DATE PLOTTED: 13 October 2020 11:58 AM BY : MARK TABER



LEGEND:

- ROAD CENTRELINE
- NOMINAL KERB LINE
- AC SURFACING
- FOOTPATHS
- TOP OF EMBANKMENT
- BOTTOM OF EMBANKMENT
- STORMWATER PIPES AND PITS
- DETENTION BASIN (INDICATIVE ONLY)
- STAGE BOUNDARY
- CONTROL LINE — ROAD WIDTH 25m
- CONTROL LINE — ROAD WIDTH 20m
- CONTROL LINE — ROAD WIDTH 18.0m

PLAN

SCALE A1 - 1 : 1500
A3 - 1 : 3000

SCALE 1:1500 @A1

0 50 100 150m

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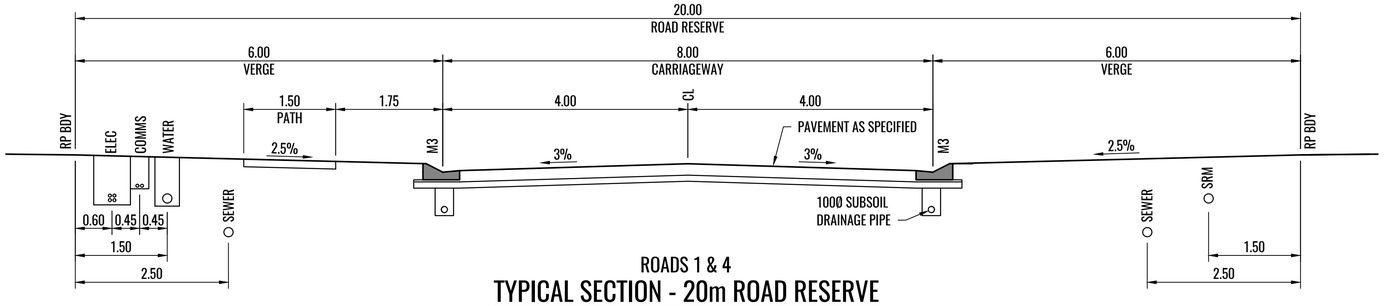
Project	134 TELEGRAPH ROAD KALKIE
TITLE	MASTERPLAN - ROADWORKS
Figure Number	UES003003-FIG-03
Revision	C
Size	A1

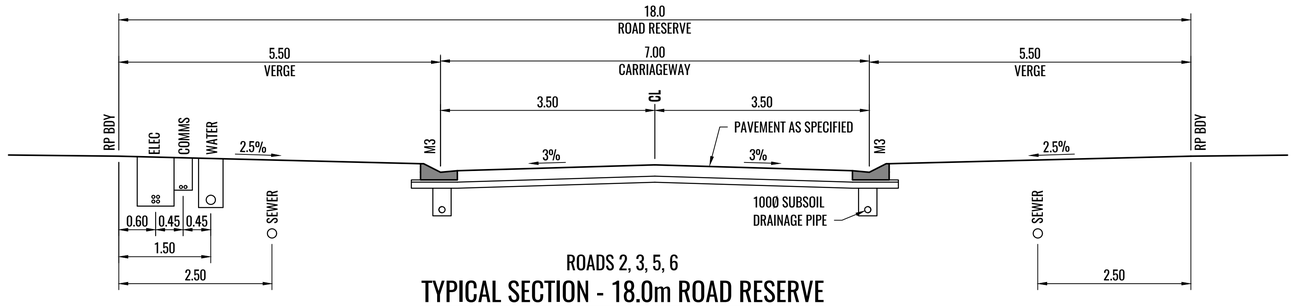
CAD File: C:\Users\tabs\Dropbox\UES Projects\UES003003 134 Telegraph Rd\Design\Acad\UES003003-FIG 03 ROADWORKS MASTERPLAN.dwg



ROADS 1 & 4

TYPICAL SECTION - 20m ROAD RESERVE

SCALE A1 - 1 : 50
A3 - 1 : 100



ROADS 2, 3, 5, 6

TYPICAL SECTION - 18.0m ROAD RESERVE

SCALE A1 - 1 : 50
A3 - 1 : 100

0 1 2 3 4 5m

SCALE 1:50 @A1

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Project
134 TELEGRAPH ROAD KALKIE

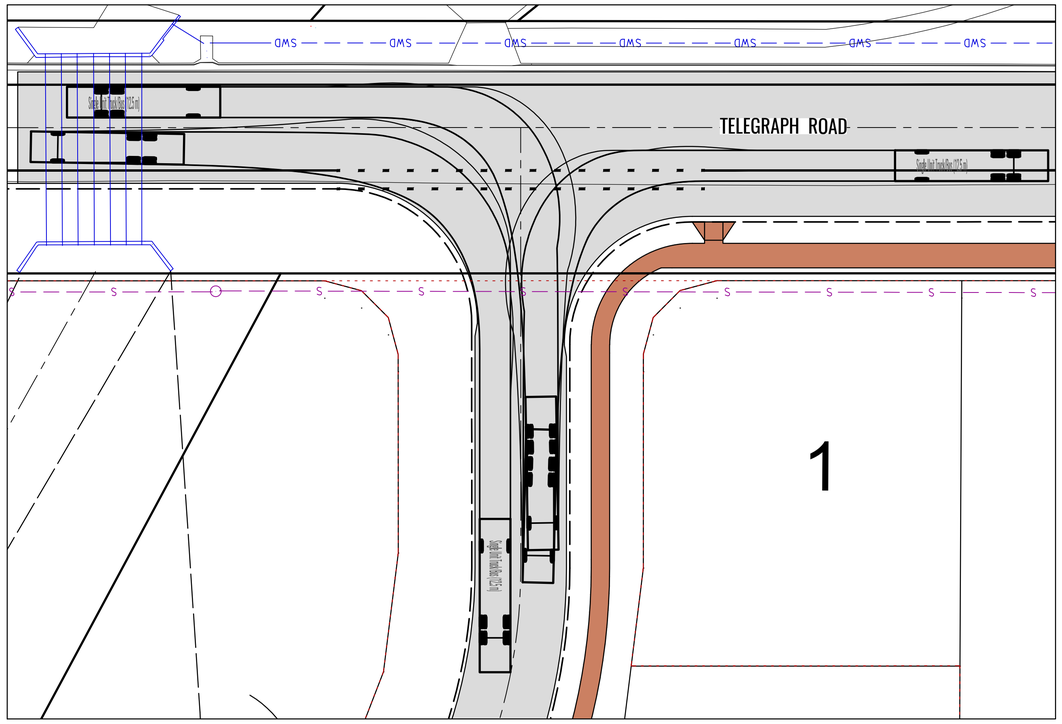
TITLE
ROADWORKS TYPICAL SECTIONS

Figure Number
UES003003-FIG-04

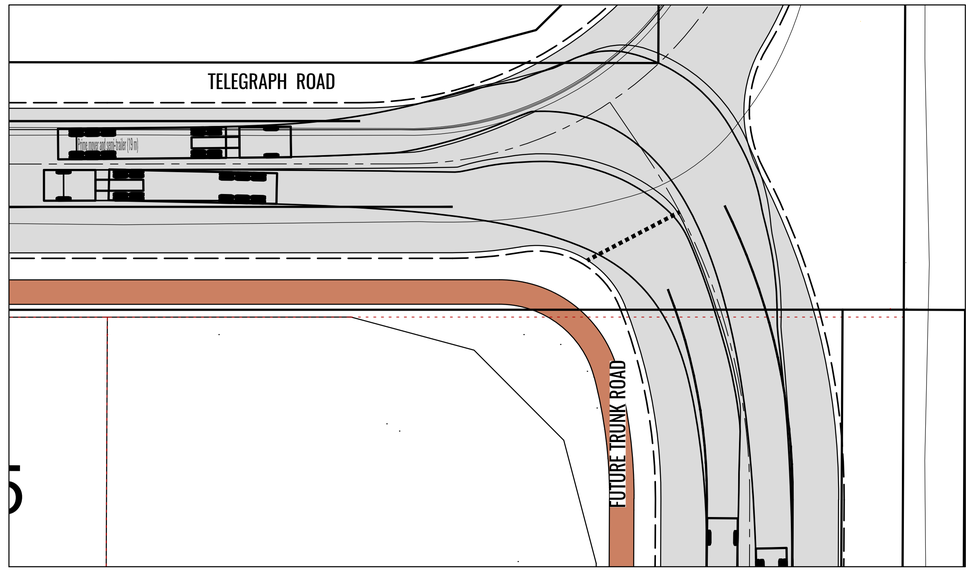
Revision
B

Size
A1

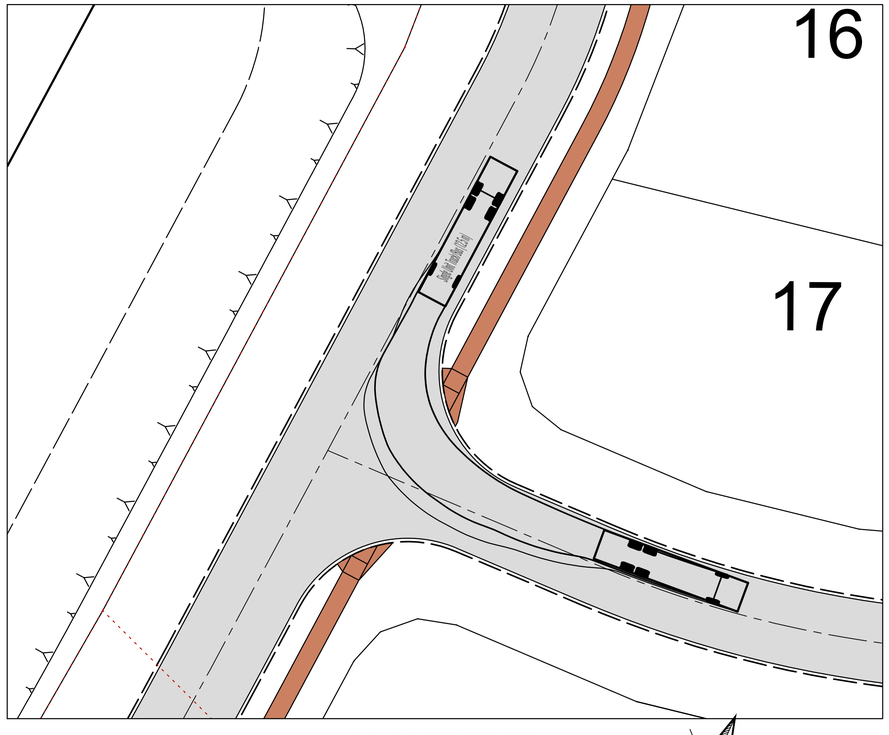
DATE PLOTTED: 8 September 2020 8:59 AM BY : MARK TABER



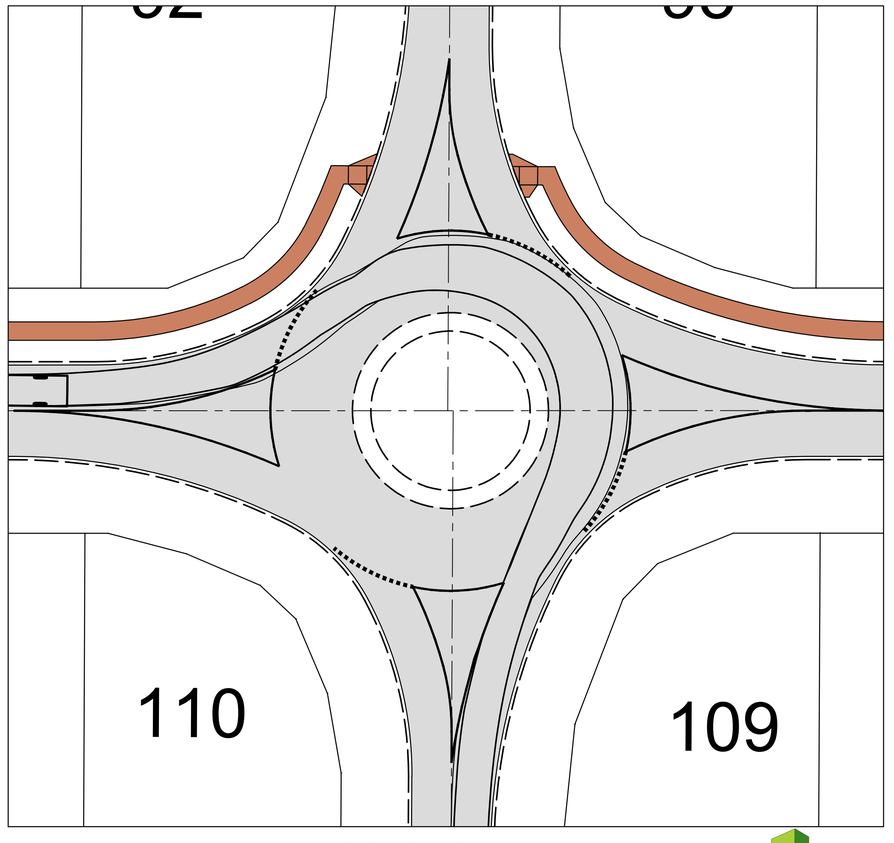
12.5m SERVICE TRUCK/BUS
PLAN - ENTRY ROAD
SCALE A1 - 1 : 250
A3 - 1 : 500



19.0m SEMI
PLAN - FUTURE TRUNK ROAD INTERSECTION
SCALE A1 - 1 : 250
A3 - 1 : 500



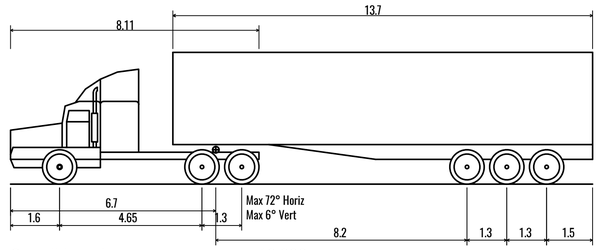
12.5m SERVICE TRUCK/BUS
PLAN - TYPICAL INTERSECTION
SCALE A1 - 1 : 250
A3 - 1 : 500



0 5 10 15 20 25m
SCALE 1:250 @A1

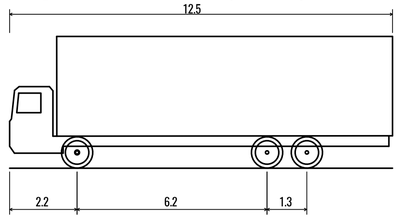
12.5m SERVICE TRUCK/BUS
PLAN - INTERNAL ROUNDABOUT
SCALE A1 - 1 : 250
A3 - 1 : 500

Prime mover and semi-trailer (19 m)



Overall Length	19.000m
Overall Width	2.500m
Overall Body Height	4.300m
Min Body Ground Clearance	0.540m
Track Width	2.500m
Lock-to-lock time	6.00s
Kerb to Kerb Turning Radius	12.500m

Single Unit Truck/Bus (12.5 m)



Overall Length	12.500m
Overall Width	2.500m
Overall Body Height	4.300m
Min Body Ground Clearance	0.490m
Track Width	2.500m
Lock-to-lock time	6.00s
Kerb to Kerb Turning Radius	12.500m

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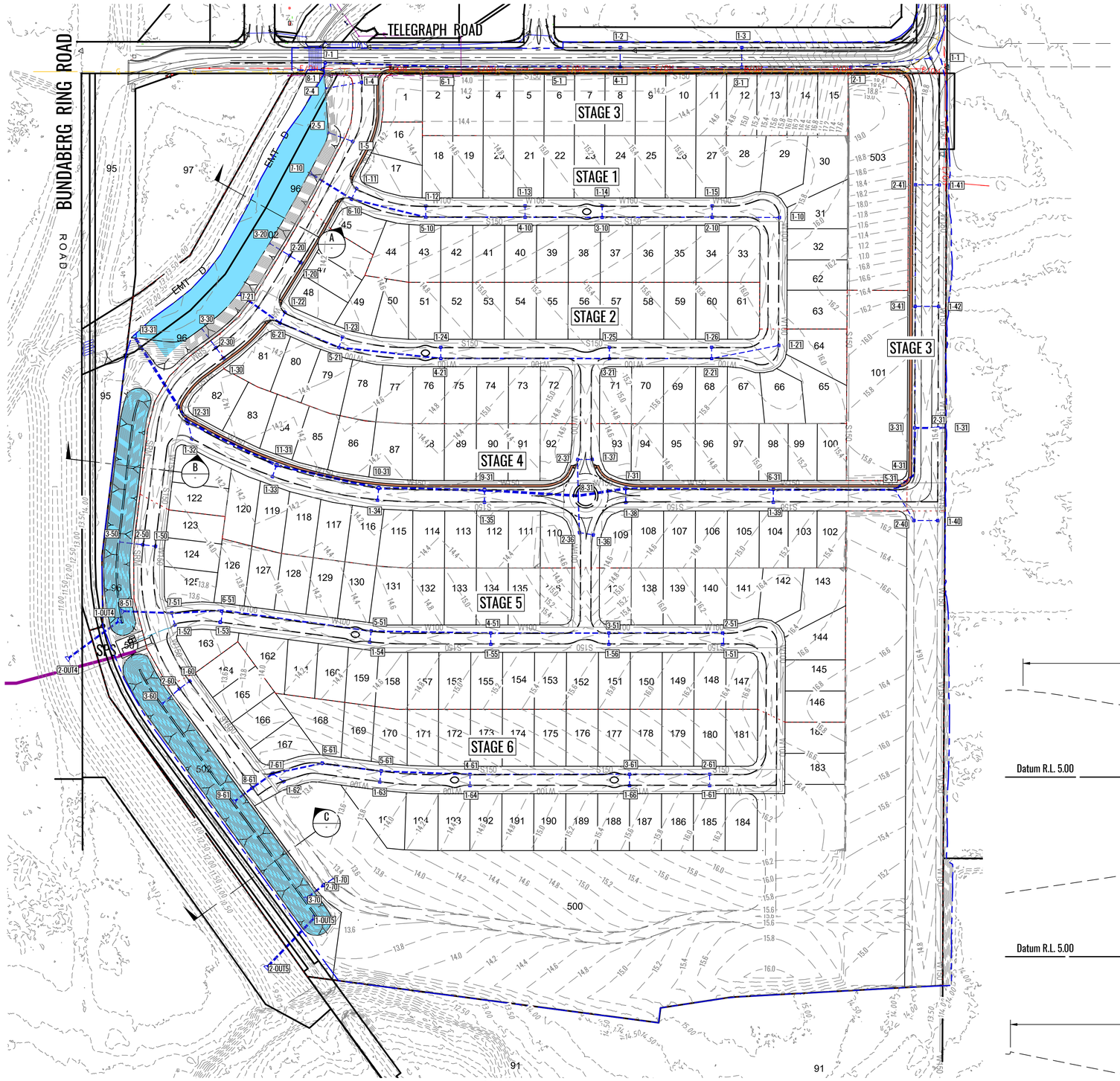
Project	134 TELEGRAPH ROAD KALKIE		
TITLE	MASTERPLAN - VEHICLE TURN PATHS		
Figure Number	Revision	Size	
UES003003-FIG-05	B	A1	

CAD File: C:\Users\tabs\Dropbox\UES Projects\UES003003 134 Telegraph Rd\Design\Acad\UES003003-FIG 05 VEHICLE TURN PATHS.dwg

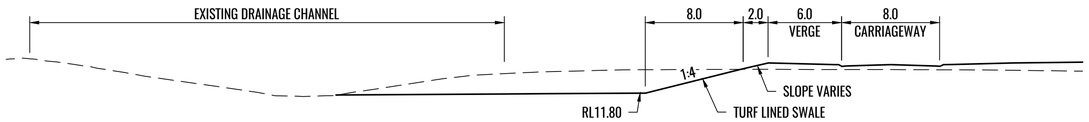


PLAN

SCALE A1 - 1 : 1500
A3 - 1 : 3000

LEGEND:

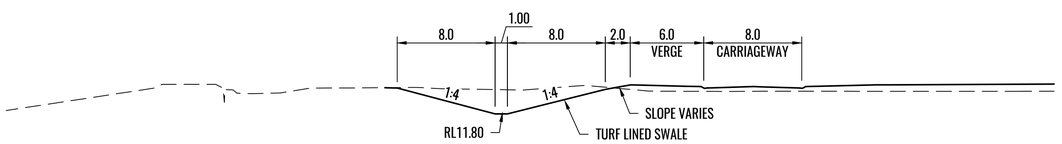
- STORMWATER CATCHMENT (EXTERNAL)
- DRAINAGE SWALE
- STORMWATER PIPES AND PITS
- 14-43 MANHOLE No. - LINE No.
- DETENTION BASIN (INDICATIVE ONLY)
- S150 SEWER MAIN AND STRUCTURE
- SEWER RISING MAIN
- W100 WATERMAIN AND PIPE DIAMETER
- STAGE BOUNDARY



Datum R.L. 5.00

SECTION A

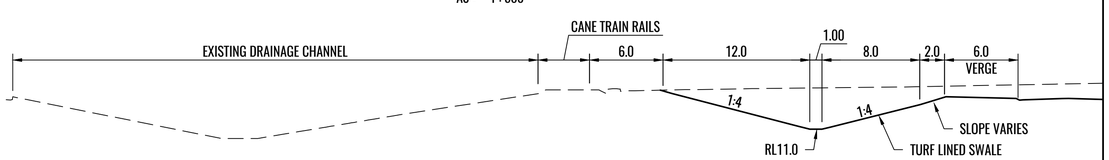
SCALE A1 - 1 : 250
A3 - 1 : 500



Datum R.L. 5.00

SECTION B

SCALE A1 - 1 : 250
A3 - 1 : 500



Datum R.L. 5.00

SECTION C

SCALE A1 - 1 : 250
A3 - 1 : 500

0 50 100 150m
SCALE 1:1500 @A1

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Project: 134 TELEGRAPH ROAD KALKIE
TITLE: MASTERPLAN - SW DRAINAGE PLAN
Figure Number: UES003003-FIG-10
Revision: C
Size: A1

DATE PLOTTED: 13 October 2020 11:59 AM BY : MARK TABER
CAD File: C:\Users\tabsa\Dropbox\UES Projects\UES003003 134 Telegraph Rd\Design\Acad\UES003003-FIG-10 DRAINAGE MASTERPLAN.dwg

