

18/06/2024

NSW Water
Water Assessments
water.assessments@dpie.nsw.gov.au

To Whom it may concern,

Re: Response to RFI dated 17/06/2024 in relation to *Submission of Addendum to the Sediment and Erosion Control Plan for Kings Forest (MP08_0194)* - Environmental Component

Please find below responses to the RFI received 17/06/2024 regarding the proposed additional stormwater outfall and associated sediment erosion controls within the footprint of the approved Kings Forest Parkway road reserve south west of Precinct 5.

1. Conditions of Approval compliance:

Condition A12 (5):

*"This approval does not approve any bulk earthworks within ecological buffers across all precincts as depicted on Drawing No. 12301-ALL-041 Revision B, **with the exception of minor encroachments into the Precinct 5 ecological buffer for the construction of stormwater management areas (bioinfiltration and vegetated swales), placement of Koala fencing, and construction of Road No. 9 in the south western corner of Precinct 5 for an area of 686m² as contained within the Proponent's Preferred Project Report 2012 and shown on the Precinct 5 Swale Sections Plan (Drawing No.12301-SK-044 Amendment C dated 15 August 2012) and Road Reserve / Buffer Interface Plan (Drawing No.12301-SK-046 Amendment A dated 17 August 2012)".***

- The location of the proposed treatment system is confined to the approved footprint of Kings Forest Parkway which encroaches into the P5 EMA outer buffer as approved.

Condition 54 the proposed works were:

- designed by a Certified Erosion and Control Specialist (Patrick Windsor (CPESC #9784); they were checked by the project design engineer (Mortons Urban Solutions); the independent stormwater consultant (Burchills) and the certifying authority (BRS – Chris Borg).
- Designed in accordance with Water By Design - Technical Design Guidelines (Chapter 5.5). This is in order to ensure the integrity and durability of the treatment devices in the early stages of the development.
- Designed to be lined so as to not intercept groundwater.
- Designed to have a HES basin to treat collected water prior to discharge to ensure the water meets the project specific water quality criteria, and in particular the specific water quality criteria requirements of both the Wallum Sedge Frog and Wallum Froglet as documented within the Wallum Sedge Frog Management Plan (JWA 2020); Threatened Species Management Plan (JWA, 2021) and Overall Water Management Plan (Gilbert and Sutherland 2020).

2. Environmental Management Plan compliance:

Koala Plan of Management (JWA 2020)

Section 7.2.4:

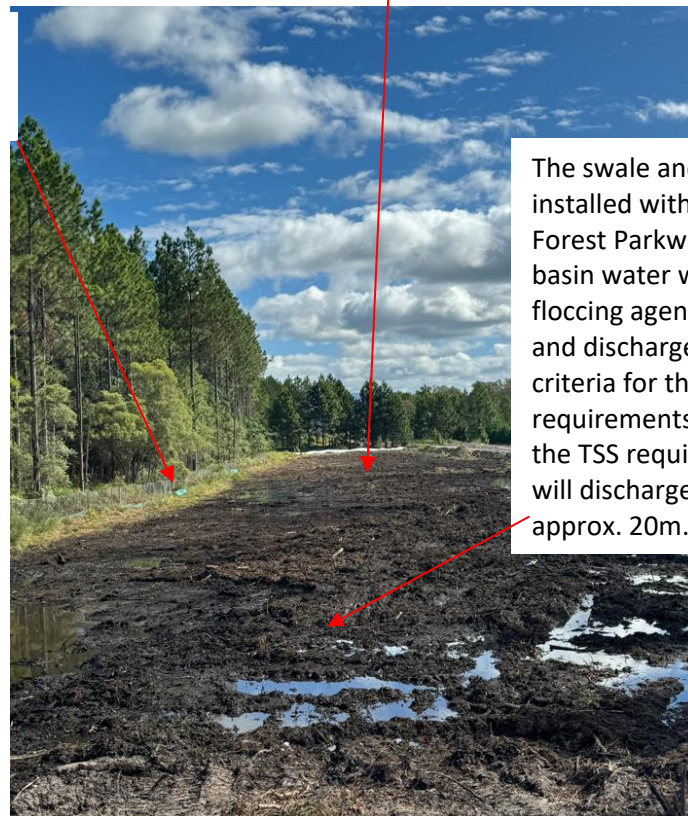
- the proposed Addendum to the Erosion and Sediment Control Plan was prepared by "a suitably qualified person utilizing current best practice standards"; and "All measures contained in the Construction Environmental Management Plan under project approval

(MP08_0194) Condition 52 and the Sediment and Erosion Control Plan under Condition 54 have been implemented prior to the commencement of construction and will be maintained throughout construction.

Furthermore, temporary koala fencing has been constructed along the outer edge of the adjacent buffer to ensure no koalas can enter the proposed area of works (see plate 1). A senior ecologist from JWA Ecological Consultants undertook a pre-clearance survey of the area of proposed construction (which is located within the footprint of Kings Forest Parkway) and a spotter- catcher was on site throughout clearing works. These works were approved as part of the Subdivision Works Approval 230584SW10 by BRS dated 13/05/2024 (attached).

There will be at least 20m of flat grass before discharge reaches North-South drain.

Temporary koala fence with sediment fencing at base for WSF barrier



The swale and HES basin will be installed within the approved Kings Forest Parkway road reserve. The HES basin water will be treated with a floccing agent to meet TSS criteria and discharge will only occur if the criteria for the WSF water quality requirements are also met as well as the TSS requirements. Then the water will discharge over flat grass for approx. 20m.

Plate 1: Location of proposed stormwater treatment system within approved Kings Forest Parkway road reserve

Wallum Sedge Frog Management Plan (JWA 2020)

Section 7.4:

“All stormwater infrastructure will be located offline from any WSF breeding habitat”. The system will involve creation of a swale and HES basin offline which will discharge into mapped WSF foraging habitat but will not enter any WSF breeding habitat.

- Prior to discharge the water will be treated and tested with particular focus on meeting the WSF water quality criteria for the WSF.

“pH must be consistent with receiving water quality. Consideration must be given to the preferred water quality conditions of WSF communities when interpreting pH results against the site-specific water quality criteria. If receiving waters are estuarine, pH can range from 5.5 -7.5; if receiving waters are fresh, pH can range from 4.2 – 6.7 in accordance with the Threatened Species Management Plans (JWA, 2020f-h) for habitat requirements for Wallum Froglet (Crinia signifera) and the Wallum Sedge Frog Management Plan (JWA 2020i) for habitat requirements for the Wallum sedge Frog (Litoria olongburensis)” (Gilbert and Sutherland Overall Water Management Plan 2020)”.

- No water will be discharged from the HES until the above pH criteria is met and the TSS discharge criteria of less than 50mg/L is met.

Threatened Species Management Plan (JWA 2021)

Section 3.2.5

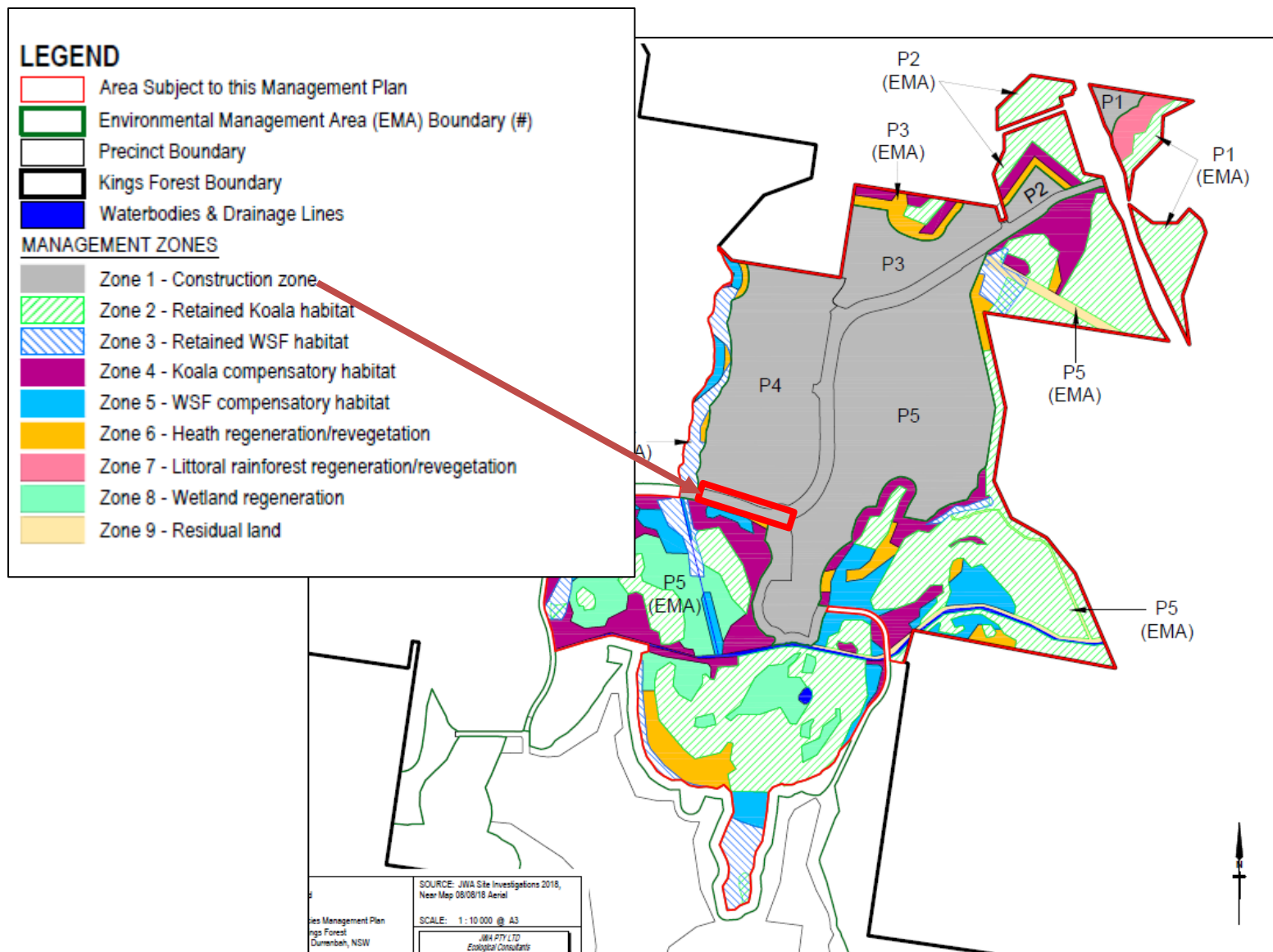
“Where the 50 m buffer zones occur adjacent to development in Precinct 5, the outer 20 m zone will be utilised for stormwater conveyance and ancillary structures such as fauna exclusion fencing whilst the inner 30 m zone will be utilised for conservation purposes only such as revegetation and assisted regeneration works_

- The proposed works are located within the P5 outer buffer zone, however as per approval MP08_0194 the area of proposed works is contained within the approved road reserve of Kings Forest Parkway in this area.

Section 6.2

“The construction zone consists of the development footprint of Precincts 1 - 5. The development footprint also includes the 20 m outer buffer zone adjacent to Precinct 5 which will be utilised for stormwater conveyance and ancillary structures such as fauna exclusion fencing (FIGURE 20)”.

- The location of the proposed treatment system is confined to the area known as Zone 1 - Construction Zone in accordance with Figure 20 of the Threatened Species Management Plan (JWA 2021 (overleaf)). Works will be undertaken within the 20m outer buffer zone however as per the project approval MP08_0194 this is within the approved road reserve for Kings Forest Parkway.



Vegetation and Weed Management Plan (JWA

Section 3.2.5

"Precinct 5 is proposed to be developed as a residential precinct and will also include the construction of a significant portion of the proposed Kings Forest Parkway. Large areas adjacent to Precinct 5 will be retained within EPZs and associated 50 m buffer zones (collectively referred to as the Precinct 5 EMA). Where the 50 m buffer zones occur adjacent to development in Precinct 5, the outer 20 m zone will be utilised for stormwater conveyance and ancillary structures such as fauna exclusion fencing whilst the inner 30 m zone will be utilised for conservation purposes only such as revegetation and assisted regeneration works".

- Works will be undertaken within the 20m outer buffer zone however as per the project approval MP08_0194 this is within the approved road reserve for Kings Forest Parkway.

Section 5.2

- Please refer to management plan wording and response under Section 6.2 of the Threatened Species Management Plan (JWA 2021).

Section 6.3

"Construction Phase Management Measures

2. *Within the EMAS the following activities will not be permitted*
Any filling or excavation including trench line, topsoil skimming and/or surface excavation (with the exception of the Precinct 5 outer 20 m zone which will be utilised for stormwater conveyance and ancillary structures such as fauna exclusion fencing, and where necessary for the installation of exclusions fencing)"
- Works will be undertaken within the 20m outer buffer zone however as per the project approval MP08_0194 this is within the approved road reserve for Kings Forest Parkway.

Buffer Management Plan (JWA 2020)

Section 3.2.5

"Precinct 5 is proposed to be developed as a residential precinct and will also include the construction of a significant portion of the proposed Kings Forest Parkway. Large portions of Precinct 5 will be retained within an EPZ with a 50m buffer zone to the proposed development. Where the 50 metre buffer zones occur adjacent to development in Precinct 5, the inner 20 metre zone will be utilised for stormwater conveyance and ancillary structures such as fauna exclusion fencing whilst the outer 30 metre zone will be utilised for conservation purposes only such as revegetation and assisted regeneration works".

- Works will be undertaken within the 20m outer buffer zone however as per the project approval MP08_0194 this is within the approved road reserve for Kings Forest Parkway.

Section 5.2

"The construction zone consists of the development footprint of Precincts 1 - 5. The development footprint also includes the 20 m outer buffer zone adjacent to Precinct 5 which will be utilised for stormwater conveyance and ancillary structures such as fauna exclusion fencing".

- The location of the proposed treatment system is confined to the area known as Zone 1 - Construction Zone in accordance with Figure 11 of the Buffer Management Plan (Precinct 1-5) (JWA 2021). No works will be undertaken within the 20m outer buffer zone but rather confined to the approved road reserve of Kings Forest Parkway.

Section 6.3.1

"The location of exclusion fencing in Precincts 1 – 5 is as follows (FIGURE 12):

- Temporary koala fence has been installed along the outer buffer zone in accordance with Figure 12 and will be replaced with permanent koala fence as construction progresses.

Acid Sulphate Soils Management Plan (Phase 1 Earthworks) – (Gilbert and Sutherland 2020).

Section 2.6

"All excavation works and stockpiling of untreated acid sulfate materials shall be carried out in such a manner that:

- *ensures that any unforeseen groundwater seepage and/or leachate and/or stormwater runoff within the excavation area is collected and not released from the site, untreated to any stormwater drain or waters (including groundwater),*
 - *ensures that any leachate and/or stormwater runoff which has been in contact with acid sulfate materials or contaminants is collected and not released from the site, untreated to any stormwater drain or waters (including groundwater)".*
- The purpose of the proposed system is to collect water from the construction zone and treat it prior to release. The system will be lined so as to not infiltrate the groundwater or expose any acid sulphate soil into the collected water to be discharged.

Section 2.7

"Stormwater control will be achieved by directing as much runoff from disturbed areas as practicable to the sediment detention basins".

- The primary purpose of the proposed system is to direct runoff from the construction zone to a treatment system that includes a swale system and HES basin where the water will be treated and tested prior to discharge.

For further information on the treatment of ASS during the proposed construction works, please refer to the attached letter from Burchills Engineering Solutions dated 16/04/2024.

For information pertaining to the design of the treatment system please refer to the attached documentation from Mortons Urban Solutions.

If you have any further queries regarding this matter, please contact Michelle Mills on 0499 987 467.

Yours faithfully



Kings Forest Environmental Officer

- Encl.
- Letter from Burchills re: KFP2 Early Works Acid Sulphate Soile Management Plan
 - RFI information relevant to the design aspects of the proposed treatment system Mortons Urban Solutions
 - SWC from BRS in relation to tree clearing and early works approval

c.c. Shaun Nicholson – Kings Forest Project Manager – LEDA Holdings Pty Ltd.

Our Reference: 12301-KFP2 [ID 1006370]
State Gov Reference: MP08_0194, DOC21/248960, 12/5212#69

**Civil Engineering
Project Coordination**

mortons@urbansolutions.net.au
www.urbansolutions.net.au

18 June 2024

MUS Pty Ltd t/as:
Mortons - Urban Solutions
ABN: 39 116 375 065

NSW Water
Water Assessments
NSW Department of Climate Change, Energy,
The Environment and Water
Locked Bag 5022
Parramatta NSW 2124

Dear Sir/Madam
E: water.assessments@dpie.nsw.gov.au

**Re: Response to Information Request in relation to Submission of Addendum to the
Sediment and Erosion Control Plan for Kings Forest (MP08_0194)**

Please find below responses to the RFI received 17/06/2024 regarding the proposed additional stormwater outfall and associated sediment erosion controls within the footprint of the approved Kings Forest Parkway Road Reserve.

In particular NSW water requests, the stormwater outlet should be designed and constructed in accordance with the Guidelines for Controlled Activities on Waterfront Land (DPE, 2022). Provide details that such design and construction will be achieved.

Below are the dot points within the Guidelines and our responses that should be considered when designing an outlet within or on the bank of a waterway. We note that the outlet or spreader weir of the sediment erosion control basin (HES) is to be set back from any waterway bank of the downstream waterway (approximately 20m) nor is it contained within the waterway but discharges over native ground prior to flowing downstream to existing channel.

Considerations in the Design and Construction of Outlet Structures

The design and construction of outlet structures should consider, but not be limited to, the following:-

- 1. Define the infrastructure route and identify the specific point of discharge. Where possible select a route along an existing cleared or disturbed area that avoids trees, preferably beyond their drip line.*

The infrastructure route is shown on the submitted engineering drawings 12301-KFP2000-681 included in the original application. The location of the works and treatment train is confined to the footprint of Kings Forest Parkway as approved in the Major Project Approval (MP08-0194).

