24 June 2015

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Dear Mike

MATAMATA PRECINCT F: ASSESSMENT OF OPTIONS TO REDUCE EXTENT

1. Summary

Matamata Piako District Council (MPDC) is currently consulting on the location and intensity of rural residential and resident development around Matamata (Discussion Paper No. 5). This includes potentially reducing the extent of Precinct F. Precinct F, as currently detailed in the District Plan, includes approximately 700 lots with the potential to generate 5,600veh/day. Rates per household are based on 8 trips/day/household and this is appropriate for large areas/neighbourhoods where internal trips takes place. Smaller areas are assessed based on approximately 10trips./day/household. The road network includes a collector road and requires improvements to the existing network.

Council is considering options to reduce the extent and intensity of development within Precinct F. These options reduces the potential yield 90 to 419 dwellings (or 12% – 60% of the original yield) and the expected trip generation reduces to 720-3,500vph.

The cost of the network improvements related to development of Precinct F range from $8,500/lot to $37,200/lot. The more intensive development proposed by the District Plan (700 lots) provides the lowest cost per lot. Option 2 results in the highest cost as it requires a similar level of network improvement but only provides 90 rural residential lots.

We recommend that the Precinct F network should include a collector road where there is potential to generate more than 2,000vpd. At lower volumes it may not be necessary to construct the link to collector road standards, but it will function as a collector road. The collector road is unlikely to attract significant volumes of bypass traffic. Several options include long rural residential culs-de-sac that have the potential to generate adverse safety and amenity effects.

2. Project Understanding

We understand that Matamata Piako District Council (MPDC) is consulting on the location and intensity of rural residential and resident development around Matamata (Discussion Paper No. 5). This includes potentially reducing the extent of Precinct F. The extent of the proposed reduction is shown in Appendix A.

In 2009 we completed a preliminary assessment which focussed on options for a collector road. In 2011, we provided an assessment of the improvements required on the existing network to support development. Our previous advice to MPDC is summarised in the following table.

Date	Topic	Conclusion
8 October 2009	Preliminary Assessment of Collector Road Options	Assessed three collector road options. Recommended the network in the District Plan. Included a central connection to Eldonwood
29 July 2011	Traffic assignment with no central connection	Recommended improvements to the existing network. No connection to Eldonwood. Focussed on trip generation, trip distribution and identifying network improvements.
11 October 2011	Precinct F, Matamata - Stage 2 assessment	Developed cost estimates for the improvements recommended in July 2011.

Date	Topic	Conclusion
25 September 2014	MPDC Structure Plan Updates – Transportation Comments	Reduction in area of Precinct F gives 420 dwellings and 4,200vpd. Recommended retention of link between Station Road and Firth Street.
17 November 2014	Road connections: growth and level of service	Assessed need for collector road. Concluded that a collector road is desirable and little justification for non-growth funding for its construction.
22 December 2014	Structure Plan updates – transportation comments	Provided advice on a range of structure plan issues. Repeated conclusion that a collector road is desirable and little justification for non-growth funding for its construction.

Table 1: Previous Assessments by Gray Matter

Based on information provided by Council we understand that six options for a reduced Precinct F are being considered. You have asked us to review these options to ensure that the traffic assessment and development costs are appropriate.

3. Option Assessment

3.1. Precinct F as per District Plan (Appendix 9)

Precinct F, as currently detailed in the District Plan, includes:

- Approximately 700 lots ranging in size from 400sq.m (comprehensive residential overlay) to 2,500sq.m. This has the potential to generate 5,600veh/day.
- A collector road providing a connection from Firth Street to Station Road.
- Neighbourhood node.
- A 'central' connection to the Eldonwood subdivision.

