Cossill & Webley
CONSULTING ENGINEERS

Draft Amendment C232melt

Expert Evidence Statement by Brock Jeffery-Monck

Assessment of Road and Intersection Project Costs

19th August 2024

Level 20, 390 St Kilda Road,
Melbourne, VIC 3004
PO Box 33152 Melbourne, VIC 3004

T (03) 8548 1560
E melbourne@cosweb.com.au
W cosweb.com.au

1. Name and Address

Brock Jeffery-Monck

CW Urban Pty Ltd trading as Cossill & Webley Consulting Engineers Australia

Level 20, 390 St Kilda Road

Melbourne VIC 3004

2. Qualifications and Experience

- Bachelor of Engineering (Civil), University of Western Australia, 2015
- Member, Engineers Australia (MIE Aust)
- Chartered Professional Engineer (CPEng)
- Registered Professional Engineer Victoria
- National Engineering Register (NER)

3. Areas of Expertise

I am a Director of Cossill and Webley's Consulting Engineers Australia (CW).

I have 10 years of experience in the design and construction of land subdivision projects in Perth and Melbourne including infrastructure works associated with the development of these projects. Fields of special competence include providing advice to clients in relation to feasibility studies, development costs, engineering inputs to structure planning, design and documentation, contract administration, construction superintendence and project management for earthworks, roadworks, drainage, sewerage, and water supply.

4. Expertise to Prepare Report

I have been involved with land subdivision projects as a consulting engineer at CW continuously since May 2014. I have expertise in the following areas relevant to this Panel Hearing -

- Cost estimation of road and intersection infrastructure associated with land development projects.
- Land development projects specifically in Melton City Council area.
- Road and Intersection projects funded through Development Contributions Plans and Infrastructure Contributions Plans.

I have overseen the award of over $100,000,000 of subdivision and associated infrastructure works in the past 6 years in the Melbourne metropolitan region, providing me with expert knowledge relating to road and intersection construction costs.

I have also prepared development cost estimates for over 150 land development sites in the past 8 years.

The analysis presented in this witness statement is within my area of expertise.

5. Instructions which defined Scope of Work

On 13th August 2024, I received a request prepare an Expert Witness Statement from Monica Ceckiewicz of Insight Planning Consultants, acting for:

- Australian Unity Funds Management (submitter 17),
- Miravor Property Developments (submitter 12 & 18),
- Roman Catholic Trust Corporation (submitter 16),
- Thornhill Gardens Estate (submitter 20),

I was instructed to –

a. Review the materials provided, which includes the draft Toolern DCP amendment and associated reports,
b. Undertake a peer review of the Transport Project Review prepared by Cardno (March 2022), insofar as it relates to Road and Intersection projects,
c. Prepare a statement of evidence which sets out your expert opinion as to:
    i. The exhibited Road and Intersection project costings;
    ii. Any relevant recommendations or amendments which should be made to the exhibited documents and DCP insofar as it relates to Road and Intersection projects; and
    iii. Any other cost matters you deem appropriate.

This Witness Statement has been prepared in accordance with *Planning Panels Victoria – Practice Note 1 – Expert Evidence* and a *Witness Statement*.

6. Facts, Matters and Assumptions Relied Upon

6.1 Apart from the relevant documents referenced in this statement, I also relied upon the Toolern DCP Transport Project Review Revision 0 prepared by Cossill & Webley Consulting Engineers dated 15th August 2024 (referred herein as "**Transport Project Review**" and included in Attachment A) which comprises the work completed by my firm in the lead up to the preparation of this witness statement.

6.2 I have also relied upon the "Pavement Profile Commentary" memo prepared by Ground Science dated 7th August 2024 (Job No G5263.1 AA) which my firm instructed the preparation of. This memo is referred herein as "**Pavement Profile Commentary".**

7. Documents Viewed in Preparing this Witness Statement

a) Part A Submissions on Behalf of Melton City Council (referred herein as "**Council's Part A Submission**"),
b) Documents referenced in this statement:
    i. VPA Benchmark Infrastructure Costings Report prepared by Cardno dated 11th April 2019 (referred herein as "**Benchmark Costings Report**"),
    ii. VPA Benchmark Infrastructure Costings prepared by Cardno (referred herein as "**Benchmark Costings**"),
    iii. VPA Benchmark Infrastructure & Cost Guide prepared by the VPA and issued 15th October 2019.
    iv. The original Toolern Development Contributions Plan (DCP).

8. Identity of Persons Undertaking Work

- Brock Jeffery-Monck (Director, Cossill & Webley Consulting Engineers Australia) – Expert Witness.
- Dale Wines (Project Engineer, Cossill & Webley Consulting Engineers Australia) – Compilation of background information to assist with preparation of the witness statement.

9. Declaration

I have made all the inquiries that I believe are desirable and appropriate and no matters of significance which I regard as relevant have to my knowledge been withheld.

Signed ____________________________

Brock Jeffery-Monck

Dated: 19th August 2024

10. Summary of Opinions

10.1 The original DCP road and intersection projects may have been under scoped, but this is difficult to determine as there is a lack of clarity regarding the original cost assumptions. There is also a lack of precision in the revised DCP Costings.

10.2 The **Benchmark Costings** have been utilised by Cardno to prepare the revised Toolern DCP Costings. The constructions rates in the **Benchmark Costings** appear too high based on tendered projects I have witnessed.

10.3 The **Benchmark Costings** don't appear to include a capping layer, which is required for Melton City Council roads. Notwithstanding this omission, the primary arterial pavement rates appear too high compared to tendered projects I have witnessed.

10.4 Traffic management costs in the revised Toolern DCP Costings are being applied for all Road and Intersection projects. This includes projects that are in greenfield conditions where traffic management won't be applicable. This is adding unnecessary cost to the revised DCP.

10.5 Rock excavation costs are conservative and, in my opinion, would be covered within the separate earthworks rate in the Costings. The additional rock excavation cost is unnecessary.

10.6 I consider there to be errors regarding lengths of road, potentially caused by errors in the delineation of road and intersection projects leading to the calculation of incorrect quantities.

10.7 The road cross sections that have been adopted in the revised Toolern DCP Costings are inconsistent with the **Benchmark Costings Report**. There are contradictions in the DCP Change Table and **Council's Part A Submission** regarding the basis for these costings. The cross sections that have been adopted are adding a significant amount of construction costs when compared to the Benchmark.

10.8 The potential errors that have been identified should be reviewed in detail and addressed, to ensure future indexation of Development Infrastructure Levies are not applied to unnecessary and additional costs.

10.9 The VPA commissioned Cardno to undertake the technical analysis and provide draft baseline infrastructure cost data to standardise the cost estimation of Infrastructure Contribution Plan (ICP) projects. Benchmark infrastructure designs and cost estimates were prepared for a range of basic and essential local infrastructure items generally provided for in Precinct Structure Plans and funded through ICP's. These **Benchmark Costings** were prepared to simplify and speed up the preparation of ICP's. In my opinion, the **Benchmark Costings** become less applicable as more information becomes available, and it is noted this statement is in relation to a DCP, not an ICP. Council should have a sizable database of construction costs that are local to the Toolern area that could have been used to inform the preparation of the costings.

11. Opinion as to the exhibited Road and Intersection project costings.

Comparison of Original and Revised DCP Costings

11.1 The original road and transport construction costings in the Toolern DCP were prepared by Meindhart and are expressed in July 2010 dollars. The DCP states the capital cost for each infrastructure item will be adjusted by applying the Building Price Index, as published in the latest edition of Rawlinsons Australian Construction Handbook on 1 July each year. I do not have access to the historic editions of this handbook to assess the price adjustment.

11.2 An alternative indexation method is the **Benchmark Costings Report** indexation method, which uses a rolling 4-quarter average of the Road and Bridge Construction Victoria index. The increase from July 2010 dollars to July 2021 dollars is 34.36% using the **Benchmark Costings Report** indexation method.

11.3 For intersections already constructed prior to the revised DCP costings, rather than re-cost the completed project, Cardno applied the **Benchmark Costings Report** indexation method. In my opinion it may have been more practical to apply indexation to the actual construction costs, rather than indexation of the original cost estimate for projects that have been completed.

11.4 The below tables show the comparison of the original Toolern DCP Cost + 34.36% indexation (based on the **Benchmark Costings Report** indexation method) compared to the costs proposed by Cardno for FY21-22.

Item	Original Toolern DCP Construction Cost	Original Toolern DCP Construction Cost (A)	Revised Toolern DCP Construction Cost (B)	Construction Cost Increase (B) – (A)	
Currency	*July 2010 dollars*	July 2021 dollars	July 2021 dollars	July 2021 dollars	
Prepared By	*Meinhardt*	Meinhardt + 34.36% Escalation	Cardno		
Road Projects	*$77,175,583*	$103,696,551.03	$97,597,516	-$6,099,035.06	-5.9%
Intersection Projects	*$23,828,000*	$32,016,362.20	$147,524,125	$115,507,762.80	360.8%
Sub-Total	***$101,003,583***	**$135,712,913.27**	**$245,121,641**	**$109,408,727.73**	**80.6%**

11.5 The revised Toolern DCP costings for Road and Intersection projects have been proposed to increase by $109,408,727.73 (80.6%) compared to the original DCP costings (once adjusted for indexation).

11.6 Of the $109,408,727.73 increase, $13,919,838.95 (12.72%) is based on new projects (or projects removed) from the scope of the Toolern DCP, while the remaining $95,488,888.61 (87.28%) is attributed to an increase to the estimated costs of the original Toolern DCP projects.

11.7 In my opinion, the gap between the costings is too large to be attributed to reasonable scope increases of the projects. At face value, it would appear either the original construction cost estimate prepared by Meinhardt, the revised construction cost estimate prepared by Cardno, or both, may include errors leading to this large discrepancy.

11.8 The errors may be related to the measurement of quantities, inadequate scoping, and under-estimation or over-estimation of rates.

Cardno Costing Method

11.9 Paragraph 36.4 in **Council's Part A Submission** states:

> "*Council met with the Victorian Planning Authority, and the transport and planning divisions at the Department of Transport and Planning at the start of the process, where it was agreed that Council would use the VPA's Benchmark Infrastructure Report, April 2019, as the base for all Cardno designed transport projects and project cost sheets.*"

11.10 In my opinion, calculation of updated transport project costings should use the original detailed project cost sheets from Meinhardt as a basis for a revised cost estimate, to provide consistency with the original DCP. At the very least, they should be procured to allow simple identification of scope changes.

11.11 Cardno has generally used the following costing method:

a. **Benchmark Costings** have been used as a basis to prepare the road and intersection transport projects,
b. Quantities have been updated as deemed appropriate,
c. Rates are based on the VPA benchmark rates for FY19,
d. Indexation has been applied to the total cost of each item using the **Benchmark Costings Report** indexation method to translate the costings into FY22 dollars,
e. P90 costs are proposed to be adopted in the Toolern DCP update.

VPA Benchmark Costs

11.12 When a local government authority or the Victorian Planning Authority (VPA) prepares an Infrastructure Contributions Plan (ICP), the scope and cost of the infrastructure to be included needs to be determined. Much of the infrastructure is conceptually common in design and similar in cost.

11.13 To simplify the preparation of ICP's, the VPA commissioned Cardno to prepare benchmark infrastructure designs and cost estimates for a range of basic and essential local infrastructure items generally provided for in PSP's and funded through ICP's. Cardno undertook technical analysis and provided draft baseline infrastructure cost data to standardise the cost estimation of ICP projects. This was developed using baseline data from a range of project designs and estimates prepared by various consultants from across Melbourne's greenfield areas.

11.14 In my experience, the **Benchmark Costings** are a useful tool for feasibilities in areas where a structure plan has yet to be prepared or is in its infancy. The relevance of the **Benchmark Costings** diminishes over time as more information becomes available, such as ground conditions, topographical information, and other area-specific information.

11.15 The **Benchmark Costings** are not designed to consider geographic, topographical or other forms of area-specific or project-specific cost implications. The **Benchmark Costings** are designed for the preparation of an ICP, whereas this statement is in relation to an amendment of a DCP.

11.16 The **Benchmark Costings Report** states that minor rock removal allowance has been included in the **Benchmarking Costings**. In my experience, rock excavation and removal is prevalent in the Toolern area and should be considered in the revised DCP Costings. Cardno has reflected this by including an item in each Road and Intersection project for rock excavation.

Currency of VPA Benchmark Construction Rates

11.17 The **Benchmark Costings** are indexed annually. The indexation method is described in detail in the VPA's Benchmark Infrastructure & Cost Guide. The reference year for indexation of the **Benchmark Costings** is 1st July 2018. Indexation from 1st July 2018 to 1st July 2021 is 9.04%. Cardno has used 9.00% for the purpose of determining the revised Toolern DCP costings.

11.18 By multiplying each P90 rate in the benchmark costings by the relevant indexation factor (9.00%), the construction rates in the **Benchmark Costings** can be converted an equivalent FY22 rate for comparison purposes.

Validity of VPA Benchmark Rates

11.19 In my role as a Director at CW, I have access to CW's reconciled tendered construction rates between December 2020 and October 2021 for construction contracts of road projects, intersection projects, and subdivision projects. These projects are a mix of west and north growth area suburbs, as I consider these areas to feature consistency amongst contractors, ground conditions, and costs.

11.20 The use of subdivision project rates is consistent with Cardno's data sample used to prepare the **Benchmark Costings**, as stated in the **Benchmark Costings Report**:

> "*Pricing data for identified gaps were extracted from internal tendered construction rates. These rates were either for sub-divisional works or similar construction elements*."

11.21 CW's sample of data for this period was based on 5 separate projects, and 16 individual pricing submissions, including prices from Winslow, Symon Bros, Rokon, Bild (formerly Bitu-Mill), Civ2Con, Lojac, Civilworx, and BMD. Each project was developer-funded, consistent with Cardno's statement in the **Benchmark Costings Report** that construction of ICP interim infrastructure is usually the responsibility of the developer.

11.22 CW's sample of data does not have enough information for me to comment on signals infrastructure, landscaping items (which are normally delivered by a separate contractor) and public lighting (which is normally priced as lump sum with very little transparency in costs).

11.23 Section 8.1 of the **Transport Project Review** provides a comparison between the **Benchmark Costing** rates, with CW's tendered rates database.

11.24 CW's reconciled database rate for earthworks costs (i.e. excavation for road pavements) is significantly lower than the **Benchmark Costing** rate. CW's rate includes rock excavation, and disposal of rock off-site which is a typical requirement of road and subdivision projects. No additional rock-related costs are applicable.

11.25 CW's rates for pavement costs differ from the **Benchmark Costing** rate. CW's pavement costs are based on **Pavement Profile Commentary** provided by Ground Science Geotechnical Engineers. While Ground Science has generally agreed with the pavement makeup assumptions in the **Benchmark Costings Report**, the **Pavement Profile Commentary** provides additional detail of the pavement composition that allowed CW to provide a cost for the respective pavement types.

11.26 CW's rates for concrete works (footpaths, shared paths, cycle paths, and kerb and channel) are significantly lower than the **Benchmark Costings** rate.

11.27 CW's drainage rates are a mix of higher and lower than the **Benchmark Costings** rates. In my opinion this is potentially due to project specific outliers such as small or large quantities that create efficiencies or inefficiencies, strategic tendering tactics employed by contractors, supply chain pressures, and varying depths, pipe classes and backfill types.

11.28 In my opinion, drainage rates do not necessarily display a linear relationship with pipe diameter. For the revised DCP Costings, I believe the CW rates are suitable for comparison.

11.29 For miscellaneous items, CW's rates are a mix of higher and lower than the **Benchmark Costings** rates. In my opinion, the CW rates are suitable for comparison.

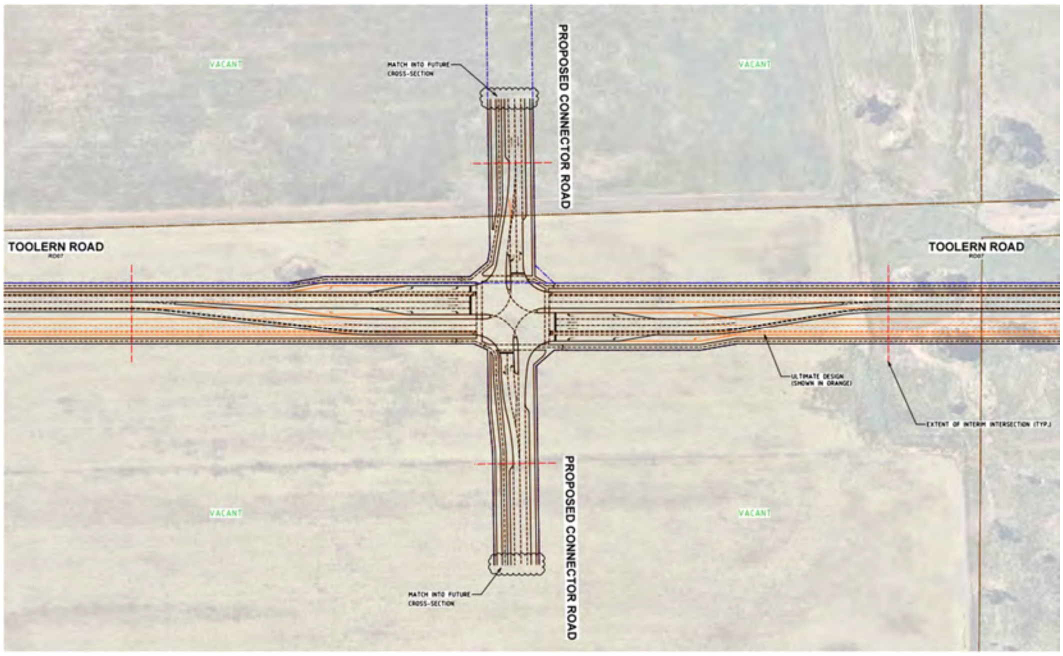
Validity of Delivery Costs

11.30 The **Benchmark Costings** use a percentage of construction cost method for several construction elements, including site establishment, environmental management, and traffic management. Site establishment costs and environmental management costs are site specific, but I consider the percentages in the **Benchmark Costings** as reasonable.

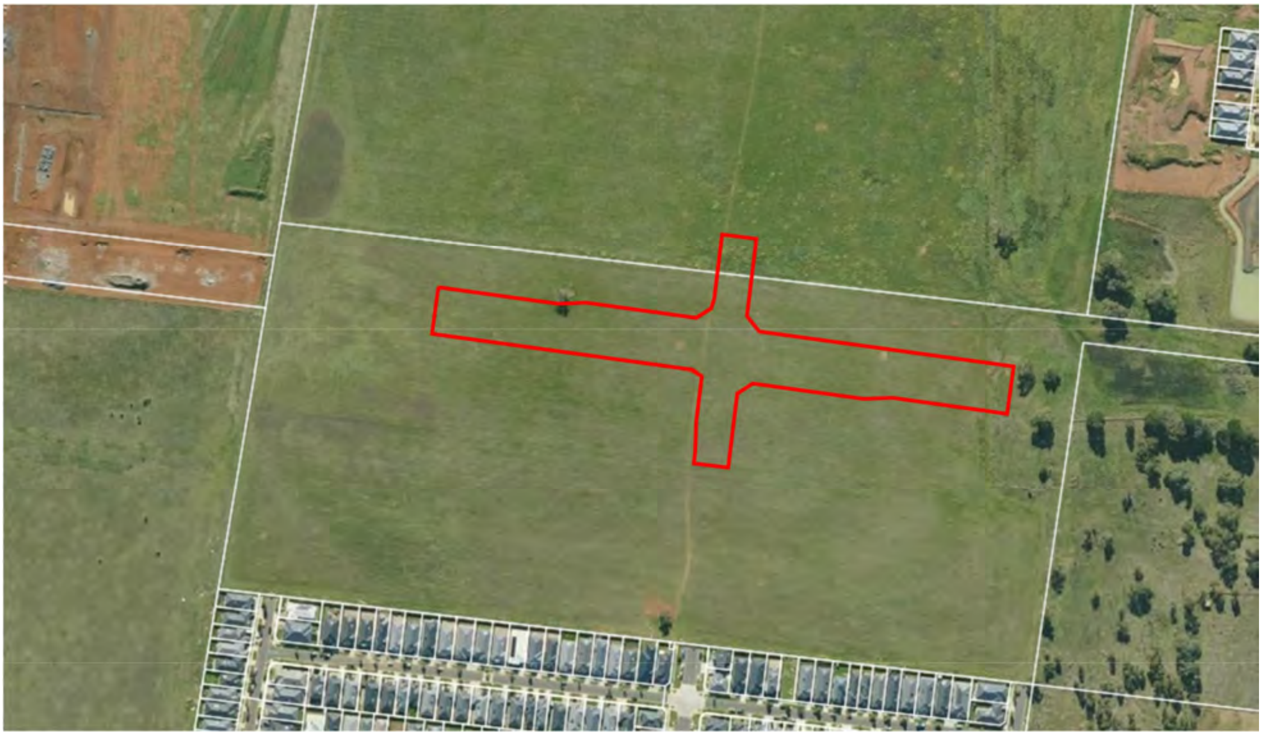
11.31 Cardno has adopted a 5% traffic management cost for each road and intersection project in the Toolern DCP. CW's database shows the traffic management costs vary significantly across projects. In my opinion, traffic management costs are predominantly based on whether traffic management is required under partial road closure or full road closure, and if it is partial road closure, whether "shuttle flow" is utilised or a bypass road is constructed.