The temporary treatment train for Kings Forest Parkway Stormwater is shown on Shadforth's Erosion Sediment Control Drawings as submitted in the original application. The treatment train is confined to the footprint of Kings Forest Parkway as approved in the Major Project Approval (MP08-0194)

The route selected is the approved road reserve of Kings Forest Parkway and all trees and vegetation in this area has been removed previously as part of the overall earthwork's approval. The stormwater system does not affect existing vegetation and avoids any further trees.

2. *Choose a stable section of the stream for the discharge point, preferably mid-way between bends. Alternatively, incorporate outlet discharge points into disturbed/eroded areas which are to be stabilised or rehabilitated.*

We note that stormwater is discharged through the proposed piped system approximately 230m from the point of discharge and then enters a high efficiency sediment basin (HES) to remove the required nutrients and sediment loadings. This initial stage detains the water and removes the velocity travelling through the stormwater pipes constructed as part of Kings Forest Parkway-Stage 2. The HES detains the water for treatment purposes and then discharges over a weir (Spreader Bar) to reduce depth and velocity of flows entering the native ground. This water sheet flows over existing ground downstream toward the existing waterway. The weir details are provided in Shadforth Sediment Erosion Control Drawing 05 which has a base width of 15m. Below the spreader is an energy dissipater 17.2m wide and a length of 1.3m to ensure erosion downstream is negated.

3. *Minimise construction footprint and proposed extent of disturbance to soil and vegetation within the watercourse or waterfront land.*

The construction footprint is contained within the approved area within Kings Forest Road reserve as set out in the Major Project Approval and does not enter any restricted area within the environmental corridors. The construction footprint does not remove any additional vegetation.

4. *Demonstrate that changes to the hydrology of the receiving watercourse have been assessed and there is no detrimental impact on discharge volumes and channel velocities. Discharge velocities and flow rates should mimic natural flows and not initiate erosion.*

The outlet structure being the spillway for the HES basin in the KFP2 ESC Plan, is designed generally in accordance with the "controlled activities guideline". The basin has been designed to the 2 year ARI with the spillway designed to the 20 year ARI in accordance with IECA best practice guidelines by the Certifying Professional for Sediment Erosion Control as demonstrated in Shadforth Sediment Erosion Control Drawings submitted as part of the original application. Weir (Spreaders) and dissipator widths and lengths were designed to spread the discharged waters and control velocities and depths entering onto the native ground to control erosion prior to entering the downstream waterway.

5. *Discharge from an outlet should not cause bed or bank instability.*

Detained water within the HES is displaced by further flows over the Weir Section and flow velocity is dissipated over a 15m wide x 1.3m long rock mattress. This controls releases over the native ground to negate erosion prior to entering the downstream channel located approximately 20m from the outlet.

6. *Protect the bed of the watercourse below the outlet if not bedrock, or if bed scour is likely. Consider bank material and outlet jet effect and protect the opposite streambank if required.*

We note that following release from the HES over the spreader and dissipater the water flows downstream to the existing water way in a controlled manner.

7. *Point outlet structure and direct discharge downstream.*

The outlet structure consists of a 15m wide spreader bar and energy dissipater to spread the flow over native ground. The location and direction of flow is based on the approved road reserve that works can occur.

8. *The outlet should not protrude beyond the streambank but tie in with the adjoining bank alignment.*

There is no outlet structure on a stream bank.

9. *Calculate tractive stresses generated from outlet discharges and from bank full discharges to determine appropriate rock size requirements for the structure.*

Rock Sizes for discharge weir and dissipater have been calculated by CPESC(#9784) as part of Shadforths Sediment Erosion control set that takes the velocities nominated in the tables on Drawing 05-Calculatians as submitted with application. 'We note that no structure is located on a streambank.

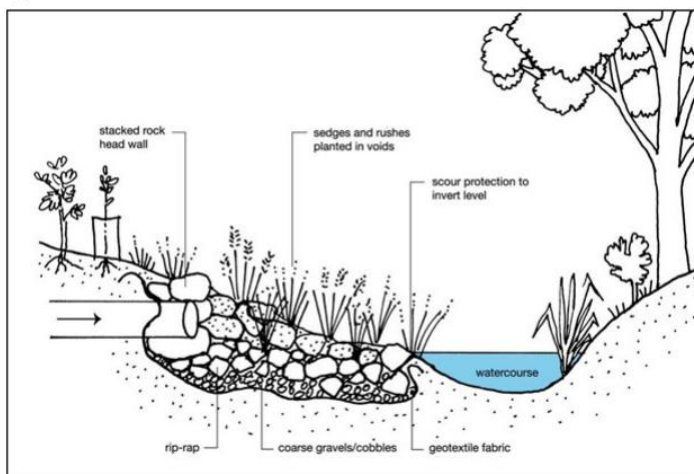
10. *Rock rip-rap is the preferred material to provide a natural outlet. Rip-rap should extend for the full extent of the design scour apron and adjoining flanks/streambank. Rip-rap must be appropriately keyed in to withstand the velocities of runoff or discharge from the site and cut-off trenches should be provided where necessary.*

We note that no riprap is to located in a streambank. The rock weir and dissipater are designed to reduce velocities and spread flows across native grasses prior to ultimately flowing into the stream systems.

Controlled Activities – Guidelines for Outlet Structures on Waterfront Land

1. *Rip-rap should consist of durable, angular run-of-quarry rock placed over a bedding layer of angular cobbles over geotextile. Where possible, incorporate vegetation such as sedges and rushes into scour management as Figure 1 for further stability.*

Figure 1: Natural outlet structure



As per above no structure is to outlet into a streambed or bank. The HES, the weir structure and the dissipator will allow water to leave the HES basin in a controlled manner across native ground prior to discharging in waterways downstream.

2. *Grade scour apron to bed level of the watercourse or just below any permanent water created by any stable feature such as a rock bar within the watercourse.*

Not Applicable

3. *Stabilise and rehabilitate all disturbed areas including topsoiling, revegetation and regeneration, mulching, weed control and maintenance.*

Stabilisation of all areas that have been disturbed or exposed during and after construction of the HES will be in line with the approved methods adopted over the Bulk Earthworks Approval for Stage 1 of the Kings Forest Development. This includes topsoiling, use of hydro mulching and polymers to reduce scour and dust. We note that this is an approved road reserve and construction of future road works will take place in this location.

We advise that we are providing a response to part of the information requested and request that the Department continues to proceed with assessment of the application.

If you have any queries in relation to this matter, please telephone me at our office on (07) 5571 1099.

Yours faithfully



Kevin Fox - Director
Mortons – Urban Solutions

Our Ref: BE230462-LTR - P5_ASSMP_Addendum-01-20240410
Enquiries to: Rod Barry

16/04/2024

Barker Ryan Stewart
Shop 74A Victoria Ave,
Broadbeach QLD 4218

Dear Chris,

Re: KFP2 Early Works - Acid Sulfate Soils Management Plan

Burchills Engineering Solutions has been engaged by Leda Design and Construction (QLD) Pty Ltd to address the management of Acid Sulfate Soils (ASS) for the proposed Early Works associated with the construction of Kings Forest Parkway Stage 2. This letter has been prepared to clarify how the proposed Early Works will comply with the requirements for managing ASS, as outlined in the approved Acid Sulfate Soils Management Plan (ASSMP).

As you are aware, the extents of the KFP2 Early Works are outside the approved ASSMP and the Site Audit Statement. Our team has been engaged to determine the presence of ASS within the extents of the KFP2 Early Works. Based on our findings, it is likely that ASS are present in the area. We have based our findings on the information provided in the '*Acid Sulfate Soil Assessment, Kings Forest Stage 1 Project Application, Kings Forest, New South Wales*' (10468 ASSA DGS3F) prepared by G+S, 2011, specifically noting Borehole 6 (borehole logs attached).

Given the presence of ASS, it is recommended that the approved ASSMP (*Acid Sulfate Soil Management Plan, Stage 1 Earthworks, Kings Forest, NSW, 12040 ASSMP REH3F, G+S, 2020*) methodologies be implemented for the management of ASS during the Early Works. No changes are required to the approved ASSMP, as it is deemed suitable for managing the ASS encountered in the KFP2 Early Works.

We will ensure that all relevant parties are informed of this recommendation and that the approved ASSMP is adhered to during the construction activities. Should any additional requirements or changes arise, we will promptly address them in consultation with you and the relevant authorities.

Please do not hesitate to contact us should you have any further questions or require additional information.

Yours sincerely,

Rod Barry

Principal Civil Engineer (NER 791172)

Attached: Borehole Data



SCALE
1:20 000



ORIENTATION
NORTH

LEGEND

- BH# ASS Investigation Boreholes (Feb 1998)
- BHA# ASS Investigation Boreholes (Aug 2007)
- TS# ASS Investigation Transect (Aug 2007)
- ▨ Potential acid sulfate soils within 6m of surface
- ▨ Residual soils - Non acid sulfate soils
- ▨ Existing acidity (non-ASS) within 6m of surface

SOURCES

Image source: Google Earth Pro 2010

CAIRNS

KAWANA

ROBINA

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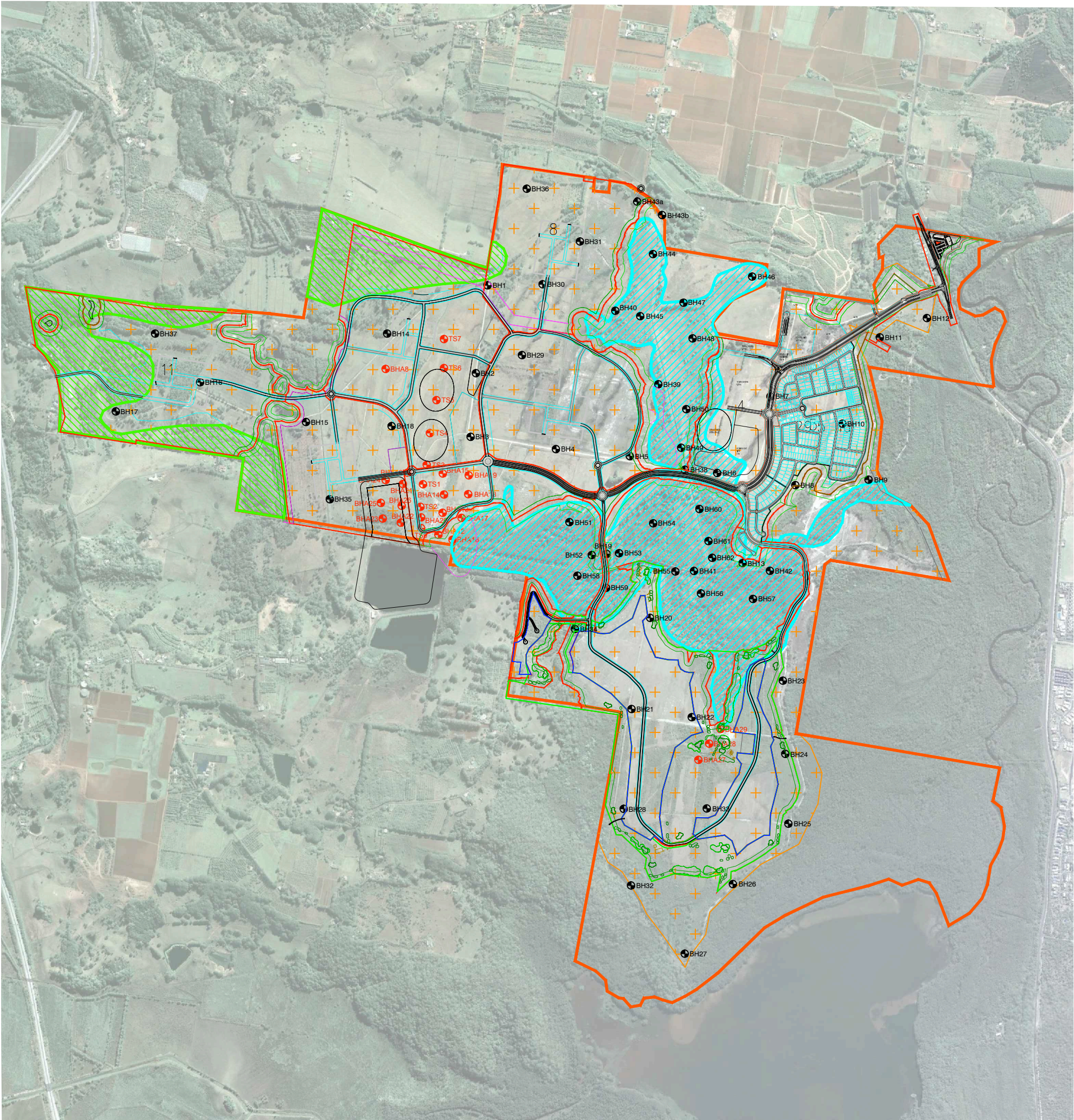
BRISBANE

Gilbert and Sultherland Pty Ltd
ABN 56 077 310 840

www.access.gs

AGRICULTURE WATER ENVIRONMENT

**GILBERT
SUTHERLAND**



PROJECT
KINGS FOREST STAGE 1
PROJECT APPLICATION

CLIENT
PROJECT 28 PTY LTD

DRAWING
DEVELOPMENT AREA AND
MASTER PLAN

DATE 18/02/2011	DRAWN AJS	PROJECT NO 10468
SCALE 1:20 000	CHECKED NTZ	DRAWING NO 10468.2.3

SOIL PROFILE BORELOG BH 6

Subject: King's Forest
 Job number: GJ9832
 Client: Narui
 Date:

Depth NSL (m)	Depositional environment	Sample Description	Accessories	Colour
0.0 - 0.5	Pleistocene	fine to med sand (S)	organics present	
0.5 - 1.0	Pleistocene	fine to med sand (S)		10YR 5/2
1.0 - 1.6	Pleistocene	fine to med sand (S)	organics present	10YR 5/3
1.6 - 1.85	Pleistocene	fine to med sand (S)	organics present	10YR 5/2
1.85 - 3.6	Pleistocene	fine to med sand (S)	silty clay inclusions	10YR 4/1 N 3/0
3.6 - 3.9	Pleistocene	silty clay (marine)	sand lenses	N 3/0 10YR 4/1(lenses)
3.9 - 5.8	Pleistocene	fine to med sand (S)	silty clay inclusions	10YR 4/1 N 3/0
	Pleistocene	MAXIMUM DEPTH OF BOREHOLE AT 5.8M		

ANALYTICAL REPORT

PAGE 1 of 18

CONTACT: MR N SUTHERLAND
 CLIENT: GILBERT & SUTHERLAND PTY LTD
 ADDRESS: P O BOX 857
 ROBINA QLD 4226

LABORATORY: ENV BRISBANE
 BATCH NUMBER: EB13231
 SUB BATCH: 0
 No. OF SAMPLES: 179
 DATE RECEIVED: 23/02/98
 DATE COMPLETED: 16/03/98

ORDER No.: NARUI COC 04840-851

SAMPLE TYPE: SOIL

PROJECT:

SAMPLE NUMBER	ELEMENT UNIT METHOD L.O.R.	pH (H2O2)	Ca(A) %	Ca(KCl) %	Ca(Perox) %	Mg(A) %	Mg(KCl) %
		EA-002 0.1	EA-022 0.02	EA-022 0.02	EA-022 0.02	EA-022 0.02	EA-022 0.02
BH1	0.5-1.9	3.5	<0.02	<0.02	<0.02	<0.02	<0.02
BH1	2.1-2.3	3.1	<0.02	<0.02	<0.02	<0.02	<0.02
BH1	2.6-2.8	3.5	<0.02	<0.02	<0.02	<0.02	<0.02
BH1	3.8-4.0	3.1	0.02	<0.02	0.02	<0.02	<0.02
BH2	0.5-1	2.4	<0.02	<0.02	<0.02	<0.02	<0.02
BH2	1.25-1.5	1.8	<0.02	<0.02	<0.02	<0.02	<0.02
BH2	2.2-2.4	1.4	<0.02	<0.02	<0.02	<0.02	<0.02
BH2	3.5-4.5	1.4	<0.02	<0.02	<0.02	<0.02	<0.02
BH3	0.5-1	2.5	<0.02	<0.02	<0.02	<0.02	<0.02
BH3	1.6-2.0	2.4	<0.02	<0.02	<0.02	<0.02	<0.02
BH3	2.0-2.3	2.5	<0.02	<0.02	<0.02	<0.02	<0.02
BH3	3-3.2	2.6	<0.02	<0.02	<0.02	<0.02	<0.02
BH4	0.6-1.05	2.4	<0.02	<0.02	<0.02	<0.02	<0.02
BH4	1.05-1.3	2.8	<0.02	<0.02	<0.02	<0.02	<0.02
BH4	2-3	2.1	<0.02	<0.02	<0.02	<0.02	<0.02
BH5	0.7-0.9	2.9	<0.02	<0.02	<0.02	<0.02	<0.02
BH5	1.6-1.8	2.9	<0.02	<0.02	<0.02	<0.02	<0.02
BH5	2.6-2.9	2.3	<0.02	<0.02	<0.02	<0.02	<0.02
BH5	4-4.5	2.2	<0.02	<0.02	<0.02	<0.02	<0.02
BH6	1-1.6	3.1	<0.02	<0.02	<0.02	<0.02	<0.02
BH6	1.6-1.85	3.1	<0.02	<0.02	<0.02	<0.02	<0.02
BH6	1.85-3.6	2.7	<0.02	<0.02	<0.02	<0.02	<0.02
BH6	3.6-3.9	2.0	<0.02	0.04	0.04	0.02	0.02
BH6	3.9-5.8	2.8	<0.02	<0.02	<0.02	<0.02	<0.02
BH7	0.5-0.8	3.0	<0.02	<0.02	<0.02	<0.02	<0.02
BH7	0.9-1.2	2.9	<0.02	<0.02	<0.02	<0.02	<0.02
BH7	1.2-1.6	2.8	<0.02	<0.02	<0.02	<0.02	<0.02
BH7	2-2.4	2.7	<0.02	<0.02	<0.02	<0.02	<0.02
BH7	2.4-2.6	2.8	<0.02	<0.02	<0.02	<0.02	<0.02
BH8	0-0.5	2.9	<0.02	<0.02	<0.02	<0.02	<0.02

COMMENTS:

POCAS as per method of Ahern et al. Results expressed as mole
 H+/tonne. POCAS Analysis: NATA registration does not cover performance
 of this service.