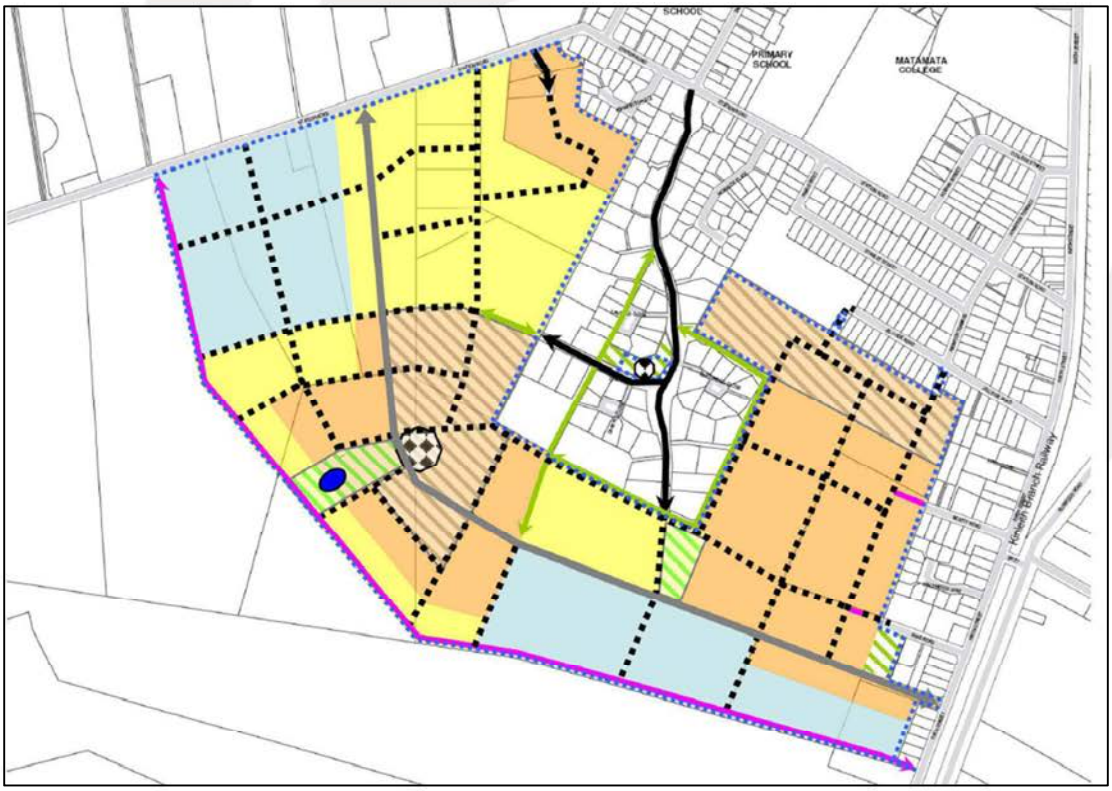


Figure 1: Precinct F (MPDC District Plan, Appendix 9.2)

In October 2011 we provided Council with an assessment of the impact on the existing road network. This included estimated costs for the road upgrades. The total cost was $5.78M or $8,300/lot (700 lots).

Site	Proposed Changes	Total Estimate	Cost to Precinct F	Cost to MPDC
Station Road (west)	Carriageway widening and pavement overlay	$1,415,000	$1,295,000	$120,000
Station Road (east)	Carriageway widening and pavement reconstruction	$3,300,000	$3,300,000	$0
Hampton Terrace	Carriageway widening and pavement reconstruction	$690,000	$690,000	$0
Smith Street	Pavement overlay	$260,000	$260,000	$0
Station Road/Firth Street (SH27) intersection	Minor intersection improvements	$60,000	$35,000	$25,000
Hinuera Road/Firth Street (SH27) intersection	Minor intersection improvements	$55,000	$55,000	$0
	Total	**$5,780,000**	**$5,635,000**	**$145,000**

Table 2: Estimated Costs (October 2011)

3.2. Reduced Precinct F

Council has identified six options for Precinct F that would yield 90 to 419 dwellings (or 12% – 60% of the original yield). The options are briefly described below. Further details including diagrams and predicted traffic volume increases on the existing network are provided in Appendix B. Due to the broad nature of the assessment, this level of trip distribution assessment is considered appropriate.

Option	Description	Development Intensity	Trip Generation[1]
Option 1	35ha total area. Mixed residential and rural residential development	Residential = 200-286 lots Rural residential = 40 lots Total = 240-306 lots	1,920 - 2,448vpd
Option 2	45 ha total area. All rural residential development	Rural residential = 90 lots Total = 90 lots	720vpd
Option 3	45 ha total area. Mixed residential and rural residential development	Residential = 80-200 lots Rural residential = 40 lots Total = 120-240 lots	960 - 1,920vpd
Option 4	74.6ha total area. Mixed residential and rural residential development Potential for development to be linked New connection proposed that uses part of existing recreation reserve	Residential = 276-362 lots Rural residential = 80 lots Total = 356-442lots	2,848 - 3,536vpd
Option 5	Total area not stated (appears to match Option 3, i.e. 45ha). Mixed residential and rural residential development	Residential = 144 lots Rural residential = 153-275 lots Total = 297-419 lots	2,376 - 3,352vpd
Option 6	Total area not stated (but largest of all options). Mixed residential and rural residential development Includes collector road from Station Road to Firth Street	Residential = 200 lots Rural residential = 105 lots Total = 305 lots	2,440vpd

Table 3: Summary of options for reduced Precinct F

[1] Based on 8 trips/day/household

3.3. Questions on Option 6

You specifically asked us to address the questions on Option 6 raised by Mark Hamilton in his email dated 29/05/2015.

Questions (email dated 29/05/2015)	Response
Will the earlier costing on the 297 lot yield be the same for this option (258 lots being 144 residential and 114 rural residential)? We assume this will be the case or not far from it as most of the infrastructure costs are for the serviced residential lots. The upgrade costs for Station Road may come down?	Similar impacts and infrastructure = similar costs. Revised cost estimates for all options provided in Appendix A. Costs for Station Road west are based on carriageway widening to meet Council's standard for collector roads. Costs for Station Road east are $3.3M if urban collector upgrade required. If only pavement effects considered, cost estimated as $320,000.
Where we have shown the Firth Street link, there is existing road reserve however a further portion of land will be required off the Council rec reserve which comes off Haig Road. Will cause any issues for the reserve land? Also will the road reserve and splays be suitable for the road capacity and loading?	Our understanding is that changing the use of a recreation reserve would require Ministerial approval under the Reserves Act 1977. We recommend that further advice is sought from Council's planning/ reserves team Based on Council's GIS the existing road reserve is approximately 20m wide and should be sufficient for construction of a collector road that meets the Development Manual standards.
The roading link needs some evaluation, Is it required, will it split the traffic loading to Firth Street and Station Road to avoid further upgrading on Station Road or will it make the situation worse? The majority of the yield will now come from the residential area, does this affect the roading distribution effects?	Figure 2 provides our assessment of traffic distribution for Option 6. Costs for all options have been revised. Refer Section 3.4 for more details.
Will any link road cause issues as a new 'bypass' road? Maybe measures in terms of traffic calming to prevent this and assume it will be a reasonably narrow carriageway.	Any continuous connection from Firth St to Station Rd has the potential to act as a 'bypass' route. We consider that the volume of traffic that would potentially use this as a bypass route is low, less than 10% of traffic generated by Precinct F (District Plan version). Reducing the cross-section width and providing on street parking are likely to assist in reducing the attractiveness of this as a bypass route.