DATE PLOTTED: 8 September 2020 9:23 AM BY : MARK TABER

STRUCTURE NAME

STRUCTURE DESCRIPTION

	1-1	2-1	3-1	4-1	5-1	6-1	7-1	8-1	1-2	4-1	1-3	3-1	1-4	2-4	1-5	2-5
	LIP IN LINE GULLY TYPE S (SAG)	LIP IN LINE GULLY TYPE S (GRADE)	LIP IN LINE GULLY TYPE S (GRADE) 1050 DIA.	LIP IN LINE GULLY TYPE S (GRADE) 1200 DIA.	LIP IN LINE GULLY TYPE S (SAG) 1200 DIA.	LIP IN LINE GULLY TYPE S (SAG) 1350 DIA.	LIP IN LINE GULLY TYPE S (SAG) 1350 DIA.	HEADWALL	LIP IN LINE GULLY TYPE S (SAG)	LIP IN LINE GULLY TYPE S (GRADE) 1200 DIA.	LIP IN LINE GULLY TYPE S (SAG)	LIP IN LINE GULLY TYPE S (GRADE) 1050 DIA.	LIP IN LINE GULLY TYPE S (SAG)	HEADWALL	LIP IN LINE GULLY TYPE S (SAG)	HEADWALL
PIPE SIZE (mm)	375	375	600	900	900	900	900		375		375		375		375	
PIPE CLASS	(RCP)	(RCP)	(RCP)	(RCP)	(RCP)	(RCP)	(RCP)		(RCP)		(RCP)		(RCP)		(RCP)	
PIPE GRADE	2.69%	4.31%	0.20%	0.12%	0.12%	0.12%	0.12%		1.02%		5.30%		1.00%		2.51%	
	1:37	1:23	1:500	1:833	1:833	1:833	1:833		1:98		1:19		1:100		1:40	
FULL PIPE VELOCITY (m/s)	0.16	0.83	1.09	0.83	1.01	1.24	1.24		0.57		0.78		0.99		0.19	
PART FULL VELOCITY (m/s)	1.45	2.74	1.09	1.10	1.12	1.24	1.24		1.47		2.90		1.67		1.48	
DATUM RL	0.0								-1.0		0.0		-1.0		-1.0	
W.S.E IN STRUCTURE	17.429	16.275	13.852	13.543	13.458	13.307	13.059	12.937	13.650	13.560	14.136	13.883	13.190	12.892	12.911	12.892
H.G.L IN PIPE	17.420	16.278	13.860	13.552	13.491	13.310	13.080	12.937		13.552		13.860				
PIPE FLOW (cumecs)	0.018	0.091	0.308	0.527	0.644	0.790	0.790		0.063		0.086		0.109		0.021	
FLOW CAPACITY (cumecs)	0.288	0.364	0.275	0.627	0.627	0.627	0.630		0.177		0.404		0.176		0.279	
							Qx=0.160									
DEPTH TO INVERT	1.26	1.54	1.56	1.74	1.97	1.26	1.56	1.46	1.48	1.47	1.49	1.67	1.69	0.90	0.90	
													1.03	1.04	1.14	1.74	1.64	0.38	1.60	0.38
INVERT LEVELS	17.324	15.898	15.878	12.785	12.560	12.400	12.100	12.052	12.032	11.943	11.923	11.827	11.807	11.800	11.800	
													12.755	12.625	13.474	12.785	12.133	11.900	12.318	11.900
SURFACE LEVELS	18.587								13.782		14.610		13.777		13.917	
FINISHED	(18.479)	17.435	(17.525)	14.529	(14.412)	13.663	(13.575)	13.513	(13.469)	13.410	(13.308)	13.502	(13.711)	12.700	(12.973)	
(EXISTING)													(13.794)	13.663	(14.595)	14.529	(13.333)	12.275	(13.433)	12.275
STRUCTURE	E 438586.389	E 438540.702	E 438475.127	E 438401.994	E 438365.246	E 438297.649	E 438223.622		E 438396.767		E 438469.829		E 438250.603		E 438261.273	
SETOUT	N 7250704.675	N 7250677.779	N 7250648.514	N 7250616.067	N 7250599.914	N 7250569.582	N 7250539.501		N 7250627.779		N 7250660.385		N 7250537.399		N 7250499.557	
COORDINATES							E 438224.848		E 438401.994		E 438475.127		E 438231.188		E 438244.625	
							N 7250533.707		N 7250616.067		N 7250648.514		N 7250524.437		N 7250498.386	
LENGTH m	53.016	71.809	80.008	40.141	74.090	79.906	5.923		12.825		13.000		23.344		16.689	
DISTANCE ALONG DRAIN	0.000	53.016	124.825	204.833	244.974	319.064	398.970	404.892	0.000	12.825	0.000	13.000	0.000	23.344	0.000	16.689
LINE	1								2		3		4		5	

150 SEW IL 9.95

C2.0: 1.305

LEGEND

- EXISTING SURFACE LEVEL
- FINISHED SURFACE LEVEL
- HGL (Q5)
- SWD PIPE

0 20 40 60 80 100m

SCALE 1:1000 @A1

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Project: 134 TELEGRAPH ROAD KALKIE

TITLE: SWD LONG SECTIONS - SHEET 1

Figure Number: UES003003-FIG-11 | Revision: B | Size: A1

CAD File: C:\Users\tahan\Dropbox\UES Projects\UES003003 134 Telegraph Rd\Design\Acad\UES003003-FIG-11 DRAINAGE LONG SEC.dwg

DATE PLOTTED: 8 September 2020 9:24 AM BY: MARK TABER

CAD File: E:\Users\tabat\Dropbox\UES Projects\UES003003 134 Telegraph Rd\Design\Acad\UES003003-FIG 11 DRAINAGE LONG SEC.dwg

STRUCTURE NAME	1-10	2-10	3-10	4-10	5-10	6-10	7-10	1-11	6-10	1-12	5-10	1-13	4-10	1-14	3-10	1-15	2-10	1-20	2-20	3-20
STRUCTURE DESCRIPTION	LIP IN LINE GULLY TYPE S (GRADE)	LIP IN LINE GULLY TYPE S (GRADE) 1050 DIA.	LIP IN LINE GULLY TYPE S (GRADE) 1200 DIA.	LIP IN LINE GULLY TYPE S (GRADE) 1200 DIA.	LIP IN LINE GULLY TYPE S (GRADE) 1350 DIA.	LIP IN LINE GULLY TYPE S (SAG) 1500 DIA.	HEADWALL	LIP IN LINE GULLY TYPE S (SAG)	LIP IN LINE GULLY TYPE S (SAG) 1500 DIA.	LIP IN LINE GULLY TYPE S (GRADE)	LIP IN LINE GULLY TYPE S (GRADE) 1350 DIA.	LIP IN LINE GULLY TYPE S (SAG)	LIP IN LINE GULLY TYPE S (GRADE) 1200 DIA.	LIP IN LINE GULLY TYPE S (GRADE)	LIP IN LINE GULLY TYPE S (GRADE) 1200 DIA.	LIP IN LINE GULLY TYPE S (SAG)	LIP IN LINE GULLY TYPE S (GRADE) 1050 DIA.	LIP IN LINE GULLY TYPE S (SAG)	LIP IN LINE GULLY TYPE S (SAG)	HEADWALL
PIPE SIZE (mm)	375	525	675	750	900	1050		375	375	375	375	375	375	375	375	375	375	375	375	375
PIPE CLASS	(RCP)	(RCP)	(RCP)	(RCP)	(RCP)	(RCP)		(RCP)	(RCP)	(RCP)	(RCP)	(RCP)	(RCP)	(RCP)	(RCP)	(RCP)	(RCP)	(RCP)	(RCP)	(RCP)
PIPE GRADE	0.40%	0.25%	1.59%	0.15%	0.12%	0.10%		1.00%	1.00%	1.00%	1.00%	1.48%	1.48%	2.90%	2.90%	1.10%	1.10%	1.00%	1.00%	1.00%
	1:250	1:400	1:63	1:667	1:833	1:1000		1:100	1:100	1:100	1:100	1:67	1:67	1:34	1:34	1:91	1:91	1:100	1:100	1:100
FULL PIPE VELOCITY (m/s)	0.81	1.41	1.70	1.71	1.56	1.32		0.55	1.49	0.81	1.85	0.81	1.85	1.51	2.78	1.46	1.88	0.72	1.02	1.55	1.69
PART FULL VELOCITY (m/s)	1.12	1.41	3.06	1.71	1.56	1.32		1.44	1.80	1.85	2.78	1.88	1.55	1.69
DATUM RL	-1.0							-1.0		-1.0		-1.0		0.0		0.0		-1.0		
W.S.E IN STRUCTURE	15.121	15.022	14.906	14.730	14.366	14.109	13.843	13.686	13.385	13.163	13.011	12.923	12.892	12.892	13.141	13.070	13.030	13.820	13.451	13.386	13.422	13.163	14.136	13.857	13.843	13.861	13.686	14.830	14.438	14.366	14.400	14.109	15.379	14.861	14.806	14.321	14.730	13.131	13.021	13.004	12.950	12.887
H.G.L IN PIPE		14.921		14.400		13.861										13.030																								
PIPE FLOW (cumecs)	0.090	0.305	0.609	0.755	0.995	1.141		0.061	0.164	0.089	0.167	0.161	0.080	0.113
FLOW CAPACITY (cumecs)	0.111	0.215	1.061	0.431	0.627	0.867		0.175	0.175	0.214	0.299	0.184	0.175	0.176
						Qx=0.273						Qx=0.011																												
DEPTH TO INVERT	1.94	1.89	2.04	1.78	1.93	2.35	2.42	2.08	2.23	1.91	1.93	1.05	1.05	1.41	1.39	1.67	1.33	1.11	1.17	2.42	1.41	1.63	1.93	1.11	1.14	2.04	1.89	1.94	1.96	0.38	0.38
INVERT LEVELS	13.700	13.523	13.373	13.192	13.042	12.235	12.160	12.062	11.912	11.851	11.831	11.800	11.800	12.447	12.371	12.511	11.831	13.520	13.410	12.160	13.564	13.342	13.042	14.355	14.273	13.373	12.058	11.971	11.951	11.800	11.800
SURFACE LEVELS	15.641							13.855		14.186		14.629		14.973		15.464		13.951		
FINISHED (EXISTING)	(14.571)	15.415	(13.862)	14.973	(13.601)	14.580	(13.561)	14.137	(13.500)	13.756	(13.446)	12.850	(13.427)	(13.444)	13.756	(13.497)	14.137	(13.535)	14.580	(13.561)	(13.583)	14.973	(13.601)	(13.934)	15.415	(13.862)	(14.269)	13.911	(14.198)	12.175	(13.647)
STRUCTURE SETOUT COORDINATES	E 438538.139 N 7250568.287	E 438497.551 N 7250550.410	E 438431.499 N 7250520.745	E 438385.116 N 7250500.231	E 438325.432 N 7250473.595	E 438275.983 N 7250464.690	E 438245.014 N 7250468.864	E 438276.128 N 7250472.330	E 438275.983 N 7250464.690	E 438222.382 N 7250480.430	E 438325.432 N 7250473.595	E 438382.065 N 7250507.066	E 438385.116 N 7250500.231	E 438428.381 N 7250527.741	E 438431.499 N 7250520.745	E 438494.501 N 7250557.245	E 438491.551 N 7250550.410	E 438262.586 N 7250412.859	E 438254.011 N 7250414.000	E 438239.033 N 7250415.993
LENGTH m	44.351	72.408	50.717	65.358	50.245	31.249		7.642	7.485	7.485	7.485	7.485	7.659	7.485	8.650	15.110
DISTANCE ALONG DRAIN	0.000	44.351	116.758	167.475	232.833	283.078	314.327	0.000	7.642	0.000	7.485	0.000	7.485	0.000	7.659	0.000	7.485	0.000	8.650	23.760
LINE	10							11		12		13		14		15		20		

150 SEW IL 11.05

QLR 0.548

LEGEND

- EXISTING SURFACE LEVEL
- FINISHED SURFACE LEVEL
- HGL (Q5)
- SWD PIPE

0 20 40 60 80 100m

SCALE 1:1000 @A1

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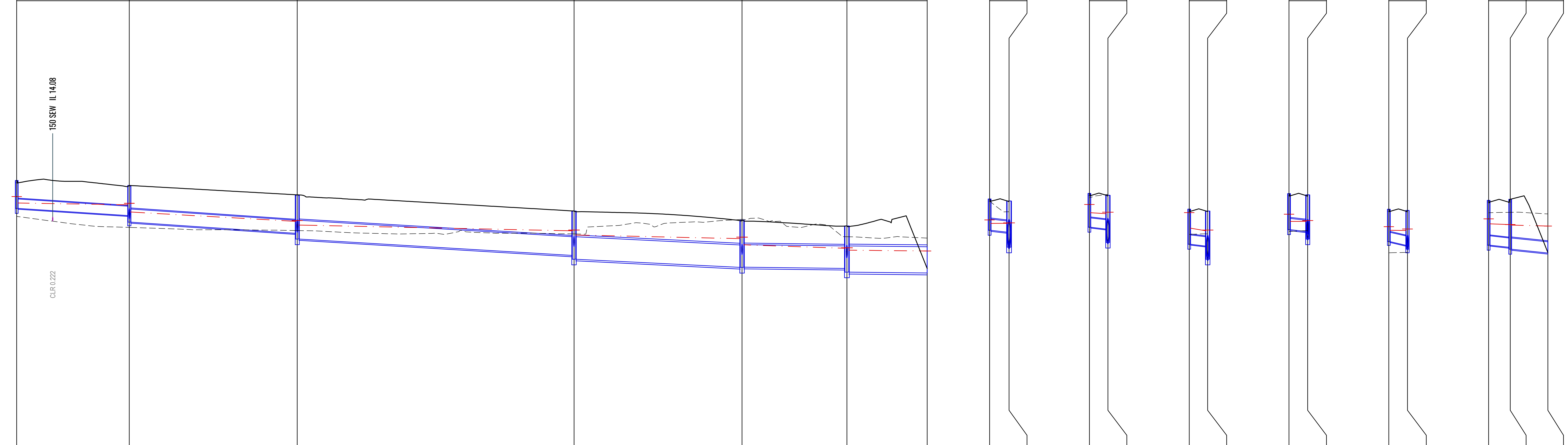
Project	134 TELEGRAPH ROAD KALKIE
TITLE	SWD LONG SECTIONS - SHEET 2
Figure Number	UES003003-FIG-12
Revision	B
Size	A1

DATE PLOTTED: 17 September 2020 11:57 AM BY : MARK TABER



STRUCTURE NAME	1-21		2-21		3-21		4-21		5-21		6-21		7-21
STRUCTURE DESCRIPTION	LIP IN LINE GULLY TYPE S (GRADE)		LIP IN LINE GULLY TYPE S (GRADE) 1050 DIA.		LIP IN LINE GULLY TYPE S (GRADE) 1200 DIA.		LIP IN LINE GULLY TYPE S (GRADE) 1350 DIA.		LIP IN LINE GULLY TYPE S (GRADE) 1350 DIA.		LIP IN LINE GULLY TYPE S (SAG) 1500 DIA.		HEADWALL
PIPE SIZE (mm)		375		525		750		900		900		1050	
PIPE CLASS		(RCP)		(RCP)		(RCP)		(RCP)		(RCP)		(RCP)	
PIPE GRADE		0.64% 1:157		0.67% 1:149		0.59% 1:168		0.49% 1:204		0.12% 1:833		0.10% 1:1000	
FULL PIPE VELOCITY (m/s)		0.77		1.53		1.27		1.33		1.64		1.37	
PART FULL VELOCITY (m/s)		1.33		1.85		2.07		2.13		1.64		1.37	
DATUM RL		0.0											
W.S.E IN STRUCTURE H.G.L IN PIPE	15.060 14.800		14.732 14.788 14.441		14.067 14.101 13.918		13.688 13.720 13.520		13.374 13.433 13.128		12.989 13.005 12.912		12.881 12.881
PIPE FLOW (cumecs) FLOW CAPACITY (cumecs)		0.085 0.140		0.331 0.352		0.563 0.859		0.845 1.266		1.042 0.627		1.183 0.867 Qx=0.315	
DEPTH TO INVERT	1.12		1.20 1.47		1.54 1.77		1.78 1.93		1.89 1.88		1.70 1.85		1.05 1.05
INVERT LEVELS	14.587		14.300 14.036		13.585 13.360		12.701 12.551		12.222 12.233		12.182 12.032		12.000 12.000
SURFACE LEVELS FINISHED (EXISTING)	15.704 (14.265)		15.505 (13.826)		15.129 (13.698)		14.480 (13.564)		14.111 (14.150)		13.882 (13.451)		13.050 (13.398)
STRUCTURE SETOUT COORDINATES	E 438572.086 N 7250491.214		E 438535.119 N 7250465.334		E 438473.652 N 7250437.902		E 438372.330 N 7250392.771		E 438308.249 N 7250372.059		E 438266.248 N 7250371.009		E 438234.661 N 7250377.248
LENGTH m		45.126		67.311		110.919		67.345		42.014		32.197	
DISTANCE ALONG DRAIN	0.000		45.126		112.437		223.355		290.700		332.714		364.912
LINE							21						

STRUCTURE NAME	1-22		6-21
STRUCTURE DESCRIPTION	LIP IN LINE GULLY TYPE S (SAG)		LIP IN LINE GULLY TYPE S (SAG) 1500 DIA.
PIPE SIZE (mm)		450	
PIPE CLASS		(RCP)	
PIPE GRADE		1.00% 1:100	
FULL PIPE VELOCITY (m/s)		0.53	
PART FULL VELOCITY (m/s)		1.56	
DATUM RL		-1.0	
W.S.E IN STRUCTURE H.G.L IN PIPE	13.124 12.984		12.989 13.005 12.912
PIPE FLOW (cumecs) FLOW CAPACITY (cumecs)		0.085 0.285	
DEPTH TO INVERT	1.25		1.25 1.85
INVERT LEVELS	12.710		12.632 12.032
SURFACE LEVELS FINISHED (EXISTING)	13.962 (13.865)		13.882 (13.451)
STRUCTURE SETOUT COORDINATES	E 438266.311 N 7250378.803		E 438266.248 N 7250371.009
LENGTH m		7.794	
DISTANCE ALONG DRAIN	0.000		7.794
LINE		22	

STRUCTURE NAME	1-23		5-21
STRUCTURE DESCRIPTION	LIP IN LINE GULLY TYPE S (GRADE)		LIP IN LINE GULLY TYPE S (GRADE) 1350 DIA.
PIPE SIZE (mm)		375	
PIPE CLASS		(RCP)	
PIPE GRADE		1.00% 1:100	
FULL PIPE VELOCITY (m/s)		1.12	
PART FULL VELOCITY (m/s)		1.72	
DATUM RL		-1.0	
W.S.E IN STRUCTURE H.G.L IN PIPE	13.743 13.411		13.374 13.433 13.128
PIPE FLOW (cumecs) FLOW CAPACITY (cumecs)		0.124 0.175	
DEPTH TO INVERT	1.35		1.35 1.88
INVERT LEVELS	12.832		12.758 12.233
SURFACE LEVELS FINISHED (EXISTING)	14.186 (14.009)		14.111 (14.150)
STRUCTURE SETOUT COORDINATES	E 438307.453 N 7250379.426		E 438308.249 N 7250372.059
LENGTH m		7.410	
DISTANCE ALONG DRAIN	0.000		7.410
LINE		23	

STRUCTURE NAME	1-24		4-21
STRUCTURE DESCRIPTION	LIP IN LINE GULLY TYPE S (GRADE)		LIP IN LINE GULLY TYPE S (GRADE) 1350 DIA.
PIPE SIZE (mm)		375	
PIPE CLASS		(RCP)	
PIPE GRADE		1.00% 1:100	
FULL PIPE VELOCITY (m/s)		1.90	
PART FULL VELOCITY (m/s)		1.90	
DATUM RL		0.0	
W.S.E IN STRUCTURE H.G.L IN PIPE	14.416 13.793		13.688 13.720 13.520
PIPE FLOW (cumecs) FLOW CAPACITY (cumecs)		0.210 0.175	
DEPTH TO INVERT	1.41		1.40 1.93
INVERT LEVELS	13.150		13.076 12.551
SURFACE LEVELS FINISHED (EXISTING)	14.558 (13.545)		14.480 (13.564)
STRUCTURE SETOUT COORDINATES	E 438369.314 N 7250399.529		E 438372.330 N 7250392.771
LENGTH m		7.400	
DISTANCE ALONG DRAIN	0.000		7.400
LINE		24	

STRUCTURE NAME	1-25		3-21
STRUCTURE DESCRIPTION	LIP IN LINE GULLY TYPE S (GRADE)		LIP IN LINE GULLY TYPE S (GRADE) 1200 DIA.
PIPE SIZE (mm)		450	
PIPE CLASS		(RCP)	
PIPE GRADE		1.00% 1:100	
FULL PIPE VELOCITY (m/s)		0.79	
PART FULL VELOCITY (m/s)		1.74	
DATUM RL		0.0	
W.S.E IN STRUCTURE H.G.L IN PIPE	14.352 14.065		14.067 14.101 13.918
PIPE FLOW (cumecs) FLOW CAPACITY (cumecs)		0.126 0.285	
DEPTH TO INVERT	1.44		1.47 1.77
INVERT LEVELS	13.735		13.660 13.360
SURFACE LEVELS FINISHED (EXISTING)	15.178 (13.664)		15.129 (13.698)
STRUCTURE SETOUT COORDINATES	E 438470.601 N 7250444.737		E 438473.652 N 7250437.902
LENGTH m		7.485	
DISTANCE ALONG DRAIN	0.000		7.485
LINE		25	

STRUCTURE NAME	1-26		2-21
STRUCTURE DESCRIPTION	LIP IN LINE GULLY TYPE S (SAG)		LIP IN LINE GULLY TYPE S (GRADE) 1050 DIA.
PIPE SIZE (mm)		375	
PIPE CLASS		(RCP)	
PIPE GRADE		2.00% 1:50	
FULL PIPE VELOCITY (m/s)		0.55	
PART FULL VELOCITY (m/s)		1.85	
DATUM RL		1.0	
W.S.E IN STRUCTURE H.G.L IN PIPE	14.853 14.711		14.702 14.759 14.411
PIPE FLOW (cumecs) FLOW CAPACITY (cumecs)		0.061 0.248	
DEPTH TO INVERT	1.30		1.40 1.55
INVERT LEVELS	14.256		14.106 13.956
SURFACE LEVELS FINISHED (EXISTING)	15.554 (13.808)		15.505 (13.826)
STRUCTURE SETOUT COORDINATES	E 438532.068 N 7250472.169		E 438535.119 N 7250465.334
LENGTH m		7.485	
DISTANCE ALONG DRAIN	0.000		7.485
LINE		26	