This is the Final Report which supersedes any preliminary reports with this batch number.

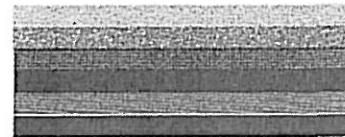
• Results apply to sample(s) as submitted by client.

Alice Springs Laboratory
 Phone: (08) 8952 6020 Fax: (08) 8952 6028
 Bendigo Laboratory
 Phone: (03) 5446 1390 Fax: (03) 5446 1389
 Brisbane Laboratory
 Phone: (07) 3243 7222 Fax: (07) 3243 7218
 Charters Towers Laboratory
 Phone: (077) 87 4155 Fax: (077) 87 4220

Cloncurry Laboratory
 Phone: (077) 42 1323 Fax: (077) 42 1685
 Kalgoorlie Laboratory
 Phone: (08) 9021 1457 Fax: (08) 9021 6253
 New Zealand Laboratory
 Phone: (07) 575 7654 Fax: (07) 575 7641
 Orange Laboratory
 Phone: (03) 6262 1722 Fax: (03) 6262 1100

Perth Laboratory
 Phone: (08) 9249 2988 Fax: (08) 9249 2942
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All pages of this report
 have been checked and
 approved for release.



ANALYTICAL REPORT

PAGE 7 of 18

CONTACT: MR N SUTHERLAND
 CLIENT: GILBERT & SUTHERLAND PTY LTD
 ADDRESS: P O BOX 857
 ROBINA QLD 4226

LABORATORY: ENV BRISBANE
 BATCH NUMBER: EB13231
 SUB BATCH: 0
 No. OF SAMPLES: 179
 DATE RECEIVED: 23/02/98
 DATE COMPLETED: 16/03/98

ORDER No.: NARUI COC 04840-851

SAMPLE TYPE: SOIL

PROJECT:

SAMPLE NUMBER	ELEMENT UNIT METHOD L.O.R.	Mg(Perox) %	S(KCl) %	S(Perox) %	S(Pos) %	TAA mole/tonne	TPA mole/tonne
		EA-022 0.02	EA-022 0.02	EA-022 0.02	EA-022 0.02	EA-022 2	EA-022 2
BH1	0.5-1.9	<0.02	<0.02	<0.02	<0.02	2	4
BH1	2.1-2.3	<0.02	0.02	0.10	0.08	6	30
BH1	2.6-2.8	<0.02	<0.02	0.06	0.06	8	22
BH1	3.8-4.0	<0.02	0.02	0.12	0.10	10	52
BH2	0.5-1	<0.02	<0.02	<0.02	<0.02	<2	42
BH2	1.25-1.5	<0.02	<0.02	0.02	0.02	8	284
BH2	2.2-2.4	<0.02	<0.02	0.04	0.04	8	460
BH2	3.5-4.5	<0.02	<0.02	0.02	0.02	12	774
BH3	0.5-1	<0.02	<0.02	<0.02	<0.02	<2	28
BH3	1.6-2.0	<0.02	<0.02	0.06	0.06	18	150
BH3	2.0-2.3	<0.02	<0.02	0.10	0.10	26	164
BH3	3-3.2	<0.02	<0.02	0.08	0.08	30	164
BH4	0.6-1.05	<0.02	<0.02	<0.02	<0.02	<2	38
BH4	1.05-1.3	<0.02	<0.02	<0.02	<0.02	<2	28
BH4	2-3	<0.02	<0.02	0.02	0.02	18	256
BH5	0.7-0.9	<0.02	<0.02	<0.02	<0.02	<2	18
BH5	1.6-1.8	<0.02	<0.02	0.02	0.02	10	54
BH5	2.6-2.9	<0.02	<0.02	0.08	0.08	18	186
BH5	4-4.5	<0.02	<0.02	0.02	0.02	6	148
BH6	1-1.6	<0.02	<0.02	<0.02	<0.02	<2	12
BH6	1.6-1.85	<0.02	0.02	0.08	0.06	10	20
BH6	1.85-3.6	<0.02	0.02	0.16	0.14	12	60
BH6	3.6-3.9	0.04	0.22	0.96	0.74	38	454
BH6	3.9-5.8	<0.02	0.04	0.10	0.06	8	36
BH7	0.5-0.8	<0.02	<0.02	<0.02	<0.02	<2	10
BH7	0.9-1.2	<0.02	<0.02	<0.02	<0.02	14	44
BH7	1.2-1.6	<0.02	<0.02	<0.02	<0.02	<2	18
BH7	2-2.4	<0.02	<0.02	<0.02	<0.02	2	40
BH7	2.4-2.6	<0.02	<0.02	0.02	0.02	14	82
BH8	0-0.5	<0.02	<0.02	<0.02	<0.02	<2	12

COMMENTS:



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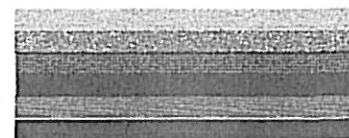
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• Results apply to sample(s) as submitted by client.

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ANALYTICAL REPORT

PAGE 13 of 18

CONTACT: MR N SUTHERLAND
 CLIENT: GILBERT & SUTHERLAND PTY LTD
 ADDRESS: P O BOX 857
 ROBINA QLD 4226

LABORATORY: ENV BRISBANE
 BATCH NUMBER: EB13231
 SUB BATCH: 0
 No. OF SAMPLES: 179
 DATE RECEIVED: 23/02/98
 DATE COMPLETED: 16/03/98

ORDER No.: NARUI COC 04840-851

SAMPLE TYPE: SOIL

PROJECT:

SAMPLE NUMBER	ELEMENT UNIT METHOD L.O.R.	TSA mole/tonne EA-022 2	pH(KCl) EA-022 0.1				
BH1	0.5-1.9	2	4.7				
BH1	2.1-2.3	24	4.4				
BH1	2.6-2.8	14	4.2				
BH1	3.8-4.0	42	4.1				
BH2	0.5-1	42	4.1				
BH2	1.25-1.5	276	3.5				
BH2	2.2-2.4	452	3.7				
BH2	3.5-4.5	762	3.9				
BH3	0.5-1	28	4.8				
BH3	1.6-2.0	132	3.5				
BH3	2.0-2.3	138	3.4				
BH3	3-3.2	134	3.5				
BH4	0.6-1.05	38	4.4				
BH4	1.05-1.3	28	4.0				
BH4	2-3	238	4.0				
BH5	0.7-0.9	18	4.1				
BH5	1.6-1.8	44	3.6				
BH5	2.6-2.9	168	3.6				
BH5	4-4.5	142	3.9				
BH6	1-1.6	12	4.2				
BH6	1.6-1.85	10	3.8				
BH6	1.85-3.6	48	3.8				
BH6	3.6-3.9	416	3.4				
BH6	3.9-5.8	28	4.0				
BH7	0.5-0.8	10	4.2				
BH7	0.9-1.2	30	3.4				
BH7	1.2-1.6	18	3.9				
BH7	2-2.4	38	3.7				
BH7	2.4-2.6	68	3.7				
BH8	0-0.5	12	4.6				

COMMENTS:



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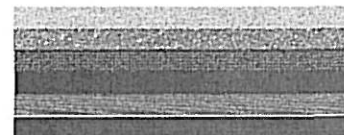
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ANALYTICAL REPORT

PAGE 1 of 6

CONTACT: MR N SUTHERLAND
 CLIENT: GILBERT & SUTHERLAND PTY LTD
 ADDRESS: P O BOX 857
 ROBINA QLD 4226

LABORATORY: ENV BRISBANE
 BATCH NUMBER: EB13231
 SUB BATCH: 0
 No. OF SAMPLES: 179
 DATE RECEIVED: 23/02/98
 DATE COMPLETED: 16/03/98

ORDER No.: NARUI COC 04840-851
 SAMPLE TYPE: QUALITY CONTROL PROJECT:

SAMPLE NUMBER	ELEMENT UNIT METHOD L.O.R.	pH (H2O2) EA-002 0.1	Ca(A) % EA-022 0.02	Ca(KCl) % EA-022 0.02	Ca(Perox) % EA-022 0.02	Mg(A) % EA-022 0.02	Mg(KCl) % EA-022 0.02
*** BH3 1.6-	CHK	2.5	<0.02	<0.02	<0.02	<0.02	<0.02
*** BH6 1-1.6	CHK	3.0	<0.02	<0.02	<0.02	<0.02	<0.02
*** BH8 0-0.5	CHK	3.4	<0.02	<0.02	<0.02	<0.02	<0.02
*** BH10 3.7-	CHK	2.5	<0.02	<0.02	<0.02	<0.02	<0.02
*** BH12 3.8-	CHK	2.4	<0.02	<0.02	<0.02	<0.02	<0.02
*** BH15 1.1-	CHK	2.9	<0.02	<0.02	<0.02	0.04	<0.02
*** BH17 0.2-	CHK	4.1	<0.02	0.02	0.02	<0.02	<0.02
*** BH19 2.1-	CHK	5.0	<0.02	0.04	0.04	<0.02	<0.02
*** BH21 3.5-	CHK	3.6	<0.02	<0.02	<0.02	<0.02	<0.02
*** BH24 3.5-	CHK	3.0	<0.02	<0.02	<0.02	<0.02	<0.02

COMMENTS:

Results which appear on this report are routine laboratory checks for QUALITY CONTROL purposes.



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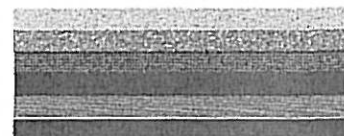
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ANALYTICAL REPORT

PAGE 3 of 6

CONTACT: MR N SUTHERLAND
 CLIENT: GILBERT & SUTHERLAND PTY LTD
 ADDRESS: P O BOX 857
 ROBINA QLD 4226

LABORATORY: ENV BRISBANE
 BATCH NUMBER: EB13231
 SUB BATCH: 0
 No. OF SAMPLES: 179
 DATE RECEIVED: 23/02/98
 DATE COMPLETED: 16/03/98

ORDER No.: NARUI COC 04840-851
 SAMPLE TYPE: QUALITY CONTROL PROJECT:

SAMPLE NUMBER	ELEMENT UNIT METHOD L.O.R.	Mg(Perox) % EA-022 0.02	S(KCl) % EA-022 0.02	S(Perox) % EA-022 0.02	S(Pos) % EA-022 0.02	TAA mole/tonne EA-022 2	TPA mole/tonne EA-022 2
*** BH3 1.6-	CHK	<0.02	<0.02	0.06	0.06	18	140
*** BH6 1-1.6	CHK	<0.02	<0.02	<0.02	<0.02	<2	12
*** BH8 0-0.5	CHK	<0.02	<0.02	<0.02	<0.02	<2	6
*** BH10 3.7-	CHK	<0.02	<0.02	0.02	0.02	4	66
*** BH12 3.8-	CHK	<0.02	<0.02	0.04	0.04	10	188
*** BH15 1.1-	CHK	0.04	<0.02	0.08	0.08	28	200
*** BH17 0.2-	CHK	<0.02	<0.02	0.02	0.02	16	16
*** BH19 2.1-	CHK	<0.02	<0.02	0.06	0.06	<2	2
*** BH21 3.5-	CHK	<0.02	<0.02	<0.02	<0.02	16	70
*** BH24 3.5-	CHK	<0.02	<0.02	<0.02	<0.02	12	70

COMMENTS:



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ANALYTICAL REPORT

PAGE 5 of 6

CONTACT: MR N SUTHERLAND
CLIENT: GILBERT & SUTHERLAND PTY LTD
ADDRESS: P O BOX 857
ROBINA QLD 4226

LABORATORY: ENV BRISBANE
BATCH NUMBER: EB13231
SUB BATCH: 0
No. OF SAMPLES: 179
DATE RECEIVED: 23/02/98
DATE COMPLETED: 16/03/98

ORDER No.: NARUI COC 04840-851 SAMPLE TYPE: QUALITY CONTROL PROJECT:

SAMPLE NUMBER	ELEMENT UNIT METHOD L.O.R.	TSA mole/tonne EA-022 2	pH(KCl) EA-022 0.1				
*** BH3 1.6- CHK		122	3.6				
*** BH6 1-1.6 CHK		12	4.2				
*** BH8 0-0.5 CHK		6	4.7				
*** BH10 3.7- CHK		62	3.7				
*** BH12 3.8- CHK		178	3.4				
*** BH15 1.1- CHK		172	3.5				
*** BH17 0.2- CHK		<2	4.0				
*** BH19 2.1- CHK		2	4.8				
*** BH21 3.5- CHK		54	4.3				
*** BH24 3.5- CHK		58	4.0				

COMMENTS:



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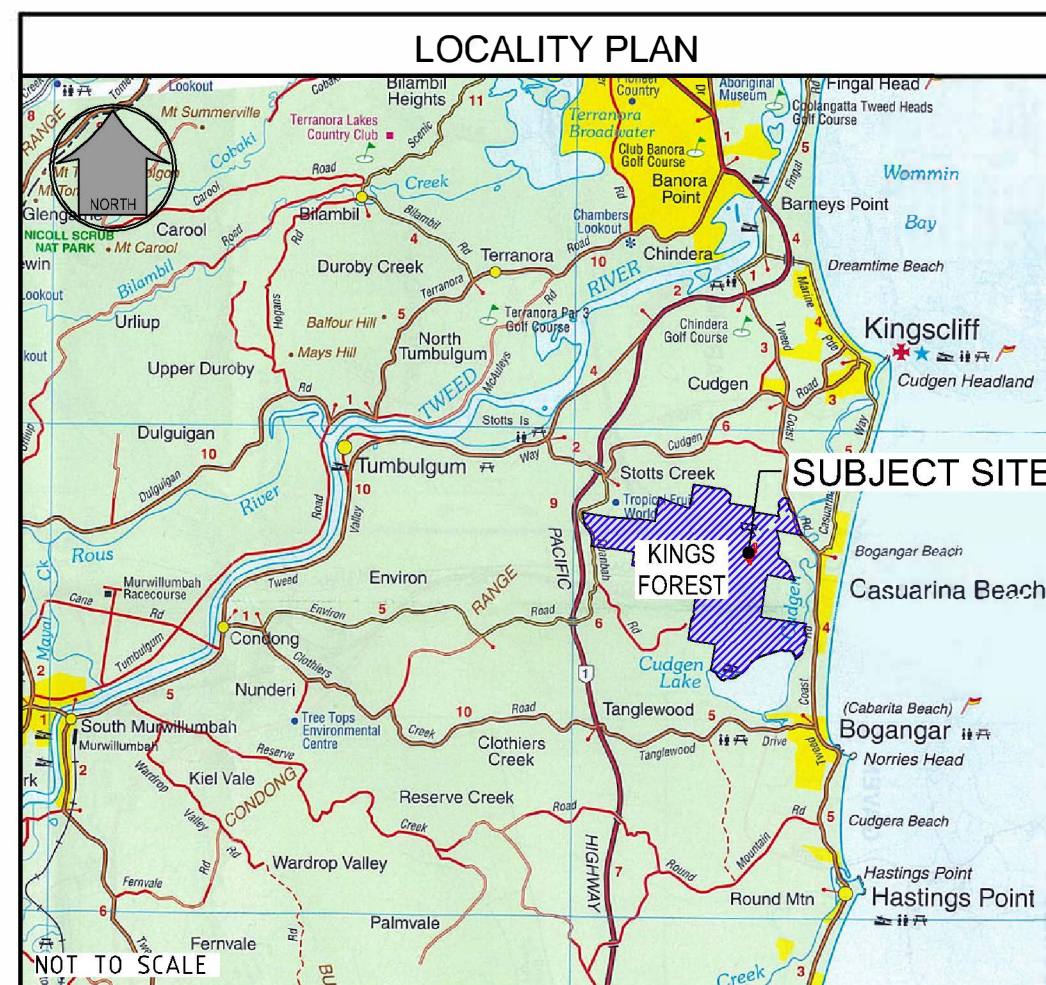
KINGS FOREST PARKWAY 2 No.12301-KFP2

Subdivision Works Certificate

Certificate Number: 230584SW10
Issuing Officer: Christopher Borg
Registration Number: BDC3330
These plans/specifications form part of
the certificate issued:13/05/24



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urban**solutions**
Urban & Regional Planning
Civil Engineering
Project Coordination