Table 4: Responses to questions on Option 6

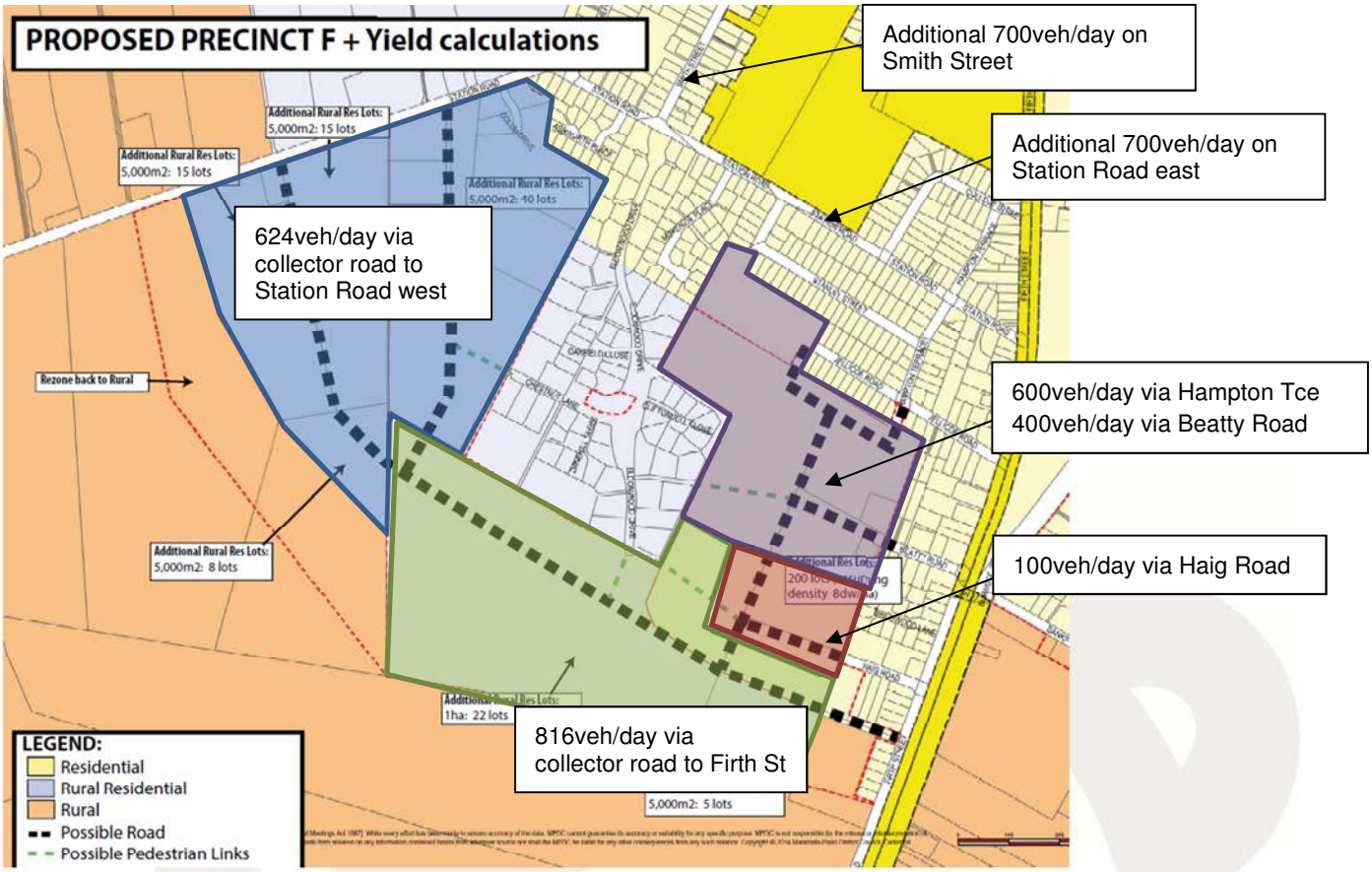


Figure 2: Assumed Traffic Distribution for Option 6

3.4. Cost Estimates

3.4.1. Costs for Station Road East Upgrade

Our initial cost estimate for Station Road east upgrade (completed 11/10/2011) assumed that carriageway widening, pavement overlay and urban upgrades (footpaths, street lighting, etc.) would be required to meet the urban collector road standard due to the expected increase in traffic of 1,200veh/day. The estimated cost of these works was $3.3M.