STRUCTURE NAME	1-30		2-30		3-30
STRUCTURE DESCRIPTION	LIP IN LINE GULLY TYPE S (SAG)		LIP IN LINE GULLY TYPE S (SAG)		HEADWALL
PIPE SIZE (mm)		375		450	
PIPE CLASS		(RCP)		(RCP)	
PIPE GRADE		1.00% 1:100		1.00% 1:100	
FULL PIPE VELOCITY (m/s)		0.96		0.88	
PART FULL VELOCITY (m/s)		1.66		1.78	
DATUM RL		-1.0			
W.S.E IN STRUCTURE H.G.L IN PIPE	13.169 12.969		12.938 12.916		12.880 12.880
PIPE FLOW (cumecs) FLOW CAPACITY (cumecs)		0.106 0.175		0.140 0.286	
DEPTH TO INVERT	1.79		1.93 2.00		0.45 0.45
INVERT LEVELS	12.113		12.026 11.951		11.800 11.800
SURFACE LEVELS FINISHED (EXISTING)	13.906 (13.414)		13.952 (13.428)		12.250 (13.364)
STRUCTURE SETOUT COORDINATES	E 438241.661 N 7250334.825		E 438234.120 N 7250339.062		E 438220.947 N 7250346.464
LENGTH m		8.650		15.110	
DISTANCE ALONG DRAIN	0.000		8.650		23.760
LINE			30		

LEGEND

- - - - EXISTING SURFACE LEVEL
——— FINISHED SURFACE LEVEL
–·– HGL (Q5)
═ SWD PIPE

0 20 40 60 80 100m
SCALE 1:1000 @A1

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Project
134 TELEGRAPH ROAD KALKIE
TITLE
SWD LONG SECTIONS - SHEET 3
Figure Number
UES003003-FIG-13
Revision
B
Size
A1

CAD File: C:\Users\tabsi\Dropbox\UES Projects\UES003003 134 Telegraph Rd\Design\Acad\UES003003-FIG 11 DRAINAGE LONG SEC.dwg

DATE PLOTTED: 8 September 2020 9:24 AM BY: MARK TABER

STRUCTURE NAME	1-31	2-31	3-31	4-31	5-31	6-31	7-31	8-31	9-31	10-31	11-31	12-31	13-31	1-32	12-31	1-33	11-31
STRUCTURE DESCRIPTION	CAP PIPE	LIP IN LINE GULLY TYPE S (SAG) 1500 DIA.	LIP IN LINE GULLY TYPE S (SAG) 1800 DIA.	ACCESS CHAMBER 1650 DIA.	LIP IN LINE GULLY TYPE S (GRADE) 1650 DIA.	LIP IN LINE GULLY TYPE S (GRADE) 1650 DIA.	LIP IN LINE GULLY TYPE S (SAG) 2100 DIA.	ACCESS CHAMBER 2100 DIA.	LIP IN LINE GULLY TYPE S (GRADE) 2100 DIA.	LIP IN LINE GULLY TYPE S (SAG) 2100 DIA.	LIP IN LINE GULLY TYPE S (SAG) 2100 DIA.	LIP IN LINE GULLY TYPE S (SAG) 2100 DIA.	HEADWALL	LIP IN LINE GULLY TYPE S (SAG) LIP IN LINE GULLY TYPE S (SAG) 2100 DIA.	LIP IN LINE GULLY TYPE S (SAG) LIP IN LINE GULLY TYPE S (SAG) 2100 DIA.		
PIPE SIZE (mm)		1050	1050	1200	1200	1200	1200	1500	1500	1500	1500	1650	1650		375		450
PIPE CLASS		(RCP)	(RCP)	(RCP)	(RCP)	(RCP)	(RCP)	(RCP)	(RCP)	(RCP)	(RCP)	(RCP)	(RCP)		(RCP)		(RCP)
PIPE GRADE		0.10%	0.10%	0.10%	0.10%	0.87%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%		1.00%		1.00%
		1:1000	1:1000	1:1000	1:1000	1:115	1:1000	1:1000	1:1000	1:1000	1:1000	1:1000	1:1000		1:100		1:100
FULL PIPE VELOCITY (m/s)		1.42	1.48	1.46	1.45	1.55	1.63	1.17	1.29	1.37	1.45	1.26	1.26		0.21		0.87
PART FULL VELOCITY (m/s)		1.42	1.48	1.46	1.45	3.19	1.63	1.44	1.44	1.37	1.45	1.53	1.53		1.10		1.78
DATUM RL		0.0													-1.0		-1.0
W.S.E IN STRUCTURE	14.636	14.636	14.636	14.634	14.612	14.384	14.227	14.134	13.917	13.819	13.792	13.640	13.576	13.491	13.409	13.260	13.169	13.060	13.003	13.026	13.008	13.482	13.188
H.G.L IN PIPE		14.636	14.636	14.633	14.610		14.234		13.935		13.823		13.588		13.440		13.190		13.033		13.033		13.190
PIPE FLOW (cumecs)		1.233	1.279	1.654	1.642	1.757		1.846		2.062		2.286		2.420		2.569		2.690		2.696		0.023		0.139	
FLOW CAPACITY (cumecs)		0.864	0.864	1.233	1.233	3.637		1.233		2.236		2.236		2.236		2.236		2.883		2.895		0.175		0.285	
		Qx=1.156	Qx=1.219	Qx=1.505	Qx=1.137	Qx=0.030																			
DEPTH TO INVERT		2.74	2.56	2.58	2.60	2.75	3.10	3.12	2.76	2.78	2.94	2.96	2.42	2.44	2.82	2.84	2.36	2.38	2.40	2.42	2.44	2.46	2.61	2.63	1.65	1.65	1.28	1.35	2.63	1.29	1.26	2.46
INVERT LEVELS		12.773	12.768	12.748	12.733	12.583	12.552	12.532	12.516	12.496	11.799	11.779	11.682	11.662	11.631	11.611	11.549	11.529	11.459	11.439	11.370	11.350	11.286	11.266	11.200	11.200	12.654	12.541	11.266	12.631	12.550	11.350
SURFACE LEVELS	15.512																															
FINISHED		(15.512)	15.324	(15.339)	15.331	(15.162)	15.650	(15.469)	15.278	(15.497)	14.736	(14.360)	14.105	(13.849)	14.454	(13.747)	13.912	(13.723)	13.862	(13.611)	13.811	(13.535)	13.895	(13.444)	12.850	(11.969)	13.932	(13.500)	13.895	(13.444)	13.922	(13.517)	13.811	(13.535)
(EXISTING)																																
STRUCTURE SETOUT COORDINATES	E 438694.487	N 7250486.599	E 438689.713	N 7250484.206	E 438675.871	N 7250478.108	E 438688.006	N 7250449.775	E 438680.540	N 7250435.686	E 438607.354	N 7250403.024	E 438518.371	N 7250364.117	E 438491.781	N 7250347.059	E 438433.913	N 7250325.291	E 438369.812	N 7250298.160	E 438302.256	N 7250284.538	E 438237.635	N 7250286.691	E 438183.015	N 7250323.327	E 438244.353	N 7250277.520	E 438237.635	N 7250286.691	E 438302.874	N 7250276.502	E 438302.256	N 7250284.538
LENGTH m		5.341	15.125	30.822	15.945	80.144		97.117		31.592		61.826		69.606		68.916		64.656		65.769			11.368				8.060						
DISTANCE ALONG DRAIN	0.000	5.341	20.466	51.288	67.233	147.376		244.493		276.085		337.911		407.518		476.434		541.090		606.859			0.000	11.368			0.000	8.060						
LINE									31																			32				33		

159.5LW IL 14.07

C&D 0.5SD

LEGEND

- EXISTING SURFACE LEVEL
- FINISHED SURFACE LEVEL
- HGL (Q5)
- SWD PIPE

0 20 40 60 80 100m

SCALE 1:1000 @A1

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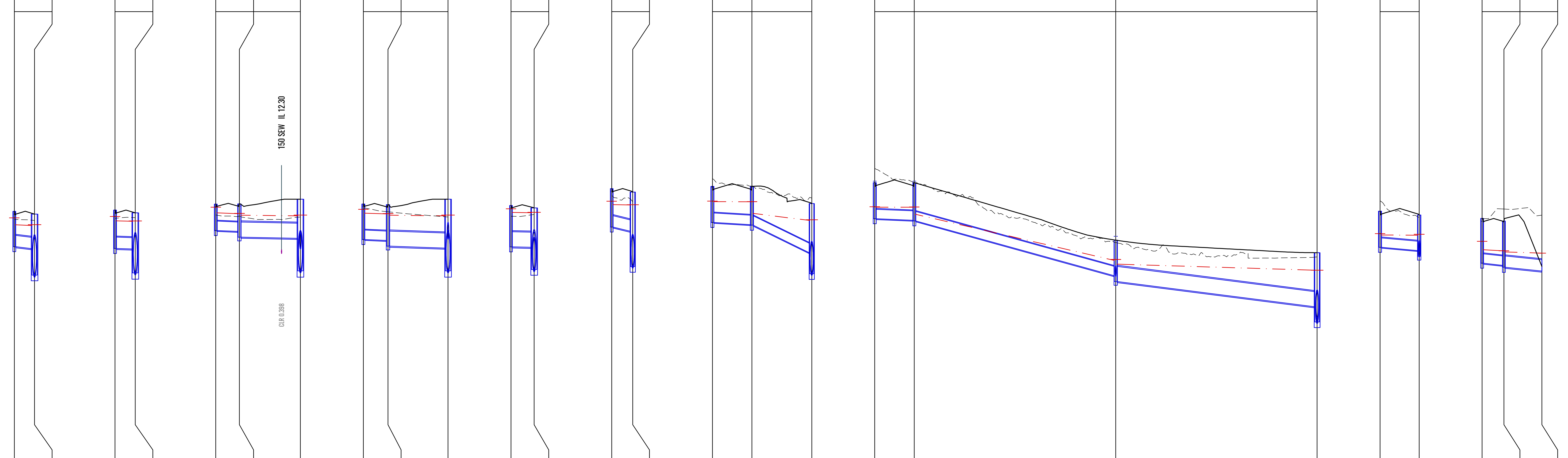
Project: 134 TELEGRAPH ROAD KALKIE

TITLE: SWD LONG SECTIONS - SHEET 4

Figure Number: UES003003-FIG-14 | Revision: B | Size: A1

CAD File: C:\Users\tabs\Dropbox\UES Projects\UES003003 134 Telegraph Rd\Design\Acad\UES003003-FIG 11 DRAINAGE LONG SEC.dwg

DATE PLOTTED: 8 September 2020 9:25 AM BY : MARK TABER



STRUCTURE NAME	1-34	10-31	
STRUCTURE DESCRIPTION	LIP IN LINE GULLY	TYPE S (SAG) LIP IN LINE GULLY	TYPE S (SAG) 2100 DIA.
PIPE SIZE (mm)		450	
PIPE CLASS		(RCP)	
PIPE GRADE		1.00% 1:100	
FULL PIPE VELOCITY (m/s)		1.06	
PART FULL VELOCITY (m/s)		1.87	
DATUM RL		-1.0	
W.S.E IN STRUCTURE H.G.L IN PIPE	13.712	13.437 13.409 13.440	13.260
PIPE FLOW (cumecs) FLOW CAPACITY (cumecs)		0.168 0.285	
DEPTH TO INVERT		1.40 1.37	2.42
INVERT LEVELS		12.570 12.489	11.439
SURFACE LEVELS FINISHED (EXISTING)	13.972	(13.649) 13.862	(13.611)
STRUCTURE SETOUT COORDINATES	E 438372.354	N 7250290.538 E 438369.812	N 7250298.160
LENGTH m		8.035	
DISTANCE ALONG DRAIN	0.000	8.035	
LINE		34	

STRUCTURE NAME	1-35	9-31	
STRUCTURE DESCRIPTION	LIP IN LINE GULLY	TYPE S (SAG) LIP IN LINE GULLY	TYPE S (GRADE) 2100 DIA.
PIPE SIZE (mm)		450	
PIPE CLASS		(RCP)	
PIPE GRADE		0.30% 1:333	
FULL PIPE VELOCITY (m/s)		0.89	
PART FULL VELOCITY (m/s)		1.11	
DATUM RL		-1.0	
W.S.E IN STRUCTURE H.G.L IN PIPE	13.766	13.596 13.576 13.588	13.491
PIPE FLOW (cumecs) FLOW CAPACITY (cumecs)		0.142 0.156	
DEPTH TO INVERT		1.52 1.44	2.38
INVERT LEVELS		12.499 12.475	11.529
SURFACE LEVELS FINISHED (EXISTING)	14.022	(13.695) 13.912	(13.723)
STRUCTURE SETOUT COORDINATES	E 438437.188	N 7250317.953 E 438433.913	N 7250325.291
LENGTH m		8.035	
DISTANCE ALONG DRAIN	0.000	8.035	
LINE		35	

STRUCTURE NAME	1-36	2-36	8-31	
STRUCTURE DESCRIPTION	LIP IN LINE GULLY	TYPE S (SAG) LIP IN LINE GULLY	TYPE S (SAG) 1050 DIA. ACCESS CHAMBER	2100 DIA.
PIPE SIZE (mm)		375	600	
PIPE CLASS		(RCP)	(RCP)	
PIPE GRADE		0.40% 1:250	0.20% 1:500	
FULL PIPE VELOCITY (m/s)		0.93	0.71	
PART FULL VELOCITY (m/s)		1.14	1.06	
DATUM RL		-1.0		
W.S.E IN STRUCTURE H.G.L IN PIPE	14.135	13.911 13.879 13.889	13.818 13.792 13.823	13.640
PIPE FLOW (cumecs) FLOW CAPACITY (cumecs)		0.103 0.111	0.202 0.275	
DEPTH TO INVERT		1.05 1.09	1.32 1.55	2.84
INVERT LEVELS		13.211 13.173	12.948 12.900	11.611
SURFACE LEVELS FINISHED (EXISTING)	14.260	(13.827) 14.268	(13.788) 14.454	(13.747)
STRUCTURE SETOUT COORDINATES	E 438511.398	N 7250327.609 E 438502.298	N 7250325.245 E 438491.781	N 7250347.059
LENGTH m		9.403	24.217	
DISTANCE ALONG DRAIN	0.000	9.403	33.620	
LINE		36		

STRUCTURE NAME	1-37	2-37	8-31	
STRUCTURE DESCRIPTION	LIP IN LINE GULLY	TYPE S (SAG) LIP IN LINE GULLY	TYPE S (SAG) 1050 DIA. ACCESS CHAMBER	2100 DIA.
PIPE SIZE (mm)		375	600	
PIPE CLASS		(RCP)	(RCP)	
PIPE GRADE		0.40% 1:250	0.33% 1:305	
FULL PIPE VELOCITY (m/s)		0.91	0.71	
PART FULL VELOCITY (m/s)		1.14	1.28	
DATUM RL		-1.0		
W.S.E IN STRUCTURE H.G.L IN PIPE	14.052	13.900 13.868 13.881	13.818 13.792 13.823	13.640
PIPE FLOW (cumecs) FLOW CAPACITY (cumecs)		0.101 0.111	0.201 0.352	
DEPTH TO INVERT		1.41 1.42	1.65 1.94	2.84
INVERT LEVELS		12.853 12.814	12.589 12.511	11.611
SURFACE LEVELS FINISHED (EXISTING)	14.261	(14.103) 14.237	(13.956) 14.454	(13.747)
STRUCTURE SETOUT COORDINATES	E 438490.510	N 7250372.711 E 438481.617	N 7250368.642 E 438491.781	N 7250347.059
LENGTH m		9.779	23.856	
DISTANCE ALONG DRAIN	0.000	9.779	33.635	
LINE		37		

STRUCTURE NAME	1-38	7-31	
STRUCTURE DESCRIPTION	LIP IN LINE GULLY	TYPE S (SAG) LIP IN LINE GULLY	TYPE S (SAG) 2100 DIA.
PIPE SIZE (mm)		600	
PIPE CLASS		(RCP)	
PIPE GRADE		0.20% 1:500	
FULL PIPE VELOCITY (m/s)		0.76	
PART FULL VELOCITY (m/s)		1.08	
DATUM RL		-1.0	
W.S.E IN STRUCTURE H.G.L IN PIPE	14.072	13.928 13.917 13.935	13.819
PIPE FLOW (cumecs) FLOW CAPACITY (cumecs)		0.216 0.275	
DEPTH TO INVERT		1.64 1.56	2.44
INVERT LEVELS		12.562 12.544	11.662
SURFACE LEVELS FINISHED (EXISTING)	14.204	(13.778) 14.105	(13.849)
STRUCTURE SETOUT COORDINATES	E 438522.173	N 7250355.746 E 438518.371	N 7250364.117
LENGTH m		9.194	
DISTANCE ALONG DRAIN	0.000	9.194	
LINE		38	

STRUCTURE NAME	1-39	6-31	
STRUCTURE DESCRIPTION	LIP IN LINE GULLY	TYPE S (GRADE) LIP IN LINE GULLY	TYPE S (GRADE) 1650 DIA.
PIPE SIZE (mm)		450	
PIPE CLASS		(RCP)	
PIPE GRADE		2.05% 1:49	
FULL PIPE VELOCITY (m/s)		0.67	
PART FULL VELOCITY (m/s)		2.16	
DATUM RL		-1.0	
W.S.E IN STRUCTURE H.G.L IN PIPE	14.374	14.238 14.227 14.234	14.134
PIPE FLOW (cumecs) FLOW CAPACITY (cumecs)		0.107 0.409	
DEPTH TO INVERT		1.52 1.56	2.96
INVERT LEVELS		13.351 13.179	11.779
SURFACE LEVELS FINISHED (EXISTING)	14.873	(14.591) 14.736	(14.360)
STRUCTURE SETOUT COORDINATES	E 438610.751	N 7250395.412 E 438607.354	N 7250403.024
LENGTH m		8.335	
DISTANCE ALONG DRAIN	0.000	8.335	
LINE		39	

STRUCTURE NAME	1-40	2-40	5-31	
STRUCTURE DESCRIPTION	LIP IN LINE GULLY	TYPE S (GRADE) LIP IN LINE GULLY	TYPE S (GRADE) LIP IN LINE GULLY	TYPE S (GRADE) 1650 DIA.
PIPE SIZE (mm)		375	375	
PIPE CLASS		(RCP)	(RCP)	
PIPE GRADE		0.56% 1:177	4.64% 1:22	
FULL PIPE VELOCITY (m/s)		0.31	1.72	
PART FULL VELOCITY (m/s)		1.00	3.43	
DATUM RL		0.0		
W.S.E IN STRUCTURE H.G.L IN PIPE	15.379	15.357 15.351 15.357	14.889 14.610 14.636	14.384
PIPE FLOW (cumecs) FLOW CAPACITY (cumecs)		0.035 0.132	0.190 0.378	
DEPTH TO INVERT		1.43 1.52	1.54 1.96	2.78
INVERT LEVELS		14.531 14.443	14.423 13.321	12.496
SURFACE LEVELS FINISHED (EXISTING)	15.963	(16.273) 15.963	(15.974) 15.278	(15.497)
STRUCTURE SETOUT COORDINATES	E 438714.494	N 7250428.580 E 438700.137	N 7250422.254 E 438680.540	N 7250435.686
LENGTH m		15.689	23.758	
DISTANCE ALONG DRAIN	0.000	15.689	39.447	
LINE		40		

STRUCTURE NAME	1-41	2-41	3-41	3-31	
STRUCTURE DESCRIPTION	LIP IN LINE GULLY	TYPE S (GRADE) LIP IN LINE GULLY	TYPE S (GRADE) LIP IN LINE GULLY	TYPE S (GRADE) 1050 DIA. LIP IN LINE GULLY	TYPE S (SAG) 1800 DIA.
PIPE SIZE (mm)		375	375	600	
PIPE CLASS		(RCP)	(RCP)	(RCP)	
PIPE GRADE		0.40% 1:250	2.73% 1:37	1.26% 1:80	
FULL PIPE VELOCITY (m/s)		0.22	1.12	1.19	
PART FULL VELOCITY (m/s)		0.80	2.52	2.42	
DATUM RL		2.0			
W.S.E IN STRUCTURE H.G.L IN PIPE	17.155	17.138 17.135 17.145	16.855 15.023 15.061	14.875 14.636	14.634
PIPE FLOW (cumecs) FLOW CAPACITY (cumecs)		0.024 0.111	0.124 0.290	0.336 0.688	
DEPTH TO INVERT		1.43 1.49	1.51 1.42	1.64 2.15	2.75
INVERT LEVELS		16.678 16.615	16.595 14.412	14.187 13.183	12.583
SURFACE LEVELS FINISHED (EXISTING)	18.110	(18.680) 18.110	(18.102) 15.828	(15.731) 15.331	(15.162)
STRUCTURE SETOUT COORDINATES	E 438625.431	N 7250630.723 E 438611.064	N 7250624.393 E 438643.479	N 7250551.256 E 438675.871	N 7250478.108
LENGTH m		15.700	79.999	79.999	
DISTANCE ALONG DRAIN	0.000	15.700	95.699	175.698	
LINE			41		

STRUCTURE NAME	1-42	3-41	
STRUCTURE DESCRIPTION	LIP IN LINE GULLY	TYPE S (GRADE) LIP IN LINE GULLY	TYPE S (GRADE) 1050 DIA.
PIPE SIZE (mm)		375	
PIPE CLASS		(RCP)	
PIPE GRADE		0.85% 1:118	
FULL PIPE VELOCITY (m/s)		0.38	
PART FULL VELOCITY (m/s)		1.23	
DATUM RL		1.0	
W.S.E IN STRUCTURE H.G.L IN PIPE	15.085	15.033 15.023 15.061	14.875
PIPE FLOW (cumecs) FLOW CAPACITY (cumecs)		0.042 0.162	
DEPTH TO INVERT		1.43 1.42	1.64
INVERT LEVELS		14.544 14.412	14.187
SURFACE LEVELS FINISHED (EXISTING)	15.976	(16.386) 15.828	(15.731)
STRUCTURE SETOUT COORDINATES	E 438657.686	N 7250557.515 E 438643.479	N 7250551.256
LENGTH m		15.525	
DISTANCE ALONG DRAIN	0.000	15.525	
LINE		42	

STRUCTURE NAME	1-50	2-50	3-50	
STRUCTURE DESCRIPTION	LIP IN LINE GULLY	TYPE S (SAG) LIP IN LINE GULLY	TYPE S (SAG) HEADWALL	
PIPE SIZE (mm)		375	450	
PIPE CLASS		(RCP)	(RCP)	
PIPE GRADE		1.00% 1:100	1.00% 1:100	
FULL PIPE VELOCITY (m/s)		1.07	1.01	
PART FULL VELOCITY (m/s)		1.70	1.85	
DATUM RL		-1.0		
W.S.E IN STRUCTURE H.G.L IN PIPE	12.780	12.446 12.406	12.359 12.311	12.311
PIPE FLOW (cumecs) FLOW CAPACITY (cumecs)		0.118 0.175	0.161 0.286	
DEPTH TO INVERT		1.78 1.76	1.84 0.45	0.45
INVERT LEVELS		11.913 11.826	11.751 11.600	11.600
SURFACE LEVELS FINISHED (EXISTING)	13.693	(13.684) 13.586	(14.063) 12.050	(13.818)
STRUCTURE SETOUT COORDINATES	E 438251.648	N 7250203.512 E 438243.387	N 7250200.948 E 438228.956	N 7250196.469
LENGTH m		8.650	15.110	
DISTANCE ALONG DRAIN	0.000	8.650	23.760	
LINE			50	

