

JOINT REGIONAL PLANNING PANEL (Southern)

JRPP No	2017 – STH014
DA Number	DA No. 205 / 2014 (Part 5) Reference DAM0029 / 2017
Local Government Area	Shellharbour
Proposed Development	Section 96(2) modification application which seeks an amendment to the deferred commencement development consent granted by the JRPP at its meeting of 20 October 2014, specifically: B30 Realignment of Cygnet / Minga Avenue Intersection
Street Address	Lot 2 DP 1091265 Cygnet Avenue, Shellharbour City Centre
Applicant	Savills Project Management
Owner	Shellharbour City Council
Number of Submissions	NIL
Regional Development Criteria (Schedule 4A of the Act)	The Panel was the consent authority for the original DA. Clause 21(1)(a), Part 4 of State Environmental Planning Policy (State and Regional Development) 2011
List of All Relevant s79C(1)(a) Matters	<ul style="list-style-type: none"> • Shellharbour Local Environmental Plan 2013 • Shellharbour Development Control Plan 2013
List all documents submitted with this report for the panel's consideration	Proposed Intersection Upgrade Road Design Pavement Plan Project Design Report – Cygnet Avenue & Minga Avenue Intersection Upgrade
Recommendation	Approval, subject to modified conditions
Report by	Helen Mulcahy Director, Helen Mulcahy Urban Planning Pty Ltd

Assessment Report and Recommendation Cover Sheet

1. PURPOSE OF REPORT

This report is presented to the Joint Regional Planning Panel (the Panel) for determination of an application made pursuant to section 96(2) of the *Environmental Planning and Assessment Act 1979* in respect of a consent granted by the Panel at its meeting of 20 October 2014.

The application seeks approval for an amendment to the development consent issued in respect of DA No. 205/2014, specifically the deletion of Condition B30 which provides that:

The intersection of Cygnet Avenue and Minga Avenue shall be realigned to allow right turn movements from Cygnet Avenue to Minga Avenue. Full details of this reconfiguration shall be submitted with the Construction Certificate application.

The purpose of this report is provide an assessment of the application to modify the consent.

Council has engaged Helen Mulcahy Urban Planning Pty Ltd (HMUP) to prepare the report to the Panel to ensure an independent and transparent assessment of the S96(2) application, having regard to Council's interest in the project. Specialist technical support in relation to traffic and road safety has been provided by TRS Transport and Road Safety. Both consultants were involved in the assessment of the original development application (DA).

2. RECOMMENDATION

It is recommended that the Panel approve the modifications to DA 205/2014 for the Shellharbour City Hub development (hereinafter referred to as the Civic Centre) at Lot 2 DP 1091265, corner of Cygnet and College Avenues in Shellharbour, by deleting Condition B30 of the Consent.

3. BACKGROUND

3.1 Site Description and Context

The site is located in the southern part of Shellharbour City Centre at the corner of College and Cygnet Avenues. Precinct E is designated as the Civil and Cultural Precinct in the Shellharbour City Centre Master Plan.

Precinct E comprises a single parcel, legally described as Lot 2 in DP 1091265. The configuration of the land and its relationship to adjoining development are illustrated in **Figure 1**.

The Civic Centre represents the first stage of development in Precinct E. Development in the balance of the precinct is expected to yield approx. 4,365m² of commercial floor space and vehicular access to / from that future development will be provided via the existing Cygnet Avenue roundabout.

3.2 The Approved Development

On 20 October 2014, the JRPP granted deferred commencement development consent to DA 205 / 2014 which allowed for the construction of the Shellharbour Civic Centre which included the following:

- City Library
- Museum
- Council Chambers
- Civic Auditorium and meeting rooms
- Facilities for sessional services
- Administrative Offices for Council
- Café associated with the Library
- Civic Square
- Car Parking



Figure 1: Relationship of approved development to Minga / Cygnet Ave intersection (Source: Nearmap)

The Consent has been amended on three occasions, as follows:

- (i) On 26 August 2015, a Section 96(2) application was approved by the JRPP. The approval deleted the Deferred Matter pertaining to car parking and Condition B11 which required a culvert upgrade at the Cygnet Avenue roundabout. It also amended Condition E15 relating to car park signage and Condition G4 relating to the hours of operation and range of uses permitted in the Auditorium.
- (ii) On 26 April 2016, a Section 96(1A) application was approved by Shellharbour City Council for minor modifications to the building envelope, materials and finishes, together with a small increase in GFA (within the approved building envelope).
- (iii) On 28 April 2017, a Section 96(1A) application was approved by Shellharbour City Council to vary the hours of work during the construction phase.

It is pertinent to the assessment of the current application that vehicular access to / from the approved development is restricted to left in / left out on Cygnet Avenue. The implications of this arrangement are that all vehicles leaving the Civic Centre will be required to:

- execute a U-turn at the Cygnet Avenue roundabout in order to access Minga Avenue (proceeding to New Lake Entrance Road) or College Avenue; or
- continue along Cygnet Avenue through the residential area to the west to reconnect with College Avenue, approximately 500 metres further to the south.

3.3 Background to Condition B30

Council's DCP 2013 cites the realignment and re-prioritisation of the Cygnet / Minga Avenue intersection as an objective associated with development in Precinct E. Council officers have confirmed that the objective was included in the DCP without the benefit of any detailed design.

The Traffic Impact Assessment (TIA) submitted with the original DA¹ noted the DCP objective but found that the existing road network could accommodate the traffic generated by both the Civic Centre and the anticipated future development in the balance of Precinct E (Stage 2), and as such, the upgrade of the Cygnet / Minga Avenue intersection would not be required.

The assessment report presented to the Panel on 20 October 2014 acknowledged that there may be some benefit in introducing the right turn from Cygnet Avenue to Minga Avenue by potentially improving accessibility around the Civic Centre development and avoiding U turns at the Cygnet Avenue roundabout. It should be noted that the relative proximity (approx. 55 metres) of the intersection to the roundabout was identified as a potential constraint. However without the benefit of detailed intersection design, no further assessment of the intersection upgrade was provided.

The modelling undertaken as part of the TIA was reviewed by TRS Transport and Road Safety found to be satisfactory. As a consequence, the requirement for the Cygnet / Minga Avenue realignment and re-prioritisation was not included in the recommended schedule of conditions presented to the Panel.

In its detailed consideration and determination of DA No. 205/2014, the Panel saw fit to require the realignment of the intersection and Condition B30 was included in the Notice of Determination.

4. PROPOSED MODIFICATION

The application seeks approval for the deletion of Condition B30 Realignment of Cygnet / Minga Avenue Intersection which provides that:

The intersection of Cygnet Avenue and Minga Avenue shall be realigned to allow right turn movements from Cygnet Avenue to Minga Avenue. Full details of this reconfiguration shall be submitted with the Construction Certificate application.

4.1 Applicant's Justification for the Modification

The application is accompanied by a Design Report² (**Attachment 2**) which examines the implications of realignment of the intersection based on operational, safety, cost and environmental impacts. It considers the relative benefits and costs associated with the intersection realignment and the findings of the original TIA in relation to the traffic impacts on the wider road network.

The Report concurs with the findings of the TIA submitted in respect of the original DA, namely that the realignment of the intersection is not required to accommodate traffic from the approved Civic Centre development, nor would it be required for the potential future development in Precinct E (Stage 2).

The Report indicates that whilst the realignment can be designed to satisfy the relevant standards, there are a range of impacts associated with the works including traffic safety, impacts on property including property not in Council ownership, and utilities infrastructure, as summarised below.

4.1.1 Traffic Impacts

The applicant reiterates the findings of the TIA prepared in support of the original DA, namely that the existing road network could accommodate the traffic generated by both the Civic Centre and the anticipated future development in the balance of Precinct E (Stage 2), and as such, the upgrade of the Cygnet / Minga Avenue intersection is not required.

¹ Traffic Impact Assessment, Shellharbour City Hub; TRAFFIX, May 2014

² Cygnet Avenue & Minga Avenue Intersection Upgrade Shellharbour; J. Wyndham Prince, February 2017

The Design Report has undertaken further analysis of the future traffic volumes detailed in the TIA in relation to the Cygnet / Minga intersection which suggests that there will be potential conflicts between the 120 vehicles turning right from Cygnet Avenue and the following movements at the intersection:

- 75 eastbound vehicles accelerating from the roundabout in Cygnet Avenue;
- 75 vehicles turning left from Cygnet into Minga Avenue; and
- 100 vehicles turning right out of Minga Avenue.

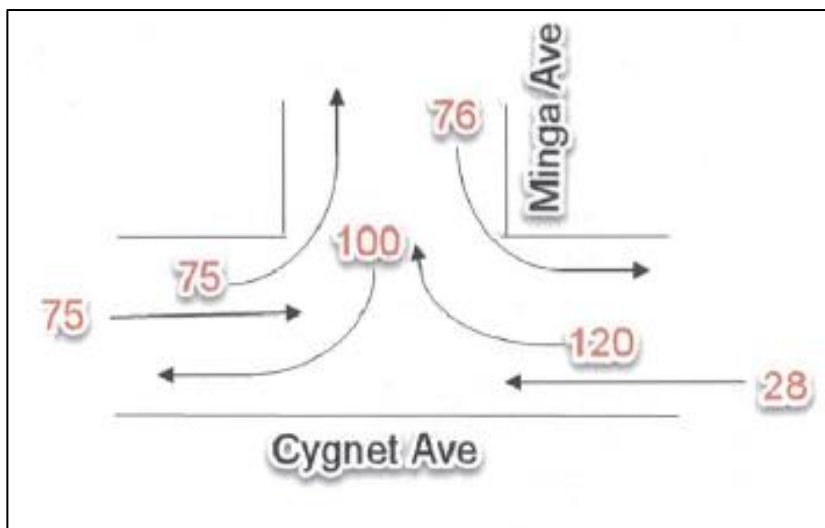


Figure 2: Traffic movements in the future PM peak (Source: J. Wyndham Prince)

The Design Report suggests that the delay to vehicles waiting to turn right from Cygnet Avenue would increase queue length of vehicles in the proposed right turn bay.

In this regard the Design Report notes that the proximity of the vehicular access to the Civic Centre development (**Figure 3**) limits the storage capacity of the Cygnet Avenue right turn bay to a maximum of 7 passenger cars.

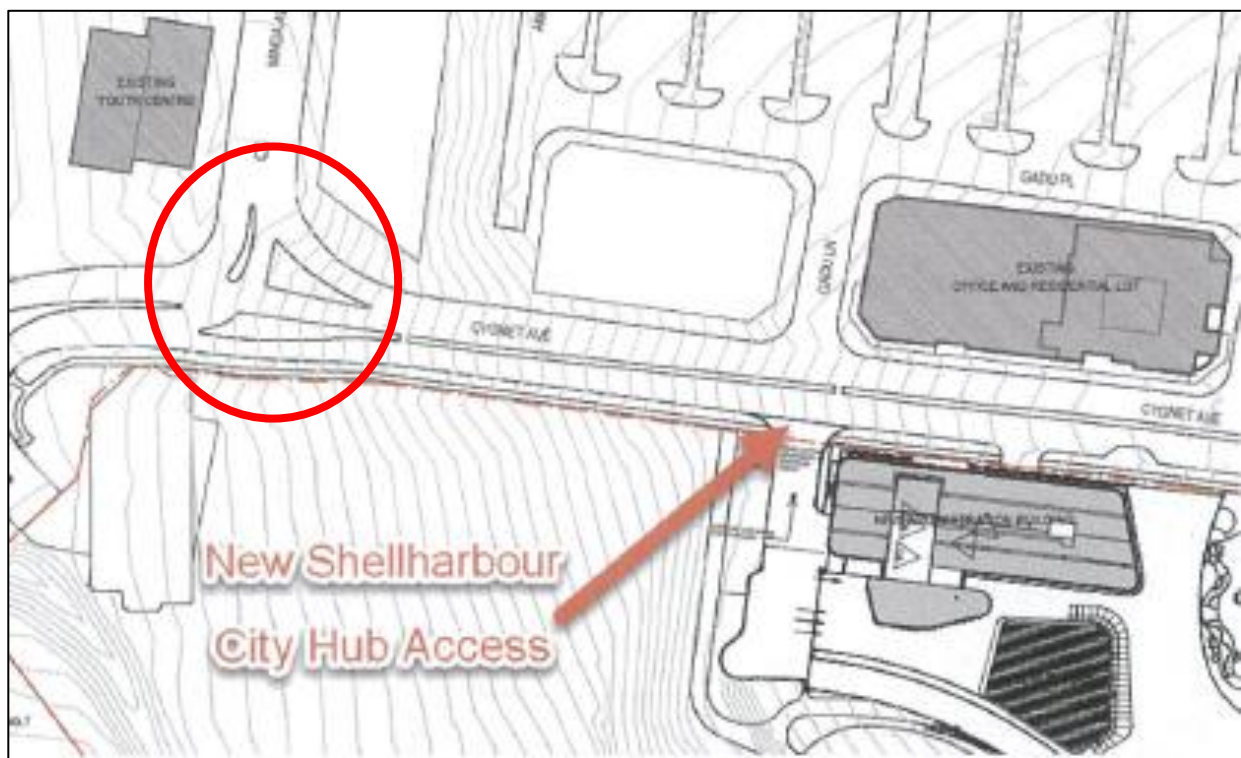


Figure 3: Relationship of the intersection to the Civic Centre entry / exit (Source: J. Wyndham Prince)

The Design Report anticipates that vehicle queuing would extend into the westbound through lane in Cygnet Avenue, possibly causing congestion and potential for rear end collisions.