In the options for reduced extent we have assessed the expected increase in traffic as 150-800veh/day. The total expected traffic volume would increase from 1,760vehday to approximately 1,910-2,560veh/day. If Council considers the existing carriageway width, footpaths, street lighting etc. as acceptable, then the impact of the additional traffic only relates to the pavement overlay. Based on the worst cast of an additional 800veh/day, the increased pavement thickness is approximately 15mm or a cost of approximately $320,000.

In our assessment of construction costs we have considered both the worst case ($3.3M) and best case ($320,000) options.

3.4.2. Revised Costs for all Options

These estimates are based on our 2011 estimates updated using the NZ Transport Agency Economic Evaluation Manual update factor of 1.04 to adjust July 2011 construction costs to July 2014.

The following table summarises the costs of the upgrade works related to the various options for Precinct F. The cost ranges from $8,500/lot to $37,200/lot. If the Station Road east collector upgrade is not required the costs could decrease to $4,200/lot to $15,000/lot (excluding Option 2).

The more intensive development proposed by the District Plan (700 lots) provides the lowest cost per lot. While Option 2 results in the highest cost as it only provides 90 rural residential lots, but requires a similar level of network improvement.

	District Plan	Option 1	Option 2	Option 3	Option 4	Option 5	Option 6
Number of Lots	700	306	90	200	362	419	305
Trip Generation (vpd)	5,600	2,448	720	1,600	2,896	3,352	2,440
Station Road (west) ($)	1,415,000	1,080,000	1,410,000	1,080,000	1,080,000	1,080,000	1,400,000
Station Road (east) ($)	3,300,000	3,270,000	330,000	3,270,000	3,270,000	3,270,000	3,270,000
Hampton Terrace ($)	690,000	690,000	660,000	690,000	690,000	680,000	670,000
Smith Street ($)	260,000	225,000	205,000	225,000	235,000	220,000	215,000
Station Road/Firth Street ($)	60,000	60,000	60,000	60,000	60,000	60,000	60,000
Hinuera Road/Firth Street ($)	55,000	55,000	55,000	55,000	55,000	55,000	55,000
Haig Road ($)	0	504,000	495,000	504,000	526,000	523,000	495,000
Beatty Road ($)	0	0	0	0	0	0	510,000
Total Cost ($2011)	**5,780,000**	**5,884,000**	**3,215,000**	**5,884,000**	**5,916,000**	**5,888,000**	**6,675,000**
Total Cost ($2015)	**5,881,728**	**5,987,558**	**3,271,584**	**5,987,558**	**6,020,122**	**5,991,629**	**6,792,480**
Cost per lot ($)	**8,402**	**19,558**	**36,351**	**29,938**	**16,630**	**14,300**	**22,270**
Cost per lot if Station Rd costs reduced[2] ($)	**4,085**	**9,790**	**36,351**	**14,979**	**8,366**	**7,160**	**$12,461**

Table 5: Cost estimates (updated to March 2015[3])

4. Need for Collector Road

4.1. Collector Road standards

There is a range of guidance on collector road standards. In general the recommended cross-sections are similar 7-8m carriageway plus cycling and parking facilities. The following table provides the traffic volumes expected in the various standards The MPDC Development Manual provides lower limits than other standards, but is broadly consistent.

Source		Local Road	Collector Road
MPDC Development Manual	Residential	200-1000vpd	1000-2500vpd
	Rural and rural residential	48-350vpd	250-1500vpd
NZS 4404: 2010 Land Development and Subdivision Infrastructure		1,000vpd	2,500vpd
NZ Road Efficiency Group One Network Road Classification (ONRC)		<1,000vpd	>3,000vpd (primary) >1,000vpd (secondary)

Table 6: Expected traffic volumes on local and collector roads

The ONRC describes the function of a secondary collector as "…. roads that provide a secondary distributor/collector function, linking local areas of population and economic sites and may be the only route available to some places within this local area".

[2] This assumes that the costs for upgrades on Station Road east are $330,000, not $3.25M to $3.3M.

[3] Updated using NZ Transport Agency Infrastructure Cost Indices, Table 1, Part 2 – Construction http://www.nzta.govt.nz/resources/procurement-manual/procurement-tools.html. Results in 1.8% increase in costs from September 2011 to March 2015

4.2. Previous Assessments

In our earlier assessments for Precinct F[4], we considered the need for a collector road, commenting:

> *"Precinct F is expected to generate up to 5,564vpd (total trips), of which 5,008vpd will be external to Precinct F. Therefore, a collector and/or principal road(s) should be provided to collect traffic from Precinct F and provide a connection to the most likely destinations and the arterial network. In this case SH27 is the closest arterial and must be crossed to reach a large segment of the employment areas in Matamata."*

We concluded that:

> *"Due to the expected traffic generation of Precinct F a collector road is required to collect traffic from Precinct F and deliver it to the arterial network, specifically SH27."*

In our recent review of the changes to development areas[5] we estimated that the reduced area of Precinct F would reduce traffic generation to around 4,200vpd (Note, this assumed a reduction in development to 420 lots).