LEGEND

– – – –	EXISTING SURFACE LEVEL
———	FINISHED SURFACE LEVEL
–·–·–	HGL (Q5)
═══	SWD PIPE

0 20 40 60 80 100m

SCALE 1:1000 @A1

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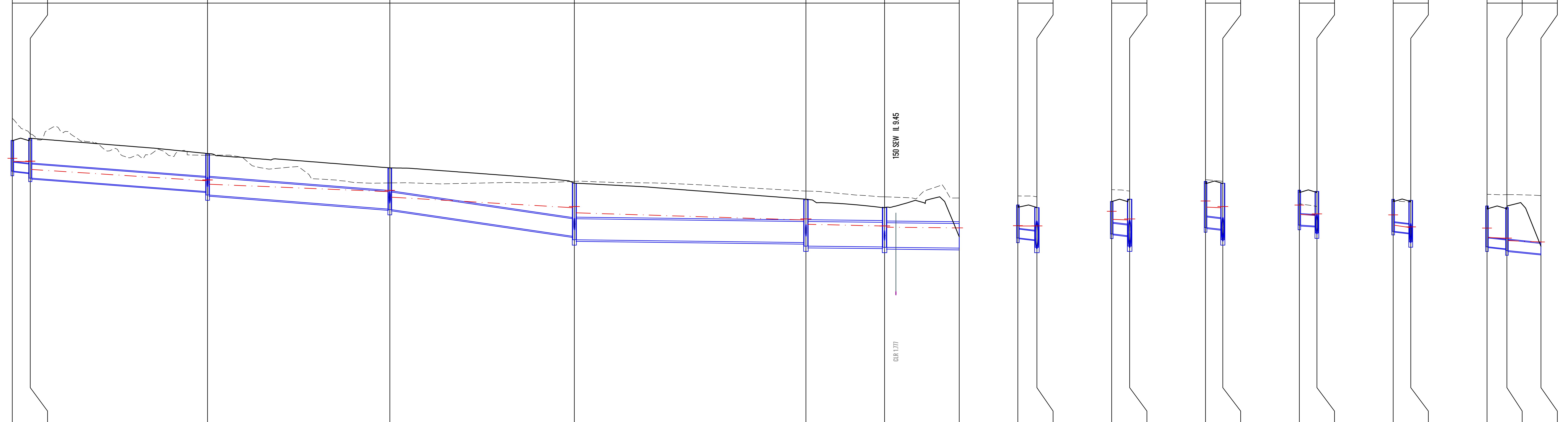
Project
134 TELEGRAPH ROAD KALKIE

TITLE
SWD LONG SECTIONS - SHEET 5

Figure Number	Revision	Size
UES003003-FIG-15	B	A1

CAD File: C:\Users\tabsi\Dropbox\UES Projects\UES003003 134 Telegraph Rd\Design\Acad\UES003003-FIG 11 DRAINAGE LONG SEC.dwg

DATE PLOTTED: 8 September 2020 9:25 AM BY : MARK TABER



LINE 51

STRUCTURE NAME	1-51	2-51	3-51	4-51	5-51	6-51	7-51	8-51	
STRUCTURE DESCRIPTION	LIP IN LINE GULLY	TYPE S (GRADE) LIP IN LINE GULLY	TYPE S (GRADE) 1050 DIA. LIP IN LINE GULLY	TYPE S (GRADE) 1200 DIA. LIP IN LINE GULLY	TYPE S (GRADE) 1200 DIA. LIP IN LINE GULLY	TYPE S (GRADE) 1350 DIA. LIP IN LINE GULLY	TYPE S (GRADE) 1500 DIA. LIP IN LINE GULLY	TYPE S (SAG) 1500 DIA. HEADWALL	
PIPE SIZE (mm)		375	600	750	750	900	1050	1050	
PIPE CLASS		(RCP)	(RCP)	(RCP)	(RCP)	(RCP)	(RCP)	(RCP)	
PIPE GRADE		1.00% 1:100	0.75% 1:133	0.78% 1:129	1.45% 1:69	0.12% 1:833	0.10% 1:1000	0.10% 1:1000	
FULL PIPE VELOCITY (m/s)		0.51	1.14	1.26	1.66	1.58	1.45	1.58	
PART FULL VELOCITY (m/s)		1.42	1.97	2.29	3.10	1.58	1.45	1.58	
DATUM RL		-1.0							
W.S.E IN STRUCTURE H.G.L IN PIPE	15.279	15.150 15.142 15.156	14.805 14.322 14.357	14.176 13.859 13.912	13.623 13.175 13.225	12.956 12.651 12.694	12.467 12.393 12.399	12.344 12.312	12.312
PIPE FLOW (cumecs)		0.057	0.322	0.557	0.735	1.006	1.254	1.366	
FLOW CAPACITY (cumecs)		0.175	0.533	0.981	1.339	0.627	0.864	0.867 Qx=0.499	
DEPTH TO INVERT		1.31 1.48	1.70 1.62	1.77 1.76	1.78 2.26	2.41 1.85	2.00 1.67	1.69 1.05	1.05
INVERT LEVELS		14.736 14.659	14.434 13.865	13.715 13.112	13.092 11.954	11.804 11.685	11.535 11.502	11.482 11.450	11.450
SURFACE LEVELS FINISHED (EXISTING)	16.043	(16.983) 16.135	(16.316) 15.485	(15.414) 14.873	(14.230) 14.219	(14.297) 13.537	(13.883) 13.175	(13.639) 12.500	(13.589)
STRUCTURE SETOUT COORDINATES	E 438618.915	N 7250296.970 E 438615.801	N 7250303.957 E 438546.974	N 7250272.757 E 438476.014	N 7250241.083 E 438403.637	N 7250210.228 E 438308.802	N 7250182.804 E 438278.941	N 7250167.547 E 438249.389	N 7250155.756
LENGTH m		7.650	75.568	77.708	78.679	98.721	33.534	31.817	
DISTANCE ALONG DRAIN	0.000	7.650	83.218	160.927	239.606	338.326	371.860	403.677	
LINE					51				

LINES 52–56

STRUCTURE NAME	1-52	7-51	
STRUCTURE DESCRIPTION	LIP IN LINE GULLY	TYPE S (SAG) LIP IN LINE GULLY	TYPE S (SAG) 1500 DIA.
PIPE SIZE (mm)		375	
PIPE CLASS		(RCP)	
PIPE GRADE		1.00% 1:100	
FULL PIPE VELOCITY (m/s)		0.17	
PART FULL VELOCITY (m/s)		1.04	
DATUM RL		-1.0	
W.S.E IN STRUCTURE H.G.L IN PIPE	12.408	12.394 12.393 12.399	12.344
PIPE FLOW (cumecs)		0.019	
FLOW CAPACITY (cumecs)		0.175	
DEPTH TO INVERT		1.41 1.37	1.69
INVERT LEVELS		11.882 11.801	11.482
SURFACE LEVELS FINISHED (EXISTING)	13.290	(13.675) 13.175	(13.639)
STRUCTURE SETOUT COORDINATES	E 438284.047	N 7250161.265 E 438278.941	N 7250167.547
LENGTH m		8.095	
DISTANCE ALONG DRAIN	0.000	8.095	
LINE		52	

STRUCTURE NAME	1-53	6-51	
STRUCTURE DESCRIPTION	LIP IN LINE GULLY	TYPE S (GRADE) LIP IN LINE GULLY	TYPE S (GRADE) 1500 DIA.
PIPE SIZE (mm)		450	
PIPE CLASS		(RCP)	
PIPE GRADE		1.00% 1:100	
FULL PIPE VELOCITY (m/s)		1.03	
PART FULL VELOCITY (m/s)		1.85	
DATUM RL		-1.0	
W.S.E IN STRUCTURE H.G.L IN PIPE	13.022	12.676 12.651 12.694	12.467
PIPE FLOW (cumecs)		0.164	
FLOW CAPACITY (cumecs)		0.285	
DEPTH TO INVERT		1.37 1.56	2.00
INVERT LEVELS		12.057 11.981	11.535
SURFACE LEVELS FINISHED (EXISTING)	13.431	(13.941) 13.537	(13.883)
STRUCTURE SETOUT COORDINATES	E 438310.977	N 7250175.470 E 438308.802	N 7250182.804
LENGTH m		7.650	
DISTANCE ALONG DRAIN	0.000	7.650	
LINE		53	

STRUCTURE NAME	1-54	5-51	
STRUCTURE DESCRIPTION	LIP IN LINE GULLY	TYPE S (GRADE) LIP IN LINE GULLY	TYPE S (GRADE) 1350 DIA.
PIPE SIZE (mm)		450	
PIPE CLASS		(RCP)	
PIPE GRADE		1.00% 1:100	
FULL PIPE VELOCITY (m/s)		1.02	
PART FULL VELOCITY (m/s)		1.85	
DATUM RL		-1.0	
W.S.E IN STRUCTURE H.G.L IN PIPE	13.459	13.199 13.175 13.225	12.956
PIPE FLOW (cumecs)		0.163	
FLOW CAPACITY (cumecs)		0.285	
DEPTH TO INVERT		1.97 1.96	2.41
INVERT LEVELS		12.328 12.254	11.804
SURFACE LEVELS FINISHED (EXISTING)	14.301	(14.371) 14.219	(14.297)
STRUCTURE SETOUT COORDINATES	E 438405.740	N 7250203.165 E 438403.637	N 7250210.228
LENGTH m		7.369	
DISTANCE ALONG DRAIN	0.000	7.369	
LINE		54	

STRUCTURE NAME	1-55	4-51	
STRUCTURE DESCRIPTION	LIP IN LINE GULLY	TYPE S (GRADE) LIP IN LINE GULLY	TYPE S (GRADE) 1200 DIA.
PIPE SIZE (mm)		450	
PIPE CLASS		(RCP)	
PIPE GRADE		0.56% 1:180	
FULL PIPE VELOCITY (m/s)		1.03	
PART FULL VELOCITY (m/s)		1.47	
DATUM RL		0.0	
W.S.E IN STRUCTURE H.G.L IN PIPE	14.288	13.883 13.859 13.912	13.623
PIPE FLOW (cumecs)		0.163	
FLOW CAPACITY (cumecs)		0.213	
DEPTH TO INVERT		1.49 1.48	1.78
INVERT LEVELS		13.433 13.392	13.092
SURFACE LEVELS FINISHED (EXISTING)	14.924	(14.336) 14.873	(14.230)
STRUCTURE SETOUT COORDINATES	E 438479.061	N 7250234.255 E 438476.014	N 7250241.083
LENGTH m		7.477	
DISTANCE ALONG DRAIN	0.000	7.477	
LINE		55	

STRUCTURE NAME	1-56	3-51	
STRUCTURE DESCRIPTION	LIP IN LINE GULLY	TYPE S (SAG) LIP IN LINE GULLY	TYPE S (GRADE) 1200 DIA.
PIPE SIZE (mm)		375	
PIPE CLASS		(RCP)	
PIPE GRADE		1.00% 1:100	
FULL PIPE VELOCITY (m/s)		1.17	
PART FULL VELOCITY (m/s)		1.73	
DATUM RL		1.0	
W.S.E IN STRUCTURE H.G.L IN PIPE	14.866	14.429 14.328 14.357	14.176
PIPE FLOW (cumecs)		0.129	
FLOW CAPACITY (cumecs)		0.175	
DEPTH TO INVERT		1.37 1.40	1.77
INVERT LEVELS		14.165 14.090	13.715
SURFACE LEVELS FINISHED (EXISTING)	15.534	(15.488) 15.485	(15.414)
STRUCTURE SETOUT COORDINATES	E 438550.023	N 7250265.924 E 438546.974	N 7250272.757
LENGTH m		7.482	
DISTANCE ALONG DRAIN	0.000	7.482	
LINE		56	

LINE 60

STRUCTURE NAME	1-60	2-60	3-60	
STRUCTURE DESCRIPTION	LIP IN LINE GULLY	TYPE S (SAG) LIP IN LINE GULLY	TYPE S (SAG) HEADWALL	
PIPE SIZE (mm)		375	450	
PIPE CLASS		(RCP)	(RCP)	
PIPE GRADE		1.00% 1:100	1.00% 1:100	
FULL PIPE VELOCITY (m/s)		1.10	1.17	
PART FULL VELOCITY (m/s)		1.71	1.91	
DATUM RL		-1.0		
W.S.E IN STRUCTURE H.G.L IN PIPE	12.306	11.909 11.868 11.876	11.770 11.713	11.713
PIPE FLOW (cumecs)		0.121	0.187	
FLOW CAPACITY (cumecs)		0.175	0.286	
DEPTH TO INVERT		1.74 1.77	1.84 0.45	0.45
INVERT LEVELS		11.505 11.420	11.345 11.200	11.200
SURFACE LEVELS FINISHED (EXISTING)	13.248	(13.743) 13.187	(13.730) 11.650	(13.688)
STRUCTURE SETOUT COORDINATES	E 438308.097	N 7250131.627 E 438303.889	N 7250124.259 E 438297.803	N 7250111.077
LENGTH m		8.485	14.520	
DISTANCE ALONG DRAIN	0.000	8.485	23.005	
LINE		60		

LEGEND

╌╌╌ EXISTING SURFACE LEVEL
─── FINISHED SURFACE LEVEL
—·— HGL (Q5)
═══ SWD PIPE

0 20 40 60 80 100m
SCALE 1:1000 @A1

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Project 134 TELEGRAPH ROAD KALKIE		
TITLE SWD LONG SECTIONS - SHEET 6		
Figure Number UES003003-FIG-16	Revision B	Size A1

CAD File: C:\Users\tabsi\Dropbox\UES Projects\UES003003 134 Telegraph Rd\Design\Acad\UES003003-FIG 11 DRAINAGE LONG SEC.dwg

DATE PLOTTED: 8 September 2020 9:26 AM BY: MARK TABER

STRUCTURE NAME	1-61	2-61	3-61	4-61	5-61	6-61	7-61	8-61	9-61	1-62	7-61	1-63	5-61	1-64	4-61	1-66	3-61	1-70	2-70	3-70	1-OUT4	2-OUT4	1-OUT5	2-OUT5
STRUCTURE DESCRIPTION	LIP IN LINE GULLY	TYPE S (GRADE) LIP IN LINE GULLY	TYPE S (GRADE)	TYPE S (GRADE) LIP IN LINE GULLY 1200 DIA.	TYPE S (GRADE) LIP IN LINE GULLY 1350 DIA.	TYPE S (GRADE) LIP IN LINE GULLY 1650 DIA.	TYPE S (GRADE) LIP IN LINE GULLY 1350 DIA.	TYPE S (SAG) LIP IN LINE GULLY 1800 DIA.	TYPE S (SAG) LIP IN LINE GULLY 1650 DIA. HEADWALL	LIP IN LINE GULLY	TYPE S (SAG) LIP IN LINE GULLY	LIP IN LINE GULLY	TYPE S (GRADE) LIP IN LINE GULLY	LIP IN LINE GULLY	TYPE S (GRADE) LIP IN LINE GULLY	LIP IN LINE GULLY	TYPE S (GRADE) LIP IN LINE GULLY	CAP PIPE	LIP IN LINE GULLY	TYPE S (SAG) LIP IN LINE GULLY	HEADWALL	HEADWALL	HEADWALL	HEADWALL
PIPE SIZE (mm)	375	450	600	900	900	900	1050	1050		375		450		450		375		450	450	1050	1200		1350	
PIPE CLASS	(RCP)	(RCP)	(RCP)	(RCP)	(RCP)	(RCP)	(RCP)	(RCP)		(RCP)		(RCP)		(RCP)		(RCP)		(RCP)	(RCP)	(RCP)	(RCP)		(RCP)	
PIPE GRADE	1.00%	0.92%	0.97%	1.77%	0.12%	0.12%	0.10%	0.10%		1.00%		1.00%		1.00%		0.40%		1.00%	1.00%	0.10%	0.25%		0.10%	
	1:100	1:108	1:103	1:56	1:833	1:833	1:1000	1:1000		1:100		1:100		1:100		1:250		1:100	1:100	1:1000	1:405		1:1000	
FULL PIPE VELOCITY (m/s)	2.21	1.92	1.76	1.34	1.65	1.80	1.53	1.55		1.14		0.77		1.30		1.09		0.27	1.25		0.00		0.00	
PART FULL VELOCITY (m/s)	2.21	1.92	2.38	3.46	1.65	1.80	1.53	1.55		1.73		1.72		1.96		1.09		1.28	1.25		0.00		0.00	
DATUM RL	0.0									-1.0		0.0		0.0		1.0		-1.0			-1.0		-2.0	
W.S.E IN STRUCTURE	15.792	15.436	15.024	14.423	14.141	13.080	12.909	12.795	12.600	12.468	12.204	12.072	11.852	11.767	11.741	11.717	11.717	12.503	12.077	12.955	12.809	12.795	13.747	13.210	13.108	12.909	14.804	14.459	14.423	14.487	14.141	12.153	12.153	12.151	12.198	12.198	12.198	11.008	11.008	11.008
H.G.L IN PIPE		15.370		14.487		13.108		12.831		12.528		12.109	11.769						12.072		12.831																			
		15.431																																					
PIPE FLOW (cumecs)	0.244	0.305	0.498	0.853	1.049	1.144	1.321	1.342		0.126		0.122		0.207		0.121		0.042	1.084		0.000		0.000	
FLOW CAPACITY (cumecs)	0.175	0.274	0.604	2.413	0.627	0.627	0.864	0.867		0.175		0.285		0.285		0.111		0.285	0.867		1.945		1.695	
	Qx=0.082							Qx=0.475											Qx=0.217					
DEPTH TO INVERT	1.41	1.49	1.56	1.51	1.66	1.56	1.86	2.26	2.28	1.93	1.95	1.69	1.84	2.09	2.11	1.05	1.05	1.22	1.16	1.84	1.85	1.83	2.28	1.39	1.41	1.86	1.41	1.44	1.66	1.52	1.60	2.20	1.05	1.20		1.20	1.35		1.35	1.35
INVERT LEVELS	14.468	14.392	14.317	13.829	13.679	12.665	12.365	11.327	11.307	11.260	11.240	11.200	11.050	11.034	11.014	11.000	11.000	11.815	11.725	11.050	11.830	11.757	11.307	12.890	12.815	12.365	13.935	13.904	13.679	11.594	11.514	10.914	10.900	10.900	11.800	11.700	11.700	11.004	10.960	10.960
SURFACE LEVELS	15.877									13.030		13.682		14.280		15.343		13.112			13.000		12.354	
FINISHED (EXISTING)	(16.565)	15.877	(16.560)	15.343	(15.947)	14.229	(15.344)	13.583	(15.827)	13.186	(15.584)	12.888	(14.944)	13.125	(14.717)	12.050	(14.296)	(14.963)	12.888	(14.944)	(15.684)	13.583	(15.827)	(15.383)	14.229	(15.344)	(15.885)	15.343	(15.947)	(14.542)	13.116	(14.425)	11.950	(14.177)	(13.580)	12.900	(11.026)	(13.981)	12.310	(10.146)
STRUCTURE SETOUT COORDINATES	E 4386648.462	E 4386645.336	E 4386597.230	E 4385501.416	E 4384409.621	E 4383882.723	E 4383374.297	E 4383367.544	E 4383071.878	E 4383391.455	E 4383382.723	E 4383449.259	E 4383447.191	E 4383504.462	E 4383501.416	E 4383600.347	E 4383597.230	E 4383447.357	E 4383443.237	E 4383436.483	E 4382249.127	E 4382239.011	E 4383446.084	E 4383431.256
	N 7250208.010	N 7250215.005	N 7250193.530	N 7250150.577	N 7250128.705	N 7250098.256	N 7250084.345	N 7250071.878		N 7250096.270	N 7250098.256	N 7250121.745	N 7250128.705	N 7250143.751	N 7250150.577	N 7250186.544	N 7250193.530	N 7250051.771	N 7250044.969	N 7250032.502	N 7250148.170	N 7250112.995	N 7250021.988	N 7249980.723
LENGTH m	7.662	52.682	105.001	58.469	39.194	33.097	16.264	14.179		8.956		7.260		7.475		7.650		7.952	14.179		40.520		43.848	
DISTANCE ALONG DRAIN	0.000	7.662	60.344	165.345	223.815	263.008	296.106	312.370	326.549	0.000	8.956	0.000	7.260	0.000	7.475	0.000	7.650	0.000	7.952	22.131	0.000	40.520	0.000	43.848
LINE	61									62		63		64		66		70			OUT4		OUT5	

150 SEW IL 10.40

C28.0419

LEGEND

- EXISTING SURFACE LEVEL
- FINISHED SURFACE LEVEL
- HGL (Q5)
- SWD PIPE

0 20 40 60 80 100m

SCALE 1:1000 @A1

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Project: 134 TELEGRAPH ROAD KALKIE

TITLE: SWD LONG SECTIONS - SHEET 7

Figure Number: UES003003-FIG-17 | Revision: B | Size: A1

CAD File: C:\Users\taber\Dropbox\UES Projects\UES003003 134 Telegraph Rd\Design\Acad\UES003003-FIG 11 DRAINAGE LONG SEC.dwg

DATE PLOTTED: 13 October 2020 12:11 PM BY : MARK TABER

JOINS RIGHT

EX. SPS SF.095

TELEGRAPH ROAD

CONNECT TO EXISTING SMH

CONSTRUCT SMH OVER EXISTING 1500 SEWER

STAGE 1

STAGE 2

STAGE 3

STAGE 4

STAGE 5

STAGE 6

BUNDABERG RING ROAD

EMT D

1/5 DISCHARGE MH

REFER FIG-28 FOR SPS DETAILS

SPS

SEWER OPTION 2. REFER FIG 29 FOR DETAILS

S225

500

502

503

PLAN

SCALE A1 - 1 : 1500
A3 - 1 : 3000

LEGEND:

- 14/43 — STRUCTURE NUMBER / LINE NUMBER
- S150 — SEWER MAIN AND STRUCTURE
- SEWER RISING MAIN
- W100 — WATERMAIN AND PIPE DIAMETER
- STORMWATER DRAINAGE
- STAGE BOUNDARY

EX. 3000 TRUNK SEWER MAIN

EX. 1000 SEWER RISING MAIN

BUNDABERG RING ROAD

SANTINA DR.