11.32 The Toolern DCP Road and Intersections projects include both upgrades of existing roads and intersections, and new roads and intersections in greenfield conditions. For projects that are in greenfield conditions, the traffic management costs are not applicable. One of many examples of this is Intersection IT22 shown below. This intersection is costed at $5,595,491 in the revised Toolern DCP, which includes $198,000 of traffic management. In my opinion, no traffic management costs should be included as the works will occur in greenfield conditions.

11.33 The below image is Intersection IT-22 – Concept Layout, May 2021.



Aerial Imagery captured May 2024 over the location of the proposed Intersection IT-22 (generally shown in red).



<u>Rock Excavation in Cardno Costings</u>

11.34 As stated in Paragraph 11.16, the **Benchmark Costings** make no allowance for significant rock excavation. Accordingly, in the revised Toolern DCP costings, Cardno has included an item in each Road and Intersection project for "rock excavation". The rock excavation (m3) appears to be based upon 20% of the earthworks quantity (m3).

11.35 Cardno has assigned a rate of $115/m3 for rock excavation (P90), though as this is not a **Benchmark Costings** rate, it is unclear where it has been sourced from. A rate of $115/m3 for rock excavation (P90), applied to 20% of the earthworks quantity, is equal to a rate of $23/m3 being applied to 100% of the earthworks quantity. As such, the equivalent Cardno rate (P90) for earthworks (inclusive of rock excavation and indexed to FY22) is $69.24/m3 of excavation.

11.36 As stated in Paragraph 11.26, CW's rate for earthworks costs includes rock excavation, and disposal of rock off-site which is a typical requirement of road and subdivision projects. As noted in Section 8.1 of the **Transport Project Review**, CW's rate is $35.23/m3 compared to Cardno's equivalent rate of $69.24/m3

11.37 In my experience, I have witnessed rates for road excavation approaching $69.24/m3 at extraordinary peak periods of activity in the land development market. However, in my opinion these rates are outliers, and are not accurate to use as the basis for a P90 cost estimate.

Cost Comparison

11.38 CW has prepared a comparison of the revised Toolern DCP Costings and the estimated Toolern DCP road and intersection project costs using the rates from CW's database discussed in Paragraph 11.23. Traffic management costs have been deducted where it is unlikely to be required. Rock excavation has been removed as it is included in the excavation rate. Completed projects, and Rockbank DCP projects, have been excluded from the comparison. The comparison in Section 8.4 of the **Transport Project Review** shows a reduction of $16,276,099.92 compared to the revised DCP Costings prepared by Cardno. A summary of the table is provided below.

ID	Cardno FY22 Cost	Deduction Based on CW P90 Rates	Deduction Based on Removing Rock Excavation	Deduction Based on CW Rates + Rock
Total	**$193,624,036.96**	**-$10,880,468.71**	**-$5,395,631.21**	**-$16,276,099.92**

11.39 In my opinion, the method applied to produce the numbers above is high-level and is not suitable to directly substitute into the revised DCP Costings. However, I consider the deduction to be a reasonable estimate for the purpose of drawing attention to the conservatism in the revised DCP Costings.

Road and Intersection Delineation

11.40 Meinhardt and Cardno have different methods of delineating the extent of works for Road projects and Intersection projects. As CW noted in the **Transport Project Review**, Meinhardt estimated 76.4% of the cost was attributed to Road projects, and 23.6% was attributed to Intersection projects. By contrast, Cardno has estimated that 39.8% of the costs are attributed to Road projects, with a significantly higher 60.2% attributed to Intersection projects.

11.41 In my opinion, understanding the difference in delineation is important for many reasons, including but not limited to:

a. Existing planning permits, public infrastructure plans, and S173 agreements that include reference to DCP infrastructure based on the original DCP, may be impacted based on significant scope changes to DCP projects.
b. It is challenging to compare scope changes to original DCP projects, if the method for delineating roads vs intersections is so different.
c. The lack of clarity in the difference between delineations in extent of works can lead to potential errors in the revised DCP costings.

11.42 I generally agree with Cardno's method of delineating the extent of works for roads vs intersections. However, in my opinion, not utilising the original delineation method does not allow for a consistent comparison of scope and costs changes to Toolern DCP projects. It creates challenges for stakeholders and affected landowners in the Toolern PSP area to digest the $109,408,727.73 cost increase (as per Paragraph 11.5and 11.6).

Inconsistency with Adopted Road Cross Sections

11.43 **Council's Part A Submission** states that Council met with the Victorian Planning Authority, and the transport and planning divisions at the Department of Transport and Planning, where it was agreed that Council would use the VPA's Benchmark Infrastructure Report, April 2019, as the base for all Cardno designed transport projects and project cost sheets.

11.44 **Council's Part A Submission** also states that where projects had not been deleted from the Toolern DCP, added from adjacent DCP's, already constructed, or already design and approved, the VPA's Benchmark Infrastructure Report would be relied upon to the extent possible. The projects that rely upon the Benchmark Infrastructure Report are listed in Paragraph 36.3 of **Council's Part A Submission**.

11.45 In my opinion, the **Benchmark Costings Report** has been used to determine updated road reserve widths (as per Paragraph 36.13 of **Council's Part A Submission**) but has not been used to determine the other elements of the road cross sections from the **Benchmark Costings Report**. Carriageway widths, cycle lanes, shared paths, and kerb and channel are significantly different than the VPA Benchmark Infrastructure Report for numerous road projects.

11.46 This appears to be confirmed in Item 491 in the PSP Change Table where it states:

> *"New cross-sections provided for secondary arterial roads that are consistent with secondary arterial road cross-sections in contemporary PSPs. Notes included with Cross-Section for consistency with contemporary PSPs – see Section 4 in Plumpton PSP for an example"*

11.47 Item 491 in the PSP Change Table appears to have superseded the commentary in **Council's Part A Submission** regarding reliance on the **Benchmark Costings Report**.

11.48 The below table from the **Transport Project Review** notes the following key differences between the different cross sections referenced in Paragraph 11.45 to 11.46 relating in particular to a secondary arterial (interim) road upgrade.

Source	Original Toolern DCP	Revised Toolern DCP	VPA Benchmark
Basis for Cross Section	Unconfirmed	Conventional PSP's such as Plumpton	VPA Benchmark
Carriageways	2-Lane Carriageway (7m)	2-Lane Carriageway (7m)	2-Lane Carriageway including full-depth asphalt shoulder (9m).
Cycle Lanes	2 x 1.5m cycle lanes, with nature strip separator	2 x 1.5m on-road cycle lanes, with 2 x 0.5m full-depth pavement separator	Nil
Paths	2 x 2.5m shared paths	2 x 3.0m shared paths	1 x 2m shared path

11.49 Section 11.2 of the **Transport Project Review** notes the road cross section elements that are surplus to the **Benchmark Costings Report**. This is shown to be equating to an approximate cost of $16,756,131 surplus to the requirements of the **Benchmark Costings Report**. This represents 17.2% of the $97,597,516 Road Projects total.

11.50 In my opinion, it is unclear whether the intention is for the revised Toolern DCP Road and Intersection projects to be based on the **Benchmark Costings Report**, or "Contemporary PSP's" for the basis of secondary and primary arterial roads. However, it is clear to me that there is a significant amount of extra cost to deliver "contemporary" PSP cross sections in lieu of the **Benchmark Costings Report** cross sections.

Potential Errors in Costings

11.51 The **Transport Project Review** did not include a detailed quantity estimation of each road and intersection project to critique the quantities Cardno has used. However, the quantities were reviewed to identify potential calculation errors, potential delineation errors (as discussed in Paragraph 11.40-11.42) and potentially incorrect scope assumptions.

11.52 An example of a potential delineation error is RD01. The revised DCP Costings allow for the delivery of 180m of a 2-lane arterial road. However, the full 180m of the road project appears to be within the extent of IT01. This would result in the RD01 costs being a duplicate and can be removed entirely from the revised DCP Costings.

11.53 An example of the lack of context and scope considerations resulting in error can be found in RD15. The revised DCP Costings allow for the delivery of an additional 2 lanes to the existing 4-lane arterial road. However, quantities for full depth pavement and pavement rehab are not reflective of the actual works that are required to be completed for this road project. This would result in additional costs in RD15 that are not part of the scope of works required to deliver this DCP project.

11.54 As stated in Section 10 the **Transport Project Review**, the potential errors result in an estimated additional cost of $14.78M in the revised DCP costings due to overall road length quantities only. Further potential errors which have not been captured in detail result in an approximate additional cost of $19.43 million in the revised DCP costings.

11.55 In my opinion, the potential errors identified in Section 10 the **Transport Project Review** are a high-level estimation and are not suitable for a direct substitution in the revised DCP Costings. However, I consider it is essential that the errors are reviewed, considered and updated where necessary.

12. Opinion as to any relevant recommendations or amendments which should be made to the exhibited documents and DCP insofar as it relates to Road and Intersection projects.

12.1 Melton City Council has access to construction cost data for all construction contracts that include Council-owned and maintained infrastructure, as schedules of prices are provided when plan checking fees and supervision fees are paid. The use of the indexed **Benchmark Costings** becomes less relevant when Council should have a sizable database of construction costs that are local to the Toolern area.

12.2 The revised DCP Costings should be updated to use rates provided by Melton City Council as noted in Paragraph 12.1.

12.3 The revised DCP Costings should remove traffic management where it is not applicable, and rock excavation should be removed subject to the rates provided by Melton City Council as part of Paragraph 12.2.

12.4 The revised DCP Costings should provide greater clarity regarding the delineation of road and intersection projects, to ensure there is no duplication of costs. The functional layout plans prepared by Cardno do not identify the exact limit of works for each project.

12.5 As I stated in Paragraph 11.50, it is unclear to me whether the **Benchmark Costings Report** is being used as a basis for road cross sections. Subject to clarification from Melton City Council and suitably qualified traffic engineers, changes may be required to the revised DCP Costings as noted in Paragraph 11.49.

12.6 Further to clarifications required above in Paragraphs 12.4 and 12.5, quantities for each road and infrastructure projects in the Toolern DCP should be revisited once assumptions and scope have been confirmed and agreed.

13. Any other cost matters you deem appropriate.

13.1 Nil

ATTACHMENT A

TOOLERN DCP TRANSPORT PROJECT REVIEW REVISION 0 PREPARED BY COSSILL & WEBLEY CONSULTING ENGINEERS DATED 15TH AUGUST 2024

Toolern DCP Transport Project Review

Revision 0

15th August 2024

MELBOURNE
Level 20, 390 St Kilda Road
Melbourne VIC 3004
E: Melbourne.reception@cosweb.com.au
T (03) 8548 1560

Cossill & Webley
CONSULTING ENGINEERS

Contents

1. ABOUT US

Cossill & Webley (CW) is a firm established to provide civil engineering services to the urban development and infrastructure industry. CW specialises in all aspects of civil engineering as applied to land development and infrastructure. CW provides a total service from initial feasibility studies and concept planning to detailed design and contract superintendence. We specialise in land development engineering and strive to be the best consultant in it. We are not a "one stop shop". Instead, we collaborate with other independently appointed specialist town planners, surveyors, environmental scientists and landscape architects to produce great outcomes for our mutual clients.

CW was established in 1989 as an engineering design house and specifically focuses on the land development market in Perth and Melbourne. Over the past 35 years, we have grown our business to being one of the largest land development engineering firms in Australia, covering a range of project sizes, values and fields from master-planned communities of over 5,000 residential lots to major industrial estates having areas of over 100ha.

CW's experience covers all aspects of the design and construction administration of engineering infrastructure associated with land subdivisions. Our expertise covers earthworks, retaining walls, roadworks, drainage, sewer reticulation and water reticulation. Our staff includes 100 people dedicated to the design and delivery of engineering aspects of land development.

***Engineering** sustainable outcomes through **empowering** our people and building **enduring** relationships.*

2. EXECUTIVE SUMMARY

The Toolern Development Contributions Plan (DCP) was first adopted by Melton City Council (Council) in 2010. Council has identified the Toolern DCP document has shortfalls in funding reserved for key transport projects. To address the shortfall, Cardno was engaged to review the transport infrastructure identified in the Toolern DCP.

The original road and transport construction costings in the Toolern DCP were prepared by Meinhardt July 2010. Once factoring for indexation of costs, the revised Toolern DCP costings proposed by Cardno for Road and Intersection projects has increased by $109,408,727.73 (80.6%).

Of the $109M increase, $13,919,838.95 (12.72%) is based on new projects in the Toolern DCP, while the remaining $95,488,888.61 (87.28%) is attributed to an increase to the estimated costs of the original Toolern DCP projects. At face value, it would appear either the original construction cost estimate prepared by Meinhardt, the revised construction cost estimate prepared by Cardno, or both, may include errors leading to this large discrepancy.

Cardno's method for costing the Road and Intersection projects was to use the VPA Benchmark Costings as a basis (expressed in 2019 dollars), update quantities in the cost sheets as required, and then apply indexation to the total cost of each item.

CW has reconciled tendered construction rates between December 2020 and October 2021 for construction contracts of road projects, intersection projects, and subdivision projects. Signals infrastructure, landscaping items, and public lighting was excluded due to limited data being available. CW's reconciliation shows that the indexed VPA Benchmark rates used by Cardno are generally conservative.

Cardno has applied a rock excavation cost to each road and intersection project. There is justification to remove these costs based on CW's rates database.

The DCP road and intersections projects include both upgrades of existing roads and intersections, and new roads and intersections in greenfield conditions. For projects that are in greenfield conditions, the traffic management costs are not applicable and are adding significant extra cost to the revised DCP road and intersection projects.

Meinhardt and Cardno have vastly differently methods to delineating Road projects and Intersection projects. Of the original DCP Costings, Meinhardt estimated 76.4% of the cost was attributed to Road projects, and 23.6% was attributed to Intersection projects. By contrast, Cardno has estimated that 39.8% of the costs are attributed to Road projects, with a significantly higher 60.2% attributed to Intersection projects

Understanding this delineation is important for a few reasons:

- Existing planning permits, public infrastructure plans, and S173 agreements that include reference to DCP infrastructure based on the original DCP, may be impacted based on significant scope changes to DCP projects.
- It is extremely challenging to compare scope changes to original DCP projects, if the method for delineating roads vs intersections is so vastly different.
- The lack of transparency can lead to potential errors in the revised DCP costings.

CW has not undertaken a detailed quantity estimation of each road and intersection project to assess the quantities Cardno has used. However, upon initial review, there appears to be potential errors that are leading to significant additional costs in the revised DCP costings.

The road cross sections used for the purpose of costings are modified cross sections that have additional elements to the VPA Benchmark cross sections. This is adding significant extra costs to the revised DCP costings.

Based on CW's investigation, it is estimated the revised DCP costings are in the order of $31M to $39M higher than necessary. The costs may be up to $53M higher than necessary, subject to assessment by a suitably qualified traffic engineer of the road cross sections that have been adopted.

3. SCOPE OF THE REVIEW

CW has been directed by Insight Planning Consultants (referred herein as 'Insight') to review the Transport Costings in the amendment to the Toolern Precinct Structure Plan and Development Contributions Plan. It is understood that Insight is representing multiple land developer clients that have an interest in landholdings within the Toolern PSP area.

The Toolern Precinct Structure Plan (PSP) and Development Contributions Plan (DCP) were first adopted by Melton City Council (Council) in 2010. Council has undertaken a review of the Toolern PSP and DCP to determine how the development of the Toolern PSP area has been progressing and whether changes are required to the rates being levied within the DCP.

Council has identified the Toolern DCP document has shortfalls in funding reserved for key transport projects. To address the shortfall, Council is proposing to update the Toolern DCP and associated development levies.

Cardno (subsequently acquired by Stantec) was engaged to review the transport infrastructure identified in the Toolern DCP. Cardno prepared Functional Layout Plans, bridge designs, new road cross-sections, land take plans, a land take table on a property specific basis, and project cost sheets.

CW's review focusses on the Intersection Project Costings and Road Project Costings. This report will provide commentary on the following Transport Project components of the Toolern DCP update:

- Validity of the Road Project Costings in the Toolern DCP, prepared by Cardno and in FY22 dollars.
- Validity of the Intersection Project Costings in the Toolern DCP, prepared by Cardno and in FY22 dollars.
- Assessment of the Road and Intersection Projects in the Toolern DCP in FY25 dollars, adopting the same indexation method used by Cardno.
- Identification of costs that appear to be inaccurate or are costed using inaccurate methods.
- Suggestions on improved costing methods.

CW's review is limited to the above and does not consider the following components of the Transport Project Review:

- Land Take requirements
- Bridge Project Costings
- Designs and cross sections of road projects, intersection projects, and bridge projects, though any potential errors will be noted if identified.

4. DOCUMENTS INCLUDED IN THE REVIEW

CW's review has been based on the following documents that are available on the below website as of 9th August 2024.

https://conversations.melton.vic.gov.au/AmendmentC232melt/amendment-c232melt-background-documents

1) "*Recommended Changes to Toolern PSP and DCP Documents*" – Cardno, 17th March 2022 (V190196)
   a. "*Appendix A Intersection Project Costings Issue D*" – Cardno, 16th March 2022
   b. "*Appendix B Road Project Costings Issue D*" – Cardno, 16th March 2022

5. REVIEW OF ORIGINAL DCP CONSTRUCTION COSTS

5.1 Comparison of Original vs Revised DCP Costings

The original road and transport construction costings in the Toolern DCP were prepared by Meindhart and are expressed in July 2010 dollars. The DCP states the capital cost for each infrastructure item will be adjusted by applying the Building Price Index, as published in the latest edition of Rawlinsons Australian Construction Handbook on 1 July each year. CW does not have access to the historic editions of this handbook to assess the price adjustment.

An alternative indexation method is the VPA Benchmark Costings indexation method, which uses a rolling 4-quarter average of the Road and Bridge Construction Victoria index. Further discussion on the VPA Benchmark Costings is found in Section 7, and the VPA Benchmark Indexation Method in Section 7.3.

If the VPA Benchmark Costings indexation method is applied, the increase from July 2010 dollars to July 2021 dollars is **34.36%**. By comparison, the All-Groups CPI for Melbourne over the same time period was 24.32%.

For intersections already constructed prior to the revised DCP costings, rather than re-cost the completed project, Cardno applied the VPA Benchmark indexation method to the original DCP costs. A suggestion for these projects would be to use "actual" construction costs and apply indexation rather than using the original cost estimates. Melton City Council should have access to the "actual" contract value of these construction projects through the DCP approvals process and collection of supervision fees. This would provide an accurate assessment that feeds into the DCP contributions to ensure that there is no under or over provision of contributions.

The below tables show the comparison of the original Toolern DCP Cost + 34.36% indexation (based on the VPA Benchmark indexation method) compared to the costs proposed by Cardno for FY22.

Item	Original Toolern DCP Construction Cost	Original Toolern DCP Construction Cost (A)	Revised Toolern DCP Construction Cost (B)	Construction Cost Increase (B) – (A)	
Currency	*July 2010 dollars*	July 2021 dollars	July 2021 dollars	July 2021 dollars	
Prepared By	*Meinhardt*	Meinhardt + 34.36% Escalation	Cardno		
Road Projects	*$77,175,583*	$103,696,551.03	$97,597,516	-$6,099,035.06	-5.9%
Intersection Projects	*$23,828,000*	$32,016,362.20	$147,524,125	$115,507,762.80	360.8%
Sub-Total	***$101,003,583***	**$135,712,913.27**	**$245,121,641**	**$109,408,727.73**	**80.6%**

It is noted the revised Toolern DCP costings for Road and Intersection projects have been proposed to increase by $109,408,727.73 (80.6%) compared to the original DCP costings (once adjusted for indexation).

Of the $109M increase, $13,919,838.95 (12.72%) is based on new projects (or projects removed) from the scope of the Toolern DCP, while the remaining $95,488,888.61 (87.28%) is attributed to an increase to the estimated costs of the original Toolern DCP projects.

At face value, it would appear the original construction cost estimate prepared by Meinhardt may include errors relating to the measurement of quantities, inadequate scoping, an under estimation of rates, or perhaps different rate calculations (e.g. P90 vs P50 rates) which has led to overall costs being very much underestimated at the time.

6. CARDNO COSTING METHOD

The original costing method for the Toolern DCP Road and Intersection projects was estimated by Meinhardt Infrastructure & Environment and Melton Shire Council and expressed in July 2010 dollars.

On 9th August 2024, Council advised CW of the following in relation to Meinhardt's original costings:

> *"When the original Toolern Development Contributions Plan was prepared by the Growth Areas Authority (now Victorian Planning Authority), it was prepared without:*
> - *Functional Layout Plans*
> - *Land Take Plans*
> - *Bridge Concept Plans*
> - *Project Cost Sheets*
>
> *It is unclear how the GAA (now VPA) arrived at the costs for transport, and community and recreation projects."*

One option for calculation of updated transport project costings would be to procure the original detailed project cost sheets, and use these as a basis for a revised cost estimate of each project in FY22 dollars. This would provide consistency with the original DCP, though cost estimate techniques evolve over time and the original cost estimation method may be outdated.