The NZ Road Efficiency Group One Network Classification method suggests typical urban daily traffic of up to 1,000vpd for access (local road), 3,000vpd for a secondary collector, and 5,000vpd for an arterial road. Even if only 50% (or 2,100vpd) uses the collector road, with remaining traffic dispersing via local access roads, a collector road remains justified to service traffic from the reduced Precinct F area.

4.3. Proposed Changes and Options

The six options developed by Council result in trip generation of 720vpd to 2,900vpd, or 12% to 60% of the original proposal.

Options 1-3 and Option 5 all sever access between the eastern and western portions of Precinct F. Assuming that 50% of this traffic would use a link between Station Road and First Street, the potential traffic volume is 360vpd to 1,450vpd and would justify a collector road in many of the options.

Several of the proposed layouts will create a long (approximately 450m) rural cul-de-sac serving up to 40 lots. Table 3.1 of the Development Manual does not specifically provide for rural residential culs-de-sac. It indicates that private accesses and ROWs in rural residential zones should serve 4 to 6 lots. In the residential zone, local road (cul-de-sac) should serve 7 to 25 lots.

Long culs-de-sac have the potential for adverse safety and amenity effects, particularly if they are designed as long straight, narrow corridors.

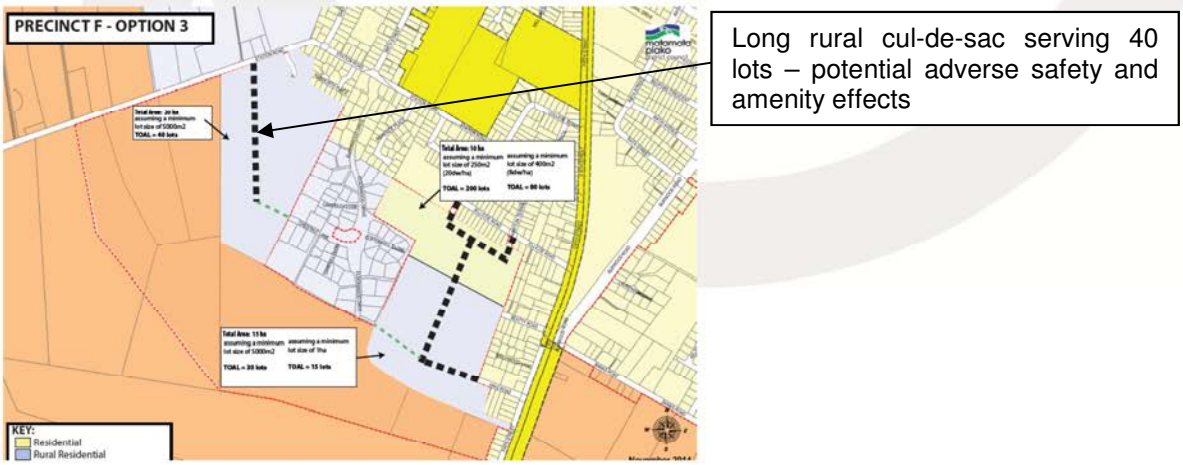
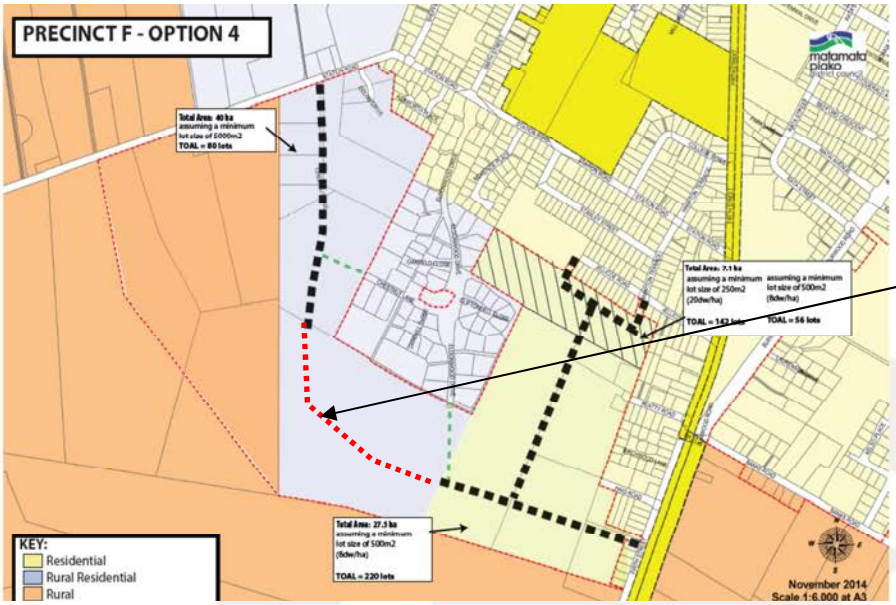


Figure 3: Proposed layout without a link road (based on Option 3)

[4] Proposed Plan Change 31 - Precinct F, Preliminary Assessment of Collector Road Options, Gray Matter letter to MPDC, 08/10/2009.
[5] MPDC Structure Plan Updates – Transportation Comments Gray Matter letter to MPDC, 25/09/2014.