EX. 1000 SEWER RISING MAIN

EX. SPS SF.095

JOINS LEFT

PLAN

SCALE A1 - 1 : 1500
A3 - 1 : 3000

0 50 100 150m

SCALE 1:1500 @A1

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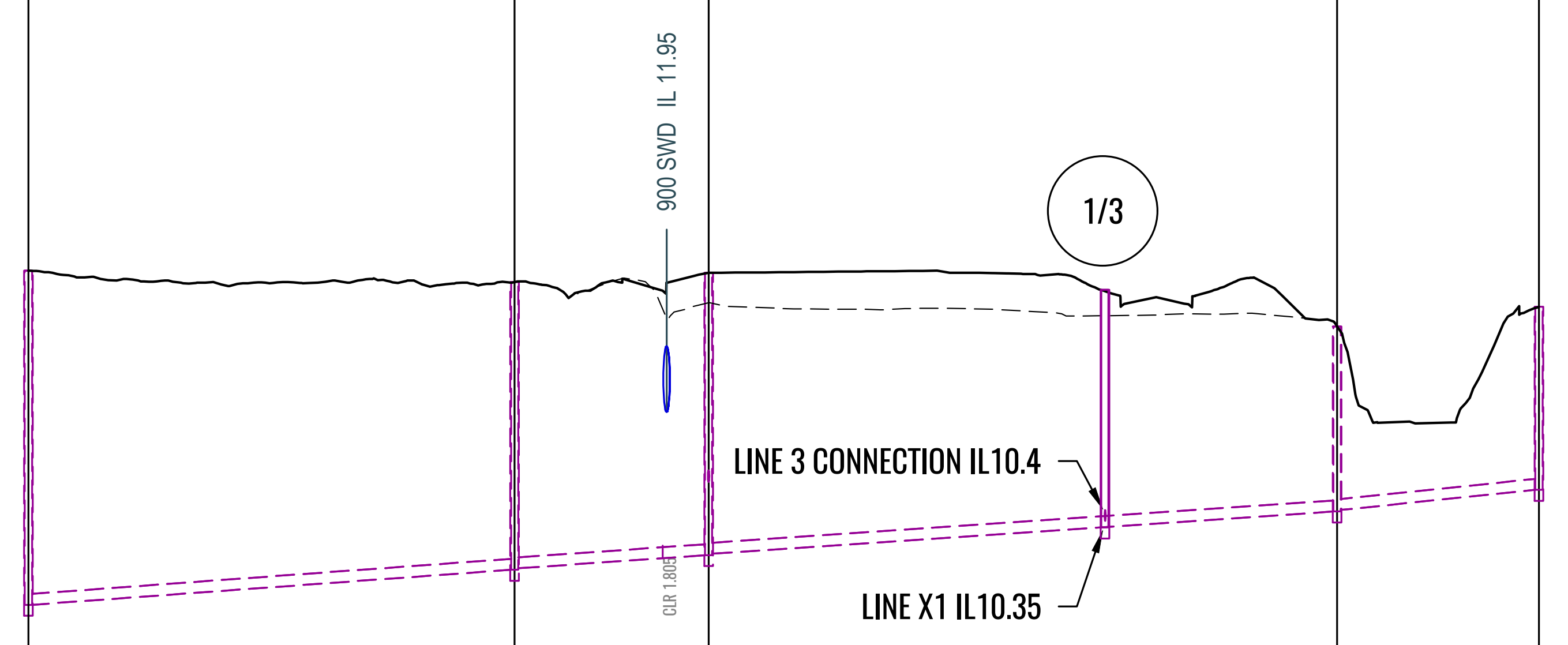
Project	134 TELEGRAPH ROAD KALKIE
TITLE	MASTERPLAN - SEWER RETICULATION
Figure Number	UES003003-FIG-20
Revision	C
Size	A1

CAD File: C:\Users\tabes\Dropbox\UES Projects\UES003003 134 Telegraph Rd\Design\Acad\UES003003-FIG 20 SEWER MASTERPLAN.dwg

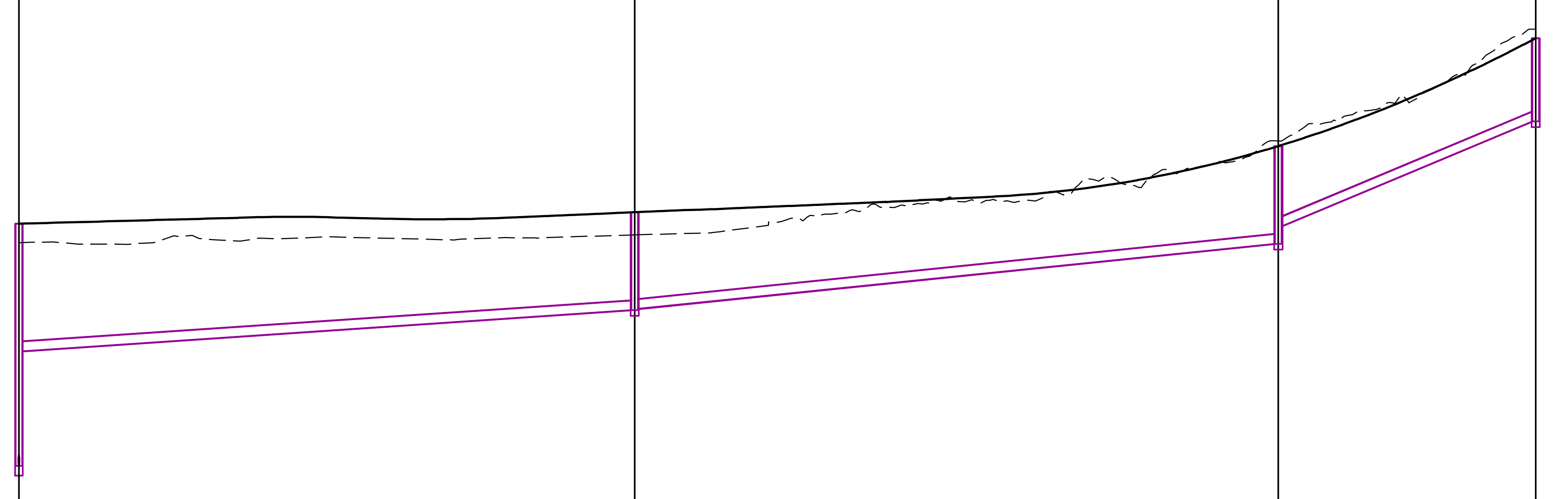
DATE PLOTTED: 8 September 2020 12:24 PM BY : MARK TABER

STRUCTURE No	1/X1		2/X1		3/X1		4/X1		5/X1
JUNCTION LINE					2				
STRUCTURE TYPE	EX SPS		EX MH		EX MH		EX MH		EX MH
STRUCTURE LID CLASS									
DROP JUNCTION TYPE				0.02		0.02		0.02	
HC DEPTH									
HC INVERT LEVEL									
HC DISTANCE TO D/S STRUCTURE									
HC TYPE									
HC LOT No									



DATUM RL	1.0								
TYPE		150 EXISTING		150 EXISTING		150 EXISTING		150 EXISTING	
GRADE		0.72 % 1:139		0.68 % 1:148		0.67 % 1:149		1.00 % 1:100	
JUNCTION INVERT LEVEL	9.23				11.000				
DEPTH	4.58		3.95 3.93		3.87 3.85		2.54 2.52		2.51
INVERT LEVEL	9.310		9.790 9.810		9.990 10.010		10.590 10.610		10.887
SURFACE LEVELS FINISHED (EXISTING)	13.892 (13.892)		13.738 (13.738)		13.862 (13.453)		13.128 (13.128)		13.396 (13.396)
STRUCTURE SETOUT COORDINATES	E 438237.008 N 7250564.354		E 438297.529 N 7250592.363		E 438308.712 N 7250568.230		E 438229.999 N 7250533.065		E 438204.729 N 7250521.775
LENGTH		66.688		26.598		86.211		27.677	
CHAINAGE	0.000		66.688		93.286		179.497		207.175
LINE	X1								

STRUCTURE No	3/X1		1/2		2/2		3/2
JUNCTION LINE	X1						
STRUCTURE TYPE	EX MH		P1 1000		P1 1000		P1 1000
STRUCTURE LID CLASS			D		D		D
DROP JUNCTION TYPE		1.78	V	0.02	V	0.27	V
HC DEPTH							
HC INVERT LEVEL							
HC DISTANCE TO D/S STRUCTURE							
HC TYPE							
HC LOT No							



DATUM RL	3.0						
				PP			
TYPE		150 SN8		150 SN8		150 SN8	
GRADE		0.67 % 1:150		1.01 % 1:99		4.08 % 1:25	
JUNCTION INVERT LEVEL	11.770						
DEPTH	3.76 1.98		1.52 1.50		1.52 1.25		1.29
INVERT LEVEL	9.990 11.770		12.408 12.428		13.439 13.708		15.340
SURFACE LEVELS FINISHED (EXISTING)	13.750 (13.453)		13.927 (13.577)		14.955 (15.035)		16.628 (16.771)
STRUCTURE SETOUT COORDINATES	E 438308.712 N 7250568.230		E 438396.151 N 7250607.081		E 438487.469 N 7250647.835		E 438523.997 N 7250664.137
LENGTH		95.681		100.000		40.000	
CHAINAGE	0.000		95.681		195.681		235.681
LINE	2						

LEGEND

– – – –	EXISTING SURFACE LEVEL
———	FINISHED SURFACE LEVEL
═══	SEWER PIPE PROPOSED
╌╌╌	SEWER PIPE EXISTING

0 20 40 60 80 100m
SCALE 1:1000 @A1

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Project
134 TELEGRAPH ROAD KALKIE

TITLE
SEWER LONG SECTIONS - SHEET 1

Figure Number	Revision	Size
UES003003-FIG-21	B	A1

CAD File: C:\Users\tabsi\Dropbox\UES Projects\UES003003 134 Telegraph Rd\Design\Acad\UES003003-FIG 21 SEWER LONGSECTIONS.dwg

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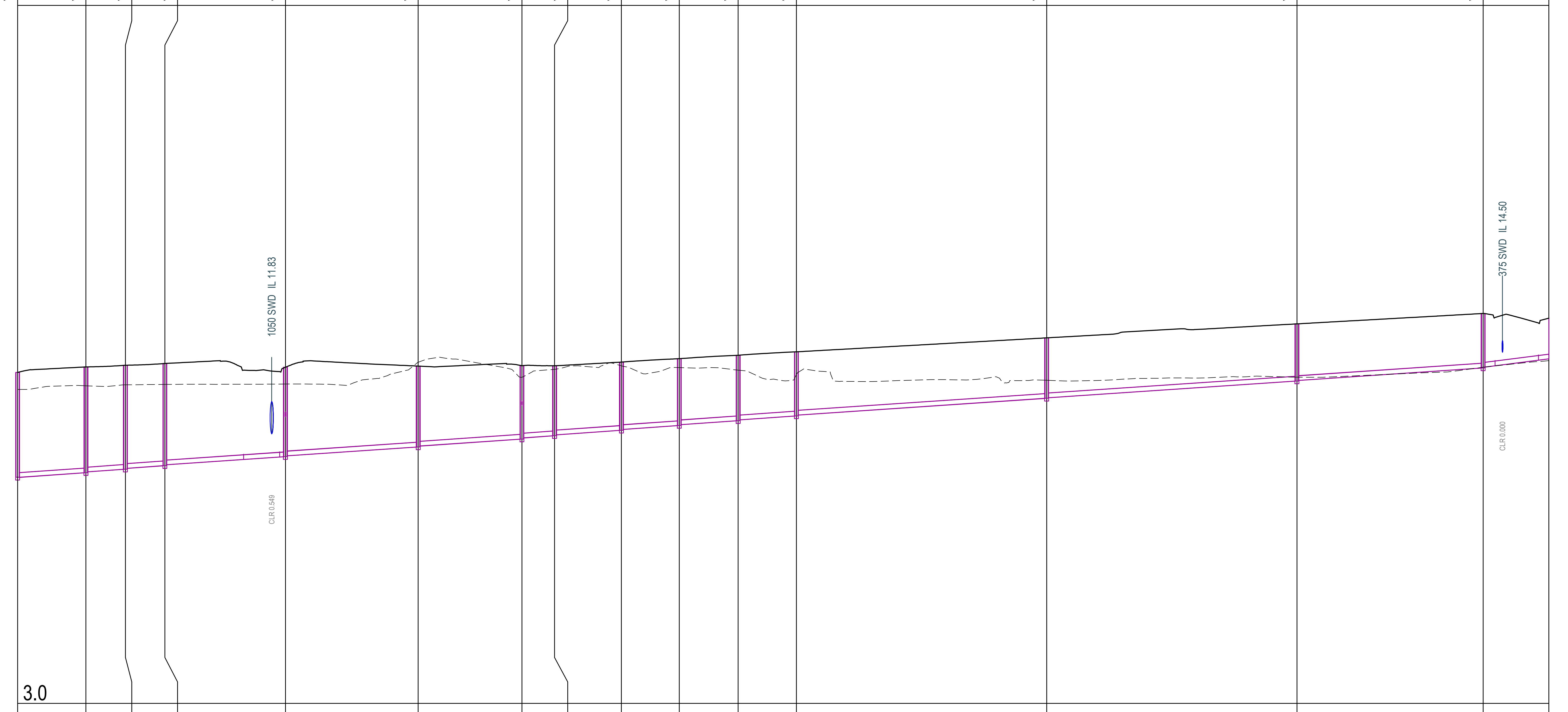
HC DEPTH

HC INVERT LEVEL

HC DISTANCE TO
D/S STRUCTURE

HC TYPE

HC LOT No



DATUM RL 3.0

FOOTPATH

STRUCTURE No	JUNCTION LINE	STRUCTURE TYPE	STRUCTURE LID CLASS	DROP JUNCTION TYPE	JUNCTION INVERT LEVEL	DEPTH	INVERT LEVEL	SURFACE LEVELS FINISHED (EXISTING)	STRUCTURE SETOUT COORDINATES	CHAINAGE
1/3		P1 1000	D	V		3.44	10.400	13.836 (13.275)	E 438259.041 N 7250546.010	0.000
2/3		P1 1000	D	V		3.46 3.43	10.549 10.579	14.013 (13.396)	E 438268.257 N 7250525.626	22.371
3/3		P1 1000	D	V		3.40 3.37	10.665 10.695	14.068 (13.426)	E 438272.034 N 7250513.268	35.293
4/3		P1 1000	D	V		3.34 3.31	10.781 10.811	14.125 (13.440)	E 438272.686 N 7250500.361	48.216
5/3	4	P1 1000	D	V	12.386	2.93 2.90	11.075 11.105	14.004 (13.453)	E 438270.008 N 7250460.974	87.694
6/3		P1 1000	D	V		2.65 2.62	11.394 11.424	14.041 (14.165)	E 438265.802 N 7250417.708	131.164
7/3	5	P1 1000	D	V	12.750	2.40 2.36	11.651 11.691	14.052 (13.669)	E 438261.111 N 7250384.057	165.141
8/3		P1 1000	D	V		2.29 2.26	11.762 11.792	14.049 (13.934)	E 438271.387 N 7250381.125	175.827
9/3		P1 1000	D	V		2.23 2.20	11.938 11.968	14.171 (14.050)	E 438293.275 N 7250381.279	197.715
10/3		P1 1000	D	V		2.19 2.16	12.094 12.124	14.282 (13.992)	E 438312.168 N 7250382.714	216.662
11/3		P1 1000	D	V		2.14 2.11	12.253 12.283	14.395 (13.907)	E 438331.003 N 7250386.796	235.935
12/3		P1 1000	D	V		2.10 2.07	12.410 12.440	14.507 (13.763)	E 438348.918 N 7250393.355	255.013
13/3		P1 1000	D	V		1.98 1.96	12.986 13.006	14.964 (13.575)	E 438423.756 N 7250426.755	336.965
14/3		P1 1000	D	V		1.87 1.85	13.553 13.573	15.422 (13.676)	E 438498.594 N 7250460.154	418.918
15/3		P1 1000	D	V		1.79 1.76	13.979 14.009	15.764 (14.004)	E 438573.432 N 7250493.553	479.883
16/3		END				1.33	14.278	15.607 (14.221)	E 438569.300 N 7250502.935	501.400

STRUCTURE No	DROP JUNCTION TYPE	TYPE	GRADE	LENGTH
1/3 – 2/3		150 SN8	0.67 % 1:150	22.371
2/3 – 3/3	0.03	150 SN8	0.67 % 1:150	12.923
3/3 – 4/3	0.03	150 SN8	0.67 % 1:150	12.923
4/3 – 5/3	0.03	150 SN8	0.67 % 1:150	39.479
5/3 – 6/3	0.03	150 SN8	0.67 % 1:150	43.470
6/3 – 7/3	0.03	150 SN8	0.67 % 1:150	33.976
7/3 – 8/3	0.04	150 SN8	0.67 % 1:150	10.686
8/3 – 9/3	0.03	150 SN8	0.67 % 1:150	21.888
9/3 – 10/3	0.03	150 SN8	0.67 % 1:150	18.947
10/3 – 11/3	0.03	150 SN8	0.67 % 1:150	19.273
11/3 – 12/3	0.03	150 SN8	0.67 % 1:150	19.078
12/3 – 13/3	0.03	150 SN8	0.67 % 1:150	81.953
13/3 – 14/3	0.02	150 SN8	0.67 % 1:150	81.953
14/3 – 15/3	0.02	150 SN8	0.67 % 1:150	60.965
15/3 – 16/3	0.03	150 SN8	1.25 % 1:80	21.517

LINE 3

LEGEND

- - - -	EXISTING SURFACE LEVEL
——	FINISHED SURFACE LEVEL
——	SEWER PIPE PROPOSED
- - - -	SEWER PIPE EXISTING

0 20 40 60 80 100m
SCALE 1:1000 @A1

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Project		
134 TELEGRAPH ROAD KALKIE		
TITLE		
SEWER LONG SECTIONS - SHEET 2		
Figure Number	Revision	Size
UES003003-FIG-22	B	A1

CAD File: C:\Users\tabsi\Dropbox\UES Projects\UES003003 134 Telegraph Rd\Design\Acad\UES003003-FIG 21 SEWER LONGSECTIONS.dwg

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STRUCTURE No	5/3		1/4		2/4			3/4			4/4			5/4			6/4		7/3		1/5		
JUNCTION LINE	3																		3				
STRUCTURE TYPE	P1	1000	P1	1000	P1	1000		P1	1000		P1	1000		P1	1000		P1	1000	P1	1000	P1	1000	
STRUCTURE LID CLASS	D		D		D			D			D			D			D		D		D		
DROP JUNCTION TYPE	V	1.31	V	0.03	V	0.03		V	0.02		V	0.02		V	0.08		V		V	1.10	V		
HC DEPTH																							
HC INVERT LEVEL																							
HC DISTANCE TO D/S STRUCTURE																							
HC TYPE																							
HC LOT No																							
DATUM RL	3.0																		3.0				
						FOOTPATH													FOOTPATH				
	150		150		150			150			150			150			150		150				
TYPE	SN8		SN8		SN8			SN8			SN8			SN8			SN8		SN8				
GRADE	0.67 %	1:150	0.67 %	1:150	0.67 %	1:150		0.67 %	1:150		0.67 %	1:150		1.25 %	1:80				1.05 %	1:95			
JUNCTION INVERT LEVEL	12.386																		12.750				
DEPTH	2.93	1.62	1.50	1.47	1.45	1.42		1.43	1.41		1.42	1.40		1.32	1.24		0.83		2.40	1.30	1.27		
INVERT LEVEL	11.075	12.386	12.548	12.578	12.781	12.811		13.465	13.485		14.045	14.065		14.438	14.518		15.159		11.651	12.750	12.900		
SURFACE LEVELS FINISHED (EXISTING)	14.004	(13.453)	14.046	(13.452)	14.233	(13.499)		14.896	(13.566)		15.466	(13.754)		15.761	(14.582)		15.993	(14.447)	14.052	(13.669)	14.171		(13.395)
STRUCTURE SETOUT COORDINATES	E 438270.008	N 7250460.974	E 438294.412	N 7250462.019	E 438323.803	N 7250469.752		E 438413.327	N 7250509.706		E 438490.035	N 7250543.940		E 438541.185	N 7250566.767		E 438551.772	N 7250542.732	E 438261.111	N 7250384.057	E 438246.964		N 7250385.931
LENGTH		24.427		30.391		98.035			84.001			56.013			51.264					14.270			
CHAINAGE	0.000		24.427		54.818			152.853			236.854			292.866			344.130		0.000		14.270		
LINE									4												5		

LEGEND

- EXISTING SURFACE LEVEL
- FINISHED SURFACE LEVEL
- SEWER PIPE PROPOSED
- SEWER PIPE EXISTING

0 20 40 60 80 100m

SCALE 1:1000 @A1

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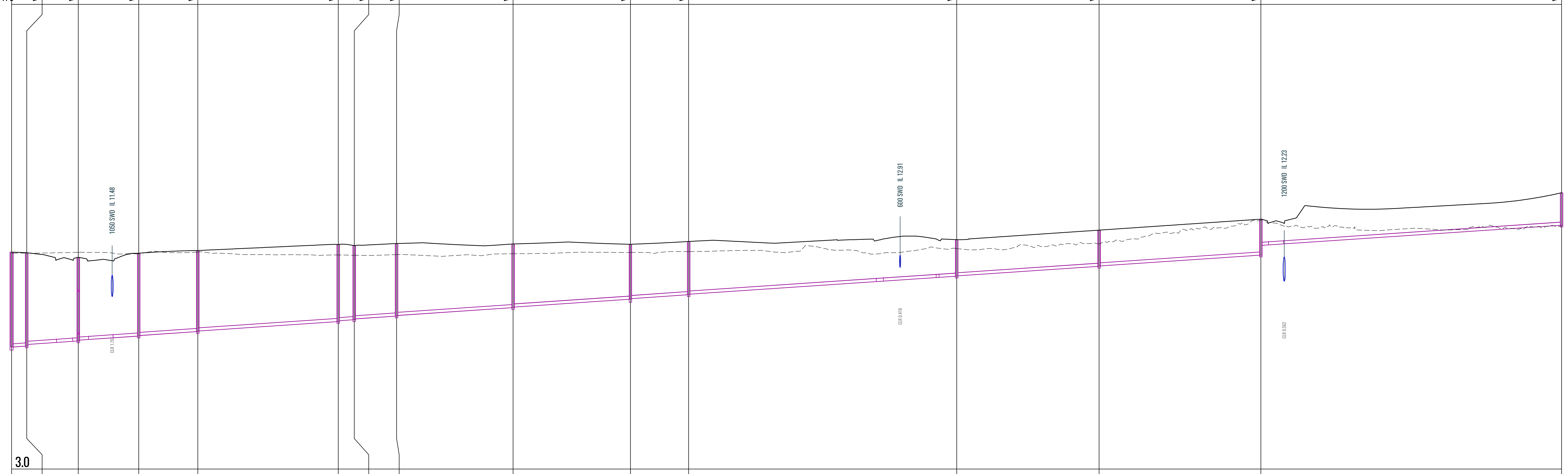
Project	134 TELEGRAPH ROAD KALKIE		
TITLE	SEWER LONG SECTIONS - SHEET 3		
Figure Number	UES003003-FIG-23	Revision B	Size A1