Another option would be to prepare cost estimates for each transport project that captures the specifics of the project, such as anticipated ground conditions, topography, and interface with the public realm. This would be CW's recommended approach, noting it is a time intensive approach.

Paragraph 36.4 in the "*Part A submissions on behalf of Melton City Council*" states:

> *Council met with the Victorian Planning Authority, and the transport and planning divisions at the Department of Transport and Planning at the start of the process, where it was agreed that Council would use the VPA's Benchmark Infrastructure Report, April 2019, as the base for all Cardno designed transport projects and project cost sheets.*

As such, Cardno has generally used the following costing method:

1) VPA Benchmark Costings have been used as a basis to prepare the road and intersection transport projects,
2) Quantities have been updated as deemed appropriate,
3) Rates are based on the benchmark rates for FY19,
4) Indexation has then been applied to the total cost of each item using the VPA's indexation method to translate the costings into FY22 dollars.
5) P90 costs are proposed to be adopted in the Toolern DCP update.

The example below from Cardno's Intersection Project Costings (Appendix A) for Intersection IT-01 shows the 9.0% indexation from FY19 to FY22.

Extract from Appendix A Intersection Project Costings – Project IT-01

Group	Sub Item	Qty	Unit	Rate (P50)	Amount (P50)	Rate (P90)	Amount (P90)
Total - (2018) rates	Excluding Delivery				2,772,531		3,138,704
	Including Delivery				3,916,200		4,433,420
Total - (2021) rates	Excluding Delivery				3,022,059		3,421,188
	Including Delivery				4,268,658		4,832,428

7. VPA BENCHMARK COSTINGS

When a local government authority or the Victorian Planning Authority (VPA) prepares an Infrastructure Contributions Plan (ICP), the scope and cost of the infrastructure to be included needs to be determined. Much of the infrastructure is conceptually common in design and similar in cost. To simplify the preparation of ICP's, the VPA commissioned Cardno to prepare benchmark infrastructure designs and cost estimates for a range of basic and essential local infrastructure items generally provided for in PSP's and funded through ICP's.

Cardno undertook technical analysis and provided draft baseline infrastructure cost data to standardise the cost estimation of ICP projects. This was developed using baseline data from a range of projects designs and estimates prepared by various consultants from across Melbourne's greenfield areas.

7.1 Benchmark Costings Method

PSPs are developed taking into account the unique characteristics and requirements of each location, and as a result there is no "one size fits all" plan.

In preparation of the benchmark costings, Cardno assessed the background data that was available to the VPA in order to provide baseline infrastructure cost data and therefore standardise the cost estimation of ICP projects. Where information from background data was insufficient, the process was supplemented using Cardno's internal resources and databases.

The benchmark rates were extracted from 26 DCP's provided by the VPA. The Monte-Carlo method was used to process the extracted data, with the database then subsequently calibrated and tested for validity by including construction costs submitted by several stakeholders through the stakeholder engagement process.

7.2 CW Commentary on VPA Benchmark Costings Method

The issue of potential cost differences related to geographic, topographical or other forms of variances from the source data has been acknowledged by the VPA in the preparation of the benchmark costings.

Cardno made baseline assumptions that addressed the ambiguity and unknown factors in the benchmark cost estimation. While the majority of the assumptions in the benchmark costings are generally supported by CW, there are several that are relevant to the Toolern DCP area which should be considered further.

Siteworks/Earthworks – Earthworks (m3)

<u>Cardno Assumption</u>: Minor rock removal allowance has been included.

<u>CW Comment</u>: Of the 26 DCP's used for the benchmark rates, 9 projects are in the southeast where rock excavation and removal is generally not relevant. Of the 17 other DCP's from areas in the north and west, excavation and disposal of rock (typically weathered basalt) is prevalent. Earthworks costs for areas with rock are generally higher than clays and sands.

<u>Impact to Benchmark Costs</u>: The earthworks costs in western and northern projects may be under-estimated, or alternatively the earthworks rates in southeast projects may be over-estimated.

Road Pavement – Primary, Secondary and Collector Arterial Pavement (m2)

<u>Cardno Assumption</u>: Pavement depths have been noted as per VPA standards. The pavement design tool "Circly" was not used to create the pavement formations. A sub-grade CBR 3% has been adopted.

<u>CW Comment</u>: CW engaged Ground Science to review the pavement assumptions in the VPA Benchmark, and provide a hypothetical pavement design for each of the three pavement types.

<u>Impact to Benchmark Costs</u>: The Primary Arterial pavement cost appears to be over-estimated in the VPA Benchmark. However, none of the VPA Benchmark pavements include a capping layer which was a requirements brought in by the EDCM after the preparation of the VPA Benchmark costings.

7.3 Currency of VPA Benchmark Construction Rates

The VPA's Benchmark Costings is a live document, with cost estimates indexed annually. The indexation method is described in detail in the VPA's "Benchmark Infrastructure & Cost Guide", with the table below presenting the values.

Quarter	Average 4-Quarter Index Number (VPA Method)	Year on Year Indexation (VPA Method)	Indexation from 1st July 2018 Benchmark (VPA Method)	FY Indexation
Jun-2018	109.6	Reference Year for Indexation		
Jun-2019	119.4	109.01%	**109.01%**	**FY20**
Jun-2020	121.7	101.90%	**111.09%**	**FY21**
Jun-2021	119.5	98.15%	**109.04%**	**FY22**
Jun-2022	124.7	104.42%	**113.85%**	**FY23**
Jun-2023	135.5	108.66%	**123.71%**	**FY24**
Jun-2024	141.7	104.57%	**129.37%**	**FY25**

For example, a road or intersection project that is estimated to cost \$1,000,000 on 1st July 2018, is estimated to cost \$1,000,000 x 129.37% = \$1,293,700 (rounded) on 1st July 2024.

As noted in Section 4, Cardno has used the FY19 benchmark rates to derive a total value for each project, and then used the VPA indexation method (noted above) to determine a cost in FY22 dollars. By multiplying each P90 rate in the benchmark costings by the same indexation factor (9.0%), the rates can be compared to actual tender rates from relevant projects to ascertain their validity.

8. VPA BENCHMARK RATES

8.1 Validity of Rates

CW has reconciled tendered construction rates between December 2020 and October 2021 for construction contracts of road projects, intersection projects, and subdivision projects. These projects are a mix of west and north growth area suburbs, as CW considers these areas to feature consistent contractors, ground conditions, and costs.

No southeast projects have been used, due to the different ground conditions, different principal contractors (that specialise in the southeast), and different suppliers and subcontractors.

The use of subdivision project rates is consistent with Cardno's data sample used to prepare the VPA Benchmark Costings, as stated in their report "*Pricing data for identified gaps were extracted from internal tendered construction rates. These rates were either for sub-divisional works or similar construction elements*."

CW's sample of data for this period was based on 5 separate projects, and 16 individual pricing submissions, including prices from Winslow, Symon Bros, Rokon, Bild (formerly Bitu-Mill), Civ2Con, Lojac, Civilworx, and BMD. Each project was developer-funded, consistent with Cardno's statement in their benchmark costings report that construction of ICP interim infrastructure is usually the responsibility of the developer.

CW has identified rates in the table below where data is available, relevant, and can be directly compared to the rates used in the benchmark costings. The items that have zero available or relevant data, are generally:

a) Items which there is not sufficient data in terms of the number of different data points available or the quality of this data, such as signals infrastructure.
b) Landscaping items, which are usually delivered by a separate contractor and are often bonded and delivered much later.

c) Public lighting, which is usually priced as lump sum with very little transparency in costs. Cardno also noted this challenge in the benchmark costings report.

CW considers the rates to be an average representation of current (at the time) market rates based on our database. In order to compare the average rates in the CW database to the Cardno P90 rates used in the updated DCP costings, CW has applied the same scaling to the CW average rates (considered to be P50) to create a CW P90 rate.

The full comparison is included in Appendix A.

Group	Sub Item	Unit	Cardno VPA Benchmark Rate (P90) + Index to July 2021	CW Rate July 2021 Average + Scaling to P90
Siteworks/ Earthworks	Earthworks	m3	$44.18	$35.23
Road Pavement	Primary Arterial Pavement	m2	$203.09	$166.89
	Secondary Arterial Pavement	m2	$145.87	$148.99
	Collector Arterial Pavement	m2	$122.60	$148.72
Concrete Works	Kerb and Channel	m	$66.40	$56.15
	Cycle Path	m2	$100.25	$75.12
	SUP/ Footpath	m2	$80.28	$69.38
Drainage	Drainage Pipe 300mm CR Bfilled	m	$215.85	$270.28
	Drainage Pipe 375mm CR Bfilled	m	$308.53	$283.36
	Drainage Pipe 450mm CR Bfilled	m	$364.54	$441.81
	Drainage Pipe 525mm CR Bfilled	m	$488.52	$474.27
	Drainage - pits	No.	$3,059.69	$3,125.93
	Drainage - Sub-soil drainage	m	$47.32	$39.18
Misc.	Regulatory Signage	Item	$414.77	$399.61
	Line Marking	m2 of Pavement	$4.46	$5.48

The above table generally shows that tendered rates from construction projects in CW's database between December 2020 and October 2021 and scaled to a P90 rate are generally lower than the benchmark rates with the indexation applied to July 2021 dollars.

Earthworks

CW's rate for earthworks costs (i.e. excavation for road pavements) is significantly lower than the VPA Benchmark rate. CW's rate includes rock excavation, and disposal of rock off-site which is a typical requirement of road and subdivision projects. It is noted in Section 7.2 that the VPA Benchmark makes no allowance for rock excavation – accordingly, Cardno has made extra/over costs in the Road and Intersection projects for rock excavation. Refer to Section 8.3 for further commentary.

Road Pavement

CW's pavement costs are based on a memo provided by Ground Science Geotechnical Engineers. This memo is included in Appendix B.

While Ground Science generally agreed with the pavement makeup assumptions in the VPA Benchmark Report, the memo provides additional detail on the pavement composition that has allowed CW to provide a cost for the respective pavement types.

It is noted that CW's rate includes a Capping Layer, which is a requirement of Melton City Council but was brought into the Engineering Design & Construction Manual after preparation of the Benchmark Costings.

CW's pavement costs are consistent with the VPA Benchmark for the Collector and Secondary Arterial pavements, but is significantly lower for the Primary Arterial road pavement.

Concrete Works

CW's rates for concrete works (footpaths, shared paths, cycle paths, and kerb and channel) are significantly lower than the VPA Benchmark.

Drainage

CW's drainage rates are a mix of higher and lower than the VPA benchmark. This is potentially due to a few factors:

- Project specific outliers due to small or large quantities that create efficiencies or inefficiencies,
- Design factors that influence pipe cost including but not limited to depth of pipe and class of pipe,
- Strategic tendering tactics employed by contractors,
- Supply chain manipulation.

Drainage rates do not necessarily display a linear relationship with pipe diameter, which is evident with CW's rates.

Misc.

CW's rates are a mix of higher and lower than the VPA benchmark, but it is noted the costs for these items have minimal impact to the overall cost when compared to the above items.

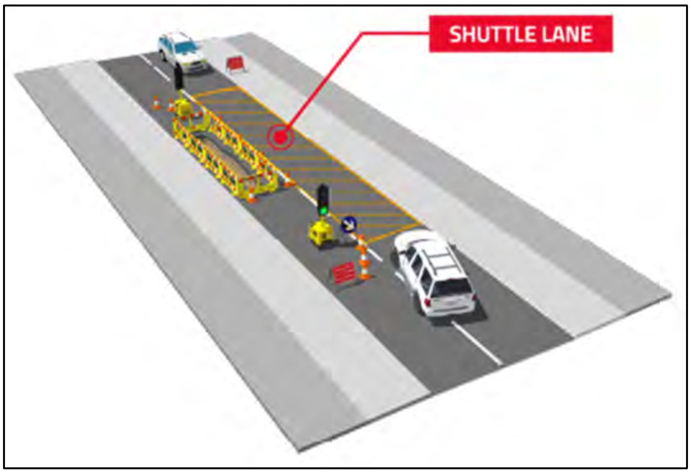
8.2 Validity of Delivery Costs

The benchmark costings use a percentage of construction cost method for several construction elements, including site establishment, environmental management, and traffic management. Site establishment costs and environmental management costs are site specific, but CW generally consider the percentages used by Cardno as reasonable.

Cardno has adopted a 5% traffic management cost for each road and intersection project in the Toolern DCP. CW's database shows the traffic management costs vary significantly across projects, based on a couple of key factors:

1) Is the traffic management under partial road closure or full road closure?
2) For partial road closure, is "shuttle flow" utilised or is a bypass road constructed?

Example of Shuttle Flow (or "stop/go")



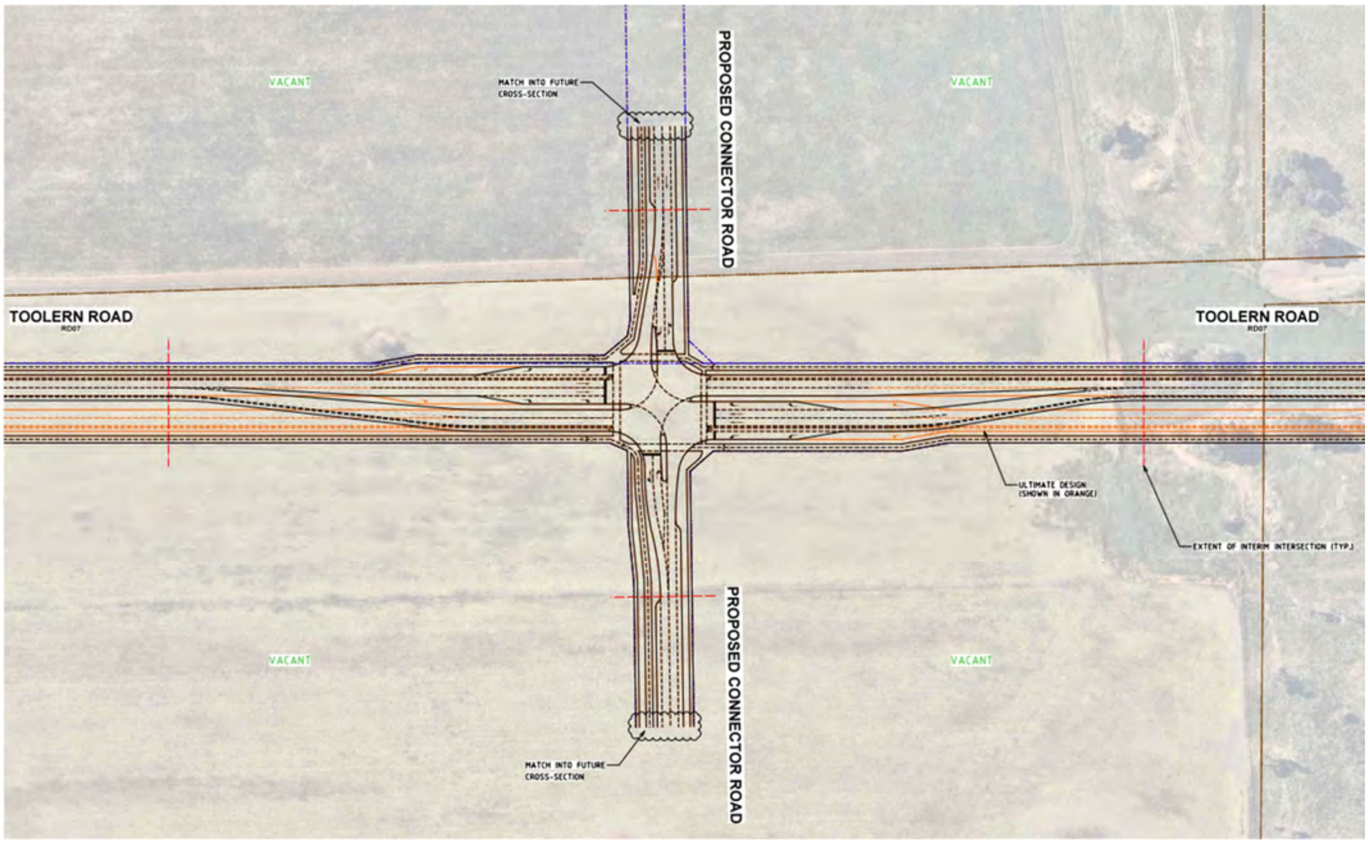
Example of a Full Road Closure

Example of a Bypass Road

The Toolern DCP road and intersections projects include both upgrades of existing roads and intersections, and new roads and intersections in greenfield conditions.

For projects that are in greenfield conditions, the traffic management costs are not applicable and are adding significant extra cost to the project. One of many examples of this is IT22 shown below.

Intersection IT-22 – Concept Layout, May 2021



Location of Intersection IT-22 – Aerial Image, May 2024

The above intersection is costed at $5,595,491 in the updated Cardno FY22 costs, which includes $198,000 of traffic management that is unlikely to be applicable given the works are in greenfield conditions.

8.3 Rock Excavation in Cardno Costings

As noted in Section 7.2, the VPA Benchmark costs make no allowance for significant rock excavation. In response to this assumption, when preparing the Toolern DCP costings, Cardno has included an item in each Road and Intersection project for “rock excavation”. The rock excavation (m3) appears to be based upon 20% of the earthworks quantity (m3).

Cardno has assigned a rate of $115/m3 for rock excavation, though as this is not a VPA Benchmark rate, it is unclear how it has been derived. As noted in Section 8.1, CW’s rate for earthworks costs includes rock excavation, and disposal of rock off-site which is a typical requirement of road and subdivision projects. As such, CW considers the inclusion of the $115/m3 for rock excavation in the Road and Intersection projects to be high.

The impact the rock excavation costs are having on the project costings is shown in Appendix C.

8.4 Effect on Construction Costs

The below table estimates the Toolern DCP road and intersection project costs using rates from CW’s database (with scaling to P90), deducting traffic management costs where it is unlikely to be required (such as the IT-22 example above), and removal of rock excavation costs.

No quantities have been amended in the below calculations, and the completed projects, and Rockbank DCP projects, have been excluded from the comparison.

ID	Cardno FY22 Cost	Deduction Based on CW P90 Rates	Deduction Based on Removing Rock Excavation	Deduction Based on CW Rates + Rock
RD01	$1,009,272.00	-$32,144.27	-$16,289.23	-$48,433.50
RD02	$4,496,855.00	-$110,444.41	-$213,884.71	-$324,329.11
RD03	$1,954,991.75	-$58,087.83	-$30,630.84	-$88,718.67
RD04	$13,092,554.00	-$327,256.41	-$167,141.69	-$494,398.10
RD05	$641,228.00	-$40,019.00	-$23,548.56	-$63,567.56
RD06	$6,751,787.00	-$421,383.11	-$240,089.12	-$661,472.23
RD07	$5,615,593.00	-$350,468.26	-$199,366.04	-$549,834.30
RD08	$7,114,863.00	-$370,255.98	-$229,465.71	-$599,721.69
RD11	$9,307,858.00	-$836,918.71	-$311,265.99	-$1,148,184.69
RD14	$5,071,142.00	-$247,991.03	-$77,727.97	-$325,719.00
RD15	$4,731,581.00	-$300,354.99	-$124,116.87	-$424,471.86
RD16	$665,655.00	-$13,199.63	-$17,174.52	-$30,374.15
RD17	$6,062,461.00	-$358,227.71	-$255,670.13	-$613,897.84
RD19	$4,832,621.22	-$583,658.79	-$155,278.88	-$738,937.67
IT01	$4,832,428.00	-$67,206.76	-$28,152.04	-$95,358.81
IT02	$6,003,029.00	-$83,277.14	-$149,613.06	-$232,890.20
IT03	$8,928,408.00	-$139,971.05	-$237,787.38	-$377,758.43
IT04	$2,686,264.00	-$36,174.70	-$60,553.45	-$96,728.15
IT05	$9,032,022.00	-$1,228,832.33	-$354,467.86	-$1,583,300.19
IT06	$11,738,409.00	-$1,059,131.04	-$470,086.00	-$1,529,217.04
IT10	$7,109,635.00	-$454,673.94	-$169,620.49	-$624,294.43
IT12	$10,179,831.00	-$1,040,424.35	-$346,677.36	-$1,387,101.71
IT13	$11,062,998.00	-$255,621.90	-$184,139.15	-$439,761.05
IT16	$5,190,822.00	-$51,465.21	-$100,745.36	-$152,210.58
IT17	$5,652,281.00	-$55,466.70	-$101,099.48	-$156,566.18
IT18	$7,973,390.00	-$258,846.56	-$89,059.61	-$347,906.17

ID	Cardno FY22 Cost	Deduction Based on CW P90 Rates	Deduction Based on Removing Rock Excavation	Deduction Based on CW Rates + Rock
IT20	$9,393,854.00	-$833,915.16	-$318,879.43	-$1,152,794.59
IT21	$6,512,388.00	-$566,830.00	-$228,757.48	-$795,587.48
IT22	$5,595,492.00	-$324,467.69	-$207,687.71	-$532,155.40
IT23	$4,802,624.00	-$306,348.26	-$179,358.61	-$485,706.88
IT25	$983,157.00	-$39,841.60	-$21,069.77	-$60,911.37
IT29	$4,598,543.00	-$27,564.19	-$86,226.70	-$113,790.89
Total	**$193,624,036.96**	**-$10,880,468.71**	**-$5,395,631.21**	**-$16,276,099.92**

As shown in the table above, based on:

a) CW's rates database,
b) Road pavements suggested by Ground Science,
c) Deductions in traffic management for greenfield projects,
d) Deduction for rock removal that is built into excavation rates,

The Cardno costs appear to be approximately $16.28M higher than the equivalent cost using CW's rates.