While no connectivity is show in Option 4, the two indicative roads should be connected form a link road. The traffic volume on this potential link is likely to be approximately 1,500vpd to 2,000vpd. A collector road standard would be desirable to ensure that the link operates in a safe and efficient manner.



Some form of link (shown as red dashed line) is likely to facilitate subdivision.

Figure 4: Option 4 Proposed Layout

4.4. Collector Summary

A collector road would be desirable where develop has the potential to generate more than 2,000vpd. The collector road will assist in distribution of traffic from this residential area to the arterial network .

If the current District Plan layout (700 lots) and level of development is retained a collector road should be included to provide a link to the arterial network. Option 4 should include a collector road should be identified as we consider it likely that the two parts of the site will be connected during development.

A collector road may not be necessary for Options 2 and 3 where the proposed development includes less than 250 lots and is likely to generate less than 2,000vpd.

5. Conclusion

Precinct F, as currently detailed in the District Plan, includes approximately 700 lots ranging in size from 400sq.m to 2,500sq.m with the potential to generate 5,600veh/day. The road network includes a collector road and requires improvements to the existing network.

Council is considering options to reduce the extent and intensity of development within Precinct F. These options reduces the potential yield 90 to 419 dwellings (or 12% – 60% of the original yield) and the expected trip generation reduces to 720-3,500vph.

Several options include long rural residential culs-de-sac. There have the potential to generate adverse safety and amenity effects.

The cost of the network improvements related to development of Precinct F range from $8,500/lot to $37,200/lot. The more intensive development proposed by the District Plan (700 lots) provides the lowest cost per lot. While Option 2 results in the highest cost as it only provides 90 rural residential lots, but requires a similar level of network improvement.

A collector road may not be necessary for Options 2 and 3 where the proposed development includes less than 250 lots and is likely to generate less than 2,000vpd. A collector road is desirable in the other options to distribute traffic to the arterial network. Where there is less than 2,000vpd, a local road provide a collector function without being upgraded to the collector road standard.

Option	Description	Development Summary[6]	Comments
District Plan	Mixed residential (including comprehensive residential overlay) and rural residential development	700 lots 5,600vpd $4,000-$8,500/lot	Collector road required due to level of development and road layout
Option 1	35ha total area. Mixed residential and rural residential development	240-306 lots 1,920 - 2,448vpd $10,000-$19,500/lot	Collector road desirable to provide alternative link to residential development Potential for adverse effects from long rural residential cul-de-sac
Option 2	45 ha total area. All rural residential development	90 lots 720vpd $38,000/lot	Collector road not necessary, but other improvements are necessary Potential for adverse effects from long rural residential cul-de-sac
Option 3	45 ha total area. Mixed residential and rural residential development	120-240 lots 960 - 1,920vpd $15,000-$30,500/lot	Collector road not necessary Potential for adverse effects from long rural residential cul-de-sac
Option 4	74.6ha total area. Mixed residential and rural residential development Potential for development to be linked New connection proposed that uses part of existing recreation reserve	356-442 lots 2,848 - 3,536vpd $8,500-$17,000/lot	Seek further advice from Council's planning/ reserves team regarding use of recreation reserve land for road purposes (refer Reserves Act 1977). Subdivision is likely to create a link – collector road desirable
Option 5	Total area not stated (appears to match Option 3, i.e. 45ha). Mixed residential and rural residential development	297-419 lots 2,376 - 3,352vpd $7,500-$14,600/lot	Collector road desirable due to level of development Potential for adverse effects from long rural residential cul-de-sac
Option 6	Total area not stated (but largest of all options). Mixed residential and rural residential development Includes collector road from Station Road to Firth Street	305 lots 2,440vpd $12,800-$22,800/lot	Collector road required due to level of development and road layout

Table 7: Summary of option assessment

Please note that our evaluation excludes the cash flow risks should MPDC have to forward fund any improvements.

Should you have any queries, please do not hesitate to contact us.