A preliminary Road Safety Audit of the proposed intersection realignment is also included in the Design Report. The Audit identifies the following issues:

1. The right turn into Minga Avenue is in conflict with the eastbound acceleration lane from the roundabout, the right turn out of Minga Avenue and the adjacent pedestrian crossing³.
2. There does not seem to be sufficient room to develop a separate right turn lane with sufficient deceleration and storage unless Cygnet Avenue is widened.
3. There is currently a potential conflict between the right turn westbound acceleration lane from Minga Avenue (which has right of way) over the adjacent lanes approaching the roundabout in Cygnet Avenue.
4. The close proximity of the adjacent roundabout in Cygnet Avenue and multiple traffic turning movements, which would restrict safe intersection sight distances (SISD)

Additional Road Works

The introduction of a right turn from Cygnet Avenue to Minga Avenue may also require additional works such as changes to the signalised intersection at Minga Avenue and New Lakes Entrance Road (which currently does not provide a right turn to New Lakes Entrance Road) to ensure traffic seeking to travel eastbound on New Lakes Entrance Road is not directed onto Memorial Avenue, which is a highly pedestrianised street with a 40km / hr speed limit.

Figure 4 illustrates the surrounding road network.

The applicant asserts that the intersection realignment required under Condition B30 could increase the potential for traffic conflicts with a resultant reduction in safety and requests that the condition be deleted in favour of maintaining the existing traffic arrangements which are able to accommodate the traffic generated by Precinct E under full development.

4.1.2 Impacts on Property and Infrastructure

The Design Report indicates that the existing slope in Cygnet Ave exceeds recommended cross fall standards and requires significant re-grading and realignment to achieve appropriate safety levels for heavy vehicles. The flow-on effects are documented on the Drawing at **Attachment 1** and include:

- Relocation and adjustments to utility services including water, sewer, electricity, communications and gas;
- Widening of the Cygnet Ave road reserve (land area of approx. 95m²) which would also necessitate cut and fill batters to accommodate new levels;
- Impact on the Youth Centre on the NW corner of the intersection which would require level adjustments (including the construction of a retaining wall) and the reconstruction of the existing access driveway;
- 4 existing kerb inlets would also require adjustment; and
- Consequential batters within the privately owned property on the north eastern corner of Minga Avenue and Cygnet Avenue to support the realignment.

In view of the impacts described above, the applicant asserts that providing right turn from Cygnet to Minga Avenue would result in a worse planning outcome in terms of traffic impact and the flow-on

³ **Note** – there is no adjacent pedestrian crossing. A pedestrian refuge in Cygnet Avenue approx. 110m east of the intersection was removed to facilitate construction access. It is understood that this will not be reinstated and that upgraded pedestrian facilities will be provided as part of the signalisation of College and Cygnet Avenues.



Figure 4 Relationship of Cygnet / Minga intersection to Memorial Avenue and New Lakes Entrance Road

effects described above. The applicant suggests a more practicable and safer outcome could be achieved by maintaining the existing traffic management infrastructure arrangements.

4.2 Assessment

The proposal to delete Condition B30 has been assessed in the context of the following:

- the traffic generated by the Civic Centre development as well as future development in the remainder of Precinct E;
- the detail of the applicant's Project Design Report and Road Safety Audit submitted as part of the S96 application; and
- the relevant Objectives contained in Shellharbour Development Control Plan 2013.

4.2.1 Traffic Generation

As described previously in this report, the TIA which accompanied the original DA examined the need for the intersection upgrade in the context of the traffic generated by the Civic Centre as well as the traffic volumes associated with the future development in the balance of Precinct E (Stage 2).

The report found that the Civic Centre would generate 163 vehicles per hour during peak periods via the left-in / left-out access to Cygnet Avenue while the balance of the Precinct E development was predicted to generate 87 vehicles / hour. It was noted that the Stage 2 development in Precinct E would access the wider network via the existing roundabout to Cygnet Avenue (**Figure 5**).



Figure 5: Vehicular access arrangements for Precinct E Stage 2 via Cygnet Ave roundabout (Source: Nearmap)

The TIA also included an analysis of the performance of key intersections in the vicinity of the Civic Centre development, including Minga Avenue / Cygnet Avenue. The following table details the existing performance in the AM and PM peak periods and the predicted performance, taking into account the additional traffic generated by full development of Precinct E (i.e. Civic Centre and the future Stage 2 development).

Intersection	Control Type	Period	Degree of Saturation	Intersection Delay	Levels of Service
Existing Intersection Performance					
Minga Ave / Cygnet Ave	Priority	AM	0.130	8.6	A
		PM	0.112	8.9	A
College Ave / Cygnet Ave	Priority	AM	0.283	8.6	A
		PM	0.381	10.7	B
Benson Ave / Cygnet Ave	Roundabout	AM	0.350	9.8	A
		PM	0.430	9.8	A
Predicted Intersection Performance					
Minga Ave / Cygnet Ave	Priority	AM	0.211	9.4	A
		PM	0.185	11.9	B
College Ave / Cygnet Ave	Priority	AM	0.356	10.3	B
		PM	0.516	11.7	B
Benson Ave / Cygnet Ave	Roundabout	AM	0.359	9.8	A
		PM	0.445	10.1	B

Where: "A" represents Good Operation with less than 14 seconds average delay per vehicle.
"B" denotes Acceptable Delays and Spare Capacity (at Give Way and Stop Signs) and Good with Acceptable Delays and Spare Capacity (at traffic signals or roundabouts). The average delay per vehicle is 15 to 28 seconds.

The modelling confirms that the proposed development will have negligible impacts on traffic congestion in the locality. In terms of the Minga / Cygnet intersection, a maximum increase of 3 seconds to the average vehicle delay in the PM peak, will marginally reduce the level of service from "A" to "B", however this is within acceptable limits.

The findings of the TIA were reviewed by Transport & Road Safety Consulting and were found to be satisfactory. Accordingly, it is agreed that:

- (i) the realignment of the Minga / Cygnet intersection is not justified as the existing road network can accommodate the impact of increased traffic volumes based on traffic efficiency; and
- (ii) the traffic modelling confirms that the introduction of the right turn bay from Cygnet to Minga Avenue is not warranted as a result of traffic generated by development in Precinct E.

4.2.2 Review of Project Design Report

Investigations have been undertaken by J. Wyndham Prince to assess the implications of realignment of the intersection based on operational, safety, cost and environmental impacts. The Design Report considers the relative benefits and costs associated with the realignment and the findings of the original TIA in relation to the traffic impacts on the wider road network.

The Report confirms that realignment can be achieved to satisfy Austroads Guidelines however would result in significant property impacts, costly adjustments to utilities road and drainage. The assessment also indicates that there would be significant traffic capacity and safety impacts.

The report goes on to suggest that the realignment and upgrade the intersection would not result in benefits to match the cost of utility and drainage infrastructure adjustments and impacts on adjoining properties however would result in significant negative outcomes.

The report further concludes that the "existing roundabout provides a higher level of safety for the proposed right turn with respect to providing lower turning speeds".

The Design Report was unable to justify the realignment on the basis of safety, traffic efficiency, accessibility or other benefits against the cost of the realignment. Furthermore it is noted that the preliminary Road Safety Audit concludes that the existing Cygnet Avenue roundabout provides a higher level of safety.

The imperative to provide for the safe management of road users is the primary objective for a road authority, in this instance, Council. Based on the information provided in the Design Report in relation to safety together with the other negative impacts on property and utility infrastructure, it is considered that the realignment of the Cygnet Avenue / Minga Avenue intersection is not warranted.

4.2.3 Shellharbour DCP 2013

Section 7.13 of the DCP sets out a series of objectives for Precinct E: Future Civic and Cultural Precinct, including:

- 17. Consider the re-alignment and re-prioritisation of intersection of Minga and Cygnet Avenue to enable right turns from east to north. Under this arrangement the east to north movement becomes the major through movement and the western approach becomes the side street.

As indicated previously in this report, Council officers have confirmed that the objective was included in the DCP without the benefit of any detailed design.

It is considered that the Project Design Report prepared by J. Wyndham Prince that accompanies this application (a copy of which is included as **Attachment 2**) satisfies Objective 17 in Section 7.13 of the DCP by enabling the intersection realignment to be considered with the benefit of a detailed concept design.

It is noted that the deletion of Condition B30 from the consent issued in respect of DA No. 205/2014 does not preclude Council giving further consideration to the intersection upgrade at some point in the future, should it be warranted.

4.2.4 Summary and Conclusion

Having regard to the preceding discussion it is concluded that:

- (i) the realignment of the Minga / Cygnet intersection is not justified as the existing road network can accommodate the impact of increased traffic volumes generated by both the Civic Centre development and any future development in the balance of Precinct E based on traffic efficiency; and
- (ii) the impacts on traffic safety together with the other negative impacts on property and utility infrastructure, do not warrant the realignment of the Cygnet Avenue / Minga Avenue intersection.

Furthermore, the deletion of Condition B30 from the consent issued in respect of DA 205/2014 does not alter the objectives of Council's DCP 2013 and as such, the provision of a right turn from Cygnet to Minga may be reconsidered by Council should it be required at some time in the future when the City Centre is fully developed.

5. NOTIFICATION AND SUBMISSIONS

As indicated previously in this report, Council notified the application for a period of 21 days in accordance with Section 2.2 of Shellharbour DCP between 11 and 31 May 2017, inclusive.

The notification included:

- distribution of a total of 516 letters to local businesses and residents in the vicinity of the site;
- an advertisement placed in *The Lake Times* on 10 May 2017; and
- a Site Notice placed on the land for the duration of the notification period.

No submissions were received.

6. ASSESSMENT

6.1 S96(2) of the Environmental Planning and Assessment Act, 1979

This modification is being proposed under Section 96(2) of the *Environmental Planning and Assessment Act, 1979* which enables a consent authority to modify a development consent upon application being sought by the applicant, or any other person entitled to the act on the consent, provided that the consent authority as part of the assessment process takes into consideration the following matters:

- a) it is satisfied that the development to which the consent as modified relates is substantially the same development as the development for which consent was originally granted and before that consent as originally granted was modified (if at all),***

The proposed modification relates to the deletion of Condition B30 which requires the realignment of the intersection of Cygnet and Minga Avenues to allow right hand turn movements from Cygnet Avenue to Minga Avenue.

The proposed amendments to the consent will not result in any substantive change to the approved development in terms of the:

- nature or intensity of the use(s);

- scale or character;
- built form (other than the notional changes that would have been necessitated by inclusion of additional car parking required by the Deferred Matter);
- relationship to and impacts on adjoining properties; and
- streetscape.

Furthermore, the modification will result in the existing traffic arrangements at the Cygnet / Minga intersection being maintained, which has been confirmed as providing a greater level of vehicle safety than would be achieved with the intersection upgrade.