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ESTATES PTY LTD**

ASSOCIATED CONSULTANTS:
RPS
**+GILBERT
SUPERLAND**

DRAWING NUMBER
12301-KFP2-000

AMEND.
A

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SCHEDULE OF DRAWINGS														
NUMBER			REV. NO.	TITLE		NUMBER			REV NO.	TITLE				
GENERAL				12301-KFP2-550		A	DETAILS		DEPARTMENT OF TRANSPORT AND MAIN ROAD STD DRAWINGS					
12301-KFP2-000	A	COVER SHEET		12301-KFP2-555	A	SCOUR STANDARD DETAIL		TWEED SHIRE COUNCIL STANDARD DRAWINGS						
12301-KFP2-001	E	SCHEDULE OF DRAWINGS		SEWER: THRUST BLOCK		S.D 007	D	STANDARD KERB DETAILS SHEET 1		S.D 1243	B	PRECAST CULVERT HEADWALLS HEADWALL CONNECTIONS FOR CULVERTS DIA OR HEIGHTS ≤1200		
12301-KFP2-002	B	GENERAL NOTES		12301-KFP2-591	B	SEWER HORIZONTAL THRUST BLOCK DETAIL		S.D 012	H				SUB SOIL DRAINAGE DETAILS	
12301-KFP2-005	C	ROAD HIERARCHY AND STAGNG PLAN SHEET 1		12301-KFP2-592	B	SEWER VERTICAL THRUST BLOCK		S.D 013	E				FOOTPATH AND CYCLEWAY DETAILS	
FENCE				12301-KFP2-593	B	SEWER VALVE THRUST		S.D 014	F	STANDARD KERB RAMP DETAILS		S.D 1243	B	PRECAST CULVERT HEADWALLS HEADWALL CONNECTIONS FOR PIPE CULVERTS DIA ≥1200
12301-KFP2-010	C	FENCING PLAN		STORMWATER: PLANS		S.D 103	B	STANDARD GULLY PIT - ROLL TOP KERB						
EXISTING FEATURES				12301-KFP2-600	F	DRAINAGE PLAN SHEET 1		S.D 104	C	STANDARD GULLY PIT - BARRIER KERB				
12301-KFP2-020	B	PLAN		12301-KFP2-601	G	DRAINAGE PLAN SHEET 2		S.D 105	B	STORMWATER STANDARDS SECURITY GRATE FOR STORMWATER OUTLETS		S.D 1243	B	PRECAST CULVERT HEADWALLS HEADWALL CONNECTIONS FOR BOX CULVERTS HEIGHT ≥1200
TREE CLEARING & PRESERVATION				STORMWATER: BIORETENTION TREATMENT		S.D 240	C	SLUICE VALVE INSTALLATION DETAILS						
12301-KFP2-030	A	PLAN SHEET 1		12301-KFP2-609	A	SWALE PLAN		S.D 243	C	MANUAL AIR VALVE INSTALLATION DETAILS				
12301-KFP2-031	A	PLAN SHEET 2		12301-KFP2-610	B	PLAN SHEET 1		S.D 261	E	PRESSURE SEWERAGE SYSTEMS TYPICAL DETAILS		S.D 1250	A	R C BOX CULVERTS AND SLAB LINK BOX CULVERTS - CULVERT HEIGHTS >600 GENERAL ARRANGEMENT AND NOTES
EARTHWORKS: CUT AND FILL				12301-KFP2-611	A	PLAN SHEET 2		S.D 275	C	TRENCH DRAINAGE BULKHEADS & TRENCH STOPS				
12301-KFP2-040	B	PLAN		12301-KFP2-612	B	PLAN SHEET 3		S.D 278	B	MAINTENANCE HOLES FOR SEWERS				
12301-KFP2-041	B	PLAN 02		12301-KFP2-613	C	PLAN SHEET 4		S.D 301	C	WATER RETICULATION LAYOUT CUL-DE-SACS		S.D 1250	A	R C BOX CULVERTS AND SLAB LINK BOX CULVERTS - CULVERT HEIGHTS >600 SLAB BASES AND APRONS
EARTHWORKS: FINAL SURFACE AND SEDIMENT & EROSION				12301-KFP2-614	B	PLAN SHEET 5		S.D 311	A	AUTOMATIC AIR RELEASE VALVE INSTALLATION DETAILS				
12301-KFP2-070	D	PLAN SHEET 1		12301-KFP2-617	B	DETAIL SHEET 1		S.D 312	C	TYPICAL VALVE INSTALLATION DETAILS				
12301-KFP2-071	C	LONG & CROSS SECTION OF SWALE		STORMWATER: PROFILES		S.D 320	C	PROPERTY SERVICES CONNECTION TO MAIN		S.D R0710-01 TO S.D R0710-25	-	R0710 SAFETY BARRIER SERIES - SEMI-RIGID		
EARTHWORKS: TOPSOIL SECTION				12301-KFP2-620	E	SHEET 1		S.D 341	E				TRENCH DRAINAGE BULKHEADS & TRENCH STOPS	
12301-KFP2-075	B	DETAIL		12301-KFP2-621	F	SHEET 2		S.D 242	C				DN50 & DN80 AUTOMATIC AIR RELEASE VALVE FOR USE IN DIFFICULT TO ACCESS LOCATIONS OR SPECIFIC APPLICATIONS	
EARTHWORKS: COMBINED SERVICES				12301-KFP2-622	E	SHEET 3		S.D 501	C	EROSION & SILTATION PREVENTION DEVICES SHEET 1		S.D R0730-01 TO S.D R0730-08	-	R0730 SAFETY BARRIER SERIES - TERMINALS
12301-KFP2-090	B	PLAN SHEET 1		12301-KFP2-623	E	SHEET 4		S.D 502	B	EROSION & SILTATION PREVENTION DEVICES SHEET 2				
12301-KFP2-091	B	PLAN SHEET 2		STORMWATER: STRUCTURE DETAILS		STRUCTURAL ARTS DRAWINGS								
12301-KFP2-095	A	TYPICAL SECTIONS OF SERVICES SHEET 01		12301-KFP2-640	F	SHEET 1		EMAW-S100		0	TYPICAL WALL PENETRATION REINFORCING DETAILS			
ROADWORKS: PLAN				STORMWATER: STORMWATER CONCRETE ACCESS PATH		EMAW-S101						0	TYPICAL WALL AND BASE SECTION	
12301-KFP2-100	C	SHEET 1		12301-KFP2-650	B	STORMWATER ACCESS TO BASIN		EMAW-S102		0	TYPICAL PIT ROOF SLAB AND MANHOLE PLAN			
12301-KFP2-101	C	SHEET 2		12301-KFP2-651	A	STORMWATER ACCESS LONGSECTIONS		EMAW-S103		0	TYPICAL PIT ROOF SLAB WITH SLAB PLAN			
ROADWORKS: DETAILS				STORMWATER: BASIN		EMAW-S110						0	PIT WALL BEAM PLANS	
12301-KFP2-120	C	SHEET 1		12301-KFP2-660	B	BASIN PLAN		EMAW-S111		0	TEMPORARY INLET PIT WALL BEAM PLANS			
12301-KFP2-121	C	SHEET 2		12301-KFP2-661	C	BASIN SECTIONS		EMAW-S120		0	01/262 AND 03/022 HEAD WALL DETAILS			
ROADWORKS: KERB LONGITUDINAL SECTIONS				STORMWATER: SWALE		KFP1-S001						C	SANDSTONE RETAINING WALL	
12301-KFP2-122	B	KERB LONGITUDINAL SECTIONS SHEET 1		12301-KFP2-664	C	SWALE TYPE DETAILS SHEET 1		WATER SERVICE OF AUSTRALIA STD DRAWINGS						
12301-KFP2-123	C	KERB LONGITUDINAL SECTIONS SHEET 2		12301-KFP2-665	A	SWALE TYPE DETAILS SHEET 2		SEW 1200		V2.1	SOIL CLASSIFICATION GUIDELINES AND ALLOWABLE BEARING PRESSURES FOR BULKHEADS			
12301-KFP2-124	C	KERB LONGITUDINAL SECTIONS SHEET 3		STORMWATER: CATCHMENT				WAT 1205		V2.2	THRUST BLOCK DETAILS CONCRETE BLOCKS			
ROADWORKS: SWEPTH PATHS				12301-KFP2-670	B	PLAN		WAT 1207		V2.2	THRUST AND ANCHOR BLOCKS GATE VALVES AND VERTICAL BENDS			
12301-KFP2-160	B	PASSANGER CAR		STORMWATER: CALCULATION TABLES				WAT 1208		V2.1	RESTRAINED JOINT SYSTEM DN100 TO DN375 DI MAINS			
12301-KFP2-161	B	12.5m TRUCK		12301-KFP2-680	A	MINOR STORM EVENT		SPS 1602		V1.1	SCOUR ARRANGEMENT PUMP AND GRAVITY			
12301-KFP2-162	A	14.5m BUS-SHEET 01		12301-KFP2-681	A	MAJOR STORM EVENT		SPS 1603		V1.1	SCOUR ARRANGEMENTS PRESSURE MAINS ≤300 ≤2.2 INVERT			
12301-KFP2-163	A	14.5m BUS-SHEET 02		WATER: RETICULATION PLAN				SPS 1605		V1.1	GAS RELEASE ARRANGEMENT PRESSURE MAINS ≤DN 300			
ROADWORKS: LONGITUDINAL SECTIONS				12301-KFP2-700	C	SHEET 1								
12301-KFP2-200	C	ROAD 27 SHEET 1		WATER: PROFILES										
12301-KFP2-201	B	ROAD 27 & ROAD 09 SHEET 2		12301-KFP2-720	C	PLAN SHEET 1 OF 2								
12301-KFP2-202	C	ROAD 10 & ROAD 57 SHEET 3		12301-KFP2-721	B	PLAN SHEET 2 OF 2								
ROADWORKS: CROSS SECTIONS				WATER: WATER VALVE DETAILS										
12301-KFP2-300	B	ROAD 27 SHEET 1		12301-KFP2-741	A	SCOUR VALVE DETAILS								
12301-KFP2-301	B	ROAD 27 SHEET 2		WATER: THRUST BLOCKS										
12301-KFP2-302	C	ROAD 27 & ROAD 10 SHEET 3		12301-KFP2-744	B	TYPICAL HORIZONTAL THRUST BLOCK DETAIL								
12301-KFP2-303	B	ROAD 09 & ROAD 57 SHEET 4		12301-KFP2-745	B	TYPICAL VERTICAL THRUST BLOCK DETAIL								
ROADWORKS: INTERSECTION GRADING DETAILS				12301-KFP2-746	B	TYPICAL VALVE THRUST								
12301-KFP2-400	C	SHEET 1												
12301-KFP2-401	A	SHEET 2												
12301-KFP2-402	D	SHEET 3												
12301-KFP2-403	D	SHEET 4												
12301-KFP2-404	B	SHEET 5												
ROADWORKS: LINEMARKING AND SIGNAGE														
12301-KFP2-420	B	PLAN SHEET 01												
12301-KFP2-421	B	PLAN SHEET 02												
RETAINING WALL														
12301-KFP2-450	B	PLAN												
12301-KFP2-451	B	DETAILS												
12301-KFP2-452	C	SECTION SHEET 1												
SEWER: RETICULATION PLAN														
12301-KFP2-500	B	NOTES AND DETAILS												
12301-KFP2-501	B	PLAN SHEET 1												
12301-KFP2-502	A	PLAN SHEET 2												
SEWER: PROFILES														
12301-KFP2-530	B	PROFILES SHEET 1												
12301-KFP2-531	B	PROFILES SHEET 2												
12301-KFP2-532	B	PROFILES SHEET 3												
SEWER: SEWER VALVE DETAILS														

EARLY WORKS EXTENT

Subdivision Works Certificate

Certificate Number: 230584SW10

Issuing Officer: Christopher Borg

Registration Number: BDC3330

These plans/specifications form part of the certificate issued:13/05/24



DRAWING NUMBER
12301-KFP2-001

AMEND.
E

y:\1231 - leas developments - ply kit\01 - kings forest\KFP2\engineering drawings\Current\12301-KFP2-002.dwg, GENERAL NOTES, 1/05/2024 4:48:40 PM, 12

GENERAL

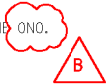
1. **CONTRACT SPECIFICATIONS**
ALL DRAWINGS ARE TO BE READ IN CONJUNCTION WITH THE CONTRACT SPECIFICATION.
2. **SETOUT**
SURVEY SETOUT INFORMATION HAS BEEN ESTABLISHED ON SITE BY THE PRINCIPAL'S SURVEYOR TO ENABLE THE CONTRACTOR TO ACCURATELY SETOUT THE WORKS TO THE CO-ORDINATES SHOWN. SETOUT INFORMATION SHALL NOT BE OBTAINED BY SCALING FROM THESE DRAWINGS.
3. **DATUM**
LEVELS SHOWN ARE TO A.H.D.
4. **EXISTING SERVICES - External Works**
THE LOCATIONS OF ALL EXISTING SERVICES HAVE BEEN CONFIRMED BY VACUUM EXCAVATIONS AND SURVEY. THE CONTRACTOR PRIOR TO CONSTRUCTION COMMENCING SHALL CONFIRM THE LOCATION OF ALL SERVICES AND REPORT ANY DISCREPANCIES TO THE SUPERINTENDENT. IT IS THE CONTRACTOR'S RESPONSIBILITY TO CONTACT THE RELEVANT AUTHORITIES AND TO ENSURE THAT THE EXISTING SERVICES ARE NOT DAMAGED OR DISTURBED IN ANY WAY.
a. ALL MATERIALS ARISING FROM ROADS AND SERVICES ARE TO BE COMPACTED TO FUTURE STAGES, TO LEVEL 1 OR IF DIRECTED BY THE SUPERINTENDENT SHALL BE TRUCKED TO A LICENSED TIP.
b. CONTRACTOR IS RESPONSIBLE TO ENSURE ANY ELECTRONIC DATA FILES MATCH THE DRAWINGS
5. **SITE ARRANGEMENTS**
a. HOURS OF WORKS ARE TO BE IN 7:00am TO 6:00pm MONDAY - FRIDAY, 8:00am TO 5:00pm SATURDAY, NO WORK SUNDAYS OR PUBLIC HOLIDAYS.
b. COMPLAINTS ARE TO BE REGISTERED AND DEALT WITH PROMPTLY IN A PROFESSIONAL MANNER.
c. COMMUNITY LIAISON -DETAILS OF THE CONTACT PERSON AND TELEPHONE NUMBER SHALL BE CLEARLY DISPLAYED AT THE SITE ENTRY. A SIGN IS TO BE ERCTED AT THE ENTRY OF THE SITE TO CLEARLY ADVISE THE COMMUNITY LIAISON OFFICER'S DETAILS AND CONTACT NUMBER. THESE DETAILS ARE TO BE DOCUMENTED IN THE CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN.
6. **SAFETY MANAGEMENT**
PRIOR TO THE COMMENCEMENT OF WORKS, A SITE-SPECIFIC SAFETY MANAGEMENT PLAN AND SAFE WORK METHODS FOR THE SUBJECT SITE HAVE BEEN PREPARED AND PUT IN PLACE IN ACCORDANCE WITH TWEED SHIRE COUNCIL GUIDELINES.
7. **ABORIGINAL HERITAGE**
ABORIGINAL CULTURAL HERITAGE PROGRAM -RECORDS ARE TO BE KEPT OF WHICH STAFF / CONTRACTORS WERE INDUCTED UNDER THE ABORIGINAL CULTURAL HERITAGE PROGRAM FOR THE DURATION OF THE PROJECT.

EARTHWORKS/ROADWORKS

1. **PAVEMENT**
a. BEFORE THE COMMENCEMENT OF THE RELEVANT STAGES OF ROAD CONSTRUCTION, PAVEMENT DESIGN DETAIL INCLUDING REPORTS FROM A REGISTERED NATA CONSULTANT SHALL BE SUBMITTED TO PRINCIPAL CERTIFIED FOR APPROVAL AND DEMONSTRATING.
b. UPON RECEIPT OF THE CRB RESULTS THE ENGINEER HAS DESIGNED THE PAVEMENT IN ACCORDANCE WITH COUNCIL'S DEVELOPMENT DESIGN SPECIFICATION, D2.
c. THE PAVEMENT MATERIALS TO BE USED, MUST COMPLY WITH THE SPECIFICATIONS TABLED IN TWEED SHIRE COUNCIL'S CONSTRUCTION SPECIFICATIONS, C242-C245, C247, C248 AND C255 (AS IN FORCE AT THE DATE OF THIS APPROVAL).
d. THAT SITE FILL AREAS MUST BE COMPACTED TO THE SPECIFIED STANDARD.
e. THAT SUPERVISION OF BULK EARTHWORKS MUST BE TO LEVEL 1 AND FREQUENCY OF FIELD DENSITY TESTING COMPLETED IN ACCORDANCE WITH TABLE 8.1 OF AS 3798-2007, DURING THE RELEVANT STAGES OF ROAD CONSTRUCTION, TESTS SHALL BE UNDERTAKEN BY A REGISTERED NATA GEOTECHNICAL FIRM. A REPORT INCLUDING COPIES OF TEST RESULTS SHALL BE SUBMITTED TO THE PRINCIPAL CERTIFIER PRIOR TO THE PLACEMENT OF THE WEARING SURFACE DEMONSTRATING:
- THAT THE PAVEMENT LAYERS HAVE BEEN COMPACTED IN ACCORDANCE WITH COUNCIL'S DEVELOPMENT DESIGN AND CONSTRUCTION SPECIFICATIONS. (AS IN FORCE AT THE DATE OF THIS APPROVAL).
- THAT PAVEMENT TESTING HAS BEEN COMPLETED IN ACCORDANCE WITH TABLE 8.1 OF AS 3798 INCLUDING THE PROVISION OF A CORE PROFILE FOR THE FULL DEPTH OF THE PAVEMENT.
f. ALL PIPEWORK AND EXCAVATION RATES ARE TO INCLUDE DE-WATERING AND EXCAVATION THROUGH INDURATED SAND (COFFEE ROCK).
2. **SOILS**
ALL WORKS THAT INVOLVE THE DISTURBANCE OF SOILS SHALL BE CARRIED OUT IN ACCORDANCE WITH THE APPROVED ACID SULFATE MANAGEMENT PLAN, AS REQUIRED BY CONDITION 17 OF MP08_0194.
3. **MAINTAIN WORKS**
a. THE SURROUNDING ROAD CARRIAGEWAYS ARE TO BE KEPT CLEAN OF ANY MATERIAL CARRIED ONTO THE ROADWAY BY CONSTRUCTION VEHICLES. ANY WORK CARRIED OUT BY COUNCIL TO REMOVE MATERIAL FROM THE ROADWAY WILL BE TAKEN OUT OF THE 1% COMPLIANCE BOND.
b. COMPULSORY INSPECTIONS ARE REQUIRED THROUGHOUT THE WORKS AS PER CONDITION 88 OF MP08_0194.

CONSTRUCTION SEQUENCE/SILT MANAGEMENT PROGRAM

1. **CONSTRUCTION - NOISE**
CONSTRUCTION NOISE MANAGEMENT SHALL COMPLY WITH THE APPROVED NOISE AND VIBRATION MANAGEMENT PLAN AND CONDITIONS 79 & 80 OF MP08_0194.
2. **CONSTRUCTION - SEDIMENT**
EROSION AND SEDIMENT CONTROL SHALL COMPLY WITH THE APPROVED EROSION AND SEDIMENT CONTROL PLAN AND CONDITION 78 OF MP08_0194.
3. **CONSTRUCTION - MACHINERY**
THE USE OF CRUSHING PLANT MACHINERY, MECHANICAL SCREENING OR MECHANICAL BLENDING OF MATERIALS IS NOT APPROVED. SEPARATE APPROVAL MUST BE OBTAINED FOR ANY SUCH USE OF THE SITE.
4. **AREA OF WORKS**
NO MORE THAN 5Ha OF AREA IS TO BE DISTURBED AT ANY TIME ONO.