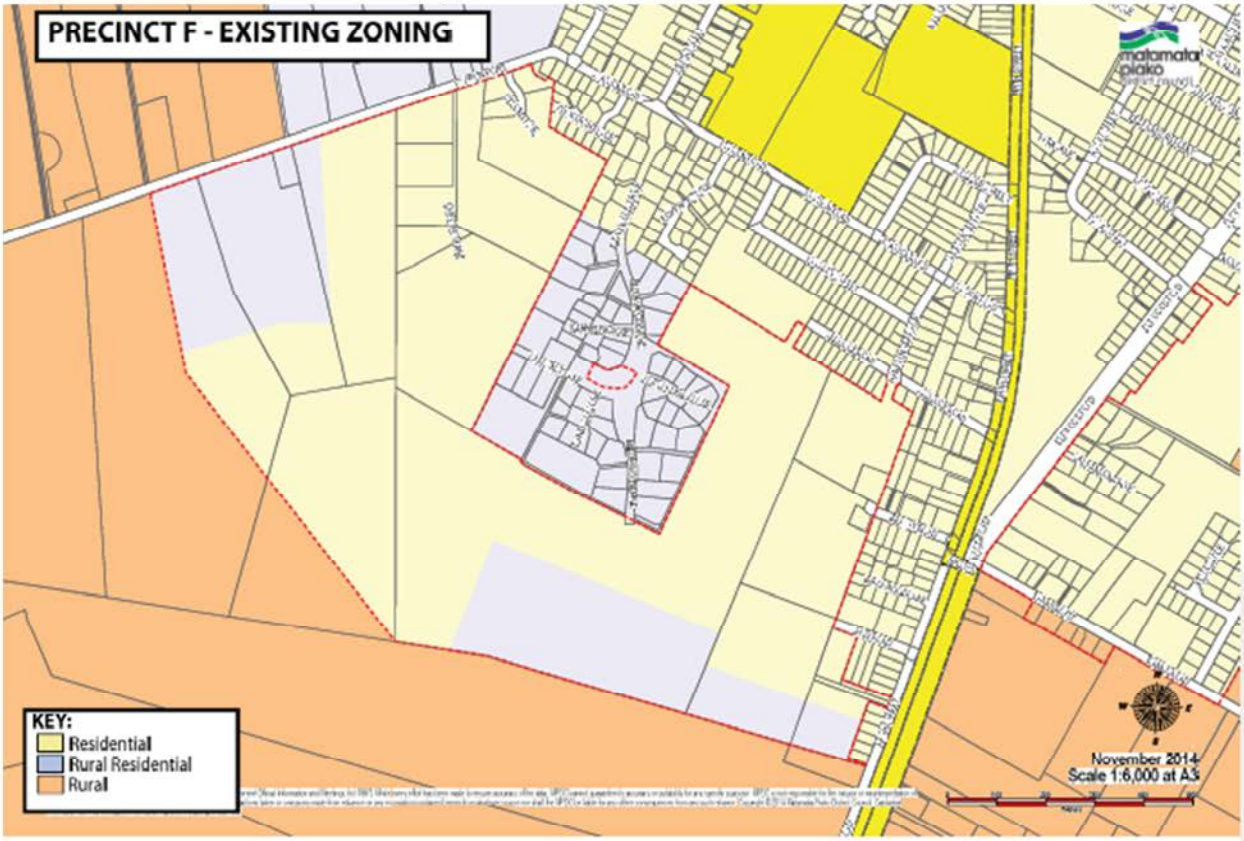
Yours sincerely

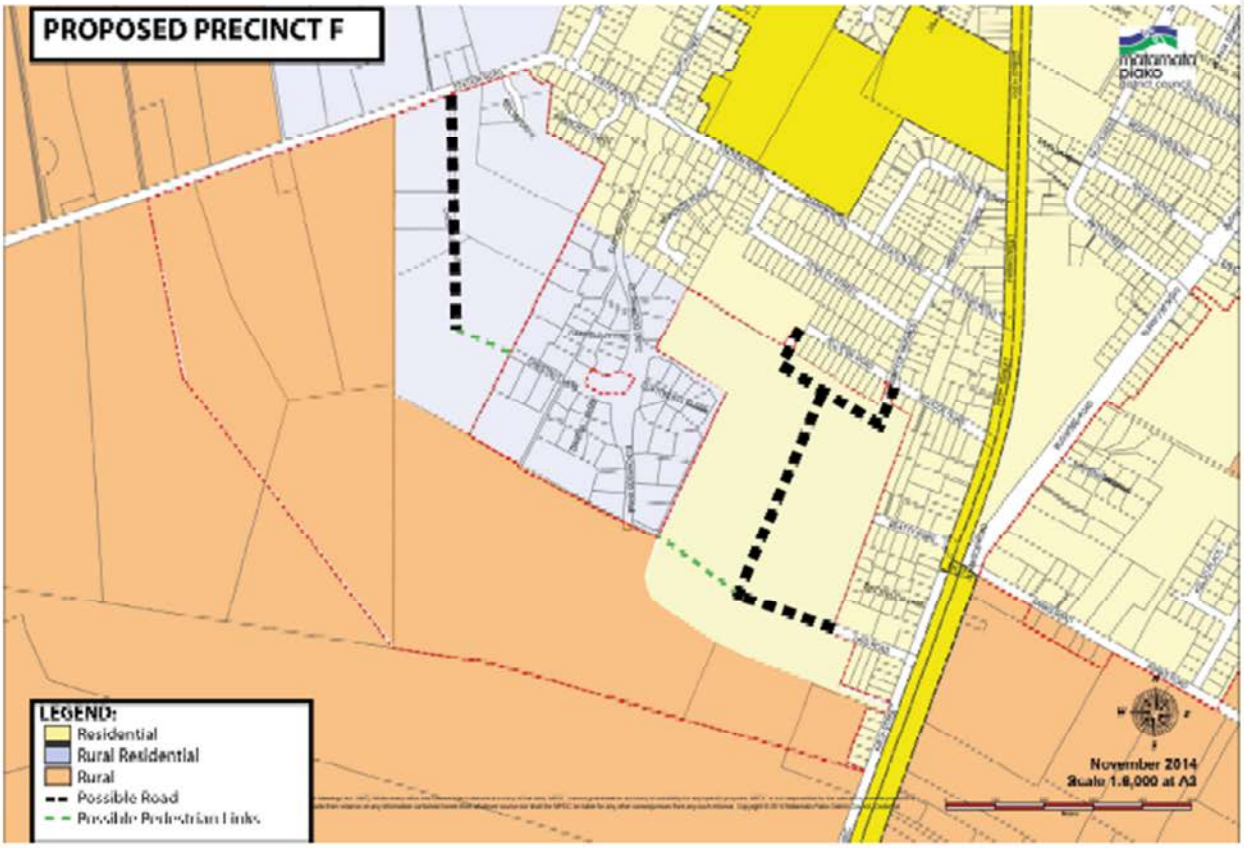
Alastair Black
Civil/Transportation Engineer