The proposed deletion of Condition B30 does not change the essential features of the approved development and as such, it is considered that the proposed modification results in substantially the same development as approved under DA 205/2014 on 20 October 2014.

b) it has consulted with the relevant Minister, public authority or approval body (within the meaning of Division 5) in respect of a condition imposed as a requirement of a concurrence to the consent or in accordance with the general terms of an approval proposed to be granted by the approval body and that Minister, authority or body has not, within 21 days after being consulted, objected to the modification of that consent, and

The application relates to the modification of an approved development and does not require the concurrence of the relevant Minister, public authority or other approval body.

c) it has notified the application in accordance with:

- i. the regulations, if the regulations so require, or***
- ii. a development control plan, if the consent authority is a council that has made a development control plan that requires the notification or advertising of applications for modification of a development consent, and***

As described in Section 5 of this report, Council placed the application on notification for a period of 21 days in accordance with Section 2.2 of Shellharbour DCP from 11 – 31 May 2017, inclusive.

d) it has considered any submissions made concerning the proposed modification within any period prescribed by the regulations or provided by the development control plan, as the case may be.

No submissions were received as a result of the notification.

6.2 S79C Assessment

Section 96(3) of the Act provides that:

In determining an application for modification of a consent under this section, the consent authority must take into consideration such of the matters referred to in section 79C (1) as are of relevance to the development the subject of the application.

6.2.1 Provisions of any environmental planning instrument

Shellharbour Local Environmental Plan 2013 (SLEP) is the relevant environmental planning instrument in the assessment of this application.

The proposed amendment does not alter the nature of the use or the physical form of the Shellharbour Civic Centre and as a consequence, does not alter the compliance of the development as approved, with the provisions of SLEP 2013.

6.2.2 Likely Impacts

The primary impact associated with the deletion of Condition B30 (that is, not implementing the intersection realignment and re-prioritisation), is traffic.

The traffic impact of not carrying out the upgrade of the Cygnet Avenue / Minga Avenue intersection has been assessed and it has been found that the existing road infrastructure in the City Centre can accommodate traffic generated by both the approved development as well as the anticipated future development in the balance of Precinct E without any substantive reduction in the level of service.

It is also noted that not implementing the intersection upgrade will not result in any adverse traffic impacts to adjoining residential areas as the traffic in question (i.e. vehicles that want to proceed north from development within Precinct E) will simply utilise the existing roundabout in Cygnet Avenue.

In addition, there are a number of adverse impacts associated with the intersection upgrade including traffic safety, road widening, adjustment / relocation of utility services infrastructure, and impacts on properties in the vicinity of the intersection (specifically the Youth Centre).

Having regard to the above, not upgrading the intersection will have arguably less environmental impact than proceeding with the works.

6.2.3 Suitability of the Site

The suitability of the site to accommodate the Civic Centre development has been assessed as part of the original development application.

The deletion of Condition B30, which requires works external to the site, does not alter the essential characteristics of the development as approved, or change the environmental impacts.

6.2.4 The Public Interest

In granting consent to the original application, the Panel concluded that the Civic Centre development would make a positive contribution to the Shellharbour local government area and the provision of new civic, community and administrative facilities will contribute to the growth of and Council's strategic vision for the City Centre, which is for a *"liveable city that is connected through places and spaces"*.

The proposed modification to the consent will not diminish this contribution of the Civic Centre development to the locality.

Integral to the consideration of the proposed amendment to the consent is whether the deletion of the requirement to upgrade the Minga / Cygnet Avenue intersection is in the public interest.

The detailed intersection design submitted by the applicant demonstrates that whilst the realignment can be achieved to satisfy the relevant standards, there are a number of resultant traffic capacity and safety impacts. On this basis, it is considered that any benefit to vehicle circulation around the City Centre is outweighed by the adverse impacts.

Accordingly, the deletion of the condition of consent requiring the intersection realignment and re-prioritisation is considered to be in the wider public interest.

7. CONCLUSION

The application is referred to the Joint Regional Planning Panel Southern Region (JRPP) for determination as the consent authority pursuant to clause 23G(2) of the EP&A Act and clauses 20 and 21 of State Environmental Planning Policy (State and Regional Development) 2011 and in accordance with clause 4 of Schedule 4A of the EP&A Act.

The Section 96(2) Application presented to the Panel seeks to modify Development Consent No. 205/2014 by deleting Condition B30, which requires the realignment of the intersection of Cygnet Avenue and Minga Avenue to allow right turn movements from Cygnet Avenue to Minga Avenue.

The application was notified in accordance with Section 2.2 of Shellharbour DCP 2013. No submissions have been received.

The proposed modification has been assessed in accordance with sections 96(2) and 79C of the *Environmental Planning and Assessment Act 1979* and in the context of the following:

- the traffic generated by the Civic Centre development as well as future development in the remainder of Precinct E;
- the relevant Objectives contained in Shellharbour Development Control Plan 2013; and
- the detail of the applicant's Design Report and Road Safety Audit submitted as part of the S96 application.

The assessment concludes that the proposal will not contribute to any adverse impacts on nearby and adjoining residential development or the safe movement of traffic through the Shellharbour City Centre. The proposed deletion of Condition B30 is therefore considered acceptable in this instance and is supported.

8. RECOMMENDATION

It is recommended that the Panel approve the modification request made pursuant to section 96(2) of the *Environmental Planning and Assessment Act 1979* in respect of Development Application No. 205 / 2014 subject to the recommended draft amended consent conditions set out below.

Conditions

The consent issued in respect of DA No. 205 / 2014 is modified as follows:

(a) *Condition B30 is deleted, as follows:*

~~B30 Realignment of Cygnet / Minga Avenue Intersection~~

~~The intersection of Cygnet Avenue and Minga Avenue shall be realigned to allow right turn movements from Cygnet Avenue to Minga Avenue. Full details of this reconfiguration shall be submitted with the Construction Certificate application.~~

Prepared by:

Helen Mulcahy

Director

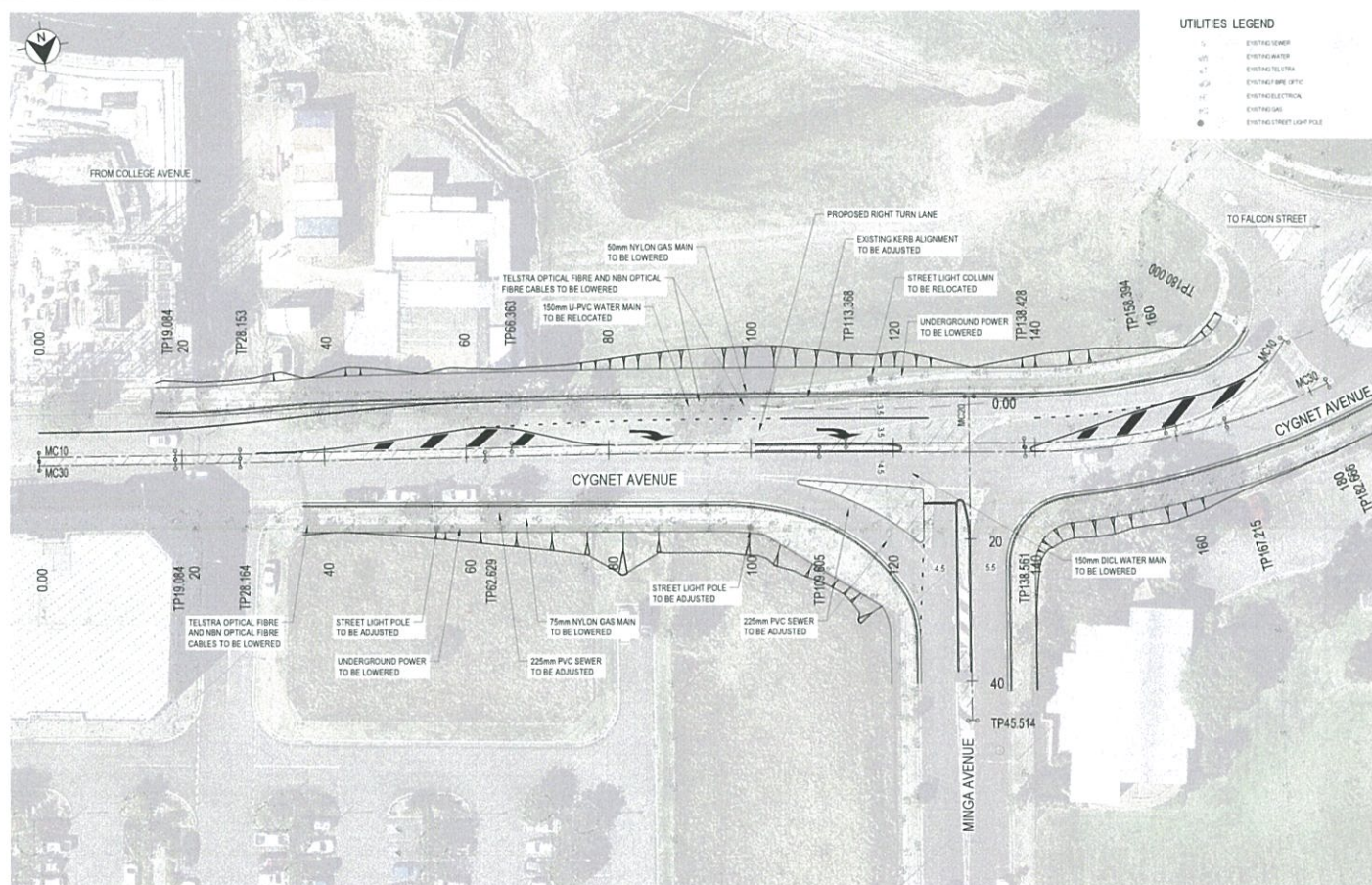
Helen Mulcahy Urban Planning Pty Ltd

7 July 2017

Attachment 1

Proposed Intersection Upgrade Road Design Pavement Plan

\\PLOT01\222\2017\306\PM\J\110262 - Cygnet & College Ave\07 - Cygnet and Minga Ave Intersection\RT\US\K\110262SK01.dwg



J. WYNDHAM PRINCE
CONSULTING CIVIL INFRASTRUCTURE ENGINEERS
& PROJECT MANAGERS

CYGNET AVENUE AND MINGA AVENUE; SHELLHARBOUR
PROPOSED INTERSECTION UPGRADE
ROAD DESIGN
PLAN

0 5 10 15 20
SCALE 1:500m

Attachment 2

Project Design Report – Cygnet Avenue & Minga Avenue Intersection Upgrade

Cygnet Avenue & Minga Avenue Intersection Upgrade SHELLHARBOUR

Project Design Report



Prepared for:
Shellharbour City Council
February, 2017

Prepared by:
J. WYNDHAM PRINCE
CONSULTING CIVIL INFRASTRUCTURE ENGINEERS
& PROJECT MANAGERS



PO Box 4366
PENRITH WESTFIELD NSW 2750
P 02 4720 3300
W www.jwprince.com.au
E jwp@jwprince.com.au

J. WYNDHAM PRINCE
CONSULTING CIVIL INFRASTRUCTURE ENGINEERS
& PROJECT MANAGERS

**Cygnets Avenue and Mings Avenue Intersection Upgrade
Project Design Report**

- DOCUMENT CONTROL SHEET -

Issue No.	Amendment	Prepared By & Date	Checked By and Date	Approved By and Date
A	Draft Issue	PS 24/02/17	PS 24/02/17	
B	Final Issue	PS 07/03/17	PS 07/03/17	PS 07/03/17

J. WYNDHAM PRINCE

CONSULTING CIVIL INFRASTRUCTURE ENGINEERS
& PROJECT MANAGERS

Cygnets Avenue and Munga Avenue Intersection Upgrade Project Design Report

- CONTENTS -

1	BACKGROUND	4
2	EXISTING CONDITIONS	5
3	SURVEY	6
4	DETAIL DESIGN	7
4.1	DESIGN CRITERIA	7
5	DESIGN CONSTRAINTS AND IMPACTS	9
5.1	MAXIMUM ALLOWABLE ADVERSE CROSSFALL	9
5.2	UTILITY IMPACTS	9
5.3	TRAFFIC IMPACTS	10
5.4	ROAD SAFETY AUDIT CHECK	11
5.5	PROPERTY IMPACTS	12
5.6	DRAINAGE IMPACTS	13
5.7	GEOTECHNICAL AND PAVEMENT	13
6	DEVIATIONS FROM STANDARDS	13
7	ESTIMATE OF COST	13
8	CONCLUSIONS	14
9	APPENDICES	15
	Appendix A –Concept Design Plans	16
	Appendix B – Survey Plans	17
	Appendix C – Preliminary Road Safety Audit Check – Letter dated 2 September 2016	18
	Appendix D – Cost Estimate (Opinion of Probable Cost)	19
	Appendix E – Site Photos	20
	Appendix F –Utility Services (DBYD Utility search)	23

1 BACKGROUND

The Shellharbour Civic Centre has been DA approved with conditions. Condition B30 of the Development Consent states that *"The intersection of Cygnets Avenue and Mings Avenue shall be realigned to allow right turn movements from Cygnets Avenue to Mings Avenue"*.