CAD File: C:\Users\taba\Dropbox\UES Projects\UES003003 134 Telegraph Rd\Design\Acad\UES003003-FIG 21 SEWER LONGSECTIONS.dwg

DATE PLOTTED: 8 September 2020 12:29 PM BY : MARK TABER

STRUCTURE No	JUNCTION LINE	STRUCTURE TYPE	STRUCTURE LID CLASS	DROP JUNCTION TYPE	JUNCTION INVERT LEVEL	DEPTH	INVERT LEVEL	SURFACE LEVELS FINISHED (EXISTING)	STRUCTURE SETOUT COORDINATES	CHAINAGE
1/6		PS	D	V		4.67	9.000	13.667 (13.610)	E 438261.728 N 7250139.486	0.000
2/6		P1 1000	D	V		4.59 4.51	9.049 9.129	13.636 (13.623)	E 438267.063 N 7250134.322	7.425
3/6	7 8	P1 1000	D	V	11.686 9.600	4.11 4.07	9.299 9.339	13.409 (13.659)	E 438284.691 N 7250152.589	32.810
4/6		P1 1000	D	V		4.07 4.04	9.537 9.567	13.612 (13.582)	E 438266.444 N 7250176.080	62.556
5/6		P1 1000	D	V		3.98 3.95	9.761 9.791	13.744 (13.670)	E 438254.416 N 7250202.543	91.624
6/6		P1 1000	D	V		3.79 3.75	10.252 10.292	14.040 (13.526)	E 438233.956 N 7250268.584	160.762
7/6		P1 1000	D	V		3.65 3.61	10.344 10.384	13.990 (13.512)	E 438238.844 N 7250274.742	168.624
8/6		P1 1000	D	V		3.57 3.54	10.523 10.553	14.089 (13.543)	E 438259.629 N 7250273.231	189.464
9/6		P1 1000	D	V		3.13 3.10	10.935 10.965	14.069 (13.584)	E 438316.945 N 7250274.737	246.799
10/6		P1 1000	D	V		2.70 2.67	11.350 11.380	14.051 (13.652)	E 438373.282 N 7250287.504	304.565
11/6		P1 1000	D	V		2.62 2.59	11.571 11.601	14.190 (13.693)	E 438399.979 N 7250297.876	333.206
12/6		P1 1000	D	V		1.80 1.78	12.481 12.501	14.279 (13.841)	E 438520.462 N 7250351.646	465.143
13/6		P1 1000	D	V		1.78 1.76	12.968 12.988	14.748 (14.071)	E 438584.459 N 7250380.228	535.233
14/6		P1 1000	D	V		1.77 1.29	13.519 14.000	15.287 (15.235)	E 438657.165 N 7250412.654	614.842
15/6		P1 1000	D	V		1.60	14.987	16.585 (14.966)	E 438597.507 N 7250548.102	762.845

HC DEPTH
HC INVERT LEVEL
HC DISTANCE TO D/S STRUCTURE
HC TYPE
HC LOT No



DATUM RL 3.0

From	To	Drop	Location	Size	TYPE	GRADE	LENGTH
1/6	2/6			150	SN8	0.67 % 1:150	7.425
2/6	3/6	0.08		150	SN8	0.67 % 1:150	25.385
3/6	4/6	0.04		150	SN8	0.67 % 1:150	29.746
4/6	5/6	0.03		150	SN8	0.67 % 1:150	29.067
5/6	6/6	0.03		150	SN8	0.67 % 1:150	69.138
6/6	7/6	0.04		150	SN8	0.67 % 1:150	7.862
7/6	8/6	0.04		150	SN8	0.67 % 1:150	20.840
8/6	9/6	0.03		150	SN8	0.67 % 1:150	57.335
9/6	10/6	0.03		150	SN8	0.67 % 1:150	57.766
10/6	11/6	0.03	FOOTPATH	150	SN8	0.67 % 1:150	28.641
11/6	12/6	0.03	FOOTPATH	150	SN8	0.67 % 1:150	131.937
12/6	13/6	0.02		150	SN8	0.67 % 1:150	70.090
13/6	14/6	0.02		150	SN8	0.67 % 1:150	79.609
14/6	15/6	0.48	PARK	150	SN8	0.67 % 1:150	148.004

LINE 6

LEGEND

- EXISTING SURFACE LEVEL
- FINISHED SURFACE LEVEL
- SEWER PIPE PROPOSED
- SEWER PIPE EXISTING

0 20 40 60 80 100m
SCALE 1:1000 @A1

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Project
134 TELEGRAPH ROAD KALKIE
TITLE
SEWER LONG SECTIONS - SHEET 4
Figure Number UES003003-FIG-24
Revision B
Size A1

CAD File: C:\Users\tabsi\Dropbox\UES Projects\UES003003 134 Telegraph Rd\Design\Acad\UES003003-FIG 21 SEWER LONGSECTIONS.dwg

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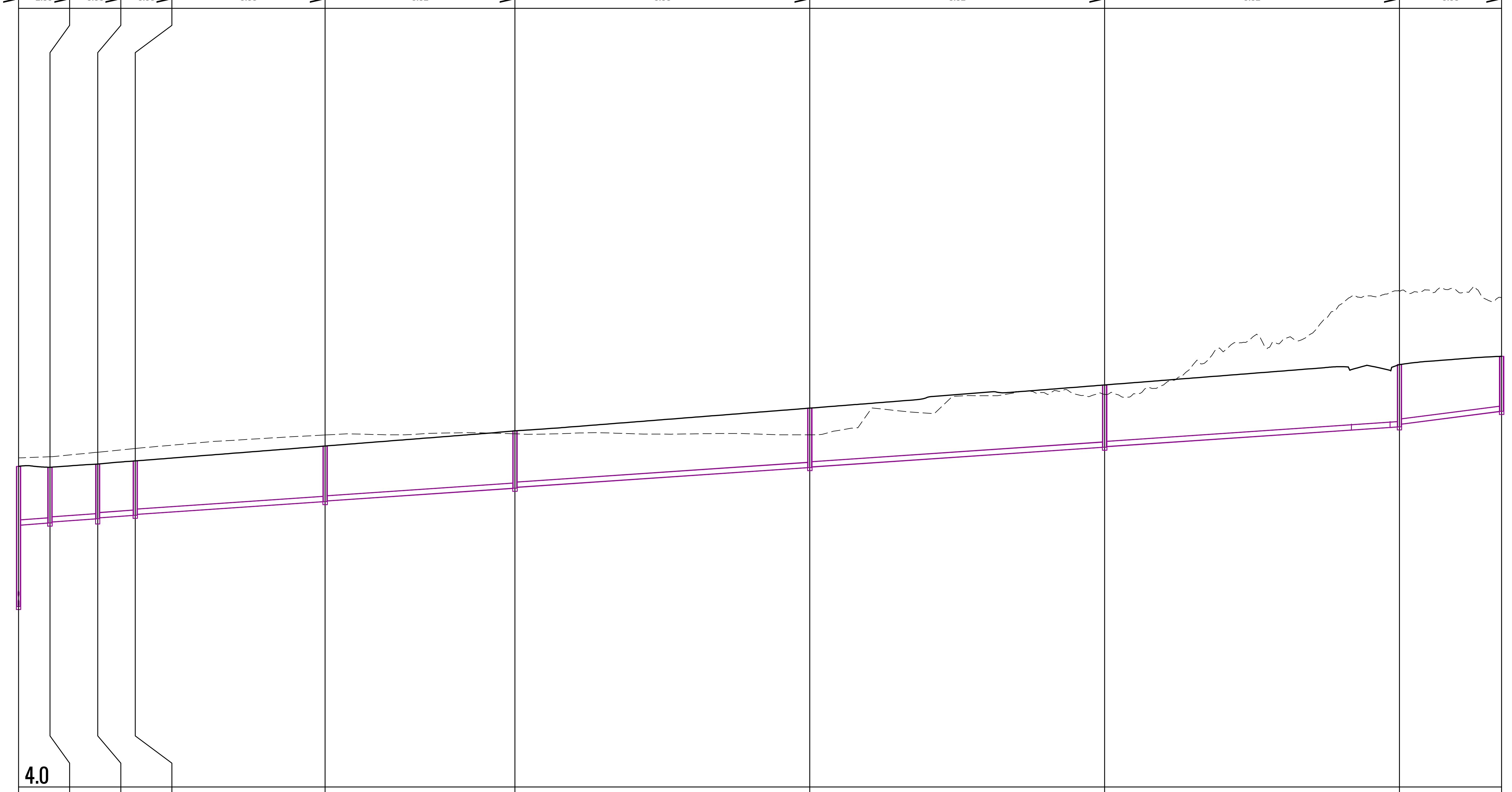
STRUCTURE No	3/6	1/7	2/7	3/7	4/7	5/7	6/7	7/7	8/7	9/7
JUNCTION LINE	6									
STRUCTURE TYPE	P1 1000	P1 1000	P1 1000	P1 1000	P1 1000	P1 1000	P1 1000	P1 1000	P1 1000	P1 1000
STRUCTURE LID CLASS	D	D	D	D	D	D	D	D	D	D
DROP JUNCTION TYPE	V	V	V	V	V	V	V	V	V	V
HC DEPTH										
HC INVERT LEVEL										
HC DISTANCE TO D/S STRUCTURE										
HC TYPE										
HC LOT No										
JUNCTION INVERT LEVEL	11.686 9.600									
DEPTH	4.11 1.72	1.63 1.60	1.60 1.57	1.59 1.56	1.63 1.61	1.68 1.65	1.74 1.72	1.83 1.81	1.83 1.75	1.61
INVERT LEVEL	9.299 11.686	11.747 11.777	11.871 11.901	11.974 12.004	12.376 12.396	12.767 12.797	13.374 13.394	13.971 13.991	14.569 14.649	15.024
SURFACE LEVELS FINISHED (EXISTING)	13.409 (13.659)	13.381 (13.691)	13.476 (13.824)	13.568 (13.934)	14.006 (14.329)	14.452 (14.365)	15.118 (14.334)	15.798 (15.523)	16.397 (18.548)	16.639 (18.354)
STRUCTURE SETOUT COORDINATES	E 438284.691 N 7250152.589	E 438288.306 N 7250161.067	E 438300.062 N 7250168.705	E 438310.389 N 7250172.533	E 438363.797 N 7250188.401	E 438417.204 N 7250204.270	E 438496.220 N 7250239.533	E 438575.236 N 7250274.797	E 438654.252 N 7250310.061	E 438666.338 N 7250282.621
CHAINAGE	0.000	9.217	23.235	34.250	89.964	145.679	232.207	318.735	405.262	435.247



DATUM RL 4.0

FOOTPATH

	3/6–1/7	1/7–2/7	2/7–3/7	3/7–4/7	4/7–5/7	5/7–6/7	6/7–7/7	7/7–8/7	8/7–9/7
DROP JUNCTION TYPE	2.39	0.03	0.03	0.03	0.02	0.03	0.02	0.02	0.08
TYPE	150 SN8	150 SN8	150 SN8	150 SN8	150 SN8	150 SN8	150 SN8	150 SN8	150 SN8
GRADE	0.67 % 1:150	0.67 % 1:150	0.67 % 1:150	0.67 % 1:150	0.67 % 1:150	0.67 % 1:150	0.67 % 1:150	0.67 % 1:150	1.25 % 1:80
LENGTH	9.217	14.019	11.015	55.715	55.715	86.528	86.528	86.528	29.984

LINE 7

LEGEND

– – – –	EXISTING SURFACE LEVEL
——	FINISHED SURFACE LEVEL
——	SEWER PIPE PROPOSED
– – – –	SEWER PIPE EXISTING

0 20 40 60 80 100m
SCALE 1:1000 @A1

CAD File: C:\Users\tabsi\Dropbox\UES Projects\UES003003 134 Telegraph Rd\Design\Acad\UES003003-FIG 21 SEWER LONGSECTIONS.dwg

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Project
134 TELEGRAPH ROAD KALKIE

TITLE
SEWER LONG SECTIONS - SHEET 5

Figure Number	Revision	Size
UES003003-FIG-25	B	A1

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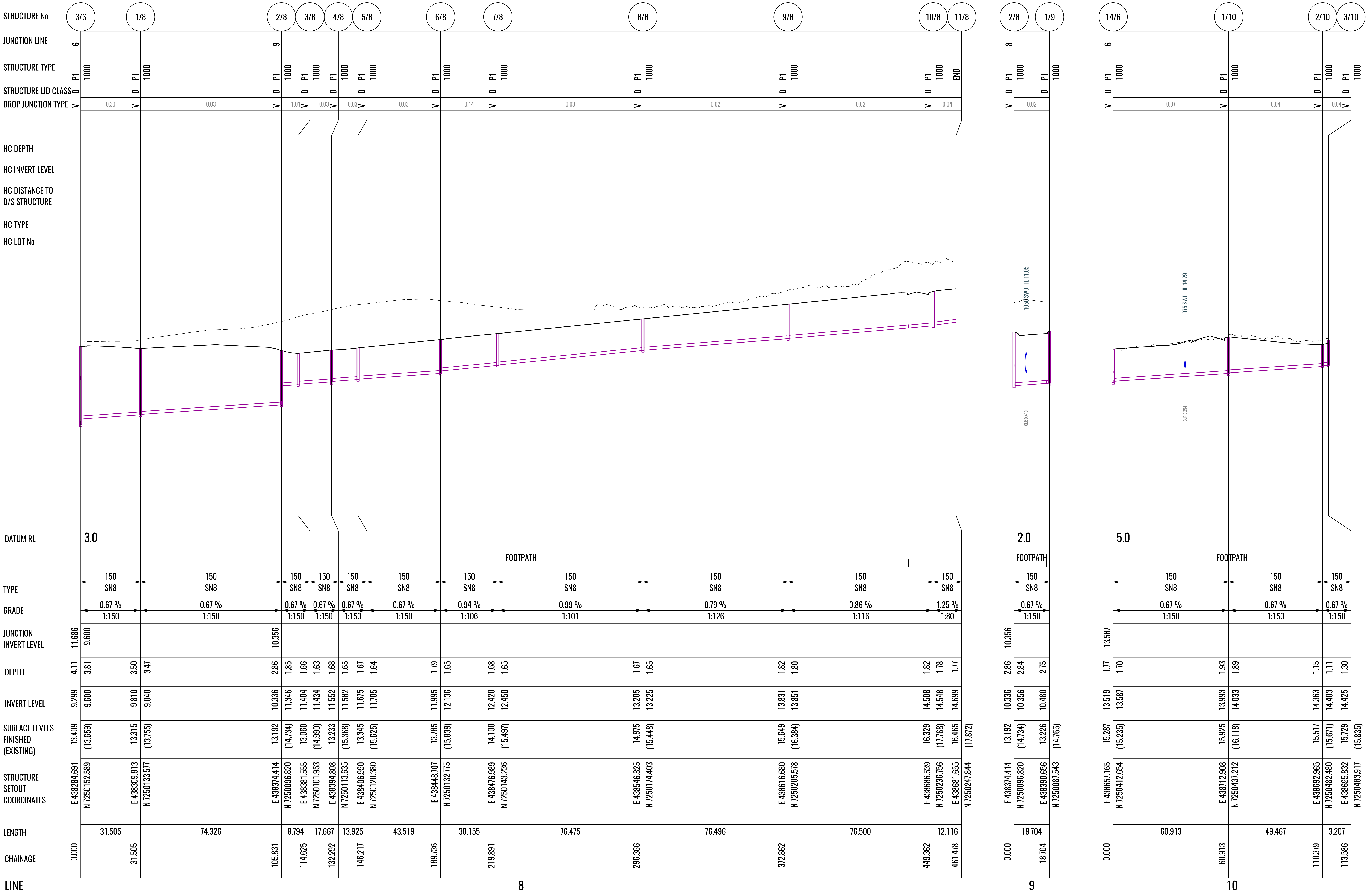

LINE 8

STRUCTURE No	JUNCTION LINE	STRUCTURE TYPE	STRUCTURE LID CLASS	DROP JUNCTION TYPE	JUNCTION INVERT LEVEL	DEPTH	INVERT LEVEL	SURFACE LEVELS FINISHED (EXISTING)	STRUCTURE SETOUT COORDINATES	CHAINAGE
3/6	6	P1 1000	D	V	11.686 9.600	4.11 3.81	9.299 9.600	13.409 (13.659)	E 438284.691 N 7250152.589	0.000
1/8		P1 1000	D	V		3.50 3.47	9.810 9.840	13.315 (13.755)	E 438309.813 N 7250133.577	31.505
2/8	9	P1 1000	D	V	10.356	2.86 1.85	10.336 11.346	13.192 (14.734)	E 438374.414 N 7250096.820	105.831
3/8		P1 1000	D	V		1.66 1.63	11.404 11.434	13.060 (14.990)	E 438381.555 N 7250101.953	114.625
4/8		P1 1000	D	V		1.68 1.65	11.552 11.582	13.233 (15.368)	E 438394.808 N 7250113.635	132.292
5/8		P1 1000	D	V		1.67 1.64	11.675 11.705	13.345 (15.625)	E 438406.990 N 7250120.380	146.217
6/8		P1 1000	D	V		1.79 1.65	11.995 12.136	13.785 (15.838)	E 438448.707 N 7250132.775	189.736
7/8		P1 1000	D	V		1.68 1.65	12.420 12.450	14.100 (15.497)	E 438476.989 N 7250143.236	219.891
8/8		P1 1000	D	V		1.67 1.65	13.205 13.225	14.875 (15.448)	E 438546.825 N 7250174.403	296.366
9/8		P1 1000	D	V		1.82 1.80	13.831 13.851	15.649 (16.384)	E 438616.680 N 7250205.578	372.862
10/8		P1 1000	D	V		1.82 1.78	14.508 14.548	16.329 (17.768)	E 438686.539 N 7250236.756	449.362
11/8		END				1.77	14.699	16.465 (17.872)	E 438681.655 N 7250247.844	461.478

STRUCTURE No	DROP JUNCTION TYPE	TYPE	GRADE	LENGTH
3/6 – 1/8	0.30	150 SN8	0.67 % 1:150	31.505
1/8 – 2/8	0.03	150 SN8	0.67 % 1:150	74.326
2/8 – 3/8	1.01	150 SN8	0.67 % 1:150	8.794
3/8 – 4/8	0.03	150 SN8	0.67 % 1:150	17.667
4/8 – 5/8	0.03	150 SN8	0.67 % 1:150	13.925
5/8 – 6/8	0.03	150 SN8	0.67 % 1:150	43.519
6/8 – 7/8	0.14	150 SN8	0.94 % 1:106	30.155
7/8 – 8/8	0.03	150 SN8	0.99 % 1:101	76.475
8/8 – 9/8	0.02	150 SN8	0.79 % 1:126	76.496
9/8 – 10/8	0.02	150 SN8	0.86 % 1:116	76.500
10/8 – 11/8	0.04	150 SN8	1.25 % 1:80	12.116

LINE 9

STRUCTURE No	JUNCTION LINE	STRUCTURE TYPE	STRUCTURE LID CLASS	DROP JUNCTION TYPE	JUNCTION INVERT LEVEL	DEPTH	INVERT LEVEL	SURFACE LEVELS FINISHED (EXISTING)	STRUCTURE SETOUT COORDINATES	CHAINAGE
2/8	8	P1 1000	D	V	10.356	2.86 2.84	10.336 10.356	13.192 (14.734)	E 438374.414 N 7250096.820	0.000
1/9		P1 1000	D			2.75	10.480	13.226 (14.766)	E 438390.656 N 7250087.543	18.704

STRUCTURE No	DROP JUNCTION TYPE	TYPE	GRADE	LENGTH
2/8 – 1/9	0.02	150 SN8	0.67 % 1:150	18.704

LINE 10

STRUCTURE No	JUNCTION LINE	STRUCTURE TYPE	STRUCTURE LID CLASS	DROP JUNCTION TYPE	JUNCTION INVERT LEVEL	DEPTH	INVERT LEVEL	SURFACE LEVELS FINISHED (EXISTING)	STRUCTURE SETOUT COORDINATES	CHAINAGE
14/6	6	P1 1000	D	V	13.587	1.77 1.70	13.519 13.587	15.287 (15.235)	E 438657.165 N 7250412.654	0.000
1/10		P1 1000	D	V		1.93 1.89	13.993 14.033	15.925 (16.118)	E 438712.908 N 7250437.212	60.913
2/10		P1 1000	D	V		1.15 1.11	14.363 14.403	15.517 (15.671)	E 438692.965 N 7250482.480	110.379
3/10		P1 1000	D	V		1.30	14.425	15.729 (15.835)	E 438695.832 N 7250483.917	113.586

STRUCTURE No	DROP JUNCTION TYPE	TYPE	GRADE	LENGTH
14/6 – 1/10	0.07	150 SN8	0.67 % 1:150	60.913
1/10 – 2/10	0.04	150 SN8	0.67 % 1:150	49.467
2/10 – 3/10	0.04	150 SN8	0.67 % 1:150	3.207