Subdivision Works Certificate

Certificate Number: 230584SW10
Issuing Officer: Christopher Borg
Registration Number: BDC3330
These plans/specifications form part of the certificate issued:13/05/24



PROJECT NAME

KINGS FOREST

KINGS FOREST PARKWAY 2

REAL PROPERTY DESCRIPTION
Lot 2 on DP1270901
PARISH OF CUDGEN.
COUNTY OF ROUS.

CLIENT

KINGS FOREST ESTATES PTY LTD

ISSUES	DATE	
TENDER	09-02-23	
COUNCIL	18-07-22	
CONSTRUCTION	06-06-23	

B	28-02-23	NOTE AMENDED
A	18-07-22	COUNCIL ISSUE
PRE DATE	AMENDMENT	

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GENERAL NOTES



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Postal Address
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Southport QLD 4215

Gold Coast Office
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Southport QLD 4215

DESIGNED RB	BRAWN JB
APPROVED <i>RB</i>	NER 916726
DATE 18-07-22	

DRAWING NUMBER	AMEND.
12301-KFP2-002	B



EXISTING PROPERTY LINE

EXISTING KOALA EXCLUSION FENCE

EXISTING TEMPORARY FENCE

EXISTING TEMPORARY NO-GO FENCE

PROPOSED TEMPORARY FENCE

ACCESS GATE IN ACCORDANCE WITH TSC STD DWG S.D.020

ECOLOGICAL BUFFER

PROPOSED GUARDRAIL (W BEAM)

PROPOSED PEDESTRIAN FENCE



SECTIONS IN THE AREA OF THE ECOLOGICAL BUFFER SHOULD BE CONSTRUCTED IN ACCORDANCE WITH THE CIVIL CONSTRUCTION DRAWINGS AND JWA ECOLOGICAL CONSULTANTS SPECIFICATIONS.



EXISTING TEMPORARY NO
GO FENCE TO BE
MAINTAINED AND KEPT
OUT OF AT ALL TIMES.

EXISTING TEMPORARY —
KOALA FENCE TO BE
MAINTAINED AND
REINSTATED IF REQUIRING
TEMPORARY REMOVAL
DURING CONSTRUCTION.

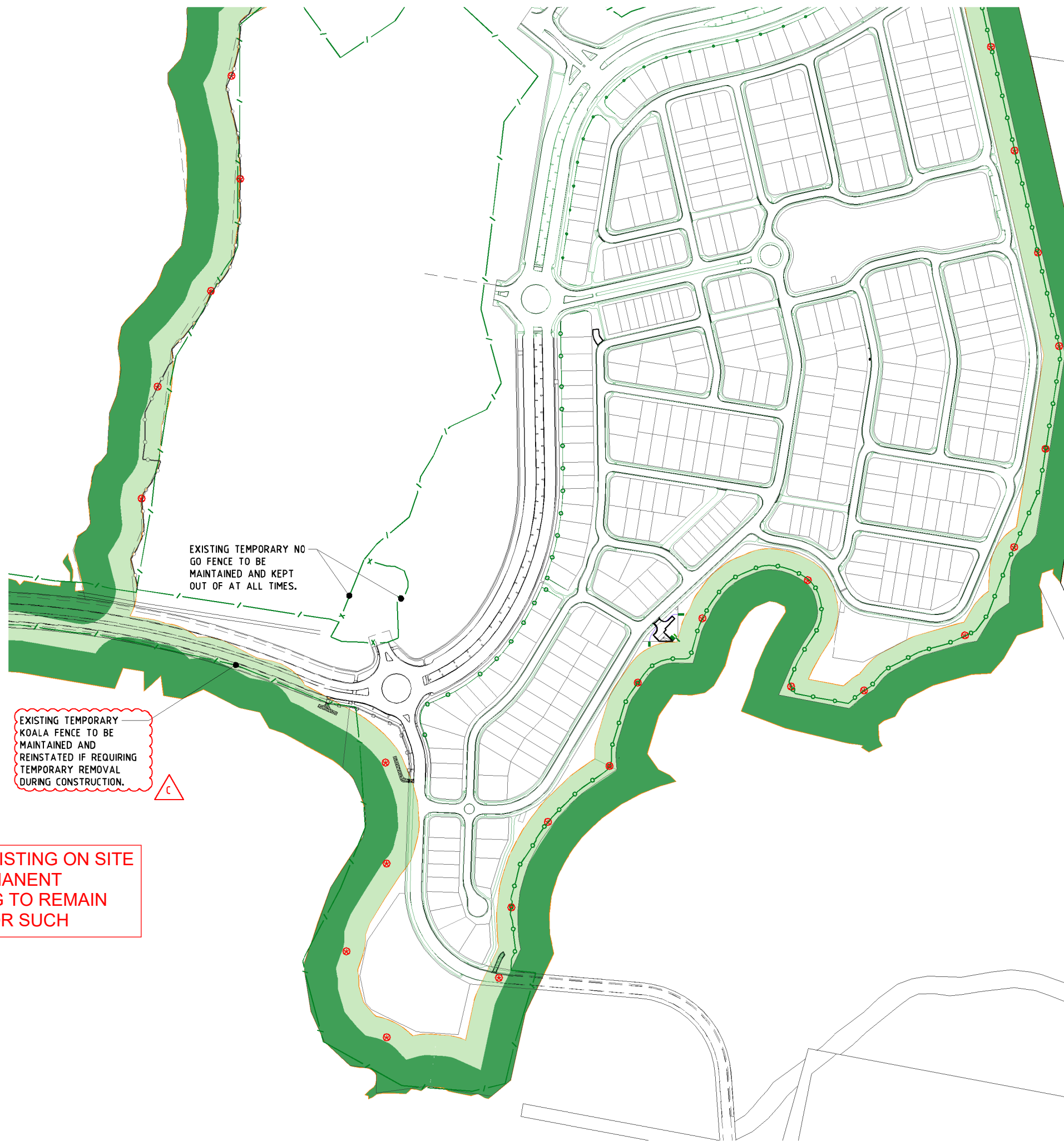
KOALA FENCING IS NOTED AS EXISTING ON SITE
IN EITHER TEMPORARY OR PERMANENT
POSITION AND NATURE. FENCING TO REMAIN
AS PER PREVIOUS APPROVAL FOR SUCH

Certificate Number: 230584SW10

Issuing Officer: Christopher Borg

Registration Number: BDC3330

These plans/specifications form part of the certificate issued: 13/05/24



KINGS FOREST
PARKWAY 2

REAL PROPERTY DESCRIPTION
Lot 2 on DP1270901
PARISH OF CUDGEN.
COUNTY OF ROUS.

CLIENT
**KINGS FOREST
ESTATES PTY LTD**



0 20 40 60 80 100m
Scale 1:2000 - A1 (1:4000 - A3)

ISSUES	DATE	
TENDER	09-02-23	
COUNCIL	18-07-22	
CONSTRUCTION	04-04-23	

C	24-04-24	TEMP KOALA FENCE NOTE ADDED			
B	28-02-23	LEGEND AND GUARDRAIL AMENDED			
A	18-07-22	COUNCIL ISSUE			
P R E	D A T E		A M E N D M E N T		

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+GILBERT SUTHERLAND

D R A W I N G T I T L E

FENCING PLAN



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 mortons@urbansolutions.net.au
 www.urbansolutions.net.au
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Fax 07 5571 1088

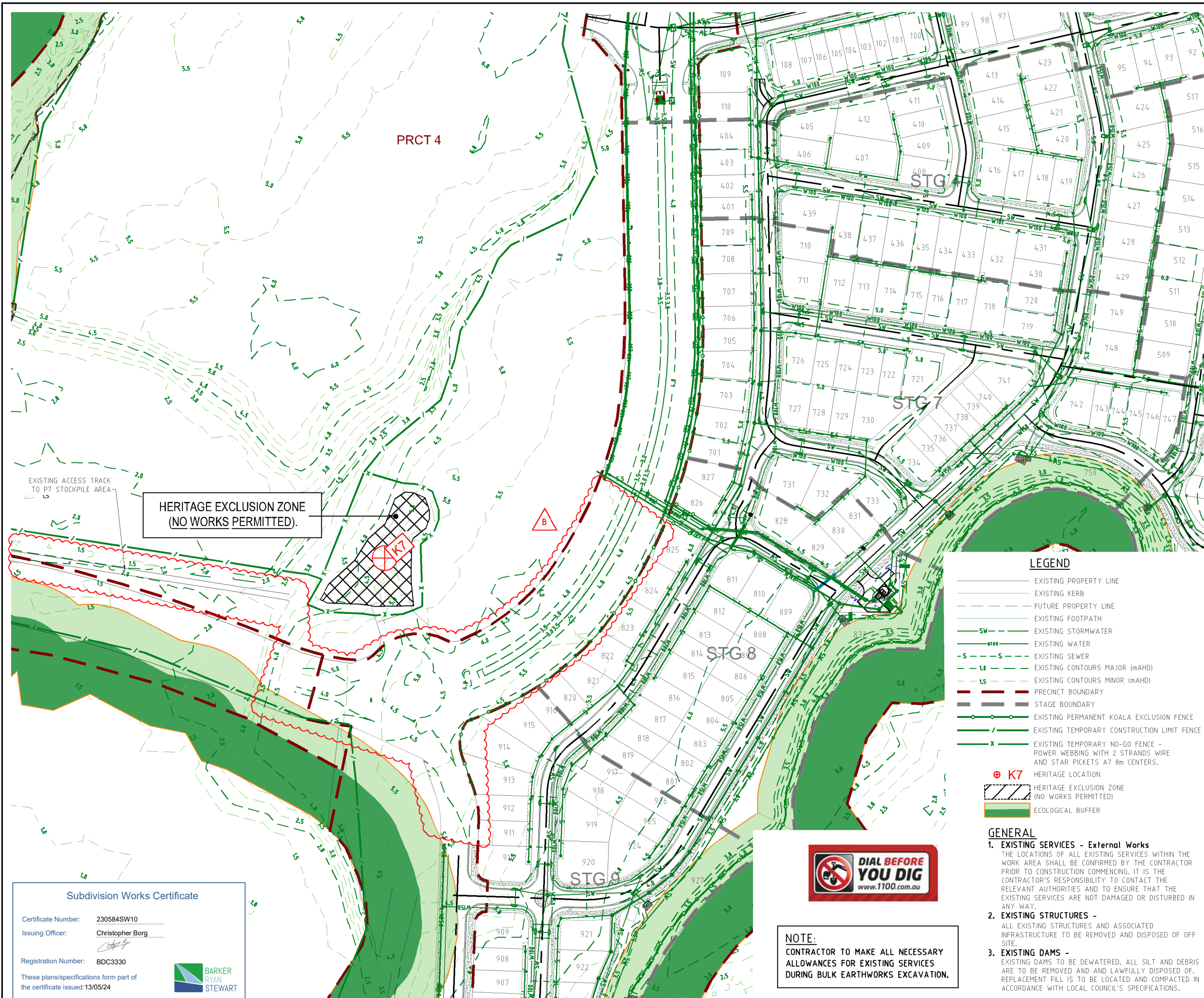
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 Southport QLD 4215

Gold Coast Office
 Suite 9, 19 Short St
 Southport QLD 4215

DESIGNED	RB	DRAWN	JB
APPROVED		NER	906726
		DATE	18-07-22

DRAWING NUMBER
12301-KFP2-010

E N D.
C



PROJECT NAME

KINGS FOREST

KINGS FOREST PARKWAY 2

REAL PROPERTY DESCRIPTION
Lot 2 on DP1270981
PARISH OF CUDGEN,
COUNTY OF ROUS.

CLIENT

KINGS FOREST ESTATES PTY LTD

010524

180722

040423

890223

180722

040423

ISSUES

DATE

TENDER

89-02-23

COUNCIL

18-07-22

CONSTRUCTION

04-04-23

PRE DATE

AMENDMENT

8

01-05-24

ACCESS TRACK ADDED & CONTOURS AMENDED

A

18-07-22

COUNCIL ISSUE

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RPS

GILBERT SUTHERLAND

DRAWING TITLE

EXISTING FEATURES PLAN

MORTONS

urbansolutions

Urban & Regional Planning

Civil Engineering

Project Coordination

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APPROVED

NER 906726

DATE 18-07-22

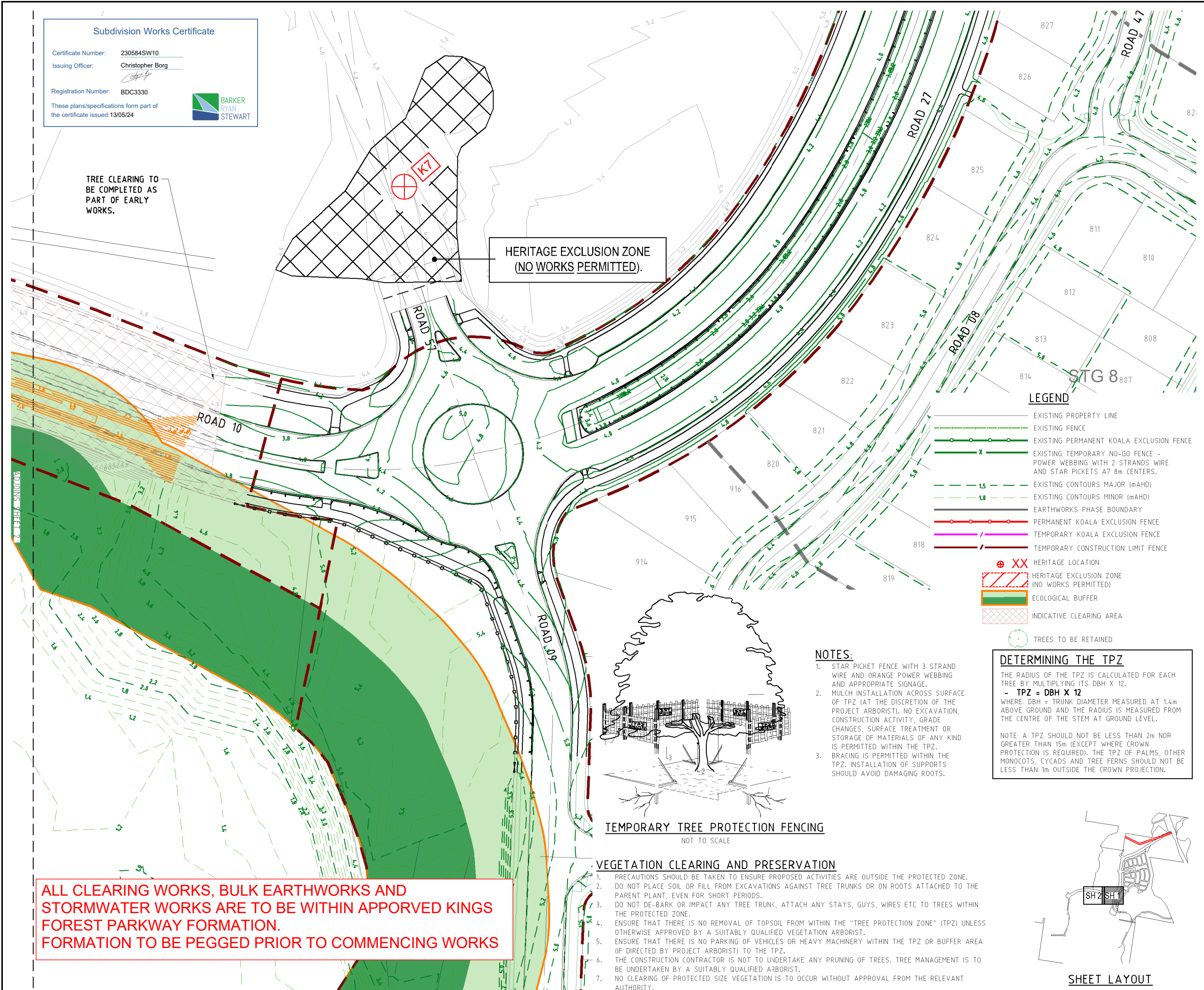
DRAWING NUMBER

12301-KFP2-020

AMEND.

B

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PROJECT NAME
KINGS FOREST
KINGS FOREST PARKWAY 2

REAL PROPERTY DESCRIPTION
Lot 2 on DP1270981
PARISH OF CUDGEN,
COUNTY OF ROUS.

CLIENT
KINGS FOREST ESTATES PTY LTD

Scale 1:500 - A1 (1:1000 - A3)

ISSUES
TENDER --
COUNCIL --
CONSTRUCTION --

DATE
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--
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PRE DATE
21-03-24

AMENDMENT
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ASSOCIATED CONSULTANTS

RPS

JWA
Ecological Consultants

DRAWING TITLE
TREE CLEARING AND PRESERVATION PLAN SHEET 1

MORTONS
urbansolutions
Urban & Regional Planning
Civil Engineering
Project Coordination

MUS Pty Ltd T/As:
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DESIGNED RB
DRAWN JB
APPROVED RB
NEE 916726
DATE 18-07-22

DRAWING NUMBER
12301-KFP2-030

AMEND.
A



Subdivision Works Certificate

Certificate Number:

230584SW10

Issuing Officer:

Christopher Borg

Registration Number:

BDC3330

These plans/specifications form part of the certificate issued:13/05/24

BARKER
RYAN
STEWART

PROJECT NAME

KINGS
FOREST

KINGS FOREST
PARKWAY 2

REAL PROPERTY DESCRIPTION

Lot 2 on DP1270901
PARISH OF CUDGEN,
COUNTY OF ROUS.

CLIENT

KINGS FOREST
ESTATES PTY LTD


NORTH


0 5 10 15 20 25m
Scale 1:500 - A1 (1:1000 - A3)

ISSUES	DATE	
TENDER	--	
COUNCIL	--	
CONSTRUCTION	--	

A	21-03-24	COUNCIL ISSUE
PRE DATE		AMENDMENT

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DRAWING TITLE

TREE CLEARING
AND PRESERVATION
PLAN
SHEET 1

MORTONS
urbansolutions

Urban & Regional Planning
Civil Engineering
Project Coordination

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APPROVED		NER	916726
DRAWING NUMBER		DATE 18-07-22	
12301-KFP2-031		AMEND.	
		A	

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Certificate Number: 230584SW10

Issuing Officer: Christopher Borg

Registration Number: BDC3330

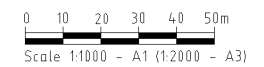
These plans/specifications form part of the certificate issued: 13/05/24



KINGS FOREST
PARKWAY 2

REAL PROPERTY DESCRIPTION
Lot 2 on DP1270901
PARISH OF CUDGEN.
COUNTY OF ROUS.