Shellharbour City Council has engaged J. Wyndham Prince under the following brief:

- Specifically review and prepare design documents which would address Condition B30 Realignment of Cygnets/Mings Avenue Intersection.
- Design to be undertaken in accordance with Austroad Guidelines, and any departures need to be identified.
- Review Austroad Guidelines in accordance to the maximum allowable cross fall Allowance.
- Design development to be undertaken to address how the existing adverse cross falls at the intersection is to be considered.
- Review potential impacts to existing infrastructure, services and existing road network.
- Review the capacity and/or constraints of the intersection to accommodate heavy to light vehicles.
- Compliance of all relevant standards and guidelines to be undertaken

This document is submitted in accompaniment of preliminary detail design shown on plans No 110262SK01 – 110262SK013. See **Appendix A**.

2 EXISTING CONDITIONS

The existing intersection of Cygnet Avenue and Minga Avenue is a half 'Seagull' configuration which incorporates the following features:-

- Provision for all turning movements except for the right turn from Cygnet Avenue to Minga Avenue.
- Right turn from Minga Avenue with priority over the westbound through movement in Cygnet Avenue.
- Right turn access from Cygnet Avenue to Minga Avenue via a u-turn at the existing roundabout located 50 metres west of the intersection.
- Raised concrete medians and traffic islands in both Cygnet Avenue and Minga Avenue.
- A pedestrian refuge in Minga Avenue located 25 metres north of the intersection.
- A pedestrian refuge in Cygnet Avenue located 20 metres east of the intersection.
- 12.5% longitudinal grade in Cygnet Avenue approaching the intersection.



- Concrete footpaths on both sides of Cygnet Avenue and Minga Avenue.
- Street lighting with underground power.

An aerial view of the site is shown in **Figure 1**.

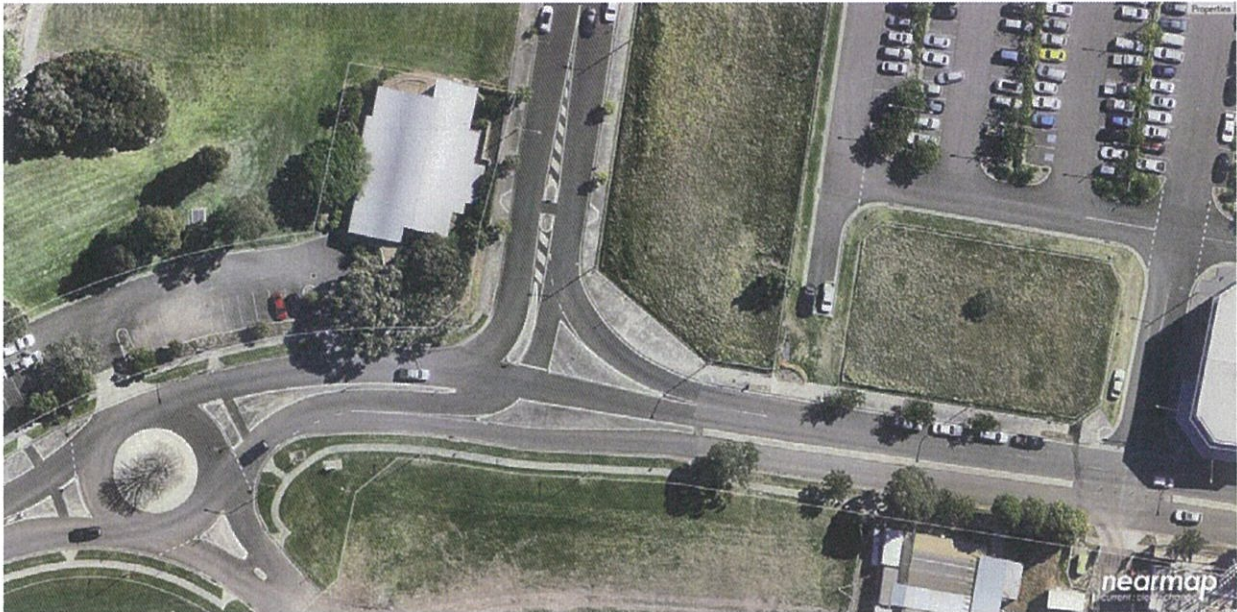


Figure 1 (Source nearmap 05 Oct 2016)

3 SURVEY

The following surveys were provided by Shellharbour City Council:

- Detail & Contour Survey Plan No. 205391-TS01 dated 22 October 2013 by LandTeam Australia Pty Ltd.
- Crossfall contour survey plan Cygnets Mingas mjo – Drawings – Drawing004.
- Cross section plan Cygnets Mingas mjo – Survey.

Survey plans are included in **Appendix B**.

4 DETAIL DESIGN

The guidelines used for design in order of priority are:

Austrroads Guide to Road Design
Published RMS Supplements to Austrroads Guides
Australian Standards

4.1 Design Criteria

Geometric Design

<i>Road Design</i>	MX SS3
<i>Model Output:</i>	MX Genio
<i>CAD Drawings:</i>	AutoCAD 2014
<i>Turning Paths:</i>	AutoTURN Pro3D

Design Speed

The following values have been adopted:

<i>Existing Posted Speed:</i>	60km/h
<i>Design Speed:</i>	60km/h

Design Vehicles

The following design vehicle has been adopted:

12.5m Single Unit Truck/Bus: All turning movements

Crossfall

Cygnet Avenue and Minga Avenue

Normal crossfall	-3.2% maximum and variable
Adverse crossfall	-5% maximum and variable

Horizontal Alignment

Cygnet Avenue westbound is to be realigned and widened to accommodate the proposed right turn storage lane.

The horizontal alignment matches the existing alignment of both Cygnet Avenue and Minga Avenue at the limit of the works. Cygnet Avenue ties into the existing roundabout at the western end. Minga Avenue ties into the existing alignment at the northern end.

Vertical Alignment

The vertical alignment of Cygnet Avenue is to be lowered to achieve maximum allowable crossfall for the right turn movement into Minga Avenue. This will result in an increase to the longitudinal grade from - 12.5% to -14.4%.

Sight Distance Requirements

Stopping Sight Distance (SSD) and Approach Sight Distance (ASD) - The following values have been adopted:

60km/h Cygnet Avenue	83m + 15m grade correction = 98m (per table 5.4 of Austroads Guide to Road Design Part 3)
60km/h Minga Avenue	83m + 15m grade correction = 98m (per table 5.4 of Austroads Guide to Road Design Part 3)

Safe Intersection Sight Distance (SISD) - The following values have been adopted:

60km/h Cygnet Avenue	114m + 15m grade correction = 129m (per table 3.2 of Austroads Guide to Road Design Part 4a)
60km/h Minga Avenue	114m + 15m grade correction = 129m (per table 3.2 of Austroads Guide to Road Design Part 4a)

5 DESIGN CONSTRAINTS AND IMPACTS

5.1 Maximum Allowable Adverse Crossfall

For the proposed right turn from Cygnet Avenue to Minga Avenue the existing road grades at the intersection result in an adverse crossfall of up to -9% (See **Appendix B**). This would result in a detrimental effect on driver and passenger comfort and vehicle stability, particularly for heavy vehicles (i.e. 12.5m Truck/Bus). Heavy vehicles could potentially overturn if turning speeds are greater than 5 km/h (Ref # Austroads Guide to Road Design Part 4A Table C3: Critical truck turning speeds).

Based on Austroads Guide to Road Design Part 4A Section 2.2.5 - 'adverse crossfall traversed by turning vehicles through an intersection should not exceed -3%. For a turn executed at very slow speed (say < 10 km/h), the desirable maximum adverse crossfall is -5%'.

To address maximum allowable adverse crossfall under Austroads the intersection has been regraded to achieve a maximum adverse crossfall of -5% for the right turn from Cygnet Avenue to Minga Avenue. The proposed regrading is shown on the concept design plans included in **Appendix A**.

5.2 Utility Impacts

Pavement widening to accommodate the proposed right turn combined with regrading Cygnet Avenue approaching and through the intersection to meet maximum adverse crossfall requirements would result in direct impacts on existing utility services. The following utility services would require relocation, adjustment or protection:

Cygnet Avenue (south side)

- Water – 130m of DN150mm U-PVC Water main (*south side*)
 - 40m of DN150mm DICL Water main
- Telstra – 150m of Optical Fibre (*south side*)
 - 130m of Optical Fibre (*north side*)
- NBN – 150m of Optical Fibre (*south side*)
 - 130m of Optical Fibre (*north side*)
- Jemena – 125m of 50mm Nylon Gas Main (*south side*)
 - 90m of 75mm Nylon Gas Main (*north side*)
- Endeavour Energy
 - 1 x Street Light Pole and 45m of underground power (*south side*)
 - 2 x Street Light Poles and 115m of underground power (*north side*)
 - 1 x Electrical Substation and 20m of underground power (*south side*)
- Sewer – 130m of DN 225mm PVC Sewer and 3 x Sewer Manholes

Utility impacts are shown on the concept design plan included in **Appendix A**.

5.3 Traffic Impacts

A traffic report entitled, 'Traffic Impact Assessment Shellharbour City Hub – Stage 1 DA Submission Report' was undertaken by Traffix traffic & transport planners in May 2014 (Ref # 13.424r02v03).

The report assessed the existing and future traffic performance of key intersections in the locality including the Cygnet Avenue / Minga Avenue intersection incorporating the traffic generation from the new Precinct E Shellharbour City Hub site under full development.

The traffic assessment indicated the future Level of Service for the existing intersection 'half seagull' configuration at Minga Avenue would remain "within acceptable thresholds (LoS B or better)" with "a maximum increase of 3 seconds to the average vehicle delay at any one critical movement and, as such, the proposed development will have negligible impacts on traffic congestion in the locality". (Ref # Section 6.3)

While the traffic assessment indicated that the "proposed development will have minimal impacts on key intersections in the locality" Condition B30 of the Development Consent requires that "The intersection of Cygnet Avenue and Minga Avenue shall be realigned to allow right turn movements from Cygnet Avenue to Minga Avenue".

Based on reassignment of the future traffic volumes shown in the Traffix report, the introduction of a right turn movement from Cygnet Avenue eastern approach to Minga Avenue northern departure would potentially result in PM peak turning volumes at the intersection as shown in **Figure 2**.



Figure 2 – Future PM Peak

The projected traffic volumes show potential conflicts between the 120 vehicles turning right and the following movements at the intersection:

- 75 eastbound vehicles accelerating from the existing roundabout in Cygnet Avenue.
- 75 vehicles turning left into Minga Avenue.
- 100 vehicles turning right out of Minga Avenue.

Although the intersection has not been remodelled with the reassigned turning movements it is apparent that the delay to vehicles waiting to turn right from Cygnet Avenue would increase the queue length of vehicles in the proposed right turn bay.

Taking into consideration the constraint imposed by the access driveway to the new Precinct E Shellharbour City Hub, the maximum available storage for the proposed right turn bay is restricted to seven passenger cars. **See Figure 3.** It is expected therefore that during the peak PM traffic period vehicle queueing would extend into the westbound through lane possibly causing congestion and rear end collisions in Cygnet Avenue. Accordingly it is recommended that the revised intersection be remodelled under SIDRA to confirm Level of Service (LoS) and queue lengths.