9. ROAD AND INTERSECTION DELINEATION

The table in Section 4.1 shows that Meinhardt and Cardno have vastly differently methods to delineating Road projects and Intersection projects. Of the original DCP Costings, Meinhardt estimated 76.4% of the cost was attributed Road projects, and 23.6% was attributed to Intersection projects. By contrast, Cardno has estimated that 39.8% of the costs are attributed to Road projects, with a significantly higher 60.2% attributed to Intersection projects.

Item	Original Toolern DCP Construction Cost	Original Toolern DCP Construction Cost (A)	Revised Toolern DCP Construction Cost (B)
Currency	*July 2010 dollars*	July 2021 dollars	July 2021 dollars
Prepared By	*Meinhardt*	Meinhardt + 34.36% Escalation	Cardno
Road Projects	*$77,175,583*	$103,696,551.03	$97,597,516
Road Project Proportion	*76.4%*	76.4%	39.8%
Intersection Projects	*$23,828,000*	$32,016,362.20	$147,524,125
Intersection Project Proportion	*23.6%*	23.6%	60.2%
Sub-Total	***$101,003,583***	**$135,712,913.27**	**$245,121,641**

Understanding this delineation is important for a few reasons:

1) Existing planning permits, public infrastructure plans, and S173 agreements that include reference to DCP infrastructure based on the original DCP, may be impacted based on significant scope changes to DCP projects.

2) It is extremely challenging to compare scope changes to original DCP projects, if the method for delineating roads vs intersections is so vastly different.

3) The lack of transparency can lead to potential errors in the revised DCP costings.

While CW agrees with Cardno's method of delineating roads vs intersections generally, in the case of revised DCP costings, the original delineation method for costing the projects would provide consistency and allow all stakeholders to make a simple comparison.

10. POTENTIAL ERRORS IN REVISED DCP COSTINGS

Cardno's "*Recommended Changes to Toolern PSP and DCP Documents*" notes that Cardno was engaged to review the road network design in the interim and ultimate scenarios and recommend intersection treatments in order to facilitate future traffic movements through the PSP area.

It was also noted that Functional Layout Plans (FLPs) of all DCP projects were prepared based on either approved functional layouts as provided by Council or adaptation of the benchmark functional layouts as per VPA standards.

CW has not undertaken a detailed quantity estimation of each road and intersection project to investigate the quantities Cardno has used. However, upon initial review, there appears to potentially be a combination of delineation errors and calculation errors that are leading to significant additional costs in the Cardno DCP costings.

Discrepancies found in the Cardno costings include:

- Road lengths are unclear and appear to be incorrect due to unclear delineation of the extent of intersection projects or discrepancies in measurements between those presented by Cardno and those measured by CW. Road projects have been measured for road length as a high-level estimate in the table below.
- Intersections have additional lanes when compared to the benchmark infrastructure costings. Assumptions and justifications for this deviation from the costing methodology are not stated. CW has provided comments to this effect in the table below and should be scrutinised by a suitable qualified transport engineering professional.
- High level assessments of intersection quantities find discrepancies between CW measured quantities and quantities presented by Cardno. This is the case for IT20 which pavement area was estimated at a high level in the table below, although further intersections have not been considered in detail.
- Context and scope of completed projects or existing infrastructure is not properly considered in the Cardno costings. There are cases where a full road upgrade is quantified but not required. Two examples where this has occurred are provided below. Further projects where this may be applicable have not been considered in detail.
    - RD15's scope in the revised DCP includes the addition of a lane in each direction to form a 6-lane arterial road. A 4-lane arterial road was built prior to the Toolern DCP gazettal in 2010 as per aerial imagery from MetroMap (15th November 2009). This road is in a similar condition in the present day. The quantities in the Cardno costing allow for the construction of full depth pavement for a width of 14m and pavement rehab for a width of 7m. In reality, there are 4 existing lanes of road to a total of 14m wide which would require pavement rehab, the additional 2 lanes where road widening is required would result in only 7m of full pavement depth primary arterial road. An additional cost of approx. $300k has been included in the Toolern Revised DCP due to the scope not being considered.
    - RD18's scope allows for the construction of a full depth primary arterial road pavement to form an interim 2-lane road. A 2-lane arterial road was present prior to the Toolern DCP gazettal in 2010 as per aerial imagery from MetroMap (15th November 2009). This road is in a similar condition in the present day. The quantities (544m) in the Cardno costing allow for the construction of full depth pavement for a width of 11m. However, the cost sheet has been disregarded in the DCP change table, and rather, indexation of a 2160m road length has been applied.

ID	Original DCP Construction Scope	Revised DCP Construction Scope*1	CW Proposed DCP Construction Scope	CW Comment	Estimated*2 Impact to Cardno DCP costings	Type of Error
ROAD PROJECTS – LENGTH OF ROAD						
RD01	180m – Construction of a 2-lane arterial road (interim layout).	180m – Construction of a 2-lane arterial road.	Remove project. Remove cost.	IT01 is directly south of RD01. Based on the Cardno FLP of RD01, the intersection extents fully encapsulate the RD01 scope.	Cost reduction of $848,383.	Potential Delineation Error
RD03	900m – Construction of a 2-lane arterial road (interim layout).	339m – Construction of a 2-lane arterial road	Reduce road length to 130m. Reduce cost to $749,702.	No road length between IT02 and IT24 extents. CW measured 130m of road length between IT24 and IT03 extents.	Cost reduction of $1,205,290.	Potential error in calculation.
RD04	2310m – Re-construct existing pavement to provide 2-lane arterial road (interim layout).	1857m – Re-construct existing pavement to provide 2-lane arterial road.	Reduce road length to 1769m. Reduce cost to $12,472,121.	CW measured road length as 1769m, deducting extents of intersections IT24 and IT04.	Cost reduction of $620,433.	Potential error in calculation.
RD05	400m – Construction of a 2-lane arterial road (interim layout).	136m – Construction of a 2-lane arterial road	Reflect actual road length. Reduce road length to 86m. Reduce cost to $580,480.	Revised DCP scope description lists 136m, actual length costed is 95m in Cardno Review Appendix B deducting 41m of bridge length. CW assessment determines 50m of bridge length should be deducted based on BD03 plans, revised length of 86m.	Cost reduction of $60,748.	Potential error in description /calculation.
RD06	1680m – Construction of a 2-lane arterial road (interim layout).	1011m – Construction of a 2-lane arterial road	Reflect actual road length. Reduce road length to 86m. Reduce cost to $580,480.	Revised DCP scope description lists 1011m, actual length costed is 970m in Cardno Review Appendix B deducting 41m of bridge length. CW assessment determines 50m of bridge length should be deducted based on BD03 plans, revised length of 961m.	Cost reduction of $62,645.	Potential error in description /calculation.
RD08	1650m – Construction of a 2-lane arterial road (interim layout).	927m – Construction of a 2-lane arterial road	Reduce road length to 799m. Reduce cost to $6,132,444.	CW measured road length as 799m between the intersection extents of IT21 and IT07. Assumptions have been made for the extent of IT07 based on the Rockbank DCP Amended 2023.	Cost reduction of $982,419.	Potential Delineation Error
RD11	2190m – Upgrade existing 2-lane unsealed rural road to 2-lane carriageway	678m – Construction of a 2-lane arterial road	Reflect actual road length. Reduce road length to 317m. Reduce cost to $3,360,582.	Revised DCP scope description lists 678m, actual length costed is 878m in Cardno Review Appendix B. CW measured a road length of 317m excluding intersection extent of IT06, IT20 and IT26.	Cost reduction of $5,947,276.	Potential Delineation Error
RD12	1,680m – Construction of a 2-lane unsealed rural road to 2-lane carriageway	312m – Construction of a 2-lane arterial road	Reduce road length to 258m. Reduce cost to $3,687,515.	CW measured road length as 258m. Assumptions have been made for the extent of intersections IT10, IT19 and IT25 as these have not been disclosed on the plans provided.	Cost reduction of $771,805.	Potential Delineation Error
RD15	940m – Construction of additional lane in each direction to existing 4-lane divided road.	350m – Construction of additional lane in each direction to existing 4-lane divided road.	Reduce road length to 301m. Reduce cost to $662,421.	CW measured road length as 301m. Assumptions have been made for the extent of intersections IT13 and IT18 where these have not been disclosed on the plans provided.	Cost reduction of $662,421.	Potential Delineation Error
RD17	2160m – Upgrade existing 2-lane sealed/unsealed road to 2-lane carriageway	729m – Construction of a 2-lane arterial road	Increase road length to 862m. Increase cost to $7,168,507.	CW measured road length as 862m. Assumptions have been made for the extent of intersections IT05, IT28 and IT27 as these have not been disclosed on the plans provided.	Cost increase of $1,106,046.	Potential Delineation Error
RD18	2160m – Upgrade existing 2-lane sealed/unsealed road to 2-lane carriageway	2160m – Construction of a 2-lane arterial road	Reduce road length to 1157m. Reduce cost to $5,453,216	CW measured road length as 1157m. However, Cardno has not adopted their RD18 cost sheet, and has instead applied indexation of the original cost that was based on 2160m.	Cost reduction of $4,727,378	Potential Delineation Error
					Cost reduction of **$14,782,752**	

ID	Original DCP Construction Scope	Revised DCP Construction Scope[*1]	CW Proposed DCP Construction Scope	CW Comment	Estimated[*2] Impact to Cardno DCP costings	Type of Error
INTERSECTION PROJECTS						
IT06	Construction of signalised 4-way intersection and slip lanes (interim layout)	Construction of signalised 4-way intersection (interim standard)		Cardno costs are based on 3-lanes in each direction for the primary arterial. The Benchmark standard drawing only includes 2-lanes in each direction for the interim standard.	Remove approx. $1.5M from IT06.	Assumption appears incorrect.
IT12	Construction of signalised 4-way intersection and slip lanes (interim layout)	Construction of signalised 4-way intersection (interim standard).		Cardno costs are based on 3-lanes in each direction for the primary arterial. The Benchmark standard drawing only includes 2-lanes in each direction for the interim standard. The Cardno costs also reflect two northbound turning lanes which is inconsistent with the benchmark standard.	Remove approx. $2.3M from IT12.	Assumption appears incorrect.
IT13	Construction of signalised 4-way intersection and slip lanes (interim layout)	Construction of signalised 4-way intersection (interim standard).		An additional northbound turning lane has been provided on the eastern approach of Shogaki Drive which is inconsistent with the VPA benchmark.	Remove approx. $100k from IT13.	Assumption appears incorrect.
IT20	Construction of signalised 4-way intersection and slip lanes (interim layout)	Construction of signalised 4-way intersection (interim standard)		Pavement and kerb quantities appear overestimated, but the reasoning why is unclear.	Remove approx. $750k from IT20.	Potential error in calculation.
					Cost reduction of approx. **$4,650,000**	
					Total cost reduction of approx. **$19,432,752**	

[*1] As apparent to CW.

[*2] Costs based on a high-level assessment

As shown in the table above, there is potentially $19.4M in extra cost based on incorrect scope assumptions and ‘double ups’ in the costings. This is based on a high-level assessment of a few key infrastructure items which stood out as part of CW’s review. A detailed revision of these costings may present additional inconsistencies with quantities, scope and resultant costings.

11. ROAD CROSS SECTIONS

11.1 Typical Cross Sections

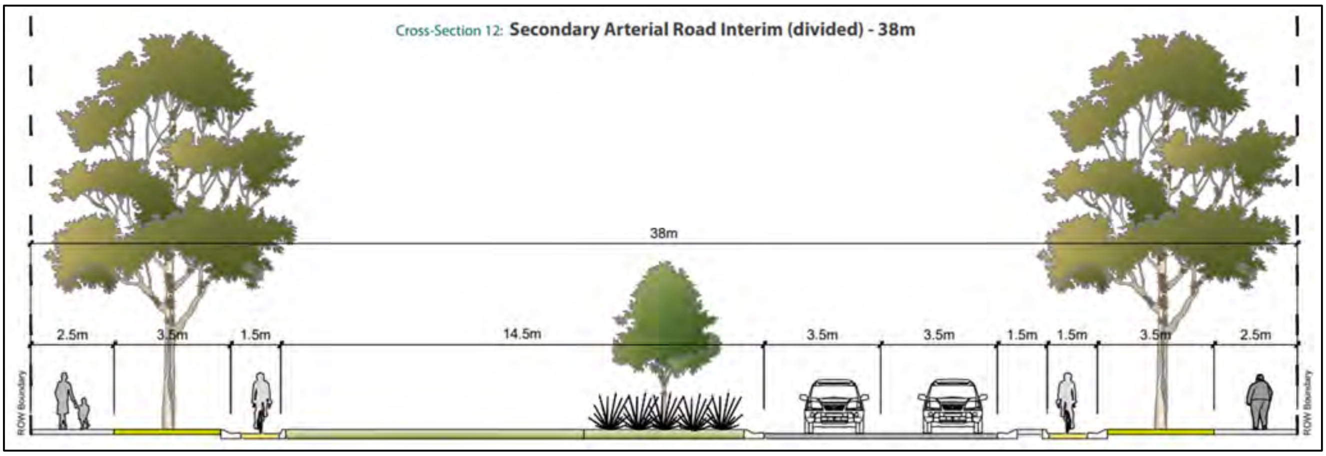
A difference between the original DCP, revised DCP, and the VPA Benchmark is the cross section of a secondary arterial (interim) road. Item 491 in the PSP Change Table notes

> "*New cross-sections provided for secondary arterial roads that are consistent with secondary arterial road cross-sections in contemporary PSPs. Notes included with Cross-Section for consistency with contemporary PSPs – see Section 4 in Plumpton PSP for an example*"

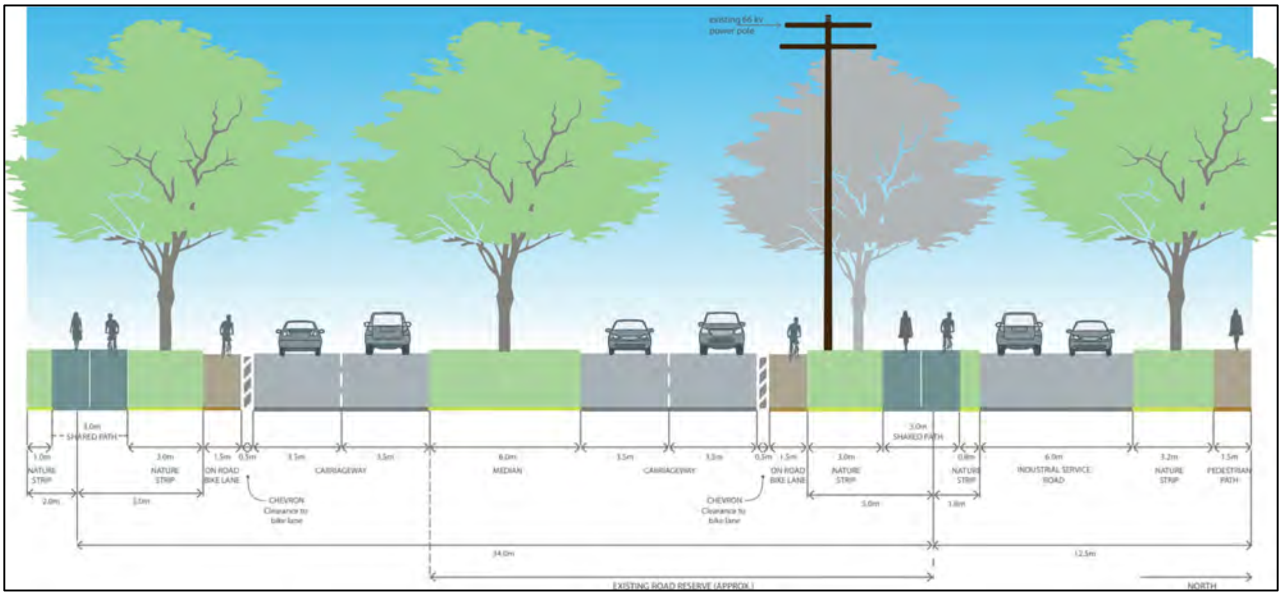
While CW is not a traffic and transport engineering specialist and cannot comment on the suitability of the revised cross sections proposed, we note the following key differences that are impacting the DCP costings.

Source	Original Toolern DCP	Revised Toolern DCP	VPA Benchmark
Carriageways	2-Lane Carriageway (7m)	2-Lane Carriageway (7m)	2-Lane Carriageway plus 2x1m full-depth asphalt shoulder (9m).
Cycle Lanes	2 x 1.5m cycle lanes, with nature strip separator	2 x 1.5m on-road cycle lanes, with 2 x 0.5m full-depth pavement separator	Nil
Paths	2 x 2.5m shared paths	2 x 3.0m shared paths	1 x 2m shared path

Original DCP Cross Section



"Contemporary" Cross Section in Revised DCP (Source: Plumpton PSP)



11.2 Inconsistency in Cardno FLP's vs VPA Benchmark

Cardno noted that Functional Layout Plans (FLPs) of all DCP projects were prepared based on either approved functional layouts as provided by Council or adaptation of the benchmark functional layouts as per VPA standards. The revised DCP documents do not appear to clarify which Road and Intersection projects are based on approved FLP's vs Benchmark adaptations. Most of the roads appear to be adapted from the Plumpton PSP example in Section 11.1.

The following table compares each road project with the VPA Benchmark designs. As shown in the table, the red cells are the Toolern DCP road cross section elements that deviate from the VPA Benchmark.

Road Project		RD01	RD02	RD03	RD04	RD05	RD06	RD07	RD08	RD11	RD14	RD15	RD16	RD17	RD19	VPA Benchmark - Primary Arterial (Interim)	VPA Benchmark - Secondary Arterial (Interim)
Classification (PRI - Primary Arterial, SEC - Secondary Arterial)		SEC	SEC	SEC	SEC	SEC	SEC	SEC	SEC	PRI	PRI	PRI	SEC	SEC	PRI	PRI	SEC
Length of Road (Description)	m	180	528	339	1857	136	1011	806	927	678	438	350	69	729	438		
Length of Road (In Calculations)	m	180	528	339	1857	95	970	806	927	878	438	350	69	729	438		
Width of Road Pavement																	
1-lane each direction	m per m	7		7	7	7	7	7	7							7	9
2-lanes each direction	m per m		14							14	14		14	14	14		
3-lanes each direction	m per m											21					
On-road cycle lanes	m per m	4	4	4	4	4	4	4	4				4	4			
Total	**m per m**	11	18	11	11	11	11	11	11	14	14	21	18	18	14	7	9
Width of Shared Paths																	
1.5m Footpaths	m per m									1.5	3	3			3		
2.0m Shared Paths	m per m																2
2.5m Shared Paths	m per m			2.5													
3m Shared Paths	m per m	6	6	3	6	6	6	6	6	6	6	6	6	6	6	3	
Total		6	6	5.5	6	6	6	6	6	7.5	9	9	6	6	9	3	2
Length of Kerb	m per m	4	4	4	4	4	4	4	4	4	4	3	4	4	4	2	2

Using Cardno's FY22 rates for the elements that are surplus to the VPA Benchmark shows a total of $16,756,131 of road infrastructure that is surplus to the VPA Benchmark standard. This represents 17.2% of the $97,597,516 Road Projects total.