CLIENT
**KINGS FOREST
ESTATES PTY LTD**



ISSUES	DATE	
TENDER	89-02-23	
COUNCIL	18-07-22	
CONSTRUCTION	04-04-23	

C	01-05-24	DETAIL AMENDED			
B	22-03-24	LONG SECTION NOTES ADDED			
A	08-03-23	COUNCIL ISSUE			
P R E	D A T E		A M E N D M E N T		

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D R A W I N G T I T L E

TEMPORARY
SWALE LONGITUDINAL
& TYPICAL CROSS
SECTIONS

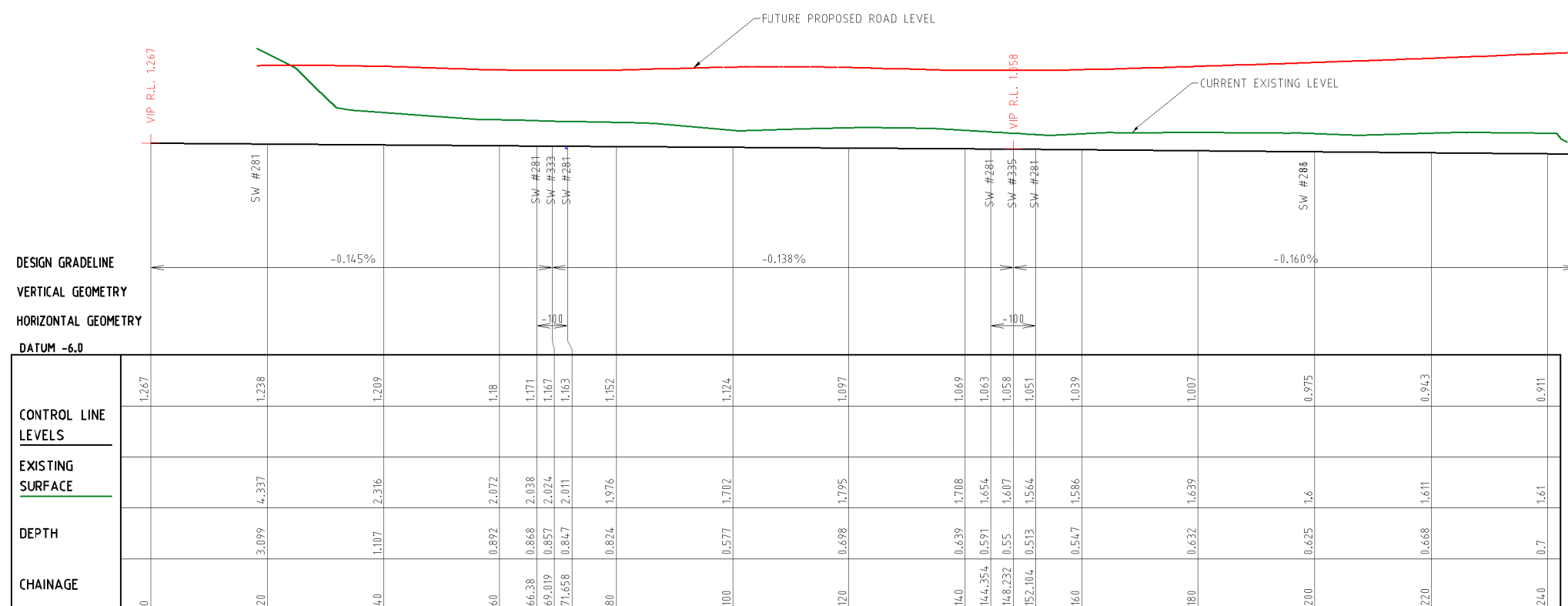
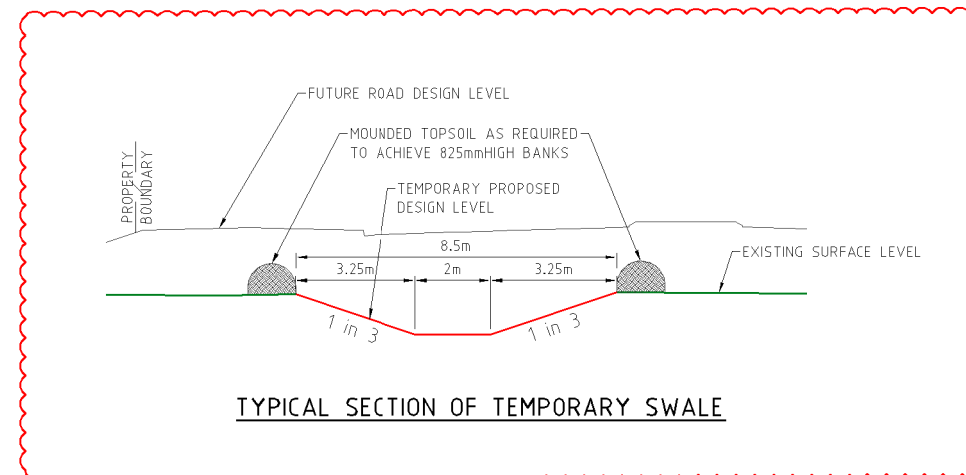


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DESIGNED	RB	DRAWN	JB
APPROVED	<i>[Signature]</i>	NER	906726
		DATE	18-07-22
DRAWING NUMBER			AMEND.
12301-KFP2-071			C



LONGITUDINAL SECTION

LEGEND

- EXISTING KERB (INVERT)
— EXISTING PROPERTY LINE
— SW — SW — EXISTING STORMWATER
— 1.0 — EXISTING CONTOURS
— EXISTING RETAINING WALL
— FUTURE KERB
— FUTURE PROPERTY LINE
— FUTURE RETAINING WALL
— SW — FUTURE STORMWATER
— SITE BOUNDARY
— PRECINCT BOUNDARY
— STAGE BOUNDARY
— CONTROL LINE / CENTER OF ROAD
— PROPOSED KERB (INVERT)
— PROPOSED KERB (LIP & BACK)
— PROPOSED PROPERTY LINE
— PROPOSED RETAINING WALL
— 1.0 — DESIGN CONTOURS
— SW — PROPOSED STORMWATER
● MANHOLE
— KERB INLET (ON GRADE) PIT
— KERB INLET (SAG) PIT
— HEADWALL
— PROPOSED BASIN
— SCOUR PROTECTION
— EXISTING SCOUR PROTECTION
— 10/001 DRAINAGE PIT & LINE NO.
— EXISTING PERMANENT KOALA EXCLUSION FENCE
— EXISTING TEMPORARY CONSTRUCTION LIMIT FENCE
— X — EXISTING TEMPORARY NO-GO FENCE - POWER WEBBING WITH 2 STRANDS WIRE AND STAR PICKETS AT 8m CENTERS.
— PROPOSED GUARDRAIL (W BEAM)
— PROPOSED PEDESTRIAN FENCE
— ECOLOGICAL BUFFER
— 41.065 CENTRELINE CHAINAGE

REFERENCE POINT LOCATION FOR DRAINAGE STRUCTURES

STRUCTURE TYPE	HORIZONTAL CONTROL (Reference Point Location)	VERTICAL CONTROL (Reference Level)
MANHOLE	 CENTRE OF MANHOLE	FINISHED SURFACE LEVEL
GULLY PIT	 LIP AT CENTRE OF PIT	FINISHED SURFACE LEVEL (LIP OF CHANNEL)
HEADWALL	 INTERSECTION OF HEADWALL FACE & PIPE CENTRELINE	INVERT LEVEL

REFER TO DWG SERIES 640 FOR ALL DRAINAGE STRUCTURE SETOUT AND/OR CUSTOM DETAILS.

EARLY WORKS EXTENT

SHEET LAYOUT

STORMWATER

- STORMWATER INFRASTRUCTURE TO BE INSTALLED IN ACCORDANCE WITH TWEED SHIRE COUNCIL CONSTRUCTION SPECIFICATIONS AND STANDARD DRAWINGS.
- ALL FIELD GULLIES SHALL CONTAIN A 150mm DIA STUB 600mm BELOW GRADE LEVEL FOR FUTURE ROOFWATER DRAINAGE.
- MANHOLES AND FIELD INLETS TO BE IN ACCORDANCE WITH TWEED SHIRE COUNCIL SD 106 OR STRUCTURAL DRAWINGS (STRUCTURAL DRAWINGS TAKE PRECEDENCE).
- OUTLET HEADWALLS TO BE IN ACCORDANCE WITH LOCAL COUNCIL STANDARD DRAWINGS.
- ALL HEADWALLS WITH A HEIGHT GREATER THAN 900mm HIGH REQUIRE INSTALLATION OF PEDESTRIAN SAFETY FENCES.
- ALL PIPES 600mm DIA OR LESS TO BE SOCKETED CONCRETE PIPES WITH RUBBER RING JOINTS. PIPES GREATER THAN 600mm DIA SHALL BE BUTT OR FLUSH JOINTED TO TSC DS 09 2.
- ALL ALLOTMENTS TO BE GRADED SUCH THAT FUTURE ROOFWATER DRAINAGE DISCHARGES TO KERB OR TO PIPED DRAINAGE SYSTEM.
- ALL PIPE 375mm DIA AND GREATER SHALL BE CONSTRUCTED USING SRC PIPES.
- FOR SETOUT DETAILS REFER TO 640 SERIES DRAWINGS (PROFILES AND PIT DETAILS).
- GULLY PITS TO BE IN ACCORDANCE WITH TWEED SHIRE COUNCIL SD 103 AND SD 104.
- LOTS WHICH CAN DRAIN OVERLAND FLOW TO THE STREET SWALE / DRAINAGE WITHOUT FLOWING THROUGH ADJOINING PROPERTIES NEED TO PROVIDE FOR Q100 OVERLAND FLOW TO THE ROAD.
- LOT EARTHWORKS DURING BUILDING CONSTRUCTION MUST NOT CHANGE FLOW PATH DIRECTION UNLESS IT IS REPLACED WITH ANOTHER FLOW PATH DRAINING TO THE ROAD SWALE / DRAINAGE.
- THE CONTRACTOR IS TO INCLUDE ROCK EXCAVATION AS PART OF THEIR STORMWATER RATE.
- ALL PIPEWORK AND EXCAVATION RATES ARE TO INCLUDE DE-WATERING AND EXCAVATION THROUGH INDURATED SAND (COFFEE ROCK).
- PIPE CLASS - PIPE CLASSES/TRENCH BEDDING SHOWN ON THE DRAWINGS ARE SUBJECT TO THE CONTRACTORS PREFERRED INSTALLATION METHOD. THE CONTRACTOR IS RESPONSIBLE FOR INSTALLING THE APPROPRIATE PIPE CLASSES AND BEDDING.
- KERB ADAPTORS ARE TO BE INSTALLED TO AUTHORITY'S REQUIREMENTS.
- SUBSOIL DRAINS TO BE INSTALLED UPSTREAM OF EACH PIT OR HEADWALL IN ACCORDANCE WITH TWEED SHIRE COUNCIL CONSTRUCTION AND DESIGN SPECIFICATIONS.

ALL CULVERTS TO BE CONSTRUCTED TO C2 EXPOSURE CLASSIFICATION

STORM REFERENCING STANDARDS

PRECAST CULVERT HEADWALLS (DRAWING 3 OF 3)	T.M.R S.D 1243 'HEADWALL CONNECTIONS FOR BOX CULVERTS HEIGHT >1200'
R C BOX CULVERTS AND SLAB LINK BOX CULVERTS (DRAWING 1)	T.M.R S.D 1250 'CULVERTS HEIGHT >600 CONSTRUCTION OF SLAB BASES AND APRONS'
R C BOX CULVERTS AND SLAB LINK BOX CULVERTS (DRAWING 2)	T.M.R S.D 1250 'CULVERTS HEIGHT >600 CONSTRUCTION OF SLAB BASES AND APRONS'
R C BOX CULVERTS AND SLAB LINK BOX CULVERTS (DRAWING 3)	T.M.R S.D 1250 'CULVERTS HEIGHT >600 INSTALLATION OF PRECAST UNITS AND CONSTRUCTION OF HEADWALLS & WINGWALLS'

Subdivision Works Certificate

Certificate Number: 230584SW10
Issuing Officer: Christopher Borg
Registration Number: BDC3330

These plans/specifications form part of the certificate issued: 13/05/24



ENSURE MANHOLE PENETRATION IS LOCATED TOWARDS THE CENTRE OF TH.

ONLY ITEMS IN ORANGE HIGHLIGHT FORM PART OF THIS SUBDIVISION WORKS CERTIFICATE
NO OTHER WORKS ARE APPROVED

ADJOINS SHEET 2

PROJECT NAME

KINGS FOREST

KINGS FOREST PARKWAY 2

REAL PROPERTY DESCRIPTION
Lot 2 on DP1270901
PARISH OF CUDGEN.
COUNTY OF ROJUS.

CLIENT

KINGS FOREST ESTATES PTY LTD



0 5 10 15 20 25m
Scale 1:500 - A1 (1:1000 - A3)

ISSUES	DATE
TENDER	09-02-23
COUNCIL	18-07-22
CONSTRUCTION	04-04-23

F	01-05-24	NOTES ADDED
E	19-03-24	STORM D'S AMENDED
D	29-02-24	EARLY WORKS EXTENT
C	22-08-23	STORM WATER PIPES AMENDED
B	23-02-23	LEGEND & NOTE AMENDED
A	18-07-22	COUNCIL ISSUE

PRE DATE	AMENDMENT
----------	-----------

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ASSOCIATED CONSULTANTS



DRAWING TITLE

STORMWATER DRAINAGE PLAN SHEET 1

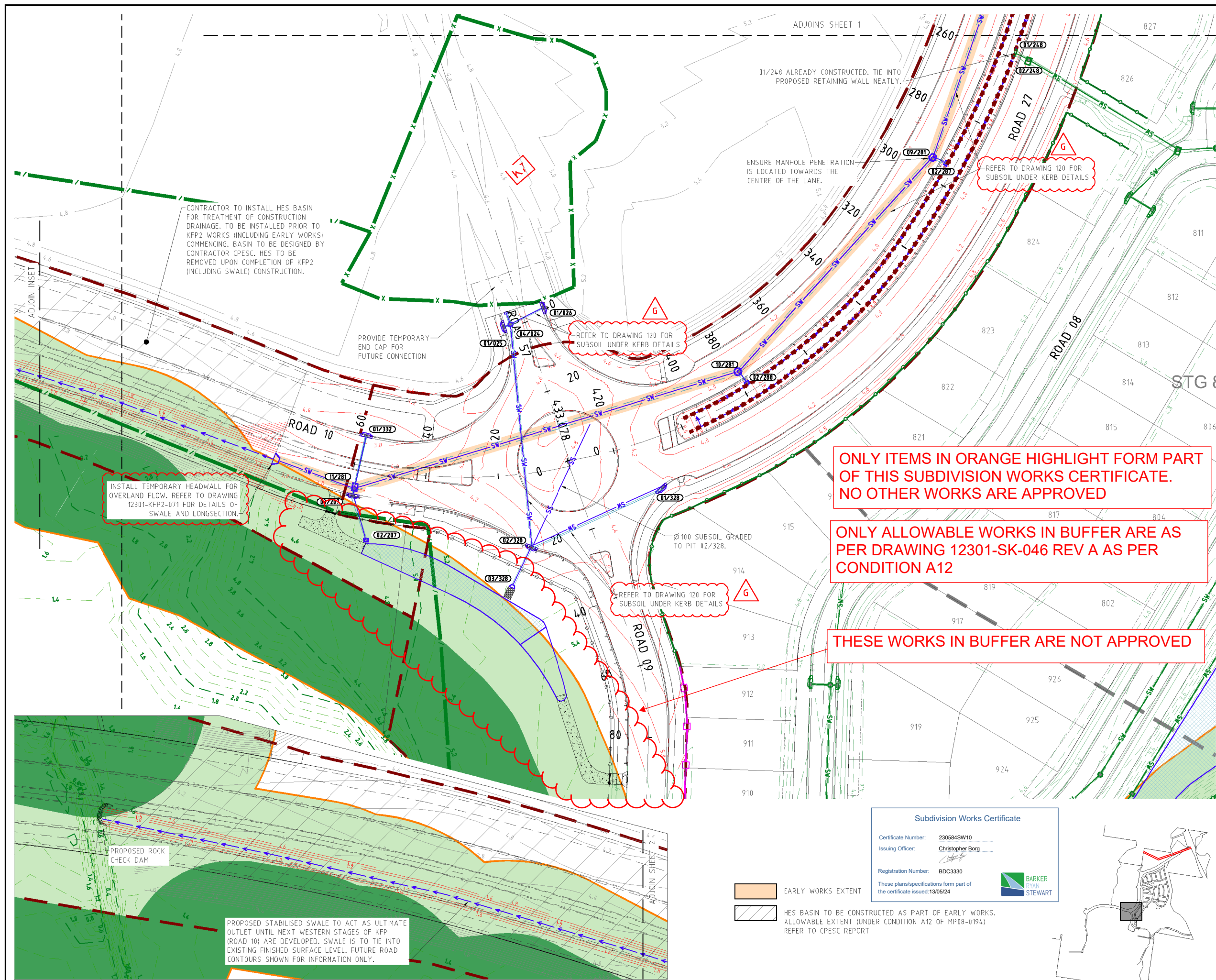
MORTONS
urbansolutions
Urban & Regional Planning
Civil Engineering
Project Coordination

MUS Pty Ltd T/As:
Mortons-Urban Solutions
ABN: 39 116 375 065
mortons@urbansolutions.net.au
www.urbansolutions.net.au
Tel: 07 5571 1099
Fax: 07 5571 1088

Postal Address
PO Box 2484
Southport QLD 4215

Gold Coast Office
Suite 9, 19 Short St
Southport QLD 4215

DESIGNED RB	DRAWN JB
APPROVED	NER 906726
DATE 18-07-22	
DRAWING NUMBER	
12301-KFP2-600	AMEND. F



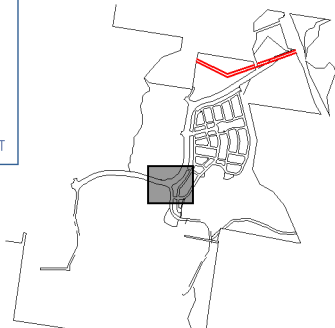
INSET - PROPOSED STABILISED SWALE

SCALE @A1 = 1:500

Subdivision Works Certificate	
Certificate Number:	230584SW10
Issuing Officer:	Christopher Borg
Registration Number:	BDC3330
These plans/specifications form part of the certificate issued: 13/05/24	

EARLY WORKS EXTENT

HES BASIN TO BE CONSTRUCTED AS PART OF EARLY WORKS. ALLOWABLE EXTENT (UNDER CONDITION A12 OF MP08-0194) REFER TO CPESC REPORT



SHEET LAYOUT

PROJECT NAME

KINGS FOREST

KINGS FOREST PARKWAY 2

REAL PROPERTY DESCRIPTION
Lot 2 on DP1270901
PARISH OF CUDGEN,
COUNTY OF ROUS.