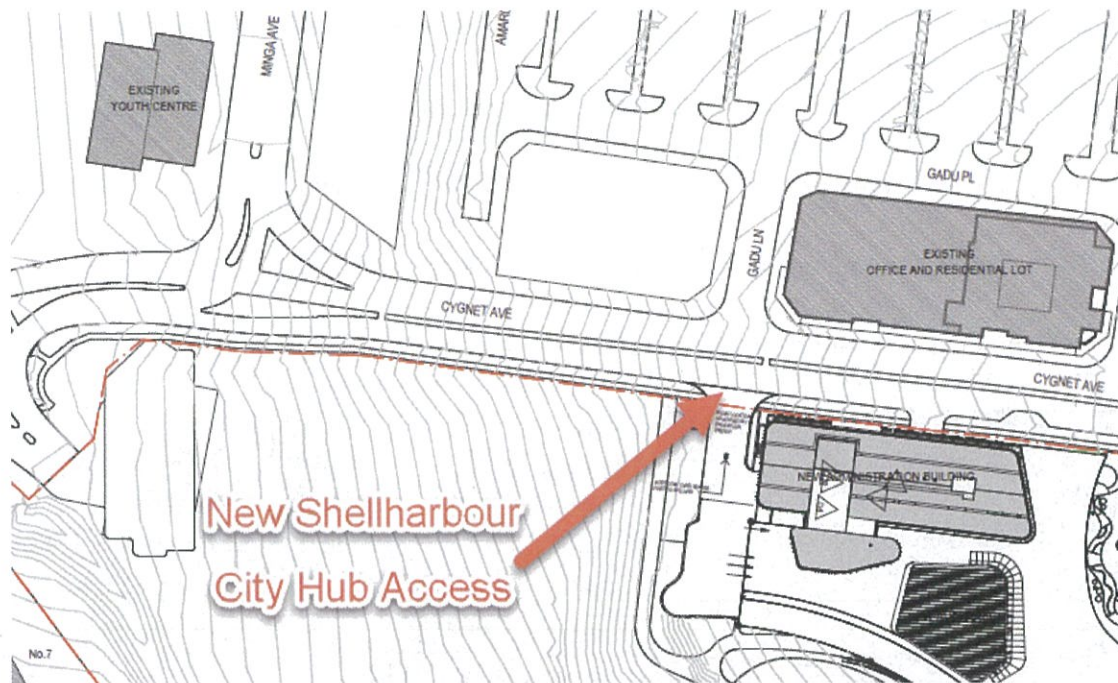


Figure 3 – Shellharbour City Hub Access Constraint

5.4 Road Safety Audit Check

Road Safety Audit Check

A preliminary road safety audit check of the proposed intersection realignment to allow right turn movements from Cygnet Avenue into Minga Avenue was undertaken by J. Wyndham Prince - Level 3 Road Safety Auditor on 2 September 2016. A summary of the findings is included below:

1. "The right turn into Minga Avenue is in conflict with the eastbound acceleration lane from the roundabout, the right turn out of Minga Avenue and the adjacent pedestrian crossing".
2. "There does not seem to be sufficient room to develop a separate right turn lane with sufficient deceleration and storage unless Cygnet Avenue is widened".
3. "There is currently a potential conflict between the right turn westbound acceleration lane from Minga Avenue (which has right of way) over the adjacent lane approaching the roundabout in Cygnet Avenue".
4. "The close proximity of the adjacent roundabout in Cygnet Avenue and multiple traffic turning movements, which would restrict Safe Intersection Sight Distance (SISD) during peak flow".

The audit concluded *"that it would be safer to use the roundabout for traffic wishing to turn right into Minga Avenue from Cygnets Avenue, rather than introduce another turning movement at the intersection"*.

See letter Ref # Shellharbour – Cygnets & Minga 020916 included in **Appendix C**.

5.5 Property Impacts

Road pavement regrading and widening of Cygnets Avenue would result in impacts to the following properties adjacent to the intersection:

Lot 2 DP 1091265 – Level adjustments along the boundary including 1m deep cut batters and 0.5m fill batters extending into Lot 2.

Lot 5 DP 1072916 – Level adjustments along the boundary including 0.7m cut batters extending into Lot 5.

Lot 61 DP 1105944 – Level adjustments along the boundary including 0.4m cut batters extending into Lot 5.

Lot 201 DP 884334 - Level adjustments up to 0.6m along the boundary, driveway, footpaths and landscaping works extending into the Shellharbour City Council Youth Centre.



5.6 Drainage Impacts

Road pavement regrading and widening of Cygnet Avenue would require the adjustment of four kerb inlet drainage structures.

5.7 Geotechnical and Pavement

For cost estimation purposes the following pavement designs have been adopted for pavement reconstruction and widening:

Pavement Type 1 New Pavement Widening

- 50mm Asphalt AC10 (laid in two layers)
- 150mm Asphalt AC14 (laid in three layers)
- 7mm Sprayed Seal
- 300mm DGS (Min CBR 15%)
- Compacted Subgrade (CBR 5%)

Pavement Type 2 Pavement Reconstruction

- Mill existing Asphalt (full depth)
- 50mm Asphalt AC10 (laid in two layers)
- 150mm Asphalt AC14 (laid in three layers)
- 7mm Sprayed Seal
- 300mm DGS (Recycled material - Min CBR 15%)
- Compacted Subgrade (CBR 5%)

Pavement Type 3 Concrete Median

- 130mm Thick 25MPa Concrete (SL62 Mesh)
- 50mm Thick Granular bedding material

Pavement Type 4 Concrete Footpath

- 100mm Thick 25MPa Concrete (SL62 Mesh)
- 50mm Thick Granular bedding material

6 DEVIATIONS FROM STANDARDS

The proposed works as shown on the concept design drawings No. 110262SK01 to 110262SK13 have been prepared in accordance with AUSTROADS Guide to Road Design. The design is not considered to have deviated from these standards.

7 ESTIMATE OF COST

A strategic estimate of cost has been prepared for the proposed upgrade. Having regard for the extent of works described above and allowing for Investigation, Design, Supervision, Infrastructure Construction, Utility Adjustments, Approvals, Reviews and Contingencies our opinion of probable cost is \$1.39 million. See **Appendix D**.

8 CONCLUSIONS

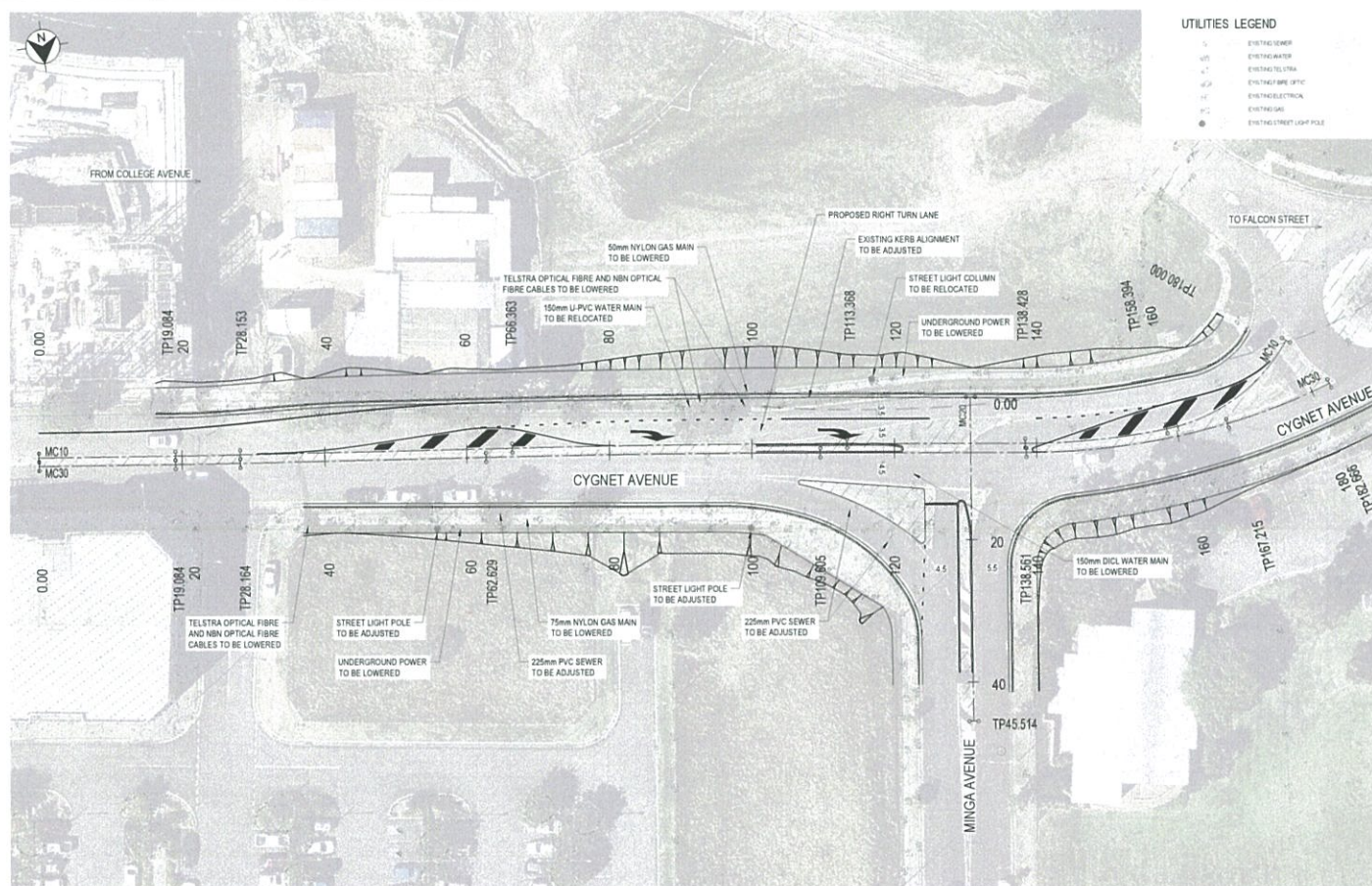
In summary:

- The proposed realignment of Cygnet Avenue to allow right turn movements into Minga Avenue can be achieved within Austroad Guidelines.
- Adjustments to existing road grading in Cygnet Avenue and Minga Avenue to achieve a maximum allowable adverse crossfall of -5% through the right turn swept path into Minga Avenue would result in extensive and costly impacts to existing utility services, road grading, drainage and property infrastructure. Refer to the estimate of cost in Appendix B.
- There are significant property impacts to the Shellharbour City Council Youth Centre including level adjustments up to 0.6m along the boundary, driveway access, pedestrian footpath access and adjacent gardens extending into the site. See Section 5.5.
- Based on Austroads GTRD, right turn vehicle speeds through an intersection with adverse crossfall of -5% should be '*very slow (say < 10 km/h)*'. Considering the westbound approach grade to the intersection at -14.4%, '*very slow*' right turn vehicle speeds of less than 10 km/h would be unlikely and difficult to manage. Actual approach and turning speeds would be expected to be significantly higher than 10km/h at the intersection.
- The close proximity of the adjacent roundabout in Cygnet Avenue and multiple traffic turning movements at the two intersections would impact adversely on traffic capacity and safety during peak periods. There is a potential conflict between eastbound vehicles accelerating from the existing roundabout and vehicles turning right into Minga Avenue.
- Based on the Traffic Impact Assessment report by Traffix (May 2014) it appears the existing roundabout in Cygnet Avenue has capacity to accommodate the east to north traffic movements from Cygnet Avenue into Minga Avenue.
- It is considered the existing roundabout provides a higher level of safety for the proposed right turn with respect to providing lower turning speeds.