Quantities Surplus to VPA Benchmark		RD01	RD02	RD03	RD04	RD05	RD06	RD07	RD08	RD11	RD14	RD15	RD16	RD17	RD19	FY22 Rate (P90)	FY22 Cost
Earthworks	m3	229	3018	431	2358	121	1232	1024	1177	4394	2192		394	4166	2192	$44.17	$1,012,649.32
Primary Arterial Pavement	m2									6146	3066				3066	$203.02	$2,492,721.31
Secondary Arterial Pavement	m2	360	4752	678	3714	190	1940	1612	1854				621	6561		$145.82	$3,249,165.70
Subgrade Preparation	m2	72	950	136	743	38	388	322	371	1229	613		124	1312	613	$17.61	$121,750.73
Kerb and Channel	m	360	1056	678	3714	190	1940	1612	1854	1756	876		138	1458	876	$66.38	$1,095,817.55
SUP/ Footpath	m2	720	2112	1187	7428	380	3880	3224	3708	4829	3066		276	2916	3066	$80.26	$2,952,764.38
Drainage - Sub-soil drainage	m	360	1056	678	3714	190	1940	1612	1854	1756	876		138	1458	876	$47.31	$780,927.45
Line Marking	m2 P'ment	229	3018	431	2358	121	1232	1024	1177	10540	5258		394	4166	5258	$4.46	$156,951.16
Construction Cost Surplus		$163,591	$1,145,961	$294,493	$1,687,717	$86,340	$881,575	$732,526	$842,495	$2,097,704	$1,099,191	$0	$149,756	$1,582,207	$1,099,191		$11,862,747.59
Delivery Cost Surplus	%	$67,481	$472,709	$121,479	$696,183	$35,615	$363,650	$302,167	$347,529	$865,303	$453,416	$0	$61,774	$652,660	$453,416	41.25%	$4,893,383.38
Total Cost Surplus to VPA Benchmark		**$231,073**	**$1,618,669**	**$415,972**	**$2,383,900**	**$121,955**	**$1,245,225**	**$1,034,692**	**$1,190,024**	**$2,963,006**	**$1,552,608**	**$0**	**$211,531**	**$2,234,867**	**$1,552,608**		**$16,756,131**

The deviation from the VPA Benchmark standard results in:

- Significantly greater areas of footpaths, cycle paths, and shared paths.
- Much greater area of full depth asphalt pavement, as it is being extended the full width of the cycle lanes (at a rate of $145.82/m2) rather than rigid pathways pavements (at a rate of $80.26/m2).

The above is a simplified calculation for comparative purposes and should not be used for the purpose of revised DCP costings.

12. SUMMARY OF POTENTIAL DIFFERENCES

The below table summarises CW's estimate of how the $109,408,728 gap between the original DCP and revised DCP Road and Intersection projects.

Increase from Original and Revised DCP Road & Intersection Projects	$109,408,727.73	
CW Suggested Reasons for Increase		
Difference attributed to added and removed projects (Section 5.1)	$13,919,838.95	12.72%
Difference due to conservatism in VPA Benchmark rates (Section 8.3)	$10,880,468.71	9.94%
Difference due to rock excavation (Section 8.4)	$5,395,631.21	4.93%
Difference potentially attributed to errors in costings (Section 10.1)	$19,432,752.00	17.76%
Difference due to cross sections surplus to the VPA Benchmark (Section 11.2)	$16,756,130.97	15.32%
Balance (Reasoning unidentified due to unavailability of original cost sheets)	$43,023,905.89	39.32%

It needs to be reiterated that the above has been based on high level estimating rather than detailed cost breakdowns of each project.

CW believes the conservatism in the benchmarks rates and the rock excavation should be adjusted to rates that reflect more realistic market conditions. The potential errors in costings should be explored in further detail, and if determined to be correct, removed from the updated DCP costings. The cross section elements surplus to the VPA Benchmark should be considered on their merits by qualified transport engineers, but the additional cost it is creating is evident.

Based on the above, CW suggests a thorough review of the above items will lead to the following range of outcomes:

- If rates are updated and rock excavation is removed, and 75% of the errors in the costings are agreed, the revised DCP Costings will be reduced by approximately $30.9M.
- If rates are updated and rock excavation is removed, 75% of the errors in the costings are agreed, and the road cross sections are scaled-back to the VPA benchmark for 50% of the road projects, the revised DCP Costings will be reduced by approximately $39.2M.
- If all concerns raised by CW are agreed, the revised DCP Costings will be reduced by approximately $52.5M.

13. FY25 COST COMPARISON

The revised DCP Costings were prepared by Cardno for FY22. It is CW's understanding that if the DCP amendment is approved, the Cardno Road and Intersection costs will be indexed from FY22 currency to FY25 currency.

As noted in Section 5.1, CW does not have access to the Rawlinsons Australian Construction Handbook for the indexation specified in the Toolern DCP. However, CW can assess indexation in accordance with the VPA Benchmark Method, which has also been adopted by Cardno in the preparation of the revised DCP costings.

13.1 CW's Rates Database Increase vs Indexation

Similar to the exercise undertaken for FY22 and described in Section 8.1, CW has reconciled tendered construction rates between February 2024 and June 2024 for construction contracts of road projects, intersection projects, and subdivision projects.

Column A is the VPA Benchmark Indexation for FY22 to FY25 (18.65%) whereas Column B is the calculated Indexation between rates in CW's database from the same time period.

As shown below, the concrete works and drainage works outpace the 18.65% indexation, whereas costs for road pavements have moved significantly less.

Item	CW FY22 Rate (from Database)	Indexation to FY25[*1] (A)	Indexed CW FY25 Rate	CW FY25 Rates (from Database)	Indexation Based on Database Rates (B)	CW FY25 Rates (from Database)
Earthworks	$35.23	18.65%	$41.80	$35.23	-5.0%	$33.46
Primary Arterial Pavement	$166.89	18.65%	$198.01	$166.89	9.8%	$183.29
Secondary Arterial Pavement	$148.99	18.65%	$176.78	$148.99	7.5%	$160.13
Collector Arterial Pavement	$148.72	18.65%	$176.46	$148.72	9.6%	$162.96
Kerb and Channel	$56.15	18.65%	$66.62	$56.15	30.0%	$72.98
Cycle Path	$75.12	18.65%	$89.13	$75.12	25.6%	$94.36
SUP/ Footpath	$69.38	18.65%	$82.31	$69.38	31.4%	$91.14
Drainage Pipe 300mm CR Bfilled	$270.28	18.65%	$320.68	$270.28	24.0%	$335.21
Drainage Pipe 375mm CR Bfilled	$283.36	18.65%	$336.21	$283.36	45.5%	$412.28
Drainage Pipe 450mm CR Bfilled	$441.81	18.65%	$524.20	$441.81	15.2%	$509.00
Drainage Pipe 525mm CR Bfilled	$474.27	18.65%	$562.72	$474.27	20.0%	$569.25
Drainage - pits	$3,125.93	18.65%	$3,708.86	$3,125.93	50.6%	$4,707.67
Drainage - Sub-soil drainage	$39.18	18.65%	$46.48	$39.18	-1.7%	$38.53
Regulatory Signage	$399.61	18.65%	$474.13	$399.61	-5.1%	$379.08
Line Marking	$5.48	18.65%	$6.50	$5.48	-47.7%	$2.87

*[*1] VPA Benchmark Indexation for this period is 18.65%*

Utilising the above rates, CW has provided a cost estimate for incomplete road projects using Cardno's cost sheets. The below table shows that while the escalation of certain components like concrete and drainage is higher than the VPA Benchmark Indexation, the more expensive components of road construction (excavation and pavements) have lesser escalation.

Item	Year	Revised Toolern DCP Construction Cost
Prepared By		Cossill & Webley (Rates Only)
CW Rates used with Cardno quantities (incomplete projects only)	July 2021	$182,743,568.25
CW Rates used with Cardno quantities (incomplete projects only)	July 2024	$204,560,522.49
Escalation based on CW Rates	July 2021 to July 2024	11.94%
Escalation based on VPA Benchmark Indexation	July 2021 to July 2024	18.65%

It is understood that Council's preference is to avoid updating the revised DCP in July 2024 dollars, and rather, apply indexation to the FY22 DCP update. However, the above table demonstrates the indexation for this period is greater than actual construction costs increases.

14. CONCLUSION

Based on the findings in this report, it is recommended that the DCP projects are re-costed with assumptions clearly defined for what will and will not be allowed for on a project specific basis.

This would assist with eliminating some of the nuances of cost estimation raised in Cardno's Benchmark Costings report prepared for the VPA:

> *Estimating is not an exact science: no two projects are alike. Variances due to geographic location, market conditions and project timing and duration, create many variables that need to be factored into every case. Often estimating requires experienced judgement and personal intuition based on the available data.*

Cossill & Webley is not a traffic and transport engineering specialist, and as such, we cannot comment on the suitability of the revised cross sections proposed. However, we have clearly demonstrated there are significant additional costs when compared to the VPA Benchmark.

Should you require any further information or wish to discuss any aspect of this report, please contact the undersigned.

Brock Jeffery-Monck
Director
Cossill & Webley Consulting Engineers Australia
E: brockj@cosweb.com.au
M: 0434 881 034

Dale Wines
Project Engineer
Cossill & Webley Consulting Engineers Australia
E: dalew@cosweb.com.au

Appendix A

Comparison of VPA Benchmark Rates to CW Rates

Cossill & Webley
CONSULTING ENGINEERS

Appendix A – Comparison of VPA Benchmark Rates to CW Rates

		VPA Benchmark					CW	
Group	Sub Item	Rate (P50)	Rate (P90)	P50 to P90 Scaling		Rate (P90) + Index to FY22	CW Rate - Average (July 2021)	CW Rate - Scaled to P90 (July 2021)
Siteworks/ Earthworks	Site Preparation	$3.68	$4.96	$1.28	34.8%	$5.41		
	Earthworks	$34.07	$40.52	$6.45	18.9%	$44.17	$29.63	**$35.23**
Road Pavement	Primary Arterial Pavement	$169.62	$186.26	$16.64	9.8%	$203.02	$151.98	**$166.89**
	Secondary Arterial Pavement	$127.01	$133.78	$6.77	5.3%	$145.82	$141.45	**$148.99**
	Collector Arterial Pavement	$105.15	$112.44	$7.29	6.9%	$122.56	$139.08	**$148.72**
	Subgrade Preparation	$14.22	$16.16	$1.94	13.6%	$17.61		
	Pavement Rehab	$51.58	$59.32	$7.74	15.0%	$64.66		
	Pavement Other	$140.00	$161.00	$21.00	15.0%	$175.49		
Concrete Works	Kerb and Channel	$54.81	$60.90	$6.09	11.1%	$66.38	$50.54	**$56.15**
	Kerb Removal	$60.00	$69.00	$9.00	15.0%	$75.21		
	Cycle Path	$76.59	$91.94	$15.35	20.0%	$100.21	$62.58	**$75.12**
	SUP/ Footpath	$63.51	$73.63	$10.12	15.9%	$80.26	$59.84	**$69.38**
	Concrete Removal	$45.03	$49.53	$4.50	10.0%	$53.99		
	Traffic Island	$77.60	$84.07	$6.47	8.3%	$91.64		
Drainage	Drainage Pipe 300mm CR Bfilled	$179.85	$197.96	$18.11	10.1%	$215.78	$245.55	**$270.28**
	Drainage Pipe 375mm CR Bfilled	$259.10	$282.96	$23.86	9.2%	$308.43	$259.47	**$283.36**
	Drainage Pipe 450mm CR Bfilled	$299.43	$334.33	$34.90	11.7%	$364.42	$395.69	**$441.81**
	Drainage Pipe 525mm CR Bfilled	$403.86	$448.03	$44.17	10.9%	$488.35	$427.52	**$474.27**
	Drainage - pits	$2,565.39	$2,806.10	$240.71	9.4%	$3,058.65	$2,857.79	**$3,125.93**
	Drainage - Sub-soil drainage	$33.88	$43.40	$9.52	28.1%	$47.31	$30.58	**$39.18**
	Drainage Culvert	$0.00	$0.00	$0.00	#DIV/0!	$0.00		
Traffic Signals	Traffic Signals (all inclusive)	$109,730.28	$128,786.34	$19,056.06	17.4%	$140,377.11		
Landscape	Tree Planting	$303.34	$363.01	$59.67	19.7%	$395.68		
	Landscaping	$21.61	$25.16	$3.55	16.4%	$27.42		
	Topsoil Seeding	$7.21	$8.44	$1.23	17.1%	$9.20		
Street Lighting	Street Lighting - Road	$216.34	$225.67	$9.33	4.3%	$245.98		
	Street Lighting - Intersections	$48,468.93	$55,617.74	$7,148.81	14.7%	$60,623.34		
Misc.	Regulatory Signage	$338.43	$380.39	$41.96	12.4%	$414.63	$355.53	**$399.61**
	Line Marking	$3.11	$4.09	$0.98	31.5%	$4.46	$4.16	**$5.48**
	Landscape maintenance (intersections)	$71,344.66	$88,131.43	$16,786.77	23.5%	$96,063.26		
	Landscape maintenance (roads)	$2.90	$2.96	$0.06	2.1%	$3.23		
	Tactile Pavers (Hazard only)	$292.43	$319.78	$27.35	9.4%	$348.56		

Appendix B

Pavement Profile Commentary

ABN 31 105 704 078
13 Brock Street, Thomastown
Victoria 3074
(P) +61 3 9464 4617

Pavement Profile Commentary			
Toolern Precinct Structure Plan (PSP) – Developer Contributions Plan (DCP) Costings			
Prepared For	Cossill & Webley	Job No	G5263.1 AA
Date	7 August 2024	By	GS

Dear Brock,

As per discussions held during our meeting on 5 August 2024, we have prepared the following pavement profile commentary for the Toolern Precinct Structure Plan (PSP) review. We understand that Cossill & Webley are working with several landowners into an investigation of the Toolern DCP costings, which has been identified by the Melton City Council (council) to have significant shortfalls in funding for key transport projects.

Council proposed to upgrade the Toolern PSP and DCP, and previously engaged Cardno to complete a review of transport infrastructure items; as presented in the Cardno 'Recommended Changes to Toolern PSP and DCP Documents' (ref: V190196 dated 17 March 2022).

We have also briefly reviewed the Cardno Benchmark Infrastructure Report (V181544 dated 11 April 2019) prepared for the Victorian Planning Authority (VPA), which we understand formed the basis of the benchmark costings referenced in the Cardno V190196 report.

Table 3-3 (Item 2, Section 3.4.1.1 Roads and Intersections) in the Cardno V181544 report discusses the assumed pavement depths for road design surfaces.

Cossill & Webley have requested Ground Science to undertake a desktop review of the Primary Arterial, Secondary Arterial and Connector Arterial (assumed Connector Boulevard in below table), with aim to discuss the potential for alternative / thinner pavement options. An extract of the table is presented below:

Table 3-3 Pavement makeup

Pavement course	Primary Arterial	Secondary Arterial	Connector Boulevard	Connector Street	Industrial street
Asphalt wearing course	40	40	40	40	40
Asphalt intermediate course	75	60	60	60	75
Asphalt base course	90	75	75	75	90
Prime	10	10	10	10	10
CTCR base	150	150	150	150	150
FCR Base	150	150	N/A	N/A	150
Select sub-base course	200	150	200	200	200
Total Depth (mm)	715	635	535	535	715

It is acknowledged that the above pavement make up was based on broad assumptions detailed in the Cardno report, and several similar assumptions have been made in our review of the above.

ABN 31 105 704 078
13 Brock Street, Thomastown
Victoria 3074
(P) +61 3 9464 4617

It should be noted that Ground Science's review prioritises the geotechnical and pavement profile design aspects of these projects. Typically, these would entail the following scenarios:

Pavement Design Premise

1. residential subdivisional developments
2. construction of internal main connector boulevards and unsignalised / signalised intersections with the existing council owned road network
3. construction of internal main connector boulevards and signalised intersections with the existing state road authority or council owned road network
4. interim / ultimate scenario road upgrades (e.g. widening) to existing sub-arterial or arterial roads (council / state owned)
5. interim / ultimate scenario road upgrades (e.g. duplication) to existing sub-arterial or arterial roads (council / state owned).

In most cases, the above works can interlink with one another depending on the subdivision layout plan and other developments. The above however forms a general basis on understanding the type of works likely to be carried out. Most importantly, interim and ultimate road upgrade scenarios would generally govern the type of pavement design applicable.

Subgrade Conditions

We have referred to several projects completed in the locality, as well as the broader area with similar geological conditions. Typically, it is expected that:

1. geology in the Toolern Vale area comprises Quaternary Newer Aged Volcanics (high plasticity clays assumed to form the subgrade
2. typical four day soaked CBRs (when remoulded at 98 % standard compaction) ranging between 1 % to 3 %, with an assumed design CBR value of 2 %.

Traffic Design

Traffic design data would typically be subject to interim v.s. ultimate design scenarios and growth of the local area. In most cases, traffic design data is estimated using the Engineering Design & Construction Manual (2019); with a designer preference to receive up to date traffic modelling from a qualified traffic engineer.

For the purpose of this exercise, the following assumptions were made for the three street categories in question:

Table 1: Traffic Design Data Assumptions

Road Category	Primary Arterial		Secondary Arterial		Collector Arterial	
Traffic Scenario	Interim	Ultimate	Interim	Ultimate	Interim	Ultimate
Assumed Total Daily Traffic Generation Volume (AADT)	10,000 vpd	25,000 vpd	5,000 vpd	10,000 vpd	2,500 vpd	5,000 vpd
Assumed Design Traffic Loading (DESAs)	5E+06	1E+07	1.8E+06	5E+06	6.5E+05	1.8E+06
NB: values in bold were adopted in the hypothetical pavement profile design						

ABN 31 105 704 078
13 Brock Street, Thomastown
Victoria 3074
(P) +61 3 9464 4617

Pavement Design Premise

Hypothetical pavement profile designs were determined using the below assumptions:

1. designs for the connector boulevard and secondary arterial were to be undertaken using the EDCM (2019)
2. strict adherence to the minimum pavement layers in the EDCM (e.g. lower subbase of min 100 mm required)
3. a capping layer of minimum 150 mm thick is required
4. a construction layer of minimum 150 mm thick is required for the secondary arterial and connector boulevard pavements
5. a construction layer is not required for the primary arterial (design acc with RC500.22)
6. ultimate pavement design scenarios were only considered, as it is expected
7. mechanistic analysis used on the assumed traffic / subgrade properties
8. typical traffic distribution and generation from residential type developments – no allowance is made for large scale commercial / industrial applications
9. a design CBR value of 2 % was adopted
10. a loading on ground improvements / over-excavations should be made, similar to what Cardno had allowed for (20 %).

Pavement Profile Composition (Ultimate Scenario)

The following pavement profile designs are expected

Table 2: Collector Boulevard (Ultimate Scenario)

Pavement Layer	Description	Thickness
Asphalt (Wearing)	Size 14 Type H or Type V (C320)	40 mm
Asphalt (Intermediate)	Size 20 Type SI (C320)	75 mm
Asphalt (Base)	Size 20 Type SI (C320)	75 mm
Base	VicRoads 3 % Class 3 CTCR (20mm)	100 mm
Subbase	VicRoads Class 3 FCR (20mm)	100 mm
Capping Layer	VicRoads Type A Capping Layer (CBR ≥ 10 %, Swell <1.5 %, k < $5x10^{-9}$ m/s)	150 mm
-	Thickness (Excluding Construction Layer)	540 mm
Construction Layer	VicRoads Type A Capping Layer (CBR ≥ 10 %, Swell <1.5 %, k < $5x10^{-9}$ m/s)	150 mm
-	Total Thickness	690 mm
Subgrade	Assumed Residual Qvn Clays (CBR = 2 %)	-

Comments
1. the above design is considered conservative when assessed using mechanistic analysis methods i.e. all cumulative damage factor (CDF) values are well below 1.0
2. pavement designers are required to conform to the EDCM Table 11 minimum material / thickness requirements, and this has resulted in a thicker pavement when compared to the Cardno report – this is generally due to the current requirements to
   a. include a minimum 150 mm thick construction layer
   b. include a minimum 100 mm subbase course layer
   c. ensure the thickness of the asphalt layers, or asphalt + base course layers equate to 190 mm to match SM2 kerb profile
3. note that the Cardno report does not appear to include a construction layer which was made compulsory in the 2019 version of the EDCM
4. it is considered that a thinner pavement is likely to apply if design could be undertaken using RC500.22 and the Austroads Guide to Pavement Technology, Part 2 (2024)

ABN 31 105 704 078
13 Brock Street, Thomastown
Victoria 3074
(P) +61 3 9464 4617

Table 3: Secondary Arterial (Ultimate Scenario)

Pavement Layer	Description	Thickness
Asphalt (Wearing)	Size 14 Type H or Type V (C320)	40 mm
Asphalt (Intermediate)	Size 20 Type SI (C320)	75 mm
Asphalt (Base)	Size 20 Type SF (C320)	75 mm
Base	VicRoads 3 % Class 3 CTCR (20mm)	100 mm
Subbase	VicRoads Class 3 FCR (20mm)	100 mm
Capping Layer	VicRoads Type A Capping Layer (CBR ≥ 10 %, Swell <1.5 %, k < $5x10^{-9}$ m/s)	150 mm
-	Thickness (Excluding Construction Layer)	540 mm
Construction Layer	VicRoads Type A Capping Layer (CBR ≥ 10 %, Swell <1.5 %, k < $5x10^{-9}$ m/s)	150 mm
-	Total Thickness	690 mm
Subgrade	Assumed Residual Qvn Clays (CBR = 2 %)	-

Comments
1. pavement designers are required to conform to the EDCM Table 11 minimum material / thickness requirements, and this has resulted in a slightly thicker pavement when compared to the Cardno report – this is generally due to the current requirements to
   a. include a minimum 150 mm thick construction layer
   b. include a minimum 100 mm subbase course layer
   c. ensure the thickness of the asphalt layers, or asphalt + base course layers equate to 190 mm to match SM2 kerb profile
2. note that the Cardno report does not appear to include a construction layer which was made compulsory in the 2019 version of the EDCM