CLIENT

KINGS FOREST ESTATES PTY LTD

0 5 10 15 20 25m
Scale 1:500 - A1 (1:1000 - A3)

ISSUES	DATE
TENDER	09-02-23
COUNCIL	18-07-22
CONSTRUCTION	04-04-23

	PRE DATE	AMENDMENT
G	26-03-24	NOTES ADDED
F	19-03-24	NOTES AMENDED
E	29-02-24	EARLY WORKS EXTEND
D	22-08-23	STORM WATER PIPES AMENDED
C	29-06-23	SWALE CHANGE
B	06-03-23	CONTOURS, STORMWATER AND GUARDRAIL AMENDED
A	18-07-22	COUNCIL ISSUE

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ASSOCIATED CONSULTANTS

DRAWING TITLE

STORMWATER DRAINAGE PLAN SHEET 2

MORTONS urbansolutions
Urban & Regional Planning
Civil Engineering
Project Coordination

MUS Pty Ltd T/As:
Mortons-Urban Solutions
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Postal Address
PO Box 2484
Southport QLD 4215

Gold Coast Office
Suite 9, 19 Short St
Southport QLD 4215

DESIGNED RB	DRAWN JB
APPROVED	NER 906726
DATE 18-07-22	
DRAWING NUMBER	AMEND.
12301-KFP2-601	G

STRUCTURE NAME

STRUCTURE DESCRIPTION

ALL TYPE D
TRAFFICABLE LIDS

1. ALL LINTEL SIZES ARE 2.4m IN ACCORDANCE WITH TSC S.D104, UNLESS SPECIFIED OTHERWISE.
2. LINTELS TO BE STAMPED "DUMP NO WATER - FLOWS TO CREEK".
3. STEP IRONS REQUIRED WHERE PITS/MANHOLE > 1200mm DEEP.

EARLY WORKS EXTENT

LEGEND

Q100 HYDRAULIC GRADE LINE

4.10 INVERT LEVELS OF OTHER SERVICES THAT CROSS THE PIPE

APPROX LINE OF INDURATED SANDS

CONTRACTOR TO VERIFY AND ALLOW FOR COST OF EXCAVATION AND DEALING WITH GROUND WATER IN ACCORDANCE WITH MANAGEMENT PLA-US IN SEWER RATES.

PIPE GRADE (%)

PIPE DIAMETER (mm)

VELOCITY (m/s)

PIPE FLOW (m3/s)

PIPE CLASS

DATUM R.L.

DEPTH TO INVERT

HYDRAULIC GRADE LINE (Q5) — — — —

PIPE INVERT LEVELS

DESIGN SURFACE LEVELS

EXISTING SURFACE LEVELS

CHAINAGE

DRAINAGE LINE

05/281

MANHOLE 1050mm DIA
JOIN 289

06/281

CUSTOM 1500x1500 MANHOLE
JOIN 281
REMOVE BLANK
OFF END

07/281

MANHOLE 1200mm DIA
JOIN 285

08/281

MANHOLE 1800mm DIA
JOIN 286

Subdivision Works Certificate

Certificate Number: 230584SW10

Issuing Officer: Christopher Borg

Registration Number: BDC3330

These plans/specifications form part of the certificate issued: 13/05/24



PROJECT NAME

KINGS FOREST

KINGS FOREST PARKWAY 2

REAL PROPERTY DESCRIPTION
Lot 2 on DP1270901
PARISH OF CUDGEN.
COUNTY OF ROUS.

CLIENT

KINGS FOREST ESTATES PTY LTD

0 5 10 15 20 25m

Horiz. Scale 1:500 - A1 (1:1000 - A3)

0 1 2 3 4 5m

Vert. Scale 1:100 - A1 (1:200 - A3)

ISSUES	DATE
TENDER	09-02-23
COUNCIL	18-07-22
CONSTRUCTION	04-04-23

PRE	DATE	AMENDMENT
E	26-03-24	NOTES ADDED
D	22-03-24	EARLY WORKS EXTEND ADDED & TEXT AMENDED
C	29-02-24	EARLY WORKS EXTENT ADDED & LEVELS REVISED
B	22-08-23	PROFILE 281 AMENDED
A	18-07-22	COUNCIL ISSUE

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ASSOCIATED CONSULTANTS



DRAWING TITLE

STORMWATER PROFILES
SHEET 1



MUS Pty Ltd T/As:
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Tel 07 5571 1099
Fax 07 5571 1088

Postal Address
PO Box 2484
Southport QLD 4215

Gold Coast Office
Suite 9, 19 Short St
Southport QLD 4215

DESIGNED RB	DRAWN JB
APPROVED	NER 906726
DATE 18-07-22	

DRAWING NUMBER
12301-KFP2-620

AMEND.
E

STRUCTURE NAME

STRUCTURE DESCRIPTION

ALL TYPE D
TRAFFICABLE LIDS



1. ALL LINTEL SIZES ARE 2.4m IN ACCORDANCE WITH TSC S.D104, UNLESS SPECIFIED OTHERWISE.
2. LINTELS TO BE STAMPED "DUMP NO WATER - FLOWS TO CREEK".
3. STEP IRONS REQUIRED WHERE PITS/MANHOLES > 1200mm DEEP.

EARLY WORKS EXTENT

LEGEND

Q100 HYDRAULIC
GRADE LINE

4.10 INVERT LEVELS
OF OTHER
SERVICES THAT
CROSS THE PIPE

APPROX LINE OF
INDURATED
SANDS

CONTRACTOR TO VERIFY
AND ALLOW FOR COST
OF EXCAVATION AND
DEALING WITH GROUND
WATER IN ACCORDANCE
WITH MANAGEMENT
PLA-US IN SEWER
RATES.

PIPE GRADE (%)

PIPE DIAMETER (mm)

VELOCITY (m/s)

PIPE FLOW (m³/s)

PIPE CLASS

DATUM R.L.

DEPTH TO INVERT

HYDRAULIC GRADE
LINE (Q5) — — — —

PIPE INVERT LEVELS

DESIGN SURFACE
LEVELS — — — —

EXISTING SURFACE
LEVELS — — — —

CHAINAGE

DRAINAGE LINE

Subdivision Works Certificate

Certificate Number: 230584SW10

Issuing Officer: Christopher Borg

Registration Number: BDC3330

These plans/specifications form part of
the certificate issued: 13/05/24



KFP2 WORKS

FUTURE WORKS

KFP2
WORKS

KFP2
WORKS

11/281

CUSTOM MANHOLE 1800x1200 (STRUCTURAL ENG. TO DESIGN)
JOIN 207
JOIN 332

01/25

INLET GULLY IN SAG

04/24

MANHOLE 1050mm DIA
JOIN 24

01/26

INLET GULLY IN SAG

04/24

MANHOLE 1050mm DIA
JOIN 24

09/281

MANHOLE 1800mm DIA
JOIN 287

10/281

MANHOLE 1800mm DIA
JOIN 288

57

10

0.87m

0.95m

WATER

22.2m

PROVIDE TEMPORARY
HEADWALL

0.100

0.100

0.100

4.000

1.736

1050

1200

1200

375

375

1.200

1.140

1.300

1.020

0.950

0.837

0.985

1.129

0.049

0.068

3

3

3

3

3

-15.000

-14.000

-14.000

DEPTH TO INVERT

HYDRAULIC GRADE
LINE (Q5) — — — —

PIPE INVERT LEVELS

DESIGN SURFACE
LEVELS — — — —

EXISTING SURFACE
LEVELS — — — —

CHAINAGE

2.458

2.488

2.391

2.386

1.551

1.521

4.008

5.699

5.689

5.832

54283.025

69826.081

54283.025

69826.081

2.458

2.488

2.391

2.386

1.551

1.521

4.008

5.699

5.689

5.832

54283.025

69826.081

54283.025

69826.081

2.568

2.598

2.290

2.287

1.441

1.411

4.009

5.832

673.689

673.689

54283.025

69826.081

54283.025

69826.081

2.568

2.598

2.290

2.287

1.441

1.411

4.009

5.832

673.689

673.689

54283.025

69826.081

54283.025

69826.081

1.487

1.348

1.332

1.248

1.248

1.248

1.248

281

57

10

0.87m

0.95m

WATER

22.2m

PROVIDE TEMPORARY
HEADWALL

0.100

0.100

0.100

4.000

1.736

1050

1200

1200

375

375

1.200

1.140

1.300

1.020

0.950

0.837

0.985

1.129

0.049

0.068

3

3

3

3

3

-15.000

-14.000

-14.000

DEPTH TO INVERT

HYDRAULIC GRADE
LINE (Q5) — — — —

PIPE INVERT LEVELS

DESIGN SURFACE
LEVELS — — — —

EXISTING SURFACE
LEVELS — — — —

CHAINAGE

2.458

2.488

2.391

2.386

1.551

1.521

4.008

5.699

5.689

5.832

54283.025

69826.081

54283.025

69826.081

2.458

2.488

2.391

2.386

1.551

1.521

4.008

5.699

5.689

5.832

54283.025

69826.081

54283.025

69826.081

2.568

2.598

2.290

2.287

1.441

1.411

4.009

5.832

673.689

673.689

54283.025

69826.081

54283.025

69826.081

2.568

2.598

2.290

2.287

1.441

1.411

4.009

5.832

673.689

673.689

54283.025

69826.081

54283.025

69826.081

1.487

1.348

1.332

1.248

1.248

1.248

1.248

281

57

10

0.87m

0.95m

WATER

22.2m

PROVIDE TEMPORARY
HEADWALL

0.100

0.100

0.100

4.000

1.736

1050

1200

1200

375

375

1.200

1.140

1.300

1.020

0.950

0.837

0.985

1.129

0.049

0.068

3

3

3

3

3

-15.000

-14.000

-14.000

DEPTH TO INVERT

HYDRAULIC GRADE
LINE (Q5) — — — —

PIPE INVERT LEVELS

DESIGN SURFACE
LEVELS — — — —

EXISTING SURFACE
LEVELS — — — —

CHAINAGE

2.458

2.488

2.391

2.386

1.551

1.521

4.008

5.699

5.689

5.832

54283.025

69826.081

54283.025

69826.081

2.458

2.488

2.391

STRUCTURE NAME

STRUCTURE DESCRIPTION

ALL TYPE D
TRAFFICABLE LIDS

1. ALL LINTEL SIZES ARE 2.4m IN ACCORDANCE WITH TSC S.D104, UNLESS SPECIFIED OTHERWISE.
2. LINTELS TO BE STAMPED "DUMP NO WATER - FLOWS TO CREEK".
3. STEP IRONS REQUIRED WHERE PITS/MANHOLE> 1200mm DEEP.

EARLY WORKS EXTENT

Subdivision Works Certificate

Certificate Number: 230584SW10

Issuing Officer: Christopher Borg

Registration Number: BDC3330

These plans/specifications form part of the certificate issued 13/05/24

BARKER
RYAN
STEWART

LEGEND

Q100 HYDRAULIC
GRADE LINE

4.10 INVERT LEVELS
OF OTHER
SERVICES THAT
CROSS THE PIPE

APPROX LINE OF
INDURATED
SANDS

CONTRACTOR TO VERIFY
AND ALLOW FOR COST
OF EXCAVATION AND
DEALING WITH GROUND
WATER IN ACCORDANCE
WITH MANAGEMENT
PLA-US IN SEWER
RATES.

PIPE GRADE (%)

PIPE DIAMETER (mm)

VELOCITY (m/s)

PIPE FLOW (m³/s)

PIPE CLASS

DATUM R.L.

DEPTH TO INVERT

HYDRAULIC GRADE
LINE (Q5) - - - -

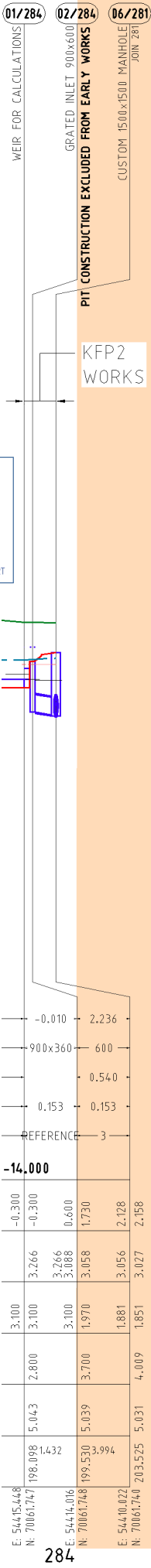
PIPE INVERT LEVELS

DESIGN SURFACE
LEVELS - - - -

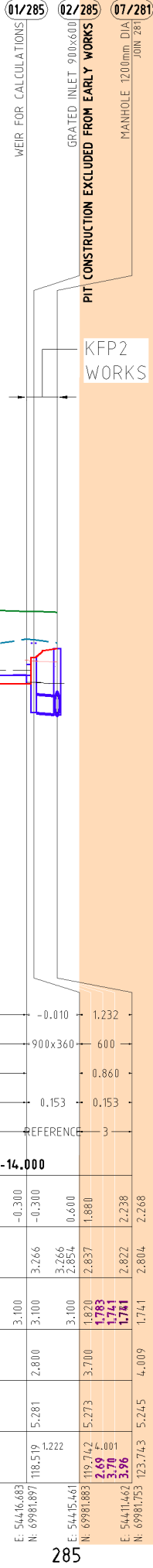
EXISTING SURFACE
LEVELS - - - -

CHAINAGE

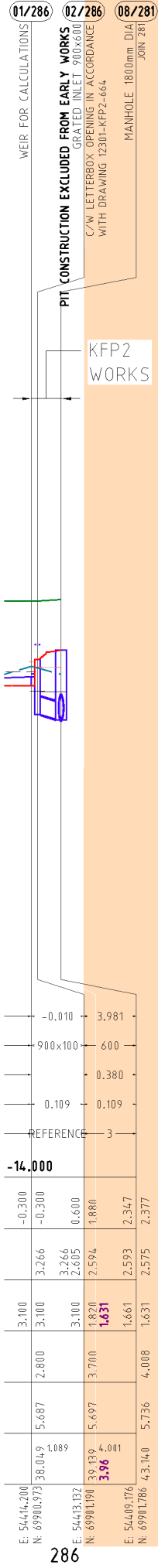
DRAINAGE LINE



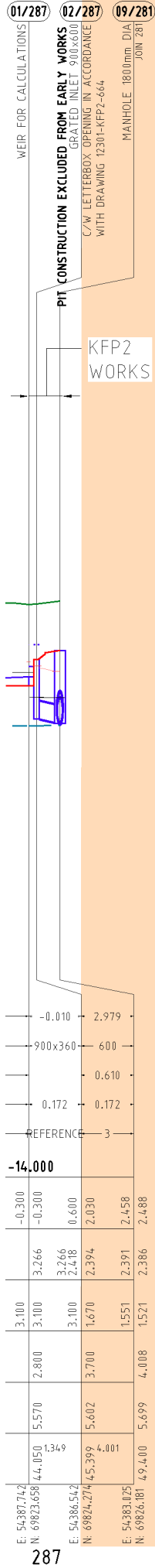
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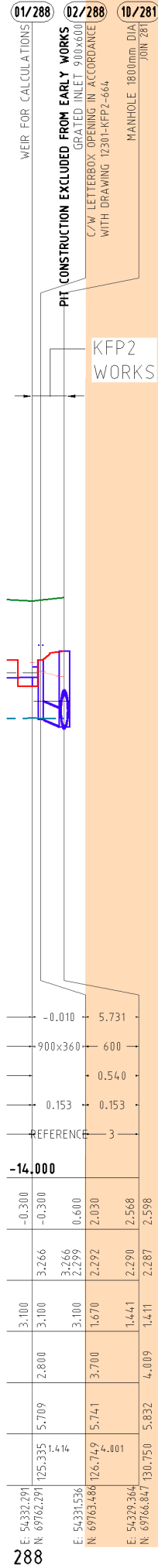
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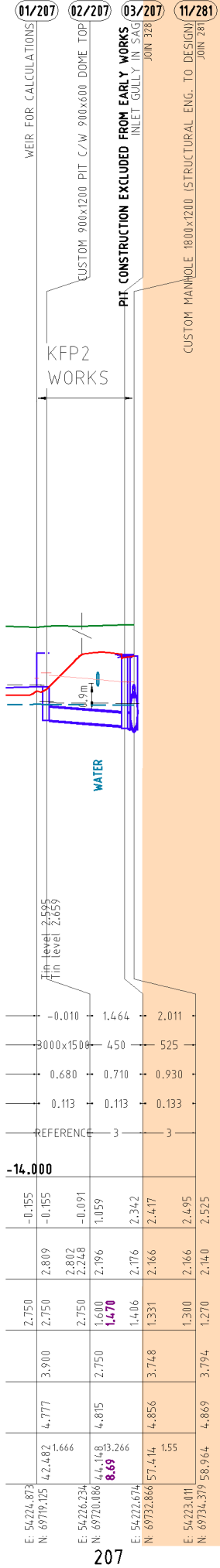
286



287



288



207

PROJECT NAME

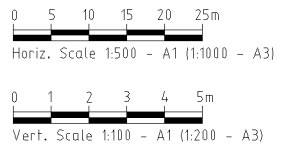
KINGS FOREST

KINGS FOREST PARKWAY 2

REAL PROPERTY DESCRIPTION
Lot 2 on DP1270901
PARISH OF CUDGEN,
COUNTY OF ROUS.