9 APPENDICES

Appendix A – Concept Design Plans

\\PLOTTER1\222\2017\3:06 PM J\110262 - Cygnet & College Ave\07 - Cygnet and Minga Ave Intersection\RT\US\K\110262SK01.dwg

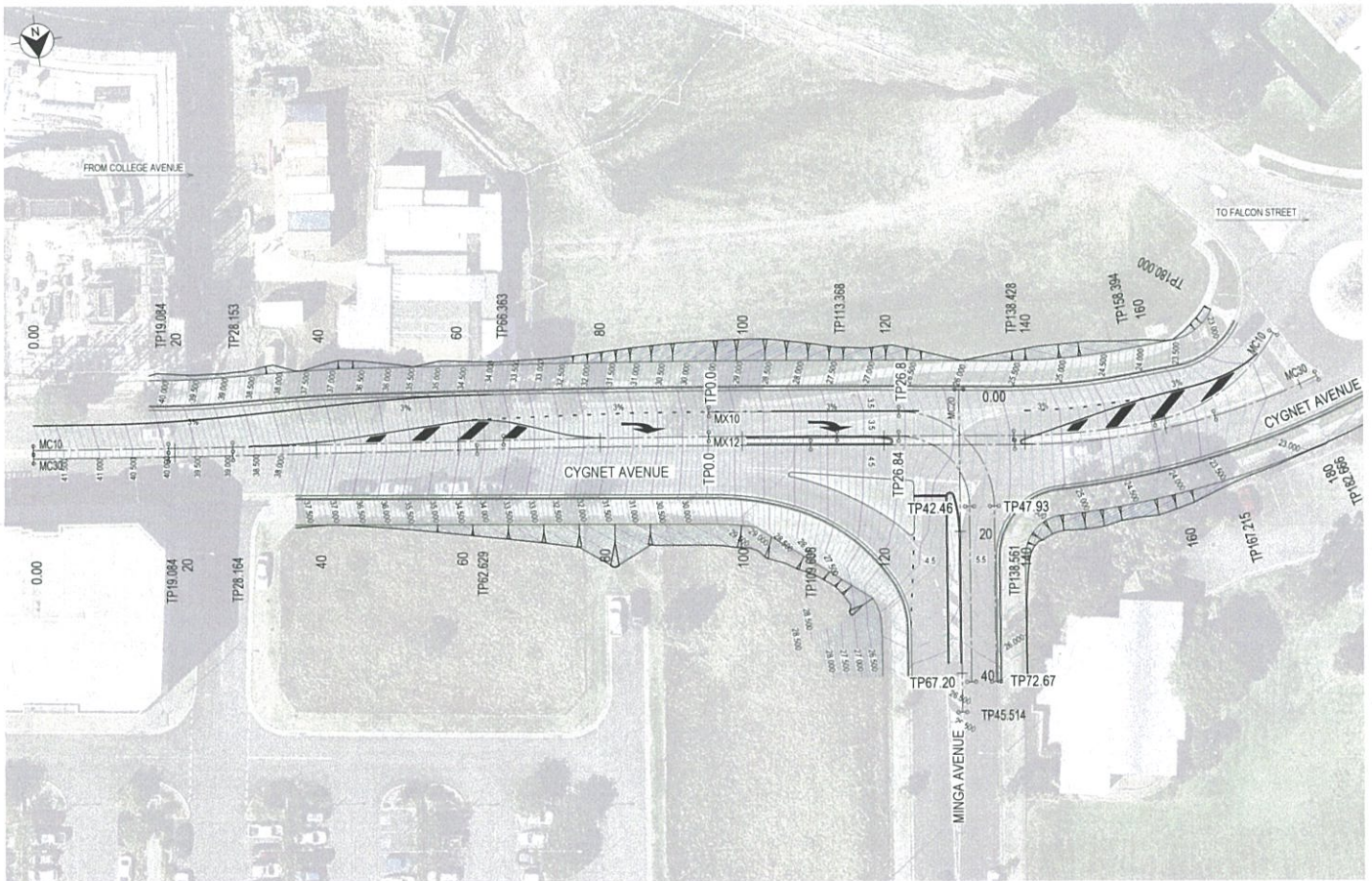


J. WYNDHAM PRINCE
CONSULTING CIVIL INFRASTRUCTURE ENGINEERS
& PROJECT MANAGERS

CYGNET AVENUE AND MINGA AVENUE; SHELLHARBOUR
PROPOSED INTERSECTION UPGRADE
ROAD DESIGN
PLAN

0 5 10 15 20
SCALE 1:500m

PLOTTED 2/22/2017 3:06 PM J:\110262 - Cygnet & Mings Ave Intersection\RT\SK110262SK02.dwg



J. WYNDHAM PRINCE
CONSULTING CIVIL INFRASTRUCTURE ENGINEERS
& PROJECT MANAGERS

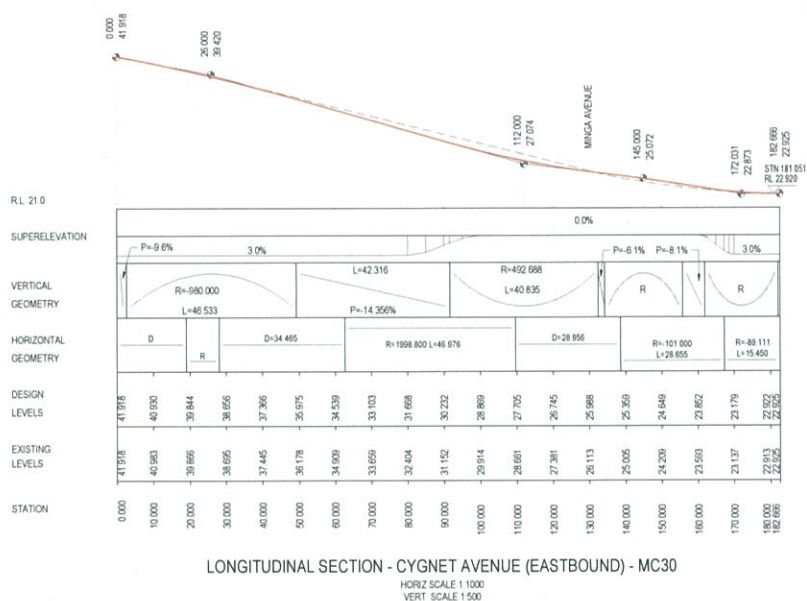
CYGNET AVENUE AND MINGA AVENUE, SHELLHARBOUR
PROPOSED INTERSECTION UPGRADE
DESIGN CONTOURS
PLAN

SCALE 1:500m

110262SK02

PLOTTED 22/2/2017 3:11 PM J:\110262 - Cygnet & College Ave07 - Cygnet and Minga Ave Intersection\RTT\GK110262SK03.dwg

PRELIMINARY DRAWING ONLY NOT FOR CONSTRUCTION



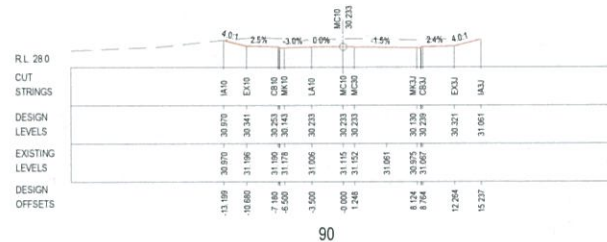
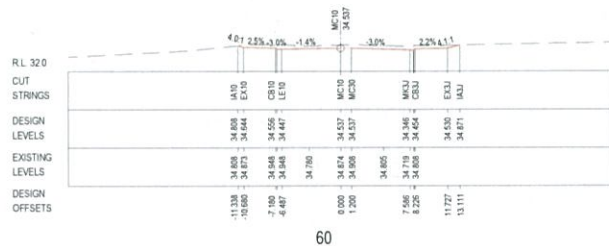
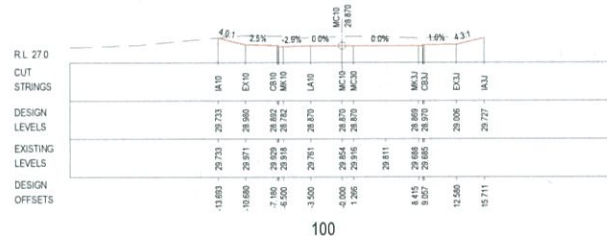
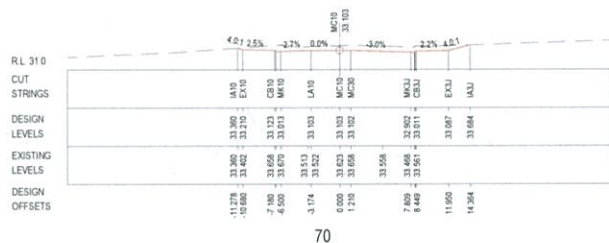
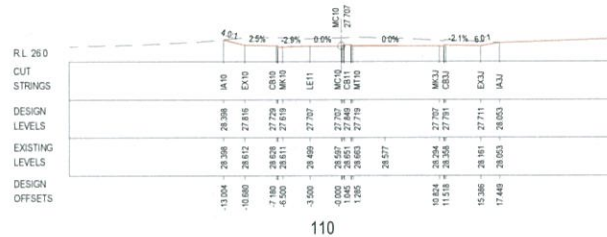
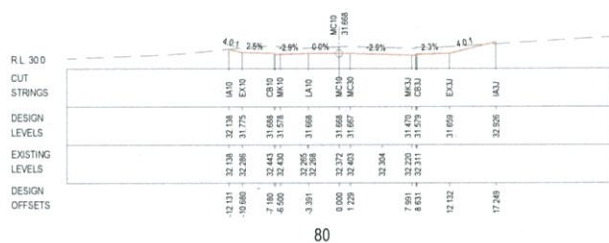
J. WYNDHAM PRINCE
CONSULTING CIVIL INFRASTRUCTURE ENGINEERS
& PROJECT MANAGERS

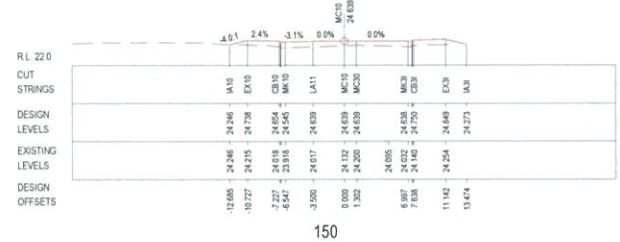
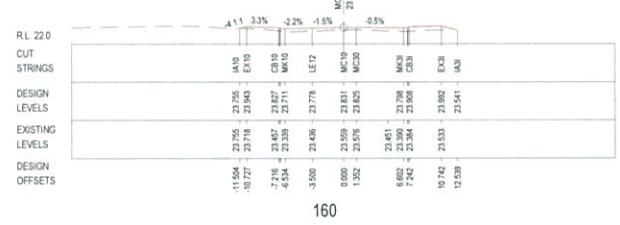
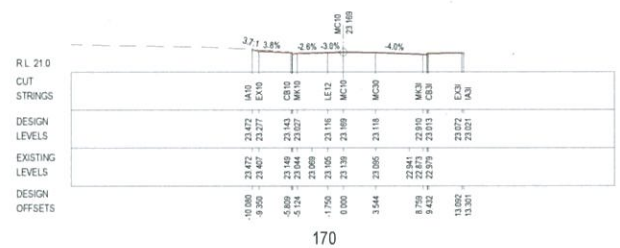
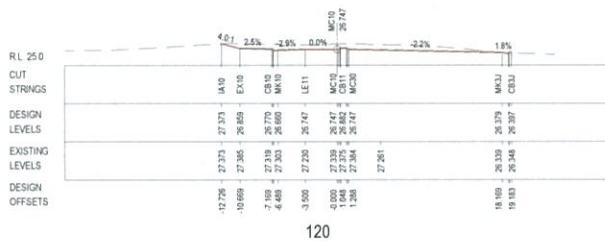
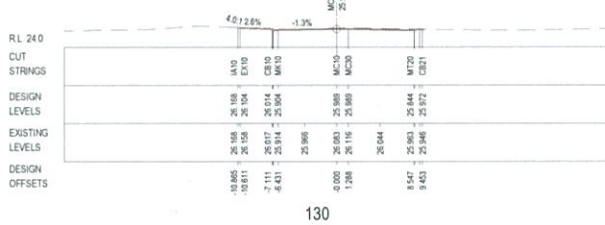
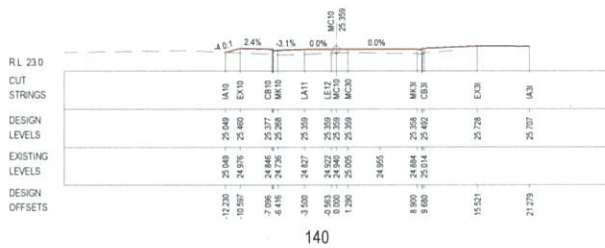
CYGNET AVENUE AND MINGA AVENUE, SHELLHARBOUR
PROPOSED INTERSECTION UPGRADE

LONG SECTION ALONG CYGNET AVENUE (EASTBOUND) - MC30

HORIZONTAL SCALE 1:1000m
VERTICAL SCALE 1:500m

110262SK03





Profile view of the bridge deck. The vertical axis shows elevations in feet. The horizontal axis shows stationing. The bridge deck is shown with a 4.2% slope. The profile includes the bridge deck, approach, and abutments. The design levels are shown as a solid line, and the existing levels are shown as a dashed line. The design offsets are shown as a solid line. The profile includes the bridge deck, approach, and abutments. The design levels are shown as a solid line, and the existing levels are shown as a dashed line. The design offsets are shown as a solid line.