Table 4: Primary Arterial (Ultimate Scenario) EDCM

Pavement Layer	Description	Thickness
Asphalt (Wearing)	Size 14 Type H or Type V (C320)	40 mm
Asphalt (Intermediate)	Size 20 Type SI (C320) Including +15 mm Construction Tolerance	75 mm
Asphalt (Base)	Size 20 Type SF (C320)	75 mm
Base	VicRoads 3 % Class 3 CTCR (20mm)	180 mm
Subbase	VicRoads Class 3 FCR (20mm)	100 mm
Capping Layer	VicRoads Type A Capping Layer (CBR ≥ 10 %, Swell <1.5 %, k < $5x10^{-9}$ m/s)	150 mm
-	Thickness (Excluding Construction Layer)	620 mm
Construction Layer	VicRoads Type A Capping Layer (CBR ≥ 10 %, Swell <1.5 %, k < $5x10^{-9}$ m/s)	150 mm
-	Total Thickness	770 mm
Subgrade	Assumed Residual Qvn Clays (CBR = 2 %)	-

Comments
1. design performed in accordance with the EDCM (2019) assuming the road will be owned by council
2. pavement designers are required to conform to the EDCM Table 11 minimum material / thickness requirements, and this has resulted in a slightly thicker pavement when compared to the Cardno report – this is generally due to the current requirements to
   a. include a minimum 150 mm thick construction layer
   b. include a minimum 100 mm subbase course layer
   c. ensure the thickness of the asphalt layers, or asphalt + base course layers equate to 190 mm to match SM2 kerb profile
   d. a +15 mm construction tolerance is typically required in the intermediate asphalt course
3. note that the Cardno report does not include a construction layer which was made compulsory in the 2019 version of the EDCM

ABN 31 105 704 078
13 Brock Street, Thomastown
Victoria 3074
(P) +61 3 9464 4617

Table 5: Primary Arterial (Ultimate Scenario) RC500.22 (2018)

Pavement Layer	Description	Thickness
Asphalt (Wearing)	Size 14 Type H or Type V (C320)	40 mm
Asphalt (Intermediate)	Size 20 Type SI (C320) Including +15 mm Construction Tolerance	75 mm
Asphalt (Base)	Size 20 Type SF (C320)	75 mm
Base	VicRoads 3 % Class 3 CTCR (20mm)	130 mm
Subbase	VicRoads Class 3 FCR (20mm)	100 mm
Capping Layer	VicRoads Type A Capping Layer (CBR ≥ 10 %, Swell <1.5 %, k < $5x10^{-9}$ m/s)	300 mm
-	Total Thickness	720 mm
Subgrade	Assumed Residual Qvn Clays (CBR = 2 %)	-

Comments
1. design assumes the road will be a state road authority asset
2. this design assumes a new pavement (e.g. duplication) to be constructed using RC500.22 (2018)
3. a +15 mm construction tolerance is required in the intermediate asphalt layer (included above)
4. a minimum 700 mm cover over expansive subgrade is required (Fig 5.1 of RC500.22)

Closing Remarks

It is apparent that the Cardno report excludes some of the more recent EDCM (2019) requirements for pavement designs, however this is understandable as the EDCM was revised in 2019, and likely after the Cardno report was issued. It is recommended that the assumptions / exclusions in the Cardno report are also reviewed, as the benchmark cost for the various pavements may not be a like for like comparison under certain circumstances.

The above designs assume a full rebuild scenario which is not always the case with road upgrades. In some cases, asphalt overlays / inlays, modification of granular material (e.g. using cementitious binders) or alternative road rehabilitation treatments (e.g. foam bitumen) would likely present a more cost-effective solution.

Disclosure

Should you have any questions pertaining to this technical memorandum, please do not hesitate to contact the undersigned:

Gee Singh, RPEng
Senior Geotechnical Engineer
(m): 0404 879 558
(e): gee@groundscience.com.au
Ground Science Pty Ltd

Limitations

This type of investigation (as per our commission) is not designed or capable of locating all soil conditions, (which can vary even over short distances). The advice given in this report is based on the assumption that the test results are representative of the overall soil conditions. However, it should be noted that actual conditions in some parts of the Site might differ from those found. If further sampling reveals soil conditions significantly different from those shown in our findings, Ground Science must be consulted.

The scope and the period of Ground Science services are described in the proposal and are subject to restrictions and limitations. Ground Science did not perform a complete assessment of all possible conditions or circumstances that may exist at the site. If a service is not expressly indicated, do not assume it has been provided. If a matter is not addressed, do not assume that any determination has been made by Ground Science in regards to it.

Where data has been supplied by the client or a third party, it is assumed that the information is correct unless otherwise stated. No responsibility is accepted by Ground Science for incomplete or inaccurate data supplied by others.

It is recognised that the passage of time affects the information and assessment provided in this document. Ground Science's assessment is based on information that existed at the time of the preparation of this document. It is understood that the services provided allowed Ground Science to form no more than an opinion of the actual site conditions observed during sampling and observations of the site visit and cannot be used to assess the effects of any subsequent changes in the quality of the site, or its surroundings, or any laws or regulations.

Any drawings or figures presented in this report should be considered only as pictorial evidence of our work. Therefore, unless otherwise stated, any dimensions should not be used for accurate calculations or dimensioning.

Appendix C

Rock Excavation Cost Impact

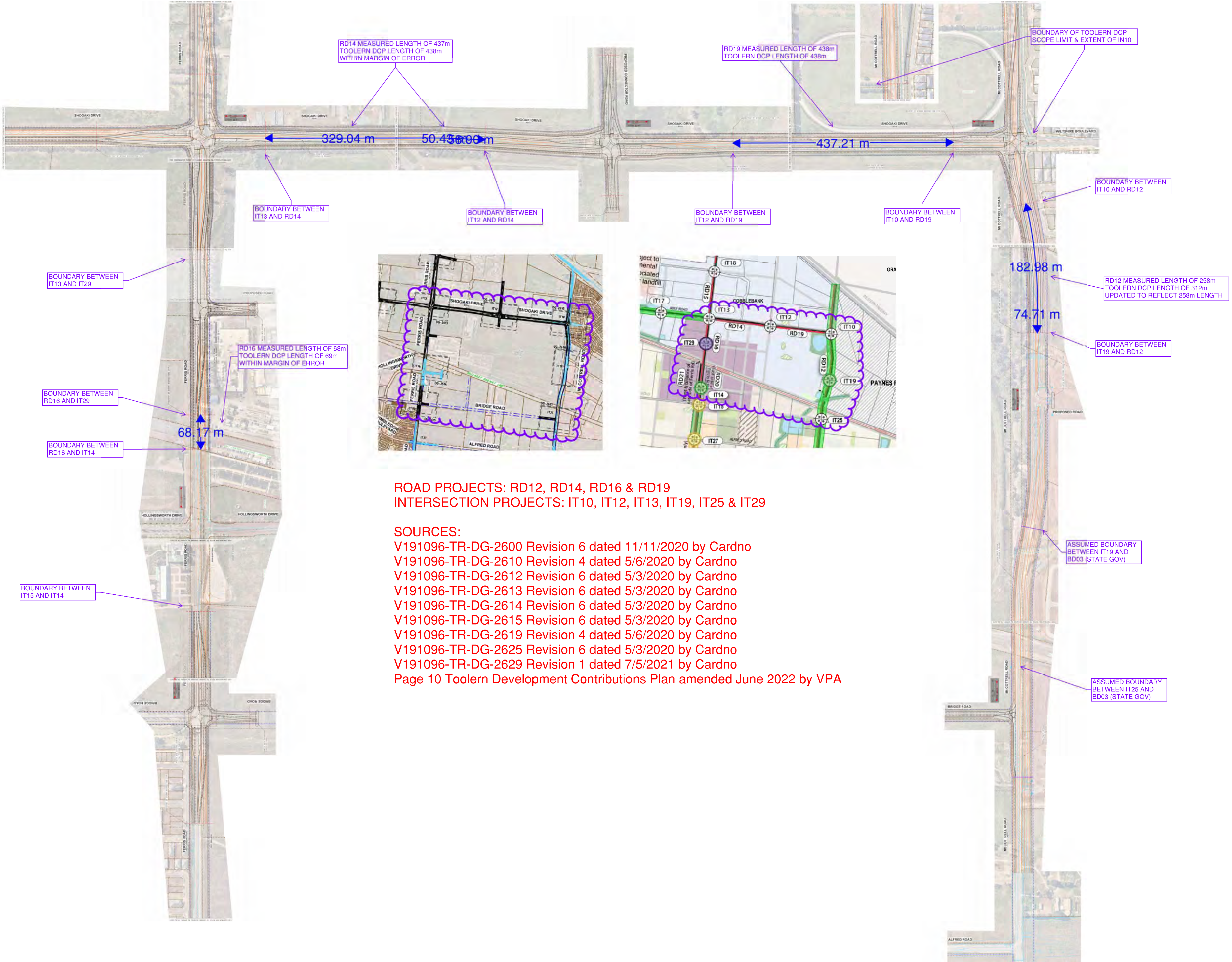
Cossill & Webley
CONSULTING ENGINEERS

Appendix C – Rock Excavation Cost Impact

ID	Qty (m3)	Rate (P90)	Rate (P90) + Index to FY22	Amount (FY22 Equivalent)	Delivery Rate	Total Rock Excavation Cost
RD01	92	$115.00	$125.35	$11,532.20	41.25%	$16,289.23
RD02	1,208	$115.00	$125.35	$151,422.80	41.25%	$213,884.71
RD03	173	$115.00	$125.35	$21,685.55	41.25%	$30,630.84
RD04	944	$115.00	$125.35	$118,330.40	41.25%	$167,141.69
RD05	133	$115.00	$125.35	$16,671.55	41.25%	$23,548.56
RD06	1,356	$115.00	$125.35	$169,974.60	41.25%	$240,089.12
RD07	1,126	$115.00	$125.35	$141,144.10	41.25%	$199,366.04
RD08	1,296	$115.00	$125.35	$162,453.60	41.25%	$229,465.71
RD11	1,758	$115.00	$125.35	$220,365.30	41.25%	$311,265.99
RD14	439	$115.00	$125.35	$55,028.65	41.25%	$77,727.97
RD15	701	$115.00	$125.35	$87,870.35	41.25%	$124,116.87
RD16	97	$115.00	$125.35	$12,158.95	41.25%	$17,174.52
RD17	1,444	$115.00	$125.35	$181,005.40	41.25%	$255,670.13
RD19	877	$115.00	$125.35	$109,931.95	41.25%	$155,278.88
IT01	159	$115.00	$125.35	$19,930.65	41.25%	$28,152.04
IT02	845	$115.00	$125.35	$105,920.75	41.25%	$149,613.06
IT03	1,343	$115.00	$125.35	$168,345.05	41.25%	$237,787.38
IT04	342	$115.00	$125.35	$42,869.70	41.25%	$60,553.45
IT05	2,002	$115.00	$125.35	$250,950.70	41.25%	$354,467.86
IT06	2,655	$115.00	$125.35	$332,804.25	41.25%	$470,086.00
IT10	958	$115.00	$125.35	$120,085.30	41.25%	$169,620.49
IT12	1,958	$115.00	$125.35	$245,435.30	41.25%	$346,677.36
IT13	1,040	$115.00	$125.35	$130,364.00	41.25%	$184,139.15
IT16	569	$115.00	$125.35	$71,324.15	41.25%	$100,745.36
IT17	571	$115.00	$125.35	$71,574.85	41.25%	$101,099.48
IT18	503	$115.00	$125.35	$63,051.05	41.25%	$89,059.61
IT20	1,801	$115.00	$125.35	$225,755.35	41.25%	$318,879.43
IT21	1,292	$115.00	$125.35	$161,952.20	41.25%	$228,757.48
IT22	1,173	$115.00	$125.35	$147,035.55	41.25%	$207,687.71
IT23	1,013	$115.00	$125.35	$126,979.55	41.25%	$179,358.61
IT25	119	$115.00	$125.35	$14,916.65	41.25%	$21,069.77
IT29	487	$115.00	$125.35	$61,045.45	41.25%	$86,226.70
Total						$5,395,631.21

Appendix D

Road and Intersection Projects Markup

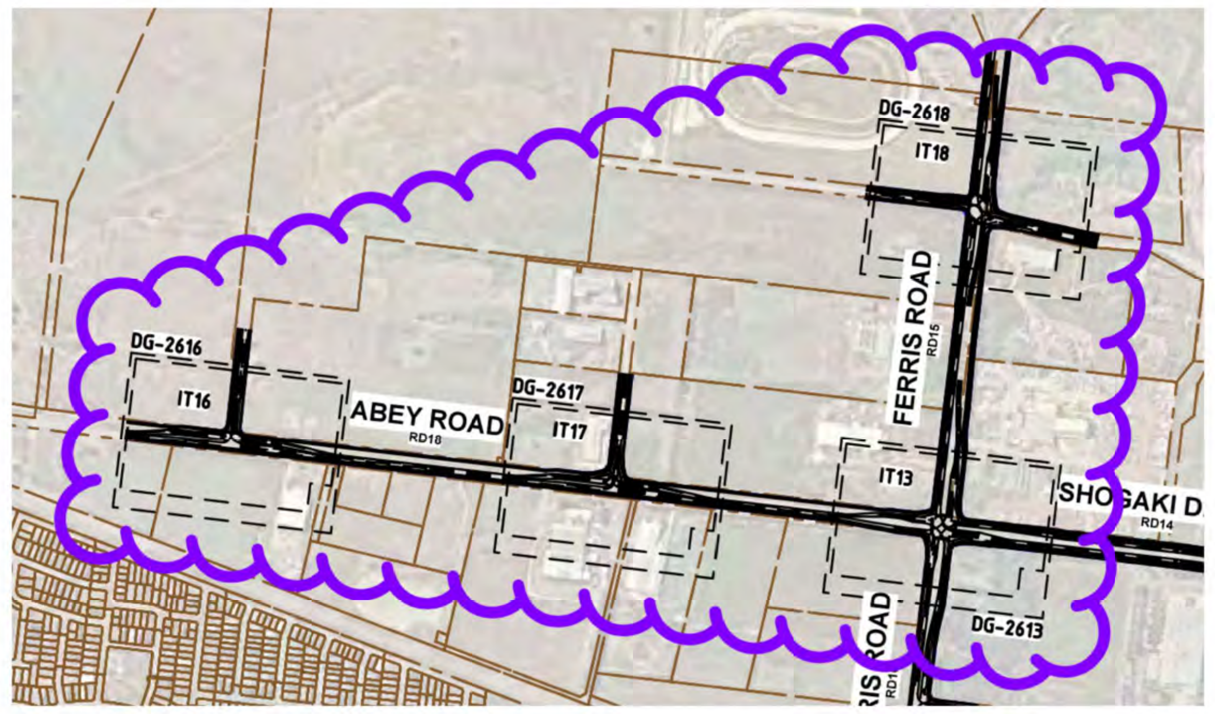


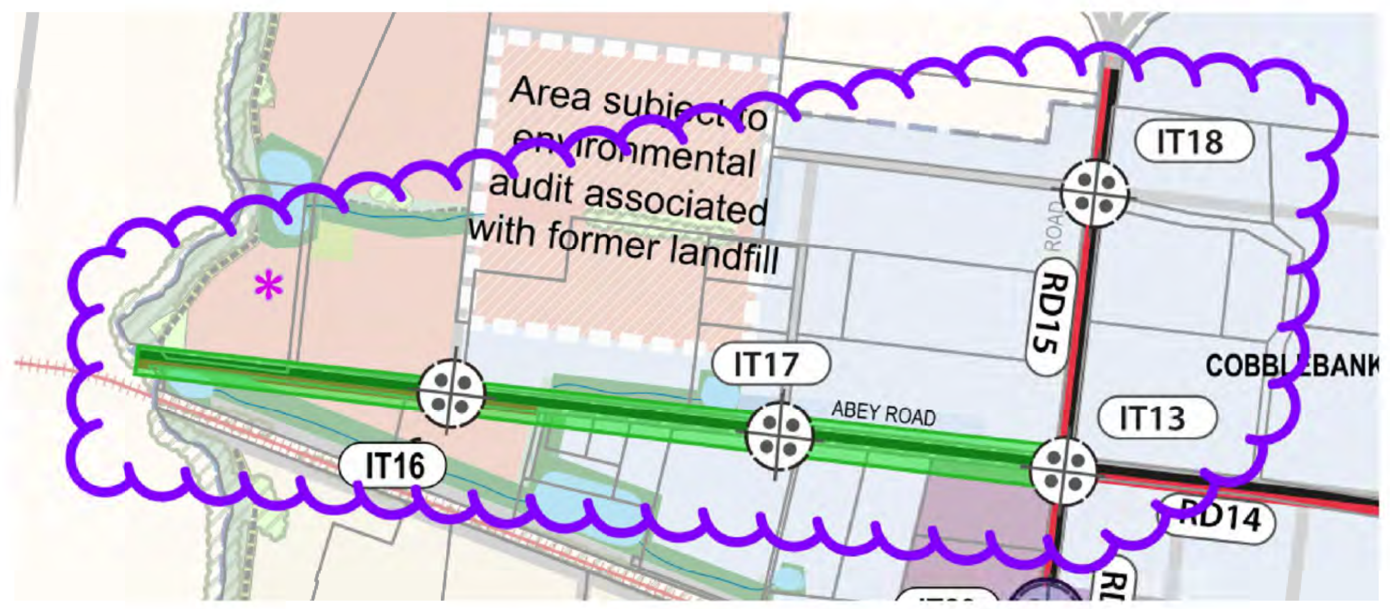
ROAD PROJECTS: RD12, RD14, RD16 & RD19
INTERSECTION PROJECTS: IT10, IT12, IT13, IT19, IT25 & IT29

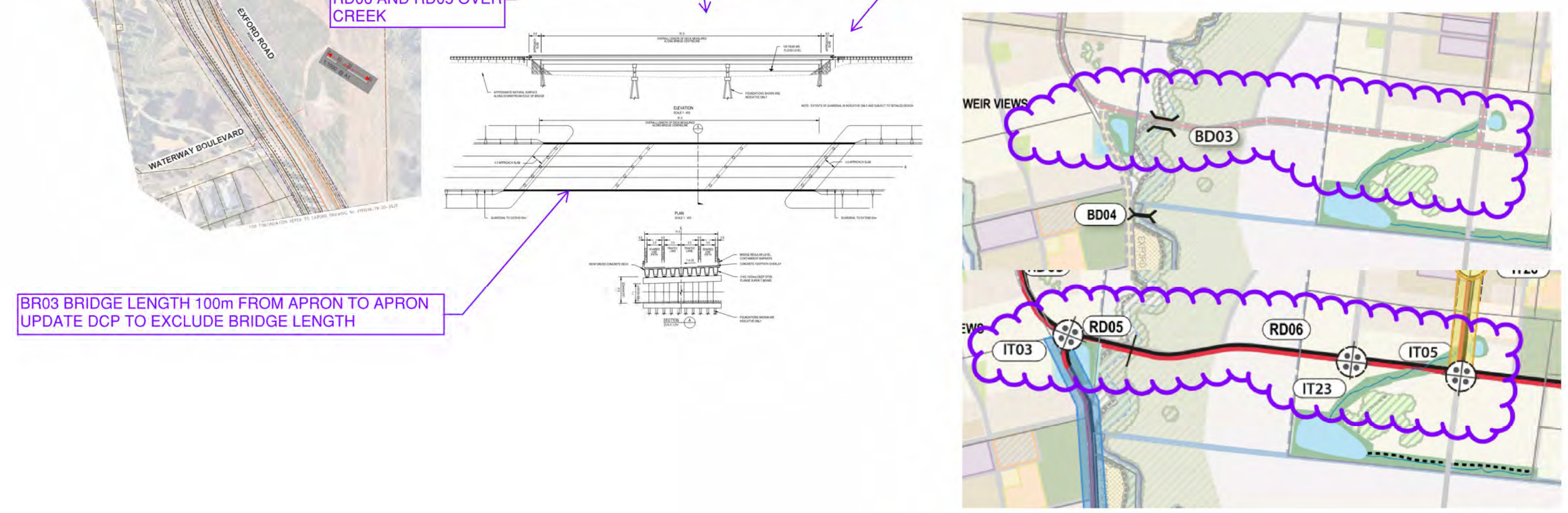
SOURCES:
V191096-TR-DG-2600 Revision 6 dated 11/11/2020 by Cardno
V191096-TR-DG-2610 Revision 4 dated 5/6/2020 by Cardno
V191096-TR-DG-2612 Revision 6 dated 5/3/2020 by Cardno
V191096-TR-DG-2613 Revision 6 dated 5/3/2020 by Cardno
V191096-TR-DG-2614 Revision 6 dated 5/3/2020 by Cardno
V191096-TR-DG-2615 Revision 6 dated 5/3/2020 by Cardno
V191096-TR-DG-2619 Revision 4 dated 5/6/2020 by Cardno
V191096-TR-DG-2625 Revision 6 dated 5/3/2020 by Cardno
V191096-TR-DG-2629 Revision 1 dated 7/5/2021 by Cardno
Page 10 Toolern Development Contributions Plan amended June 2022 by VPA