CLIENT

KINGS FOREST ESTATES PTY LTD



ISSUES	DATE
TENDER	09-02-23
COUNCIL	18-07-22
CONSTRUCTION	04-04-23

E	26-03-24	NOTES ADDED
D	29-02-24	EARLY WORKS EXTEND ADDED & LEVELS REVISED
C	22-08-23	PROFILES AMENDED
B	04-04-23	PROFILES AMENDED
A	18-07-22	COUNCIL ISSUE

PRE	DATE	AMENDMENT
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ASSOCIATED CONSULTANTS



DRAWING TITLE

STORMWATER PROFILES SHEET 3

MORTONS
urbansolutions
Urban & Regional Planning
Civil Engineering
Project Coordination

MUS Pty Ltd T/As:
Mortons-Urban Solutions
ABN 39 116 375 065
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www.urbansolutions.net.au
Tel 07 5571 1099
Fax 07 5571 1088

Postal Address
PO Box 2484
Southport QLD 4215

Gold Coast Office
Suite 9, 19 Short St
Southport QLD 4215

DESIGNED	RB	DRAWN	JB
APPROVED	VER	NER	916726
DATE		18-07-22	

DRAWING NUMBER

12301-KFP2-622

AMEND.

E

STRUCTURE NAME

STRUCTURE DESCRIPTION

ALL TYPE D
TRAFFICABLE LIDS

1. ALL LINTEL SIZES ARE 2.4m IN ACCORDANCE WITH TSC S.D104, UNLESS SPECIFIED OTHERWISE.
2. LINTELS TO BE STAMPED "DUMP NO WATER - FLOWS TO CREEK".
3. STEP IRONS REQUIRED WHERE PITS/MANHOLES > 1200mm DEEP.

EARLY WORKS EXTENT

Subdivision Works Certificate

Certificate Number: 230584SW10
Issuing Officer: Christopher Borg
Registration Number: BDC3330
These plans/specifications form part of the certificate issued 13/05/24



LEGEND

Q100 HYDRAULIC GRADE LINE

4.10 INVERT LEVELS OF OTHER SERVICES THAT CROSS THE PIPE

APPROX LINE OF INDURATED SANDS

CONTRACTOR TO VERIFY AND ALLOW FOR COST OF EXCAVATION AND DEALING WITH GROUND WATER IN ACCORDANCE WITH MANAGEMENT PLA-US IN SEWER RATES.

PIPE GRADE (%)

PIPE DIAMETER (mm)

VELOCITY (m/s)

PIPE FLOW (m³/s)

PIPE CLASS

DATUM R.L.

DEPTH TO INVERT

HYDRAULIC GRADE LINE (Q5) - - - -

PIPE INVERT LEVELS

DESIGN SURFACE LEVELS

EXISTING SURFACE LEVELS

CHAINAGE

DRAINAGE LINE

01/328

INLET GULLY ON GRADE

02/328

INLET GULLY IN SAG
JOIN 24

03/328

INLET HEADWALL

03/24

MANHOLE 1050mm DIA

04/24

MANHOLE 1050mm DIA
JOIN 26

02/328

INLET GULLY IN SAG
JOIN 328

01/332

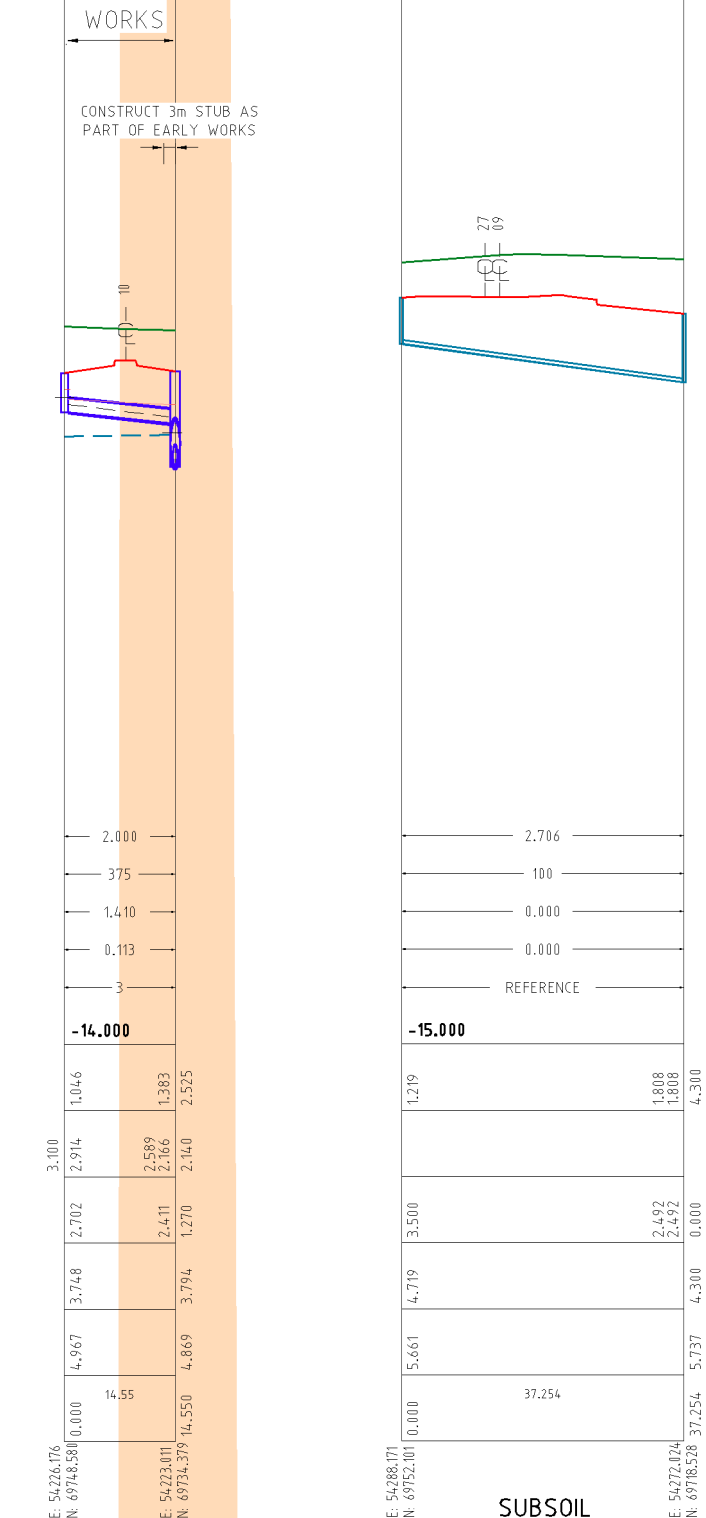
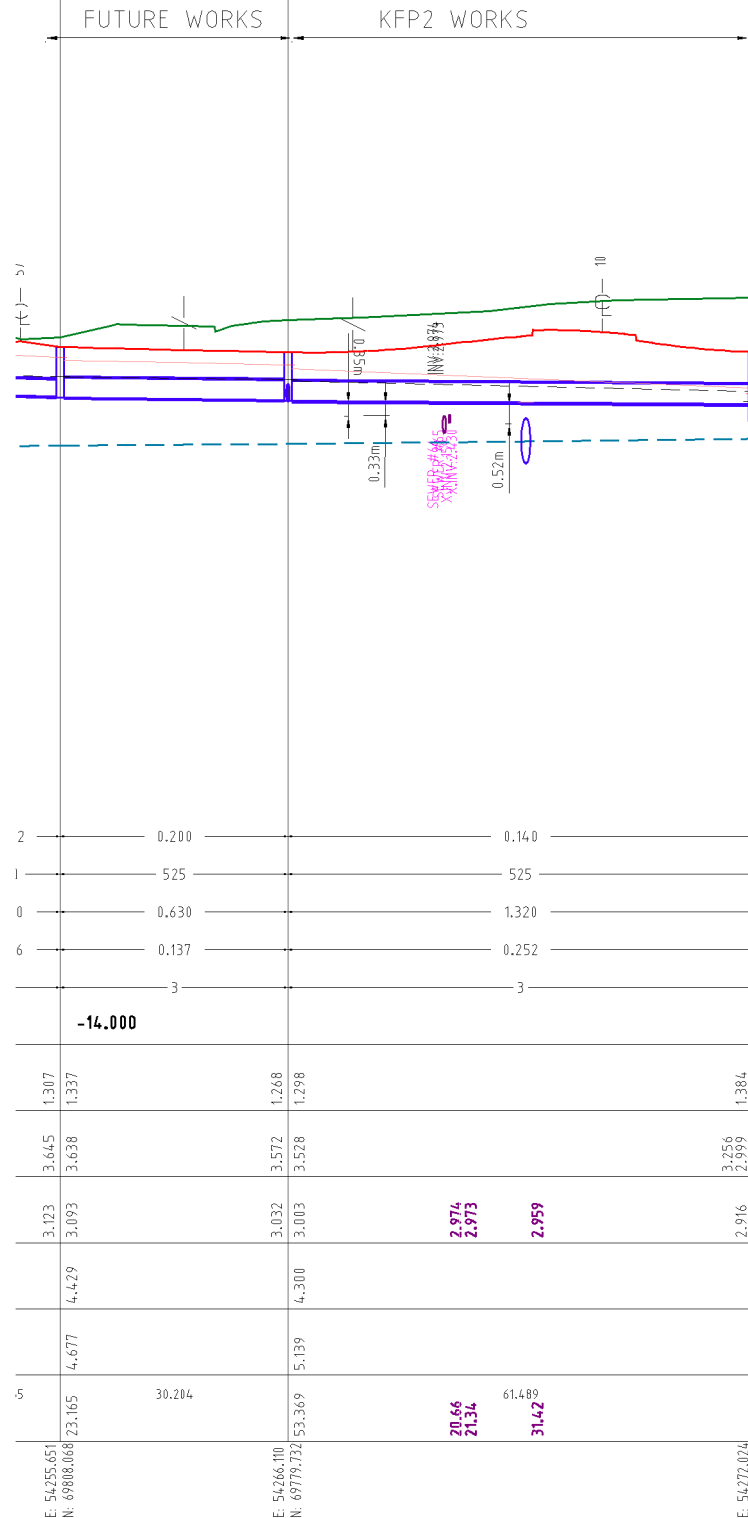
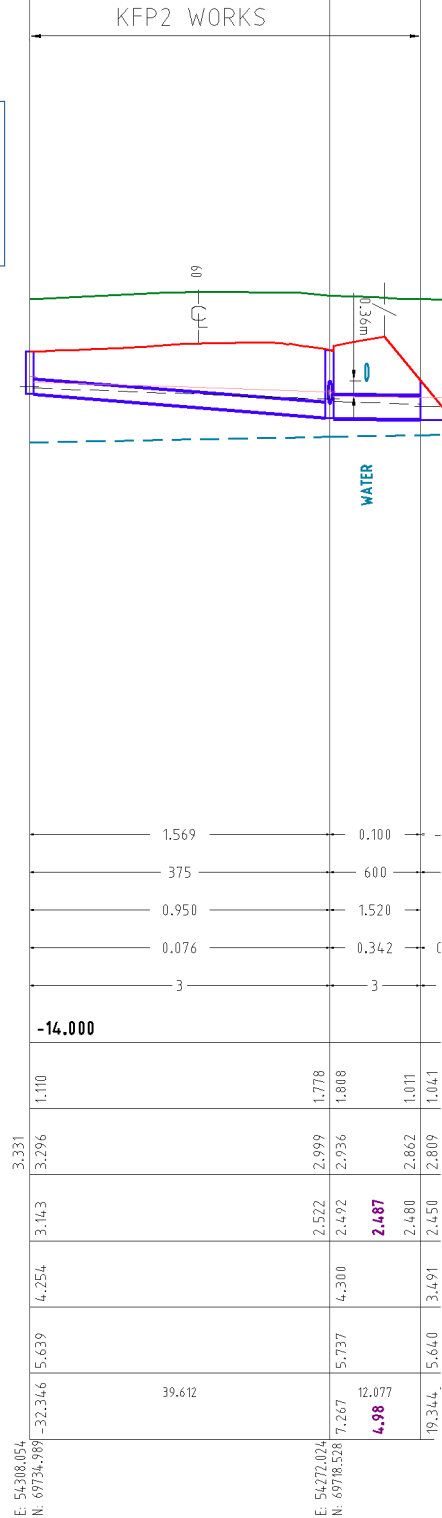
INLET GULLY IN SAG

11/281

CUSTOM MANHOLE 1800x1200 (STRUCTURAL ENG. TO DESIGN)
JOIN 281

02/328

INLET GULLY IN SAG



PROJECT NAME

KINGS FOREST

KINGS FOREST PARKWAY 2

REAL PROPERTY DESCRIPTION
Lot 2 on DP1270981
PARISH OF CUDGEN,
COUNTY OF ROUS.

CLIENT

KINGS FOREST ESTATES PTY LTD

0 5 10 15 20 25m
Horiz. Scale 1:500 - A1 (1:1000 - A3)

0 1 2 3 4 5m
Vert. Scale 1:100 - A1 (1:200 - A3)

ISSUES	DATE
TENDER	09-02-23
COUNCIL	18-07-22
CONSTRUCTION	04-04-23

PRE DATE	AMENDMENT
E	26-03-24
D	29-02-24
C	22-08-23
B	08-03-23
A	18-07-22

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DRAWING TITLE

STORMWATER PROFILES SHEET 4

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AMEND.

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INTENSITY - FREQUENCY (DURATION) [FID] TABLE									
DURATION MINUTES	ARI INTENSITY (TREAT)					ARI INTENSITY (DURATION)			
	TREAT	1	2	5	10	20	50	100	300
5	65.7	131.5	165.5	199.8	218.4	244.7	278.3	303.2	
5.5	63.6	127.2	160.0	193.4	211.5	236.9	269.9	293.8	
6	61.6	123.2	155.0	187.5	205.1	229.9	261.8	285.3	
6.5	59.8	118.6	150.5	182.7	199.4	223.5	254.6	277.6	
7	58.1	114.1	146.5	178.2	194.5	218.1	248.0	270.0	
7.5	56.6	113.2	142.6	172.8	189.2	212.7	241.9	263.9	
8	55.2	110.4	138.0	168.6	184.7	207.3	236.3	257.7	
8.5	53.9	107.8	135.9	164.8	180.5	202.7	231.1	252.2	
9	52.8	105.3	132.7	161.1	176.6	198.3	226.2	246.9	
9.5	51.5	103.0	129.9	157.8	173.0	194.2	221.4	241.6	
10	50.4	100.9	127.2	154.6	169.5	190.4	217.3	237.0	
12	46.7	93.4	117.8	143.5	157.5	177.1	202.1	223.3	
13	45.1	90.2	113.3	138.8	152.4	171.4	195.9	214.0	
14	43.6	87.3	110.2	134.4	147.7	166.2	190.5	207.7	
15	42.3	84.6	106.9	130.5	143.4	161.4	185.4	201.8	
16	41.1	82.2	103.9	126.5	139.1	157.1	179.6	195.1	
17	39.9	79.8	101.0	123.5	134.8	153.0	175.5	190.5	
18	38.9	77.8	98.4	120.3	132.4	149.7	170.7	186.6	
19	37.9	75.8	95.8	117.4	129.2	145.6	166.7	182.5	
20	37.0	74.0	93.6	114.6	126.2	142.3	162.9	178.4	
21	36.1	72.3	91.4	112.0	123.4	139.2	159.5	174.5	
22	35.3	70.6	89.4	109.6	120.7	136.2	156.1	170.9	
23	34.5	69.1	87.5	107.3	118.2	133.4	152.9	167.5	
24	33.8	67.7	85.7	105.1	115.9	130.9	149.9	164.2	
25	33.1	66.3	83.9	103.1	113.6	128.6	147.6	161.0	
26	32.5	65.0	82.3	101.1	111.5	125.9	144.4	158.2	
27	31.8	63.7	80.7	99.2	109.4	123.6	141.8	155.4	
28	31.2	62.5	79.2	97.5	107.5	121.4	139.3	152.7	
29	30.7	61.4	77.8	95.7	105.6	119.4	137.0	150.5	
30	30.1	60.3	76.5	94.1	103.9	117.4	134.7	147.7	
32	29.1	58.3	73.6	91.1	100.5	113.7	130.5	143.2	
34	28.2	56.4	71.6	88.2	97.5	110.2	126.6	138.9	
36	27.3	54.7	69.4	85.6	94.6	107.6	123.0	135.0	
38	26.5	53.1	67.4	83.2	92.0	104.1	119.7	131.5	
40	25.8	51.6	65.5	80.9	89.5	101.3	116.5	127.9	
45	24.1	48.3	61.3	75.9	84.0	95.5	109.5	120.2	
50	22.7	45.5	57.8	71.6	79.3	89.8	103.5	113.7	
55	21.5	43.0	54.6	67.5	75.1	85.2	98.2	107.9	
60	20.4	40.8	51.9	64.5	71.5	81.1	95.1	102.9	
75	19.8	35.6	45.3	56.5	62.7	71.2	82.3	90.6	
90	15.8	31.7	40.4	50.5	56.2	63.9	73.9	81.4	
105	14.3	28.7	36.6	45.9	51.1	58.1	67.3	74.2	
120	13.1	26.3	33.6	42.1	47.0	53.5	62.0	68.4	
135	12.1	24.3	31.1	39.1	43.6	49.7	57.5	63.6	
150	11.3	22.9	29.1	36.5	40.8	46.3	53.9	60.1	
165	10.6	21.3	27.2	34.3	38.3	44.2	50.8	56.1	
180	10.0	20.1	25.6	32.4	36.2	41.4	48.1	53.2	
195	9.5	19.0	24.3	30.7	34.4	39.3	45.7	50.0	

NOTES:
 FLOW CONSTRAINED TO 0.4 D_xV
 FLOW CONSTRAINED TO 250mm DEEP MAX.
 CAPACITY COMPOUND CROSS SECTION (ARR 1987 , 4.38) (n varies)