Station	Design Level (ft)	Existing Level (ft)	Design Offset (ft)
0+00	22.825	22.825	0.000
4+57	22.715	22.715	4.957
5+56	22.833	22.833	5.566
8+09	22.915	22.915	8.095
8+92	22.915	22.915	8.912

RL 21.0
CUT
STRINGS

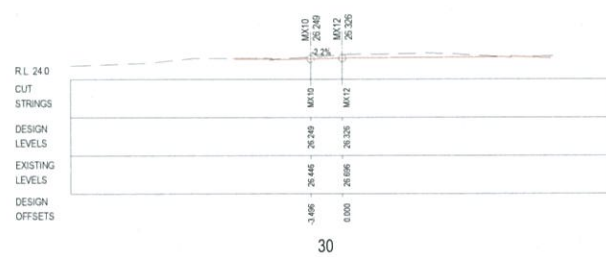
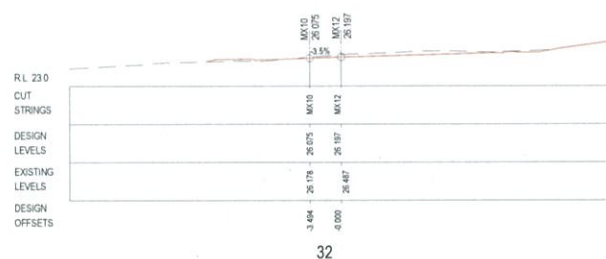
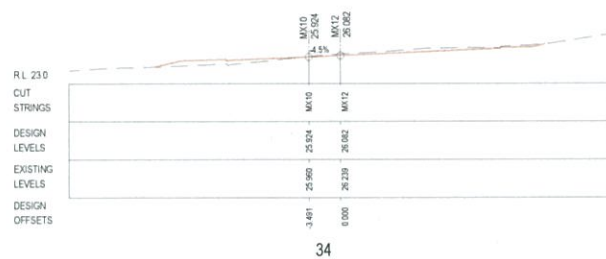
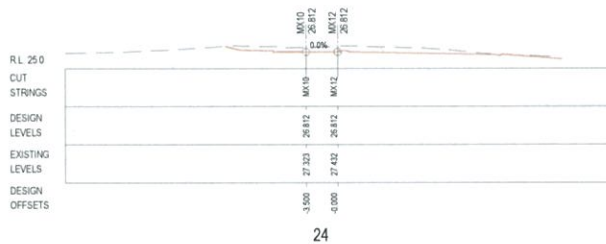
DESIGN
LEVELS

EXISTING
LEVELS

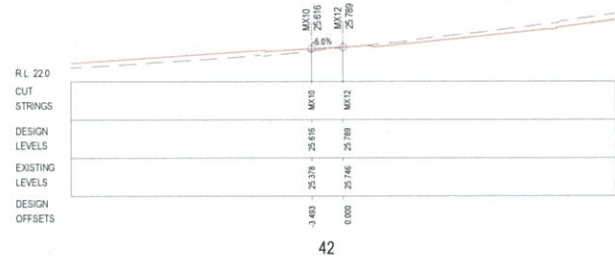
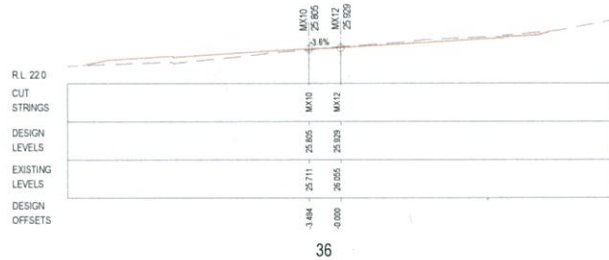
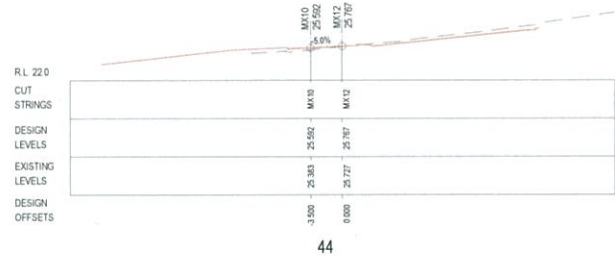
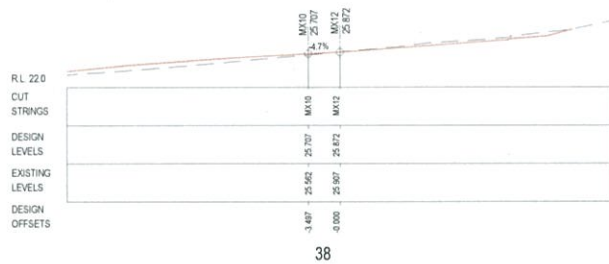
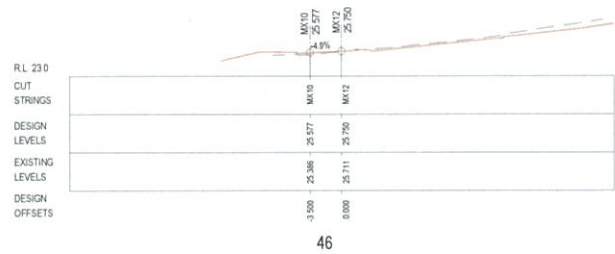
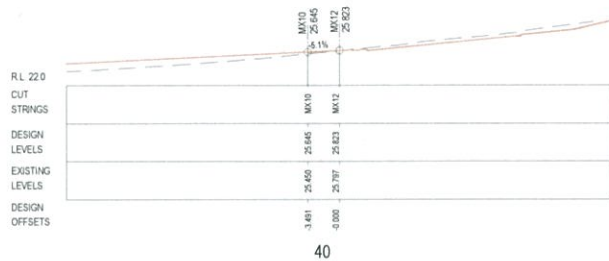
DESIGN
OFFSETS

180

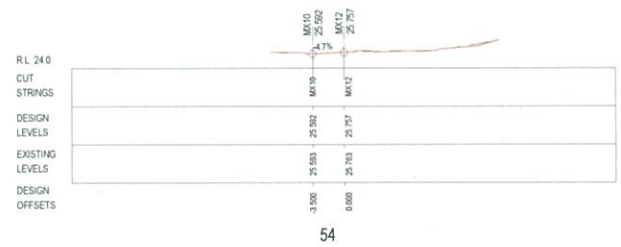
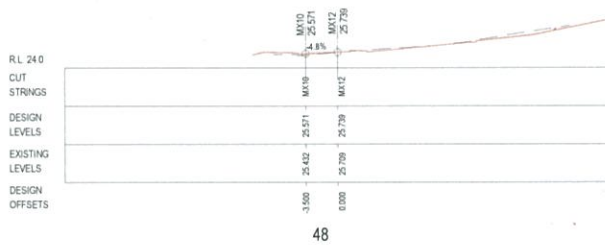
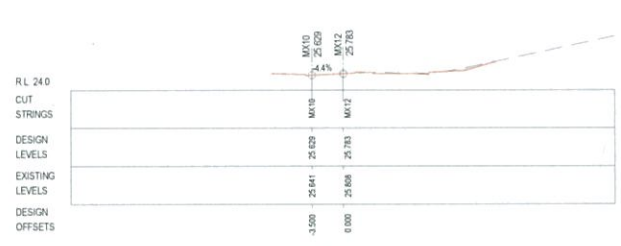
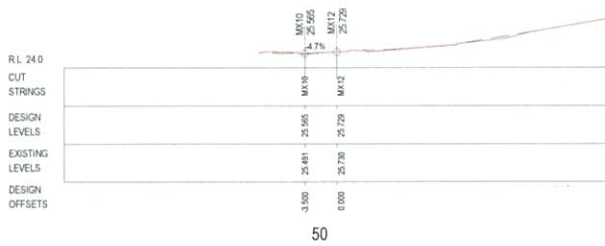
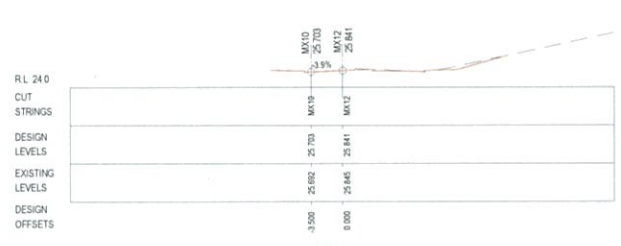
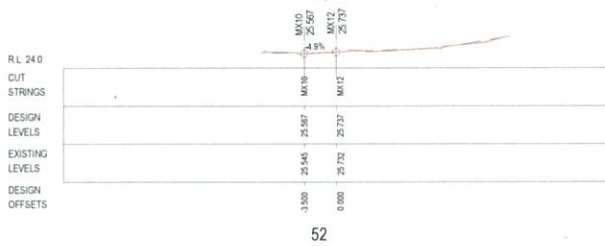
PLOTTED 2/22/2017 3:27 PM J:\110262 - Cygnet & Mingo Ave Intersection\RT\110262SK08.dwg



PRELIMINARY DRAWING ONLY NOT FOR CONSTRUCTION



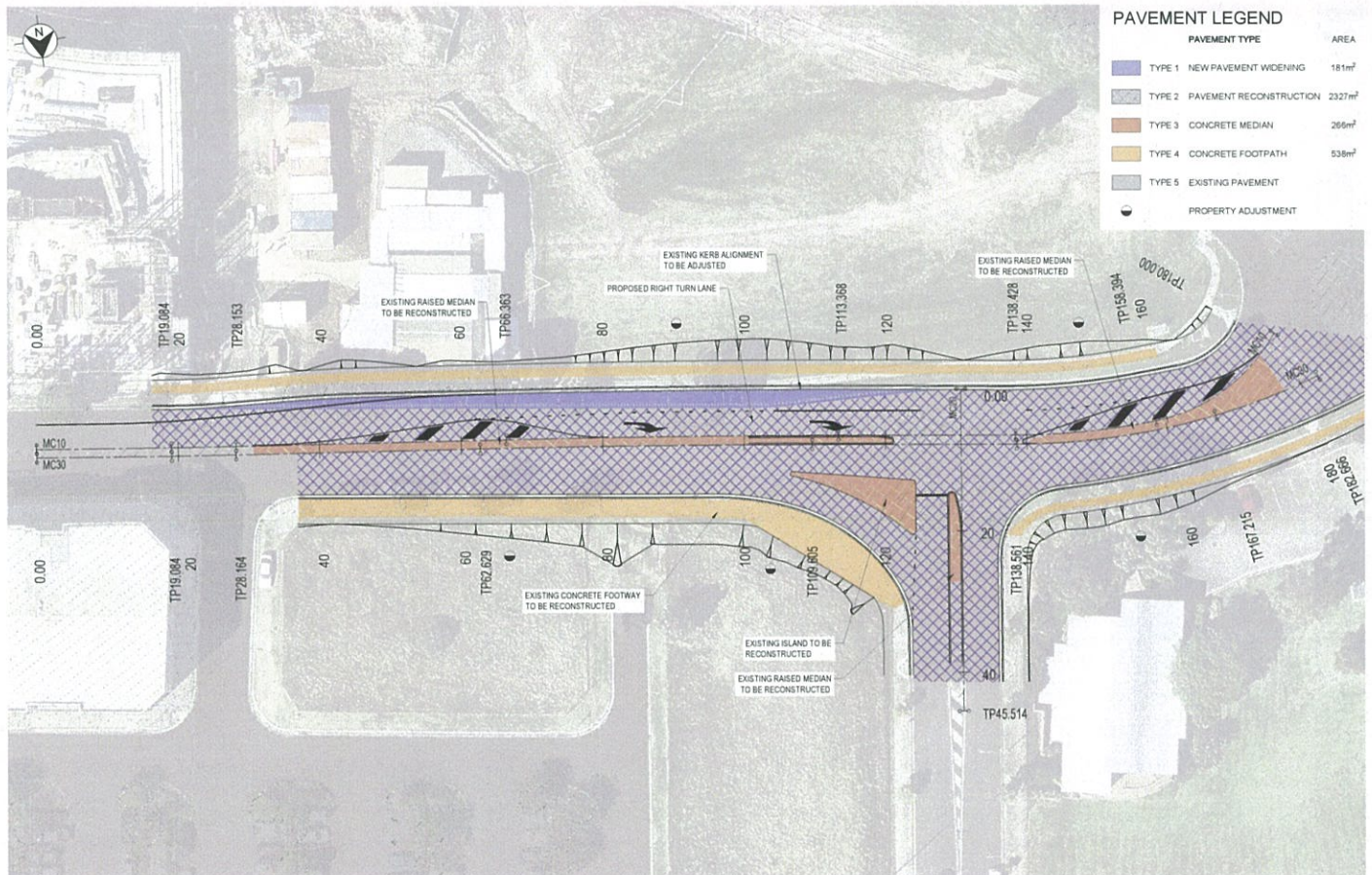
PRELIMINARY DESIGN - NOT FOR CONSTRUCTION