ROAD PROJECTS: RD13 & RD15
INTERSECTION PROJECTS: IT13, IT16, IT17 & IT18

SOURCES:
V191096-TR-DG-2600 Revision 6 dated 11/11/2020 by Cardno
V191096-TR-DG-2613 Revision 6 dated 5/3/2020 by Cardno
V191096-TR-DG-2616 Revision 6 dated 5/3/2020 by Cardno
V191096-TR-DG-2617 Revision 6 dated 5/3/2020 by Cardno
V191096-TR-DG-2618 Revision 6 dated 5/3/2020 by Cardno
V191096-TR-DG-2634 Revision 1 dated 10/5/2021 by Cardno
Page 10 Toolern Development Contributions Plan amended June 2022 by VPA

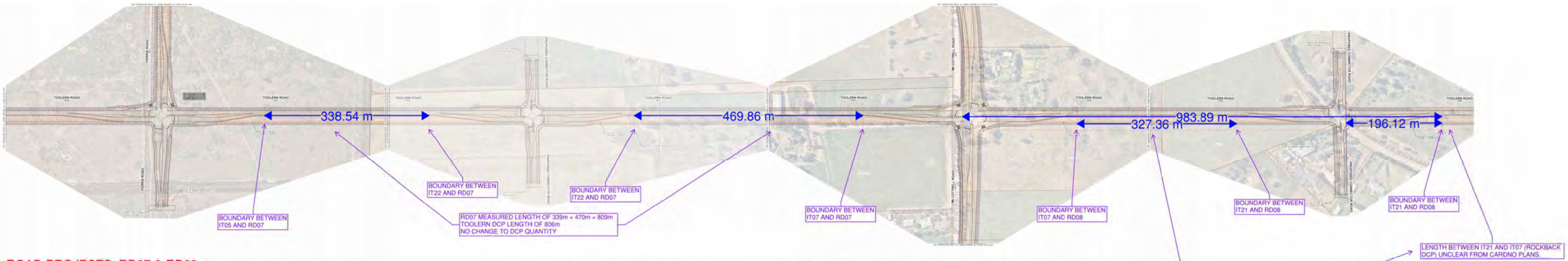






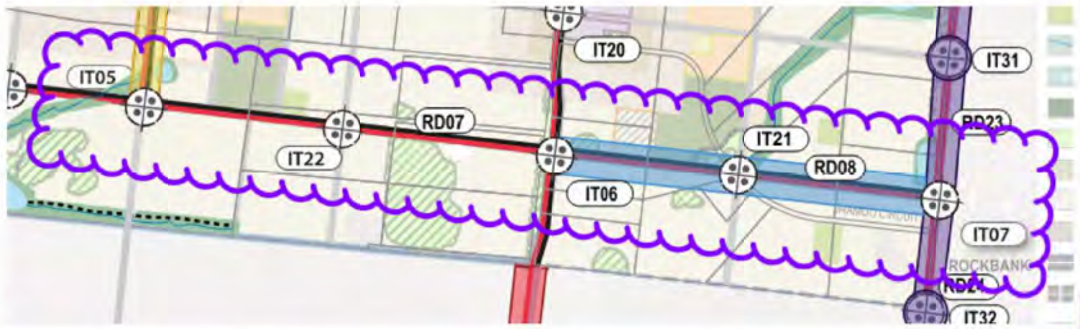
ROAD PROJECTS: RD05 & RD06
INTERSECTION PROJECTS: IT03, IT23 & IT05
BRIDGE PROJECTS: BR03

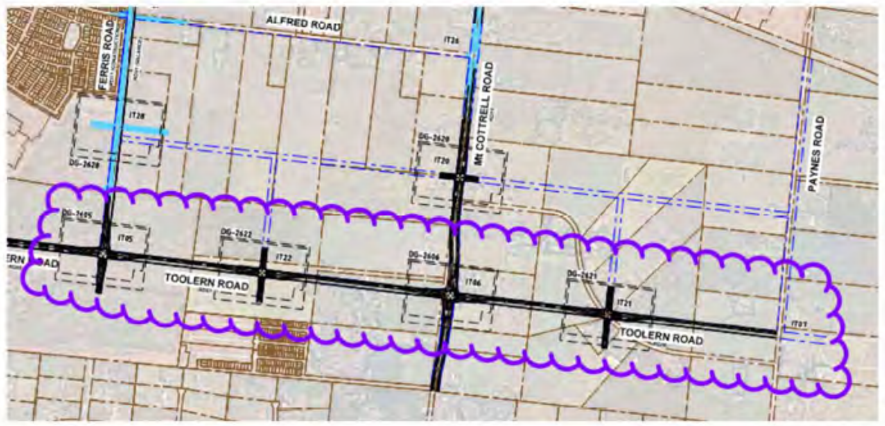
SOURCES:
V191096-TR-DG-2600 Revision 6 dated 11/11/2020 by Cardno
V191096-TR-DG-2603 Revision 6 dated 5/3/2020 by Cardno
V191096-TR-DG-2605 Revision 6 dated 5/3/2020 by Cardno
V191096-TR-DG-2623 Revision 6 dated 5/3/2020 by Cardno
V191096-TR-DG-2631 Revision 6 dated 5/3/2020 by Cardno
Page 10 Toolern Development Contributions Plan amended June 2022 by VPA
Page 12 Toolern Development Contributions Plan amended June 2022 by VPA



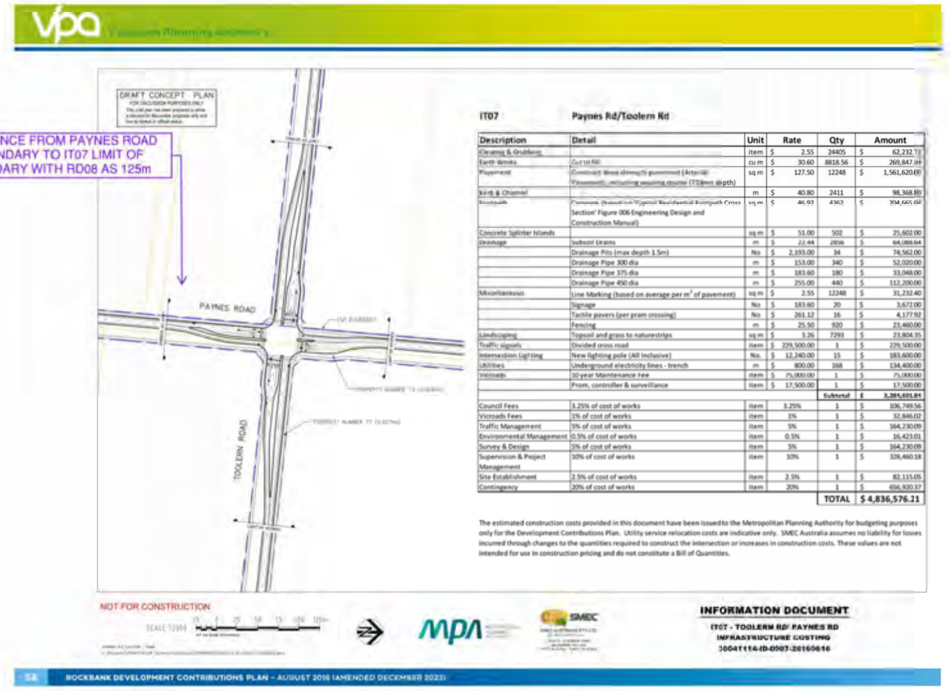
ROAD PROJECTS: RD07 & RD08
INTERSECTION PROJECTS: IT05, IT06, IT07, IT22 & IT21

SOURCES:
V191096-TR-DG-2600 Revision 6 dated 11/11/2020 by Cardno
V191096-TR-DG-2605 Revision 6 dated 5/3/2020 by Cardno
V191096-TR-DG-2606 Revision 6 dated 5/3/2020 by Cardno
V191096-TR-DG-2621 Revision 6 dated 5/3/2020 by Cardno
V191096-TR-DG-2622 Revision 6 dated 5/3/2020 by Cardno
Page 10 Toolern Development Contributions Plan amended June 2022 by VPA
Page 12 Toolern Development Contributions Plan amended June 2022 by VPA
Page 58 Rockbank Development Contributions Plan amended December 2023 by VPA





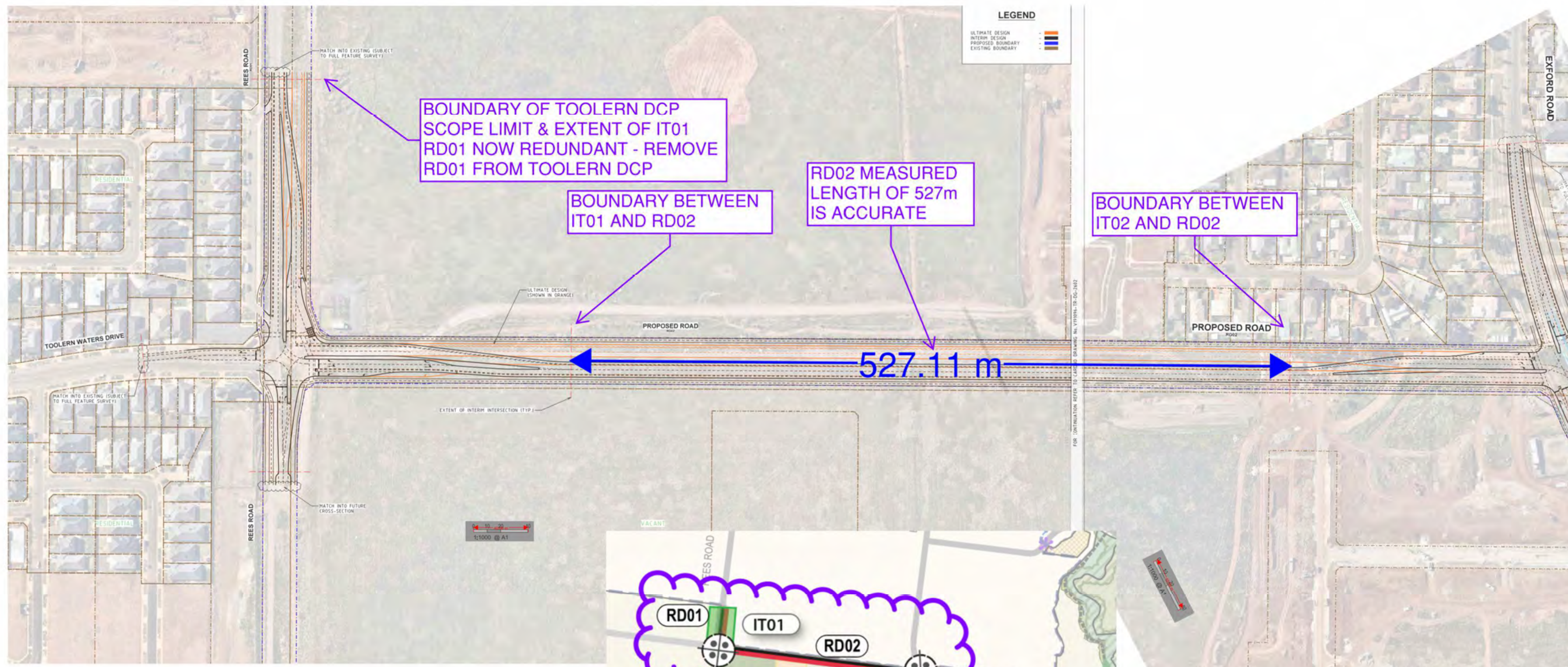
ASSUME DISTANCE FROM PAYNES ROAD EASTERN BOUNDARY TO IT07 LIMIT OF WORKS BOUNDARY WITH RD08 AS 125m

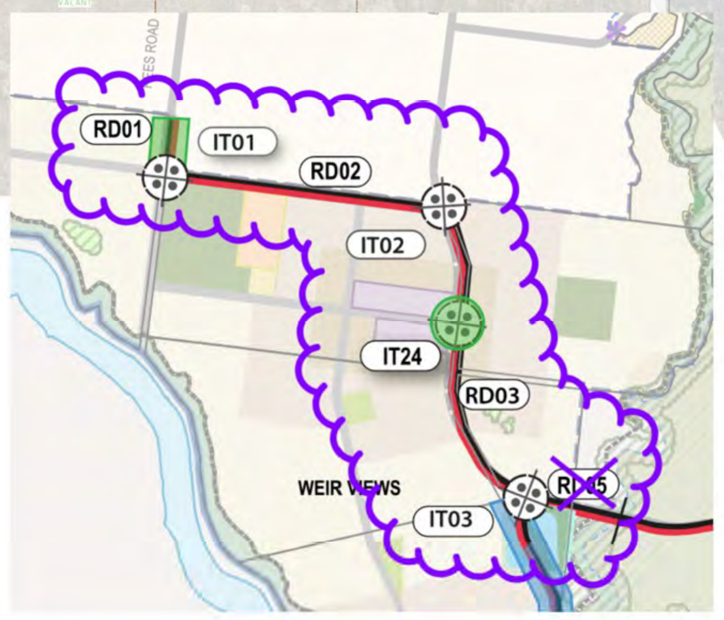


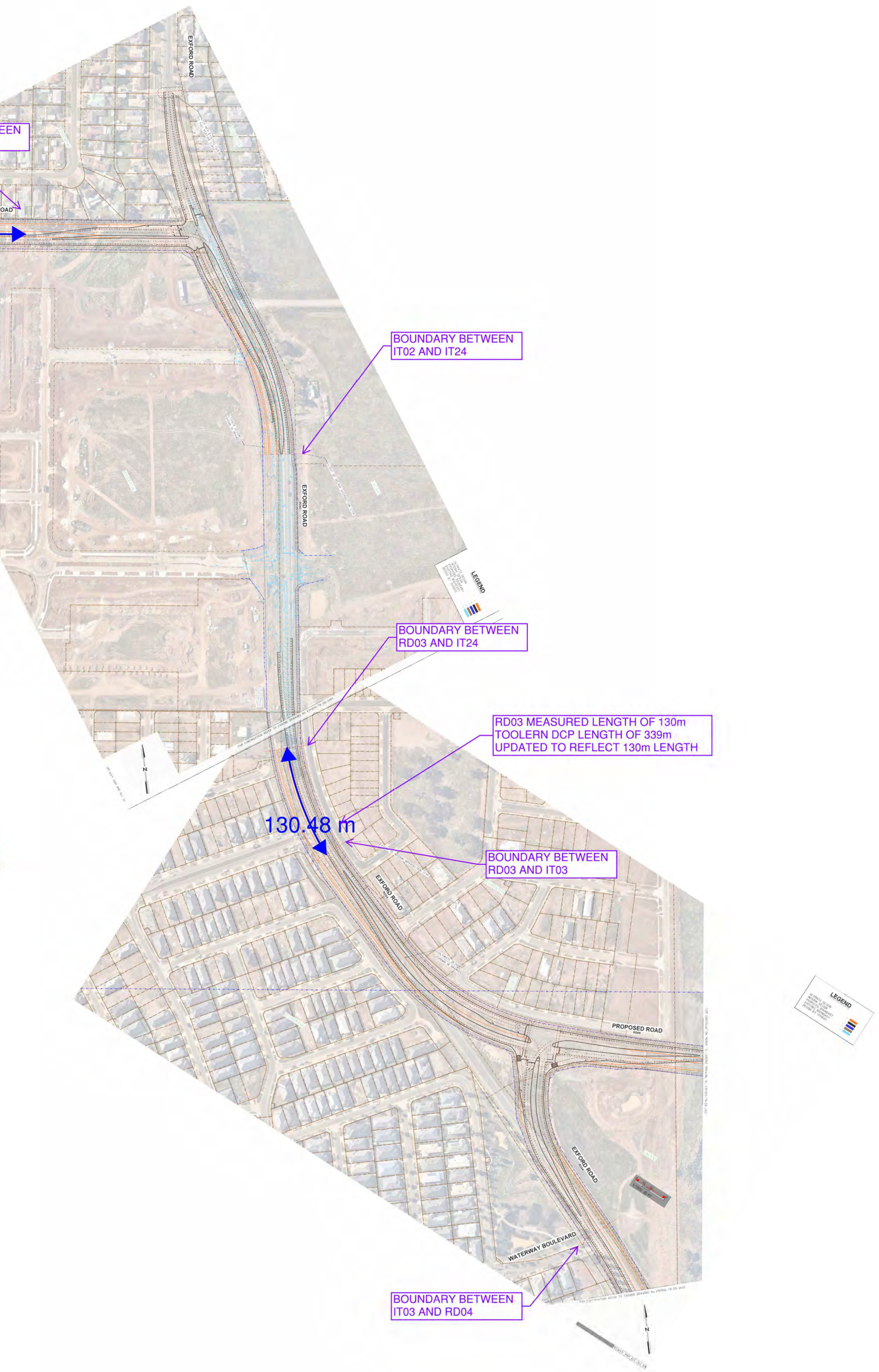
IT07 Paynes Rd/Toolern Rd

Description	Detail	Unit	Rate	Qty	Amount
Clearing & Grubbing		item	$ 2.55	24405	$ 62,232.75
Earth Works	Cut to fill	cu m	$ 30.60	8818.56	$ 269,847.94
Pavement	Construct deep strength pavement (Arterial Pavement), including wearing course (710mm depth)	sq m	$ 127.50	12248	$ 1,561,620.00
Kerb & Channel		m	$ 40.80	2411	$ 98,368.80
Footpath	Concrete (based on 'Typical Residential Footpath Cross Section' Figure 006 Engineering Design and Construction Manual)	sq m	$ 46.92	4362	$ 204,665.04
Concrete Splitter Islands		sq m	$ 51.00	502	$ 25,602.00
Drainage	Subsoil Drains	m	$ 22.44	2856	$ 64,088.64
	Drainage Pits (max depth 1.5m)	No	$ 2,193.00	34	$ 74,562.00
	Drainage Pipe 300 dia	m	$ 153.00	340	$ 52,020.00
	Drainage Pipe 375 dia	m	$ 183.60	180	$ 33,048.00
	Drainage Pipe 450 dia	m	$ 255.00	440	$ 112,200.00
Miscellaneous	Line Marking (based on average per m^2 of pavement)	sq m	$ 2.55	12248	$ 31,232.40
	Signage	No	$ 183.60	20	$ 3,672.00
	Tactile pavers (per pram crossing)	No	$ 261.12	16	$ 4,177.92
	Fencing	m	$ 25.50	920	$ 23,460.00
Landscaping	Topsoil and grass to naturestrips	sq m	$ 3.26	7293	$ 23,804.35
Traffic signals	Divided cross road	item	$ 229,500.00	1	$ 229,500.00
Intersection Lighting	New lighting pole (All inclusive)	No.	$ 12,240.00	15	$ 183,600.00
Utilities	Underground electricity lines - trench	m	$ 800.00	168	$ 134,400.00
Vicroads	10 year Maintenance Fee	item	$ 75,000.00	1	$ 75,000.00
	Prom, controller & surveillance	item	$ 17,500.00	1	$ 17,500.00
				Subtotal	$ 3,284,601.84
Council Fees	3.25% of cost of works	item	3.25%	1	$ 106,749.56
Vicroads Fees	1% of cost of works	item	1%	1	$ 32,846.02
Traffic Management	5% of cost of works	item	5%	1	$ 164,230.09
Environmental Management	0.5% of cost of works	item	0.5%	1	$ 16,423.01
Survey & Design	5% of cost of works	item	5%	1	$ 164,230.09
Supervision & Project Management	10% of cost of works	item	10%	1	$ 328,460.18
Site Establishment	2.5% of cost of works	item	2.5%	1	$ 82,115.05
Contingency	20% of cost of works	item	20%	1	$ 656,920.37
				TOTAL	$ 4,836,576.21

The estimated construction costs provided in this document have been issued to the Metropolitan Planning Authority for budgeting purposes only for the Development Contributions Plan. Utility service relocation costs are indicative only. SMEC Australia assumes no liability for losses incurred through changes to the quantities required to construct the intersection or increases in construction costs. These values are not intended for use in construction pricing and do not constitute a Bill of Quantities.