LEGEND

- EXISTING SURFACE LEVEL
- FINISHED SURFACE LEVEL
- SEWER PIPE PROPOSED
- SEWER PIPE EXISTING

0 20 40 60 80 100m
SCALE 1:1000 @A1

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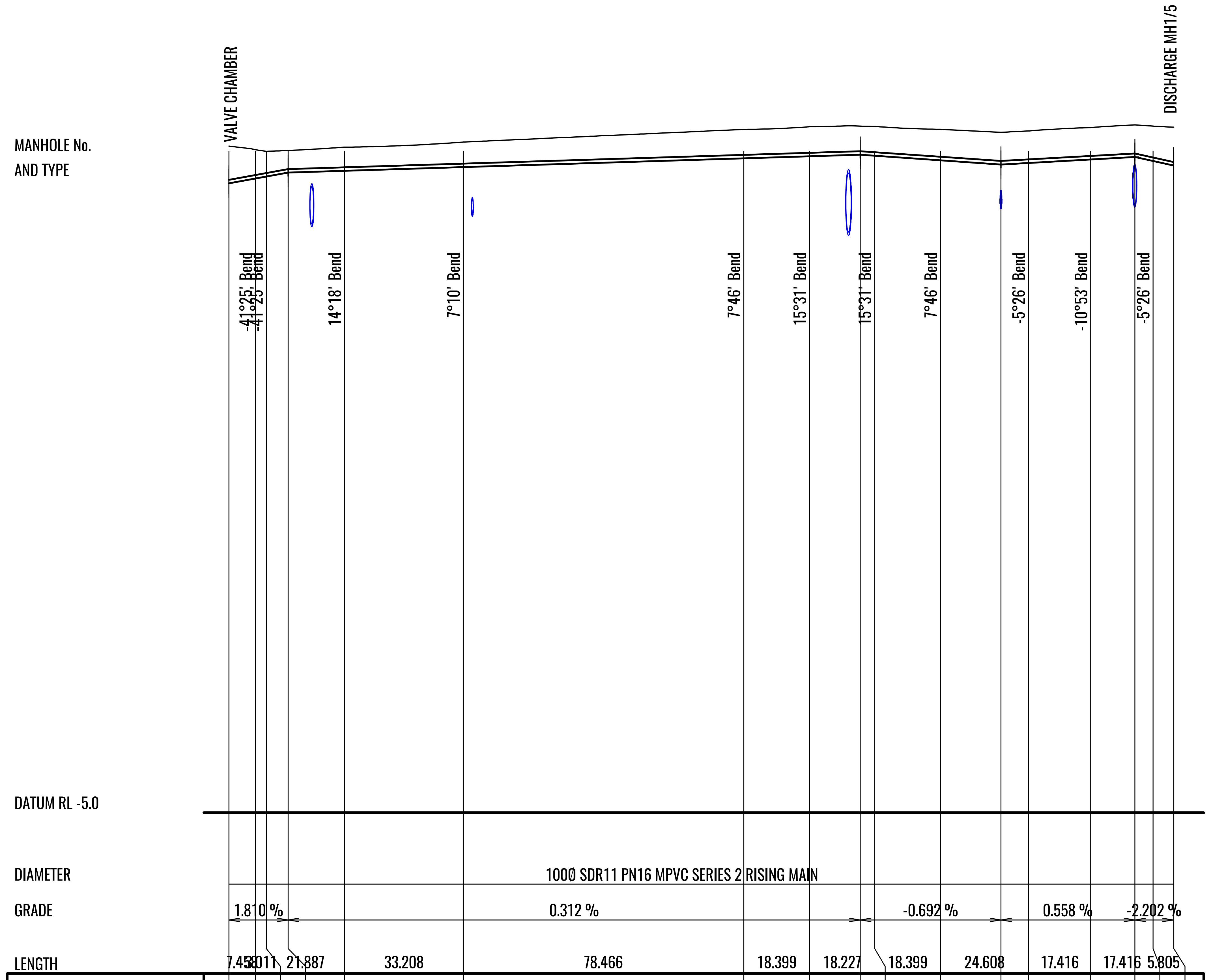
Project
134 TELEGRAPH ROAD KALKIE

TITLE
SEWER LONG SECTIONS - SHEET 6

Figure Number	Revision	Size
UES003003-FIG-26	B	A1

CAD File: C:\Users\tabsi\Dropbox\UES Projects\UES003003 134 Telegraph Rd\Design\Acad\UES003003-FIG 21 SEWER LONGSECTIONS.dwg

DATE PLOTTED: 8 September 2020 12:28 PM BY : MARK TABER



JUNCTION INVERT LEVEL																	
DEPTH	1.04	0.80	0.71	0.62	0.66	0.70	0.81	0.83	0.80	0.82	0.87	0.90	0.90	0.89	0.90	0.98	
INVERT LEVEL	12.600	12.735	12.789	12.900	12.949	13.053	13.298	13.356	13.400	13.372	13.244	13.128	13.171	13.268	13.337	13.225	
SURFACE LEVEL	13.642	13.539	13.496	13.520	13.613	13.755	14.110	14.184	14.201	14.194	14.112	14.028	14.066	14.160	14.236	14.200	14.171
CHAINAGE	0.000	7.458	10.469	16.576	32.356	65.564	144.030	162.429	176.576	180.656	199.055	215.944	223.663	241.079	253.421	258.495	264.300

LINE No. SRM01

HOR. 1 : 1000
VERT. 1 : 100

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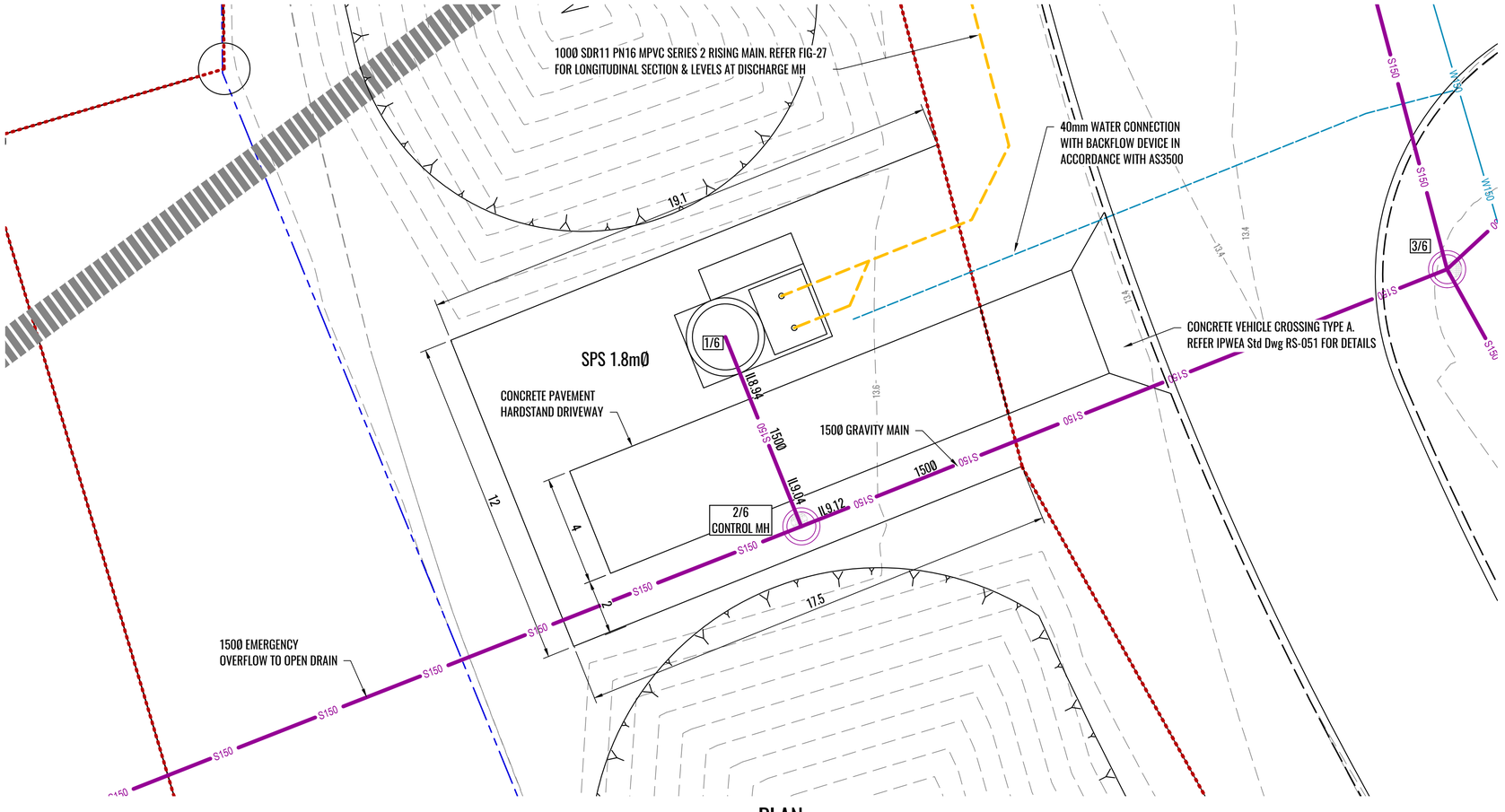
Project	134 TELEGRAPH ROAD KALKIE
TITLE	SEWER LONG SECTIONS - SHEET 7
Figure Number	UES003003-FIG-27
Revision	B
Size	A1

CAD File: C:\Users\tabsi\Dropbox\UES Projects\UES003003 134 Telegraph Rd\Design\Acad\UES003003-FIG 21 SEWER LONGSECTIONS.dwg

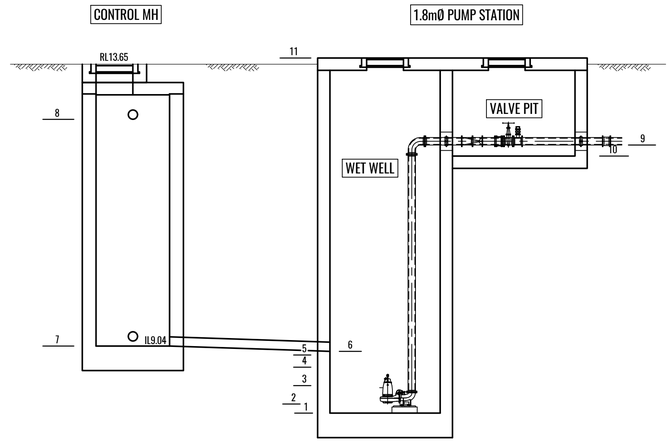


PLAN

SCALE A1 - 1 : 100
A3 - 1 : 200

LEGEND:

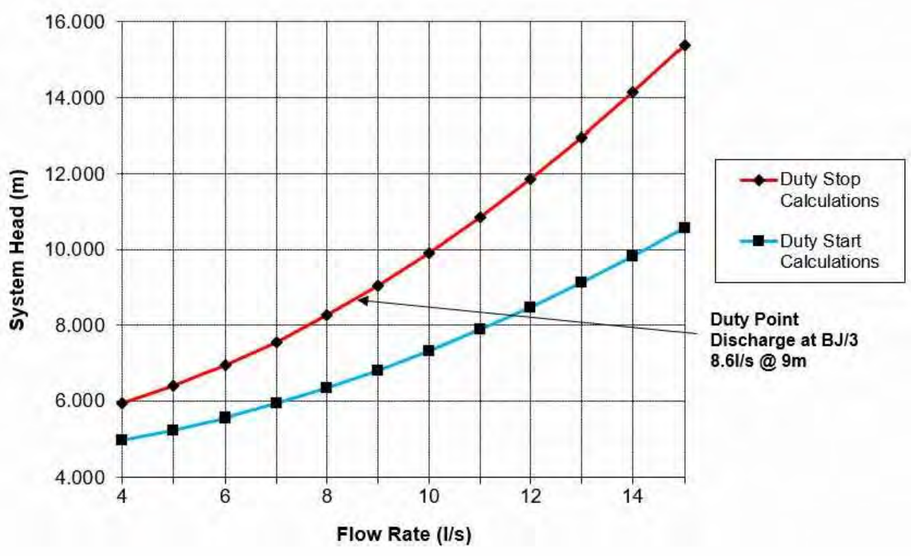
14/43	STRUCTURE NUMBER / LINE NUMBER
S100	SEWER MAIN AND STRUCTURE
	SEWER RISING MAIN
W100	WATERMAIN AND PIPE DIAMETER
	STORMWATER DRAINAGE
	STAGE BOUNDARY



PUMP STATION LEVELS

SCALE A1 - N.T.S.
A3 - N.T.S.

	DESCRIPTION	LEVEL
1	INVERT LEVEL PUMP STATION	7.89
2	PUMP SUCTION	8.04
3	BOTTOM WATER LEVEL	8.34
4	TOP WATER LEVEL - DUTY PUMP	8.64
5	TOP WATER LEVEL - STANDBY PUMP	8.84
6	INVERT LEVEL & ALARM LEVEL	8.94
7	INVERT RL OF CONTROL MH	9.04
8	OVERFLOW RL	12.94
9	INVERT LEVEL OF RISING MAIN	12.60
10	FLOOR LEVEL OF VALVE PIT	12.42
11	TOP RL OF PUMP STATION	13.80



PUMP SYSTEM CURVE

SCALE A1 - N.T.S.
A3 - N.T.S.

0 1 2 4 6 8 10m
SCALE 1:100 @A1

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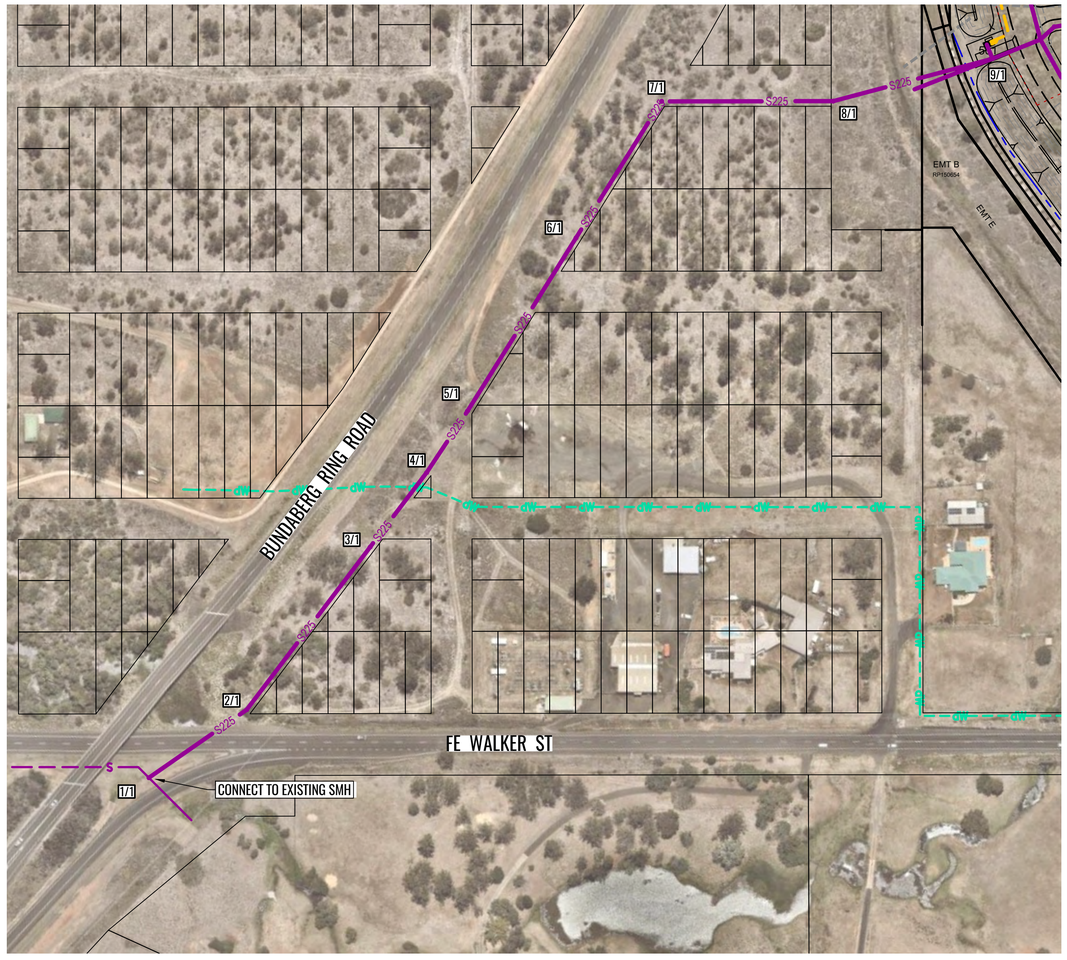
Project	134 TELEGRAPH ROAD KALKIE
TITLE	MASTERPLAN - SPS CONCEPT
Figure Number	UES003003-FIG-28
Revision	B
Size	A1



PLAN

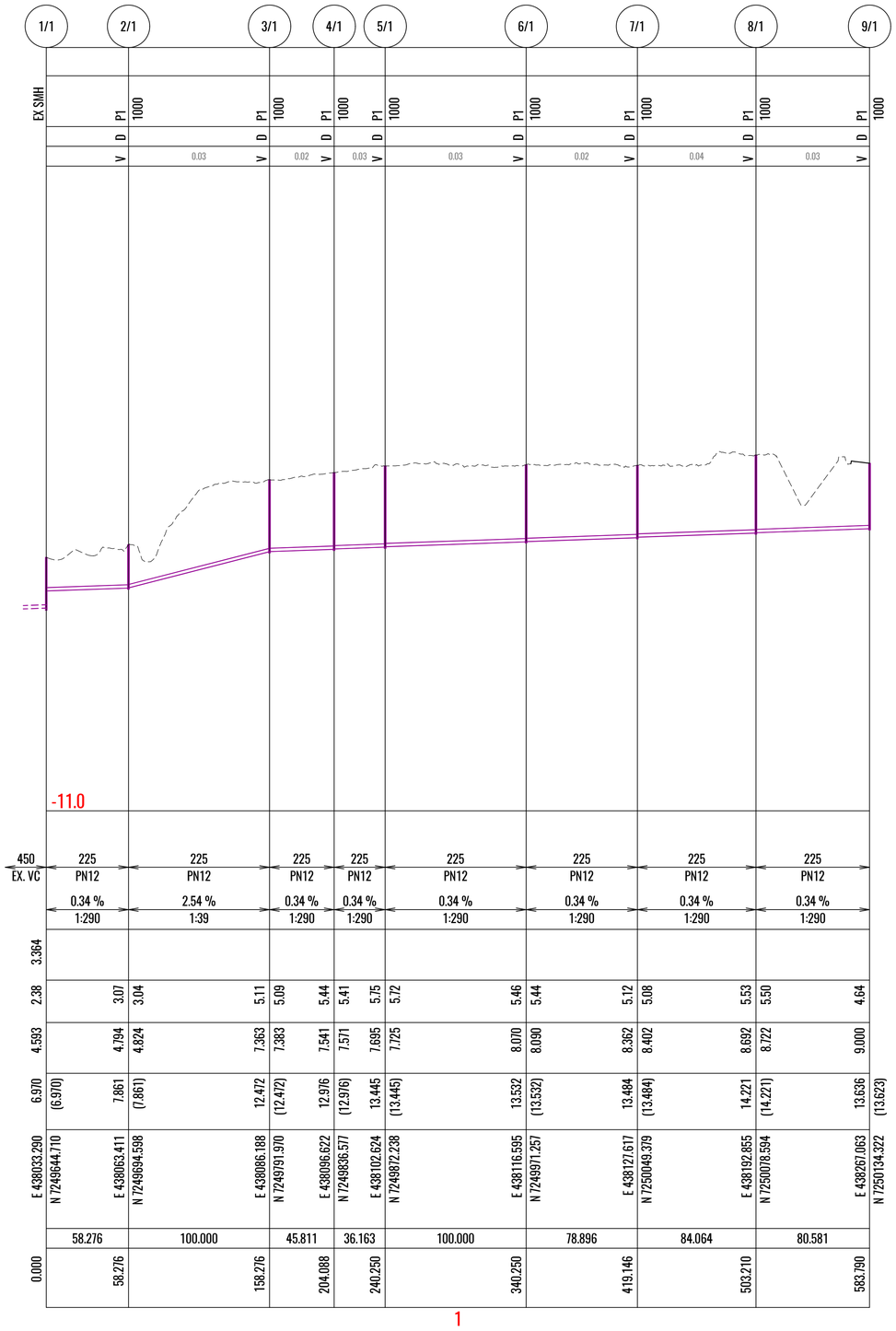
SCALE A1 - 1 : 1500
A3 - 1 : 3000

LEGEND:

14/43	STRUCTURE NUMBER / LINE NUMBER
S100	SEWER MAIN AND STRUCTURE
	SEWER RISING MAIN
W100	WATERMAIN AND PIPE DIAMETER
	STORMWATER DRAINAGE
	STAGE BOUNDARY

LEGEND - SECTION

- EXISTING SURFACE LEVEL
- FINISHED SURFACE LEVEL
- SEWER PIPE PROPOSED
- SEWER PIPE EXISTING



LONGITUDINAL SECTION

SCALE A1 - 1:2000(H) 1:200(V)
A3 - 1:4000(H) 1:400(V)

0 50 100 150m
SCALE 1:1500 @A1

0 50 100 150 200m
SCALE 1:2000 @A1

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Project	134 TELEGRAPH ROAD KALKIE
TITLE	MASTERPLAN - SEWER RETICULATION OPT2
Figure Number	UES003003-FIG-29
Revision	B
Size	A1

DATE PLOTTED: 8 September 2020 12:00 PM BY : MARK TABER

CAD File: C:\Users\tabs\Dropbox\UES Projects\UES003003 134 Telegraph Rd\Design\Acad\UES003003-FIG-29 SEWER MASTERPLAN OPT2.dwg

DATE PLOTTED: 13 October 2020 12:12 PM BY : MARK TABER

CAD File: C:\Users\tabs\Dropbox\UES Projects\UES003003 134 Telegraph Rd\Design\Acad\UES003003-FIG-30 WATER MASTERPLAN.dwg

EX. SPS

EX. 3000 WM (WP.02820)

EX. 3000 WM (WP.03838)

EX. 2250 WM (WP.03763)

EX. 2250 WM (WP.11320)

TELEGRAPH ROAD

PROPOSED 2250 CROSS ROAD CONNECTION TO EXISTING

PROPOSED FUTURE TRUNK WATERMAIN (P.WP.0108)

BUNDABERG RING ROAD

EMT D

STAGE 1

STAGE 2

STAGE 3

STAGE 4

STAGE 5

STAGE 6

SPS

JOINS RIGHT

JOINS LEFT

PROPOSED FUTURE TRUNK WATERMAIN (P.WP.0108)

FE WALKER STREET

EX. WM (WP.12098)

LEGEND:

- W100 — WATERMAIN AND PIPE DIAMETER
- FUTURE TRUNK WATERMAIN
- STAGE BOUNDARY

PLAN

SCALE A1 - 1 : 1500
A3 - 1 : 3000

PLAN

SCALE A1 - 1 : 1500
A3 - 1 : 3000

0 50 100 150m

SCALE 1:1500 @A1

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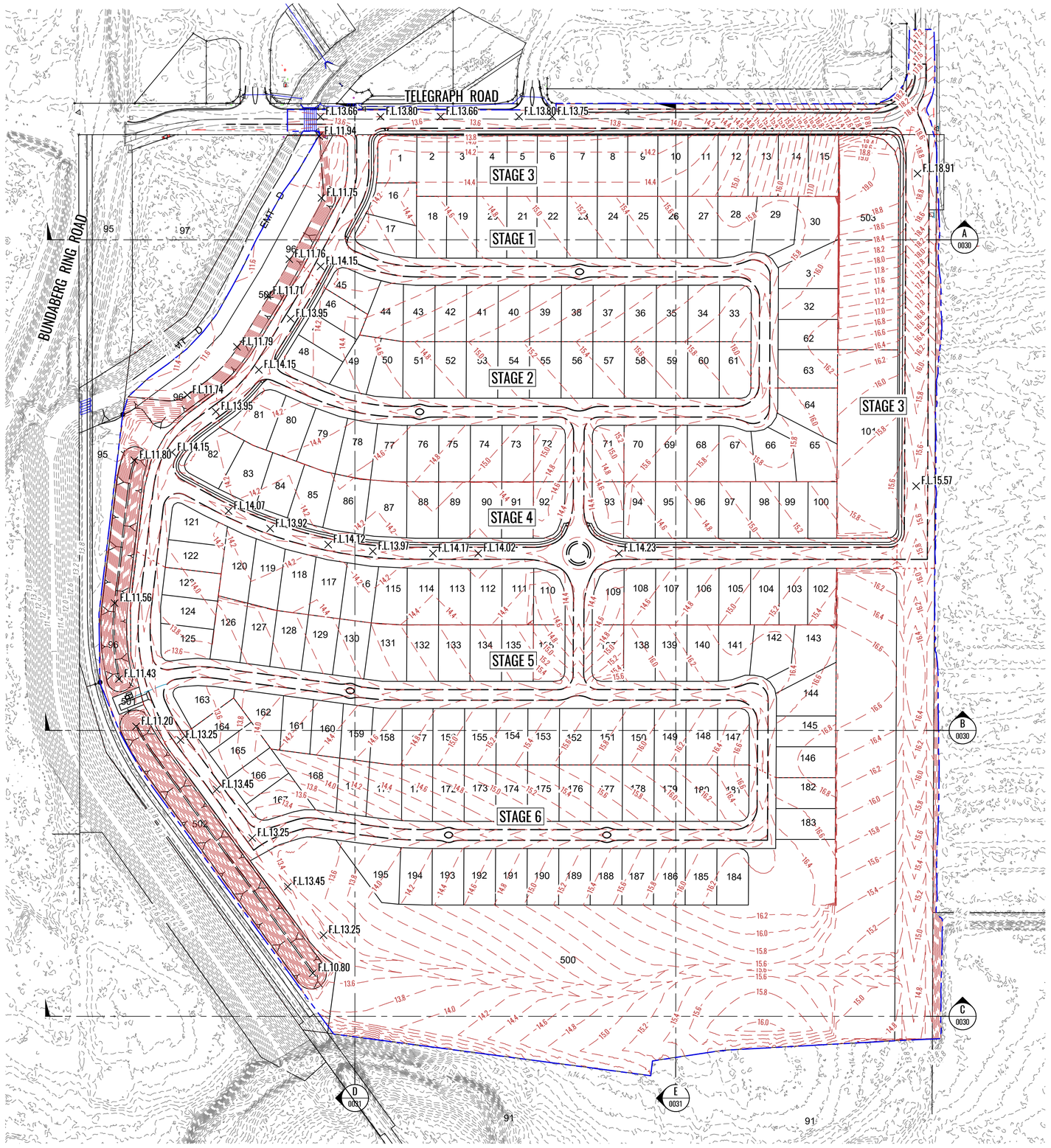
Project	134 TELEGRAPH ROAD KALKIE		
TITLE	MASTERPLAN - WATER RETICULATION		
Figure Number	UES003003-FIG-30	Revision C	Size A1

DATE PLOTTED: 13 October 2020 12:13 PM BY: MARK TABER



LEGEND:

- FL15.50 — FILL GRADE LINE AND LEVEL
- EARTHWORKS LIMIT
- TOP OF EMBANKMENT
- BOTTOM OF EMBANKMENT
- 14.5 — FINISHED CONTOURS
- STAGE BOUNDARY

PLAN

SCALE A1 - 1 : 1500
A3 - 1 : 3000

0 50 100 150m
SCALE 1:1500 @A1

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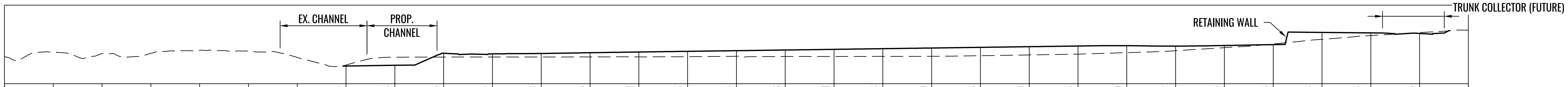
Project	134 TELEGRAPH ROAD KALKIE
TITLE	MASTERPLAN - EARTHWORKS GRADING
Figure Number	UES003003-FIG-40
Revision	C
Size	A1

CAD File: C:\Users\taber\Dropbox\UES Projects\UES003003 134 Telegraph Rd\Design\Acad\UES003003-FIG 40 EARTHWORKS MASTERPLAN.dwg

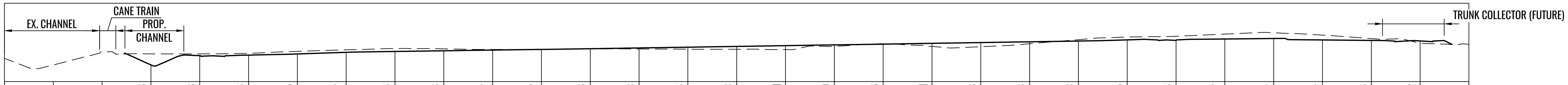
DATE PLOTTED: 8 September 2020 1:21 PM BY : MARK TABER



DATUM RL 8.000

CUT/FILL DEPTHS								-0.204	-1.658	0.775	0.634	0.733	0.865	0.991	1.085	1.126	1.326	1.451	1.566	1.690	1.706	1.680	1.645	1.420	0.937	0.435	-0.128	1.397	0.537	-0.175	
DESIGN LEVELS								11.610	11.753	14.207	14.080	14.162	14.319	14.461	14.597	14.732	14.868	15.003	15.139	15.274	15.410	15.545	15.681	15.751	15.660	15.784	15.972	18.446	18.349	18.245	
EXISTING LEVELS	13.477	14.429	14.134	14.218	14.816	14.646	13.360	11.815	13.412	13.431	13.445	13.429	13.454	13.470	13.512	13.606	13.542	13.552	13.573	13.584	13.704	13.865	14.036	14.331	14.723	15.349	16.100	17.049	17.812	18.421	18.893
CHAINAGE	00	20	40	60	80	100	120	140	160	180	200	220	240	260	280	300	320	340	360	380	400	420	440	460	480	500	520	540	560	580	600

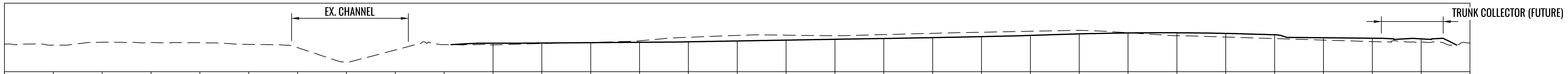
SECTION A
0030
SCALE A1 - 1 : 1000
A3 - 1 : 2000



DATUM RL 8.000

CUT/FILL DEPTHS				-2.246	-0.358	-0.368	-0.535	-0.512	-0.606	-0.398	-0.132	-0.022	0.046	0.213	0.408	0.583	0.811	0.300	-0.086	0.641	0.848	0.388	-0.283	-0.565	-0.786	-0.997	-1.174	-0.984	-0.368	0.482	
DESIGN LEVELS				11.412	13.303	13.414	13.655	13.987	14.160	14.303	14.446	14.579	14.720	14.878	15.035	15.192	15.349	15.506	15.664	15.821	15.978	16.135	16.292	16.536	16.472	16.709	16.808	16.520	16.421	16.310	
EXISTING LEVELS	12.753	11.410	14.100	13.658	13.661	13.782	14.189	14.499	14.767	14.701	14.578	14.602	14.675	14.665	14.627	14.609	14.538	15.206	15.749	15.180	15.130	15.747	16.576	17.102	17.258	17.706	17.982	17.504	16.789	15.828	15.631
CHAINAGE	00	20	40	60	80	100	120	140	160	180	200	220	240	260	280	300	320	340	360	380	400	420	440	460	480	500	520	540	560	580	600

SECTION B
0030
SCALE A1 - 1 : 1000
A3 - 1 : 2000



DATUM RL 8.000

CUT/FILL DEPTHS											0.341	0.111	-0.064	-0.309	-0.919	-1.136	-1.011	-0.709	-0.795	-0.877	-0.896	-0.842	-0.726	-0.040	0.606	0.740	0.773	0.482	0.692	0.662	
DESIGN LEVELS											13.829	13.866	13.939	14.012	14.111	14.284	14.456	14.628	14.792	14.967	15.171	15.422	15.731	15.920	15.956	15.826	15.548	14.948	14.849	14.715	
EXISTING LEVELS	13.641	13.447	14.032	13.965	13.932	13.591	12.921	10.005	12.435	13.536	13.488	13.754	14.003	14.321	15.030	15.419	15.467	15.337	15.587	15.844	16.067	16.263	16.457	15.959	15.350	15.086	14.776	14.466	14.156	14.053	13.878
CHAINAGE	00	20	40	60	80	100	120	140	160	180	200	220	240	260	280	300	320	340	360	380	400	420	440	460	480	500	520	540	560	580	600

SECTION C
0030
SCALE A1 - 1 : 1000
A3 - 1 : 2000

CAD File: C:\Users\tabsi\Dropbox\UES Projects\UES003003 134 Telegraph Rd\Design\Acad\UES003003-FIG 40 EARTHWORKS MASTERPLAN.dwg

UES

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Project
134 TELEGRAPH ROAD KALKIE

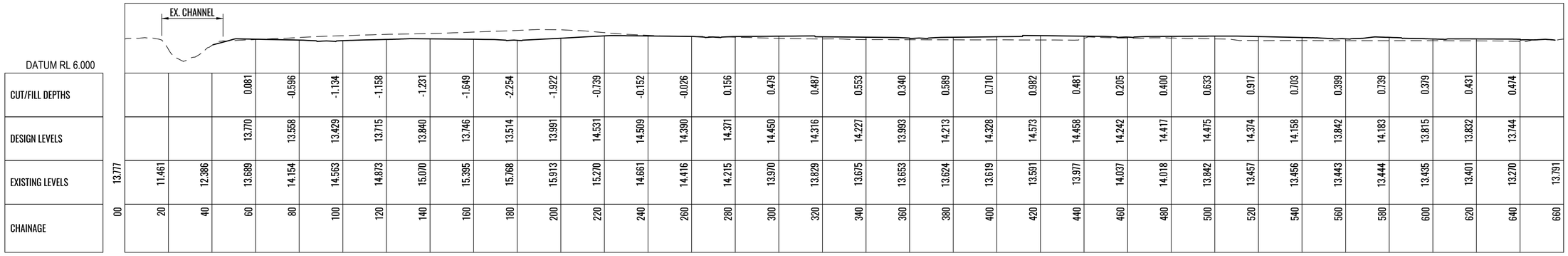
TITLE
MASTERPLAN - SITE SECTIONS - SHEET 1

Figure Number
UES003003-FIG-41

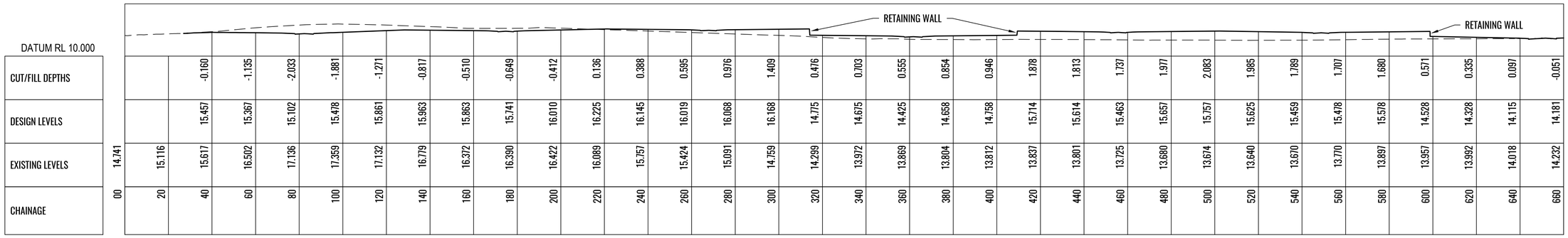
Revision
B

Size
A1

DATE PLOTTED: 8 September 2020 1:21 PM BY: MARK TABER



SECTION D
SCALE A1 - 1 : 1000
A3 - 1 : 2000
0030



SECTION E
SCALE A1 - 1 : 1000
A3 - 1 : 2000
0030

0 20 40 60 80 100m
SCALE 1:1000 @A1

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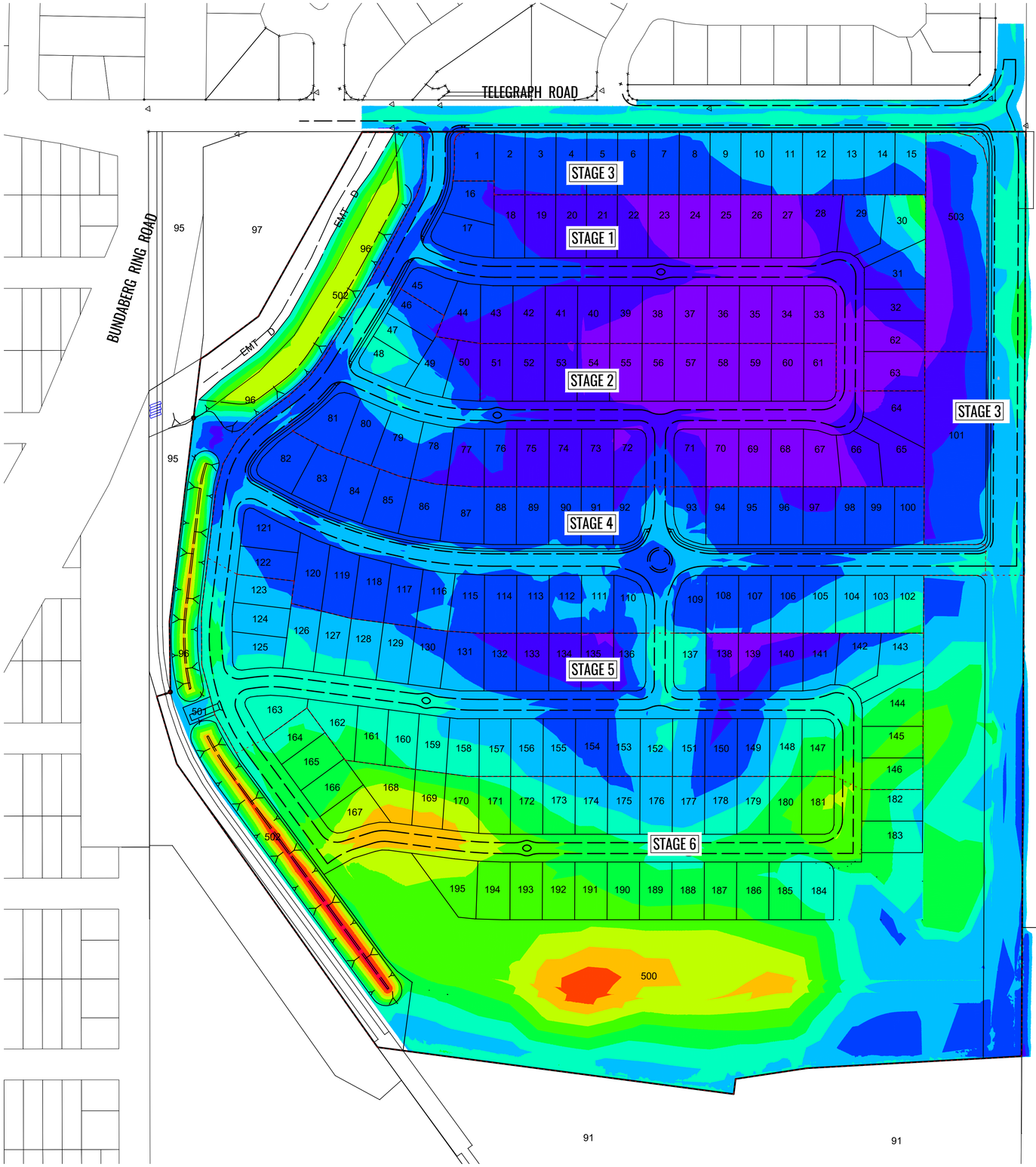
Project: 134 TELEGRAPH ROAD KALKIE
TITLE: MASTERPLAN - SITE SECTIONS - SHEET 2
Figure Number: UES003003-FIG-42
Revision: B
Size: A1

CAD File: C:\Users\tabat\Dropbox\UES Projects\UES003003 134 Telegraph Rd\Design\Acad\UES003003-FIG 40 EARTHWORKS MASTERPLAN.dwg

DATE PLOTTED: 13 October 2020 12:14 PM BY: MARK TABER



Surface Analysis: Elevation Ranges

Number	Color	Minimum Elevation (m)	Maximum Elevation (m)
1		-3.500	-3.000
2		-3.000	-2.500
3		-2.500	-2.000
4		-2.000	-1.500
5		-1.500	-1.000
6		-1.000	-0.500
7		-0.500	0.000
8		0.000	0.500
9		0.500	1.000
10		1.000	1.500
11		1.500	2.500

PLAN

SCALE A1 - 1 : 1500
A3 - 1 : 3000

0 50 100 150m
SCALE 1:1500 @A1

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Project: 134 TELEGRAPH ROAD KALKIE
TITLE: MASTERPLAN - EARTHWORKS CUT FILL
Figure Number: UES003003-FIG-50
Revision: C
Size: A1

CAD File: C:\Users\taber\Dropbox\UES Projects\UES003003 134 Telegraph Rd\Design\Acad\UES003003-FIG 43 EARTHWORKS CUT FILL PLAN.dwg

DATE PLOTTED: 12 January 2021 8:30 AM BY: MARK TABER

CAD File: C:\Users\tabs\Dropbox\UES Projects\UES003003 134 Telegraph Rd\Design\Acad\UES003003-FIG 30 WATER MASTERPLAN.dwg

APPROVED PLAN
Date: 31/03/2021
Application No.: 521.2021.195.1
BUNDABERG REGIONAL COUNCIL

EX. 3000 WM (WP.02820)
EX. 3000 WM (WP.03838)
EX. SPS
EX. 2250 WM (WP.03763)
EX. 2250 WM (WP.11320)
TELEGRAPH ROAD
PROPOSED 1000 CROSS ROAD CONNECTION TO EXISTING
PROPOSED 1500 CROSS ROAD CONNECTION TO EXISTING
PROPOSED 1500 CROSS ROAD CONNECTION TO EXISTING
PROPOSED FUTURE TRUNK WATERMAIN (P.WP.0108)
BUNDABERG RING ROAD
EMT D
EMT D
STAGE 1
STAGE 2
STAGE 3
STAGE 4
STAGE 5
STAGE 6
STAGE 3
500
501
502
503

LEGEND
- 1000
- 1500 NON-TRUNK
- 1500 TRUNK
- FUTURE - LOT 500

JOINS RIGHT

PLAN
SCALE A1 - 1 : 1500
A3 - 1 : 3000

JOINS LEFT

PROPOSED FUTURE TRUNK WATERMAIN (P.WP.0108)
FE WALKER STREET
EX. WM (WP.12098)

PLAN
SCALE A1 - 1 : 1500
A3 - 1 : 3000

0 50 100 150m
SCALE 1:1500 @A1

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Project	134 TELEGRAPH ROAD KALKIE		
TITLE	MASTERPLAN - WATER RETICULATION		
Figure Number	UES003003-FIG-30	Revision E	Size A1

DATE PLOTTED: 19 January 2021 1:50 PM BY: MARK TABER

CAD File: C:\Users\tabsi\Dropbox\UES Projects\UES003003 134 Telegraph Rd\Design\Acad\UES003003-FIG 80 SEWER MASTERPLAN OPT5.dwg

APPROVED PLAN
Date: 31/03/2021
Application No.: 521.2021.195.1

EX. SPS RECEIVING MH IL9.30

EX. SPS SF.095

TELEGRAPH ROAD

EX. GRAVITY CONNECTION

STAGE 1 & 2 EX. GRAVITY CONNECTION IL10.33

STAGE 1

STAGE 2

STAGE 3

STAGE 4

STAGE 5

STAGE 6

LINE 1 TRUNK MAIN

LINE 4 TRUNK MAIN

BUNDABERG RING ROAD

ALTERNATE SPS LOCATION

FUTURE CONNECTION

FUTURE CONNECTION

LEGEND:

- 14/43 — STRUCTURE NUMBER / LINE NUMBER
- S150 — SEWER MAIN AND STRUCTURE
- SEWER RISING MAIN
- W100 — WATERMAIN AND PIPE DIAMETER
- STORMWATER DRAINAGE
- STAGE BOUNDARY

PLAN

SCALE A1 - 1 : 1500
A3 - 1 : 3000

0 50 100 150m
SCALE 1:1500 @A1

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Project	134 TELEGRAPH ROAD KALKIE
TITLE	SEWER OPTION 5 - PLAN
Figure Number	UES003003-FIG-80
Revision	A
Size	A1

DATE PLOTTED: 25 March 2021 1:45 PM BY : MARK TABER

APPROVED PLAN
Date: 31/03/2021
Application No.: 521.2021.195.1

DECOMMISSION EXISTING SPS.
PROPOSED GRAVITY MAIN
FROM EXISTING CONTROL MH

EX. 100Ø SEWER RISING MAIN

EX. SPS SF.095

TELEGRAPH ROAD

BUNDABERG RING ROAD

CONSTRUCT MH OVER
EXISTING 450Ø TRUNK MAIN

FE WALKER ST

STAGE 1
STAGE 2
STAGE 3
STAGE 4
STAGE 5
STAGE 6

17/1 16/1 15/1 14/1 13/1 12/1 11/1 10/1 9/1 8/1 7/1 6/1 5/1 4/1 3/1 2/1 1/1 1/X 2/X 3/X

PLAN
SCALE A1 - 1 : 2000
A3 - 1 : 4000

0 50 100 150 200m
SCALE 1:2000 @A1

LONGITUDINAL SECTION
SCALE A1 - 1:2000(H) 1:200(V)
A3 - 1:4000(H) 1:400(V)

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Project: 134 TELEGRAPH ROAD KALKIE
TITLE: MASTERPLAN - SEWER RETICULATION OPT6
Figure Number: UES003003-FIG-90 | Revision: A | Size: A1

CAD File: C:\Users\taber\Dropbox\UES Projects\UES003003 134 Telegraph Rd\Design\Acad\UES003003-FIG 90 SEWER MASTERPLAN OPT6.dwg