PLOTTED 22/2/2017 3:27 PM J:\110262 - Cygnet & College Ave\07 - Cygnet and Mings Ave Intersection\RT\110262SK10.dwg

PLOTTED 2/22/2017 3:08 PM J:\110262 - Cygnet & College Ave 07 - Cygnet and Minga Ave Intersection\RTSK110262SK11.dwg

PRELIMINARY DRAWING ONLY NOT FOR CONSTRUCTION



J. WYNDHAM PRINCE
 CONSULTING CIVIL INFRASTRUCTURE ENGINEERS
 & PROJECT MANAGERS

CYGNET AVENUE AND MINGA AVENUE, SHELLHARBOUR
 PROPOSED INTERSECTION UPGRADE
 ROAD DESIGN
 PAVEMENT PLAN

SCALE 1:500 110262SK11

PRELIMINARY DRAWING ONLY NOT FOR CONSTRUCTION



PLOTTED 22/2/2017 3:08 PM J:\110262 - Cygnet & Minga Ave Intersection\RTIS\K110262SK12.dwg

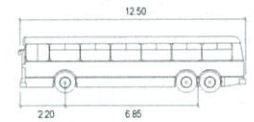
J. WYNDHAM PRINCE
CONSULTING CIVIL INFRASTRUCTURE ENGINEERS
& PROJECT MANAGERS

CYGNET AVENUE AND MINGA AVENUE, SHELLHARBOUR
PROPOSED INTERSECTION UPGRADE
TURNING PATHS 1 OF 2
PLAN

0 5 10 15 20
SCALE 1:300m

110262SK12

PRELIMINARY DRAWING ONLY NOT FOR CONSTRUCTION



VEHICLE PROFILE	
NTS	
BUS	meters
Width	2.50
Track	2.50
Lock to Lock Time	6.0
Steering Angle	36.6

J. WYNDHAM PRINCE
CONSULTING CIVIL INFRASTRUCTURE ENGINEERS
& PROJECT MANAGERS

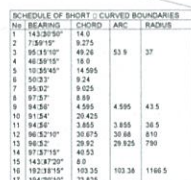
CYGNET AVENUE AND MINGA AVENUE, SHELLHARBOUR
PROPOSED INTERSECTION UPGRADE
TURNING PATHS 2 OF 2
PLAN

0 5 10 15 20
SCALE: 1:500m

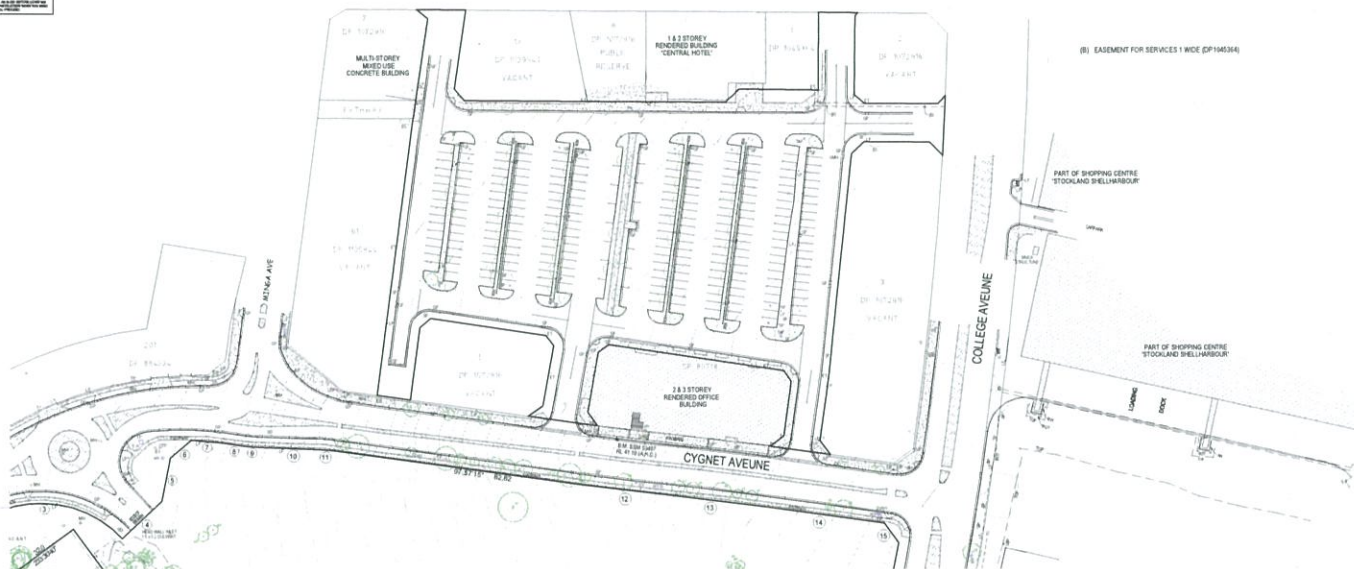
110262SK13

PLOTTED 2/22/2017 3:08 PM J:\110262 - Cygnet & Minga Ave Intersection\RTSK110262SK13.dwg

Appendix B – Survey Plans



SHELLHARBOUR CITY COUNCIL					A1 SHEET
DETAIL <input type="checkbox"/> CONTOUR SURVEY PLAN LOT 2 IN D.P. 1091265 CORNER OF COLLEGE <input type="checkbox"/> CYGNET AVENUE'S SHELLHARBOUR					SURVEYED \$5000 DRAWN: AC CHECKED: GG DRAWING No. 205391-TS01 SHEET 1 OF 2 SHEETS
DATE	AHD	CONTOUR INTERVAL	0.5m	DATE	15/04/2003



NOTE:
• FOR SPOT LEVEL INFORMATION SEE 3D DIGITAL MODEL
• FOR TREE SCHEDULE SEE E-COL SPREAD SHEET ATTACHED WITH THE DELIVERABLE PACKAGE

EXPLANATORY NOTE:

1. This plan is a plan of a site and is not a map. It is not intended to be used as a map for navigation or for any other purpose. It is a plan of a site and is not a map. It is not intended to be used as a map for navigation or for any other purpose.

2. This plan is a plan of a site and is not a map. It is not intended to be used as a map for navigation or for any other purpose. It is a plan of a site and is not a map. It is not intended to be used as a map for navigation or for any other purpose.

3. This plan is a plan of a site and is not a map. It is not intended to be used as a map for navigation or for any other purpose. It is a plan of a site and is not a map. It is not intended to be used as a map for navigation or for any other purpose.

4. This plan is a plan of a site and is not a map. It is not intended to be used as a map for navigation or for any other purpose. It is a plan of a site and is not a map. It is not intended to be used as a map for navigation or for any other purpose.

5. This plan is a plan of a site and is not a map. It is not intended to be used as a map for navigation or for any other purpose. It is a plan of a site and is not a map. It is not intended to be used as a map for navigation or for any other purpose.

CAUTION

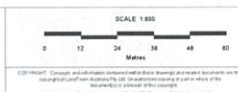
THE TREES ALONG THE OPEN CHANNEL SECTION (HW 40 M) WERE SURVEYED IN 2006. THE TREE SCHEDULE ATTACHED RELATES TO DETAIL, CURVE, SPREAD & HEIGHT AT THAT TIME. UPDATE WAS NOT CARRIED OUT IN SEPTEMBER 2015 DUE TO UNDERGROWTH. REFLECTING ACCESS: ALL OTHER TREE DETAIL INDICATES CURRENT DIMENSIONS ETC.

SCHEDULE OF SHORT & CURVED BOUNDARIES			
NO.	BEARING	CHORD	ARC RADIUS
1	143.3015°	14.0	
2	7.5015°	6.275	
3	85.5510°	49.26	53.9
4	40.5015°	16.0	
5	10.5045°	14.595	
6	50.5015°	9.24	
7	95.5015°	8.025	
8	57.5015°	8.89	
9	154.5015°	4.565	4.565
10	91.5015°	29.425	
11	54.5015°	2.855	3.855
12	96.5210°	30.679	30.64
13	68.5210°	29.92	29.925
14	87.5015°	46.53	
15	143.8720°	8.0	
16	182.5110°	103.35	103.38
17	184.3015°	23.625	

LEGEND

- AF ACTUAL APOSTrophe
- BP BOTTOM OF BANK
- CS CURVED SURFACE
- DS DOWNHILL
- ES ELECTRICITY SUBSTATION
- ET ELECTRICITY TOWER
- FL FLOOD LINE
- GP GRADED PILE
- HP HORIZONTAL
- IS INSPECTION OPENING
- LS LATERAL SURFACE
- LP LIGHT PILE
- MP MAIN PILE
- NP NORTH POINT
- OP OPEN POINT
- PP POWER PILE
- RP RAILWAY
- SS TOP OF BANK
- TS TOP OF BANK
- UP UNLATERAL SURFACE
- WP WATER PILE

- DETECTED HARDWARE AREA
- DETECTED TRAFFIC ISLAND (MEDIAN) STOP



NO.	DESCRIPTION	DATE
1	INITIAL ISSUE - 3D DIGITAL MODEL	20/05/15
2	ADD SURVEY OF CARPARK ACCESS CYGNET AVE - 3D DIGITAL MODEL	22/05/15

LandTeam Australia Pty Ltd
Wollongong Office
101 Fife Street
Wollongong NSW 2520
P: (02) 4299 7006
F: (02) 4297 1100
E: wollongong@landteam.com.au
www.landteam.com.au



SHELLHARBOUR CITY COUNCIL
DETAIL: CONTOUR SURVEY PLAN
LOT 2 IN D.P. 1091265
CORNER OF COLLEGE & CYGNET AVENUES
SHELLHARBOUR
DATE: 20/05/15
A1 SHEET
B
205391-TS01
SHEET 2 OF 2 SHEETS



MAGNET Office SITE - [W:\SURVEY\DATA\Cygnat Minda mjo.mjo - Survey] Scale 1:272
Printed on October 26 2016 15:09 by User Name, Company Name

Appendix C – Preliminary Road Safety Audit Check – Letter dated 2 September 2016



Our Ref: Shellharbour - Cygnet & Minga Letter 020916
RO:ro

2 September 2016

Shellharbour City Council
Lamerton House
Lamerton Crescent
Shellharbour City Centre NSW 2529

Attention: Matt Hipsley

Subject: Proposed right turn movement – Cygnet Avenue to Minga Avenue

Dear Matt,

Thank you for giving J. Wyndham Prince the opportunity to provide you preliminary advice with respect to Condition B30 of the Development Consent for the Civic Centre.

Condition B30 states that *"The intersection of Cygnet Avenue and Minga Avenue shall be realigned to allow right turn movements from Cygnet Avenue to Minga Avenue."*

A preliminary review of the current intersection configuration has identified the following issues:

1. The right turn into Minga Avenue is in conflict with the eastbound acceleration lane from the roundabout, the right turn out of Minga Avenue and the adjacent pedestrian crossing.
2. There does not seem to be sufficient room to develop a separate right turn lane with sufficient deceleration and storage unless Cygnet Avenue is widened.
3. There is currently a potential conflict between the right turn westbound acceleration lane from Minga Avenue (which has right of way) over the adjacent lane approaching the roundabout in Cygnet Avenue
4. The close proximity of the adjacent roundabout in Cygnet Avenue and multiple traffic turning movements, which would restrict SISD during peak flow.

Assuming the roundabout can accommodate the design vehicle, it is suggested that it would be safer to use the roundabout for traffic wishing to turn right into Minga Avenue from Cygnet Avenue, rather than introduce another turning movement at the intersection. The provision of some traffic data would assist in assessing the safety issues and risks.

If you have any queries regarding this matter, please do not hesitate to contact me.

Yours faithfully

J. WYNDHAM PRINCE

ROBERT ODEWAHN

Executive Manager Engineering Design