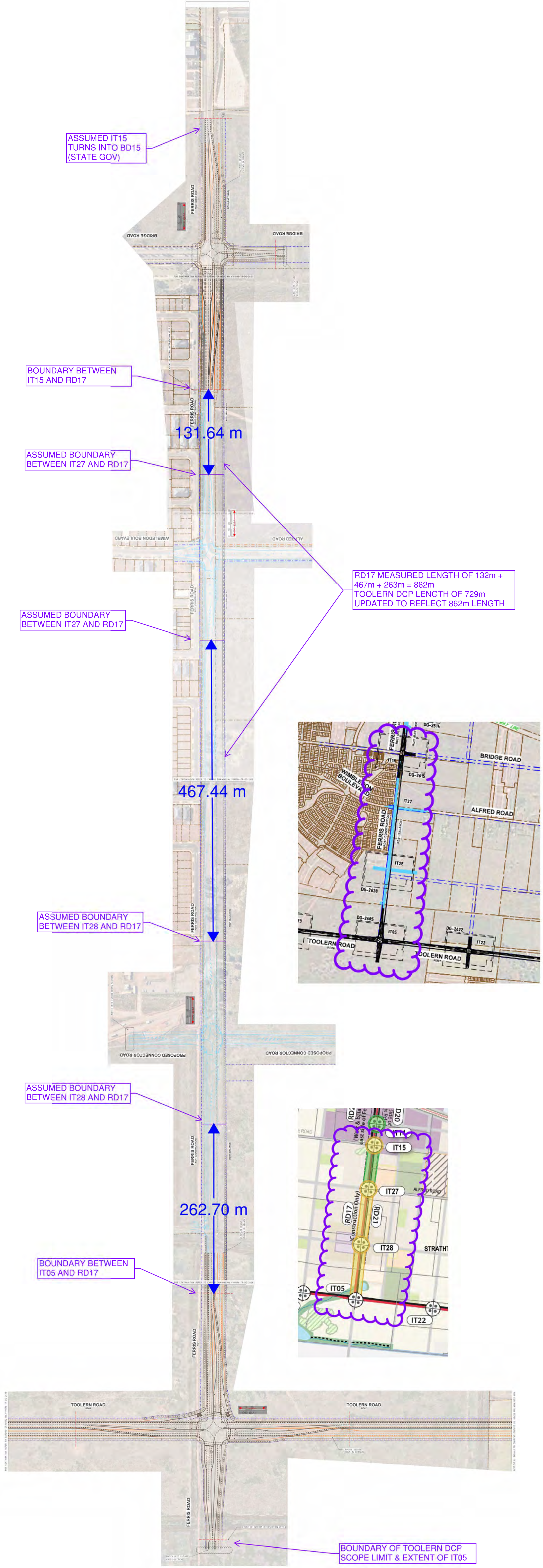






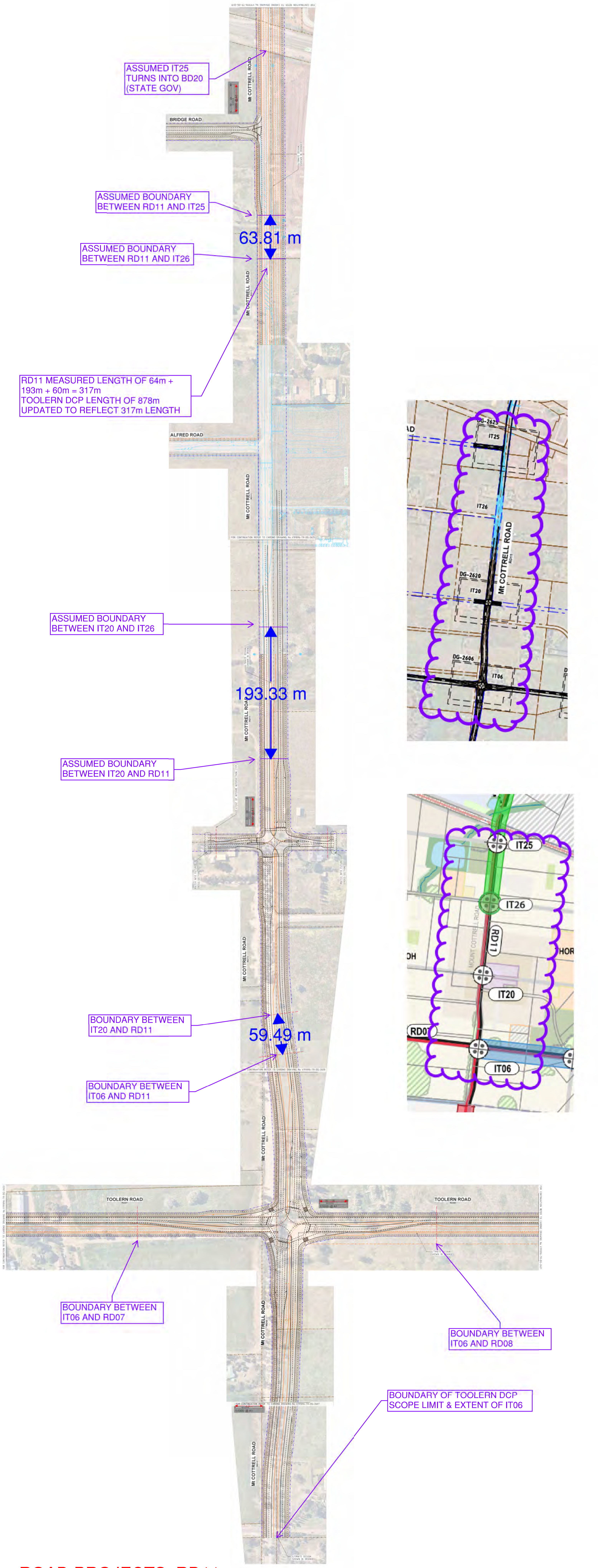
ROAD PROJECTS: RD01, RD02 & RD03
INTERSECTION PROJECTS: IT01, IT02, IT24 & IT03

SOURCES:
V191096-TR-DG-2600 Revision 6 dated 11/11/2020 by Cardno
V191096-TR-DG-2601 Revision 6 dated 5/3/2020 by Cardno
V191096-TR-DG-2602 Revision 6 dated 5/3/2020 by Cardno
V191096-TR-DG-2603 Revision 6 dated 5/3/2020 by Cardno
Page 10 Toolern Development Contributions Plan amended June 2022 by VPA



ROAD PROJECTS: RD17
INTERSECTION PROJECTS: IT05, IT15, IT27 & IT28

SOURCES:
V191096-TR-DG-2600 Revision 6 dated 11/11/2020 by Cardno
V191096-TR-DG-2605 Revision 6 dated 5/3/2020 by Cardno
V191096-TR-DG-2615 Revision 6 dated 5/3/2020 by Cardno
V191096-TR-DG-2627 Revision 1 dated 7/5/2021 by Cardno
V191096-TR-DG-2628 Revision 4 dated 5/6/2020 by Cardno
Page 10 Toolern Development Contributions Plan amended June 2022 by VPA



ROAD PROJECTS: RD11
INTERSECTION PROJECTS: IT06, IT20, IT25 & IT26

SOURCES:
V191096-TR-DG-2600 Revision 6 dated 11/11/2020 by Cardno
V191096-TR-DG-2606 Revision 6 dated 5/3/2020 by Cardno
V191096-TR-DG-2607 Revision 2 dated 1/3/2022 by Cardno
V191096-TR-DG-2620 Revision 6 dated 5/3/2020 by Cardno
V191096-TR-DG-2625 Revision 6 dated 5/3/2020 by Cardno
Page 10 Toolern Development Contributions Plan amended June 2022 by VPA

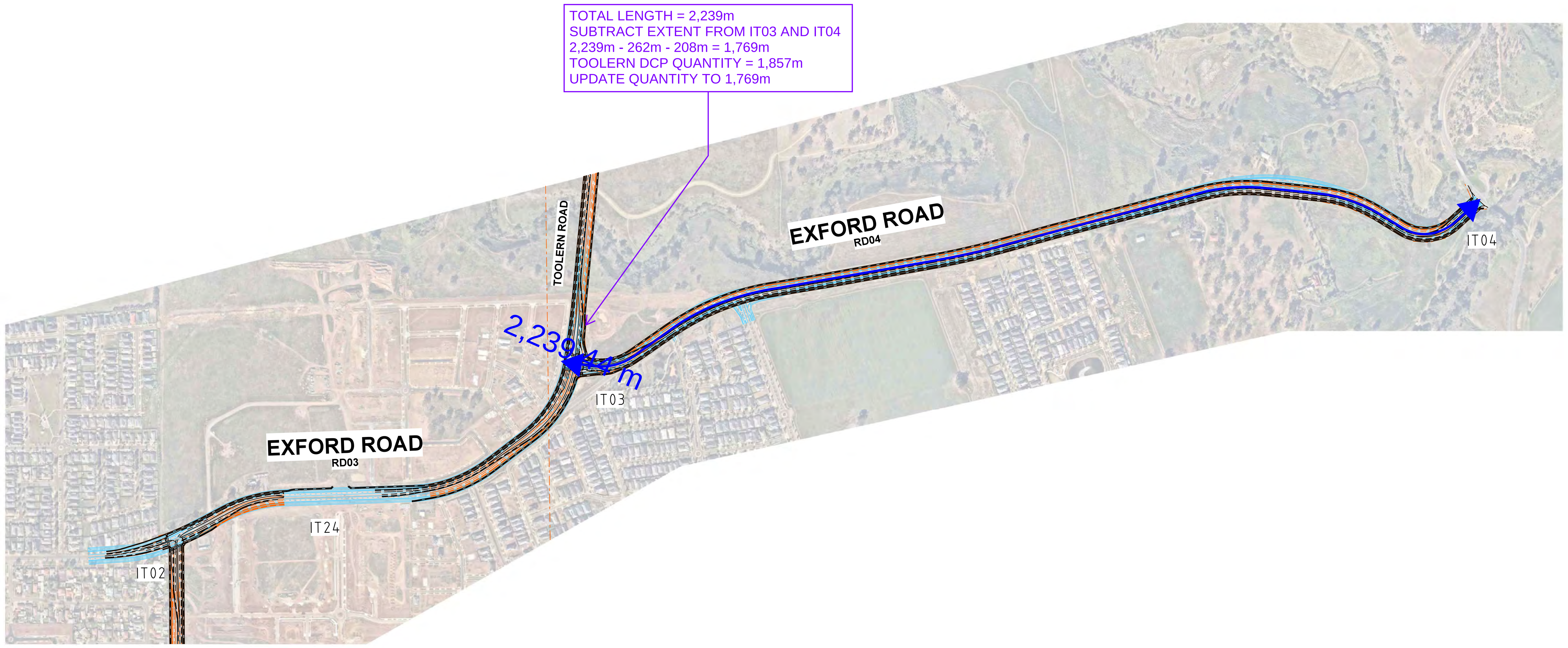
BY: User:Agnieszka.Booth DATE PLOTTED: 17/03/2022 10:31:24 AM

CAD File: M:\2019\1001_1500\V191096_Toolern_PSP_Transport_Review\Traffic\Drafting\04 Drawings\01 CAD\V191096-TR-DG-2639.dgn

LEGEND

ULTIMATE DESIGN -	(orange)
INTERIM DESIGN -	(black)
PROPOSED BOUNDARY -	(blue)
EXISTING BOUNDARY -	(brown)
DESIGN BY OTHERS -	(light blue)

TOTAL LENGTH = 2,239m
SUBTRACT EXTENT FROM IT03 AND IT04
2,239m - 262m - 208m = 1,769m
TOOLERN DCP QUANTITY = 1,857m
UPDATE QUANTITY TO 1,769m



N

Rev	Date	Description	Drawn	Appr.
2	17.03.2022	COUNCIL COMMENTS	AB	AC
1	10.12.2021	ISSUED FOR INFORMATION	AB	AC

0 75 150 300
300.00 m

WARNING
BEWARE OF UNDERGROUND SERVICES
THE LOCATIONS OF UNDERGROUND SERVICES SHOWN ARE APPROXIMATE ONLY AND THEIR EXACT POSITION SHOULD BE PROVEN ON SITE.

GENERAL NOTE:
1. BASE INFORMATION SUPPLIED BY NEARMAP
2. ALL DIMENSIONS ARE TO FACE OF KERB AND CHANNEL U.N.O.
3. DECLARED MAIN ROAD - EXFORD ROAD (SPEED ZONE 60KM/H)
   LOCAL ROAD - PROPOSED CONNECTOR (SPEED ZONE 60KM/H)

Cardno
Shaping the Future
ABN: 47 106 610 913
501 Swanston Street, Melbourne, VIC Australia 3000
Phone (+61 3) 8415 7777 Fax (+61 3) 8415 7788
Email: victoria@cardno.com.au Web: www.cardno.com.au/victoria

Drawn	A.BOOTH
Designed	A.BOOTH
Checked	V.OSADCHIY
Authorised	A.CARR
Client	CITY OF MELTON
Project	TOOLERN PSP EXFORD ROAD MELTON SOUTH
Title	INTERIM / ULTIMATE PSP CONCEPT LAYOUT
Status	PRELIMINARY NOT TO BE USED FOR CONSTRUCTION PURPOSES
Date	10.12.2021
Scale	1:7500
Size	A1
Drawing Number	V191096-TR-DG-2639
Revision	2

BY: User:Agnieszka.Booth

DATE PLOTTED: 7/05/2021 4:50:42 PM

MELWAY MAP REF 342 K9

Rev	Date	Description	Drawn	Appr.
6	10.05.2021	COUNCIL COMMENTS	AB	6
5	09.04.2021	COUNCIL COMMENTS	AB	AC
4	05.11.2020	COUNCIL AND DoT COMMENTS	EC	BM
3	05.06.2020	GENERAL AMENDMENTS	LS	TM
2	03.04.2020	COUNCIL COMMENTS	LS	TM
1	05.03.2020	ISSUED FOR INFORMATION	EC	TM

0 10 20 40
40.00 m
1:1000 @ A1

WARNING
BEWARE OF UNDERGROUND SERVICES
THE LOCATIONS OF UNDERGROUND SERVICES SHOWN ARE APPROXIMATE ONLY AND THEIR EXACT POSITION SHOULD BE PROVEN ON SITE.

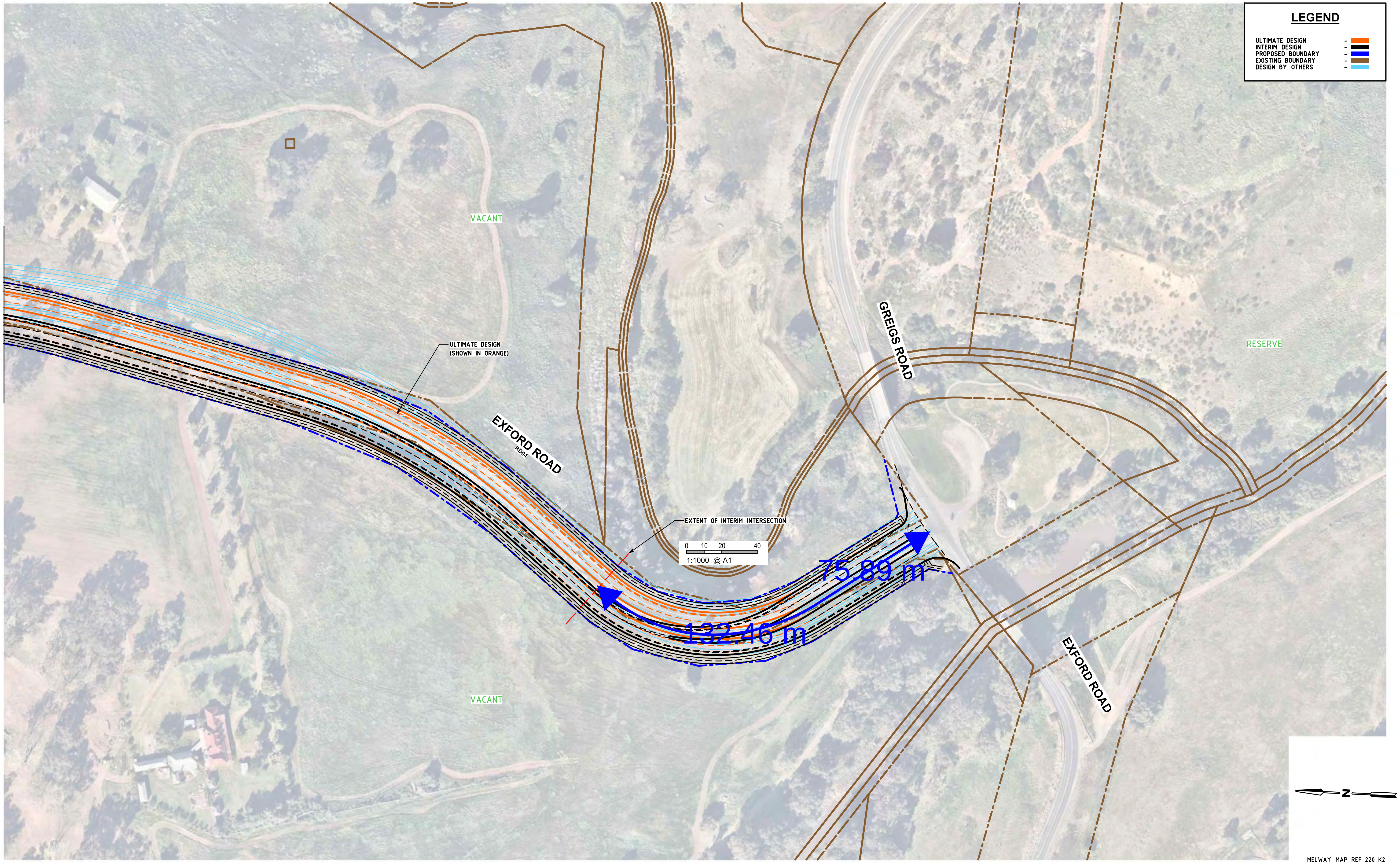
GENERAL NOTES:
1. BASE INFORMATION SUPPLIED BY TRAFFIX DESIGN, REF No. G10414B-01, BREECE PIT DIXON PTY LTD, REF No. 6751E/INT AND NEARMAP.
2. ALL DIMENSIONS ARE TO FACE OF KERB AND CHANNEL U.N.O.
3. LOCAL ROAD - EXFORD ROAD (SPEED ZONE 60KM/H)
   - PROPOSED ROAD (SPEED ZONE 60KM/H)

Cardno
Shaping the Future
ABN: 47 106 610 913
501 Swanston Street, Melbourne, VIC Australia 3000
Phone (+61 3) 8415 7777 Fax (+61 3) 8415 7788
Email: victoria@cardno.com.au Web: www.cardno.com.au/victoria

Drawn	L. SIMPSON
Designed	L. SIMPSON
Checked	C. SANSTOUPET
Authorised	T. McKINLEY
Client	CITY OF MELTON
Project	TOOLERN PSP EXFORD ROAD / PROPOSED ROAD MELTON SOUTH
Title	IT03 - INTERIM PSP INTERSECTION CONCEPT LAYOUT
Status	**PRELIMINARY** NOT TO BE USED FOR CONSTRUCTION PURPOSES
Date	05.03.2020
Scale	1:1000
Size	A1
Drawing Number	V191096-TR-DG-2603
Revision	6

CAD File: \\AUMELCFS03.cardno.corp\VicData\2019\1001_1500\V191096_Toolern_PSP_Transport_Review\Traffic\Drafting\04 Drawings\01 CAD\V191096-TR-DG-2603.dgn

CAD File: \\AUMELCFS03.cardno.corp\VicData1\2019\1001_1500\V191096_Toolern_PSP_Transport_Review\Traffic\Drafting\04 Drawings\01 CAD\V191096-TR-DG-2604.dgn
DATE PLOTTED: 7/05/2021 4:52:54 PM BY: User:Agnieszka.Booth



MELWAY MAP REF 220 K2

Rev	Date	Description	Drawn	Appr.
5	10.05.2021	COUNCIL COMMENTS	AB	AC
4	09.04.2021	COUNCIL COMMENTS	AB	AC
3	05.11.2020	COUNCIL AND DoT COMMENTS	EC	BM
2	05.06.2020	GENERAL AMENDMENTS	LS	TM
1	03.04.2020	ISSUED FOR INFORMATION	LS	TM

40.00 m
0 10 20 40
1:1000 @ A1

WARNING
BEWARE OF UNDERGROUND SERVICES
THE LOCATIONS OF UNDERGROUND SERVICES SHOWN ARE APPROXIMATE ONLY AND THEIR EXACT POSITION SHOULD BE PROVEN ON SITE.

GENERAL NOTES:
1. BASE INFORMATION SUPPLIED BY TRAFFIX DESIGN, REF No. G10414B-01 AND NEARMAP.
2. ALL DIMENSIONS ARE TO FACE OF KERB AND CHANNEL U.N.O.
3. LOCAL ROAD - EXFORD ROAD RD04 (SPEED ZONE 60KM/H)
   - GREIGS ROAD (SPEED ZONE 80KM/H)
   - EXFORD ROAD (SPEED ZONE 80KM/H)

Cardno
Shaping the Future
ABN: 47 106 610 913
501 Swanston Street, Melbourne, VIC Australia 3000
Phone (+61 3) 8415 7777 Fax (+61 3) 8415 7788
Email: victoria@cardno.com.au Web: www.cardno.com.au/victoria

Drawn: L. SIMPSON
Designed: L. SIMPSON
Checked: S. McKENZIE
Authorised: T. McKINLEY

Client: CITY OF MELTON
Project: TOOLERN PSP
EXFORD ROAD / GREIGS ROAD
MELTON SOUTH
Title: IT04 - INTERIM PSP INTERSECTION CONCEPT LAYOUT

Status: **PRELIMINARY**
NOT TO BE USED FOR CONSTRUCTION PURPOSES

Date	Scale	Size
03.04.2020	1:1000	A1

Drawing Number	Revision
V191096-TR-DG-2604	5