Alasdair Gray
Civil/Transportation Engineer

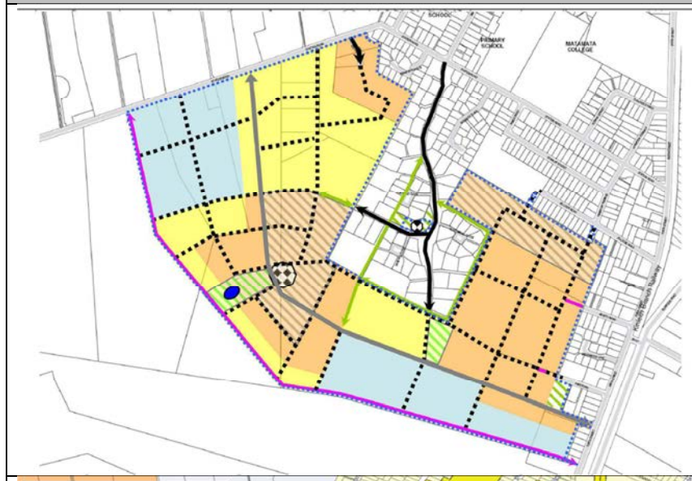
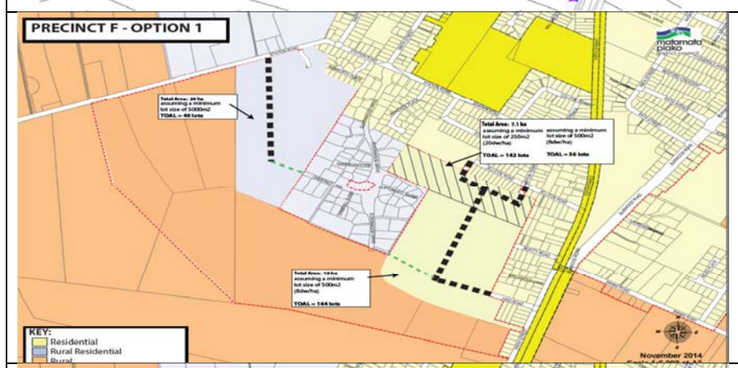
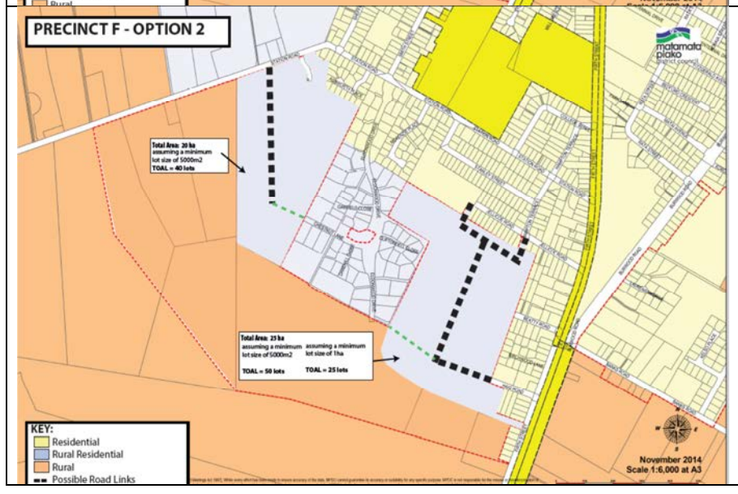
[6] Lower cost range assumes that urban upgrade of Station Road is not required and the only improvements required are for pavement overlay due to the additional traffic.

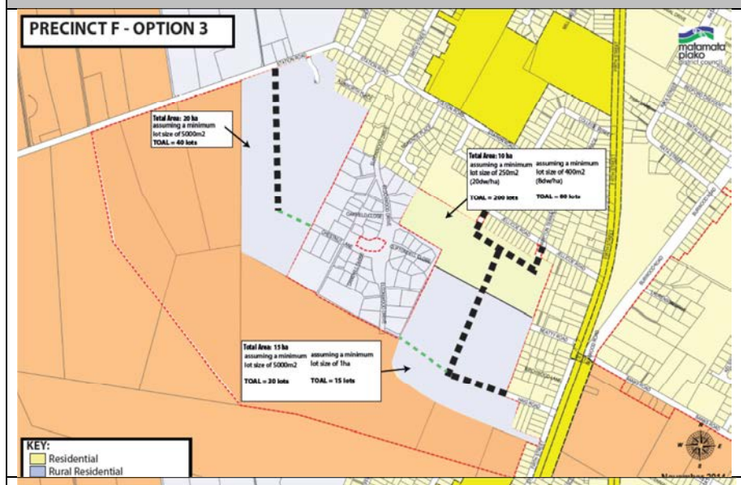
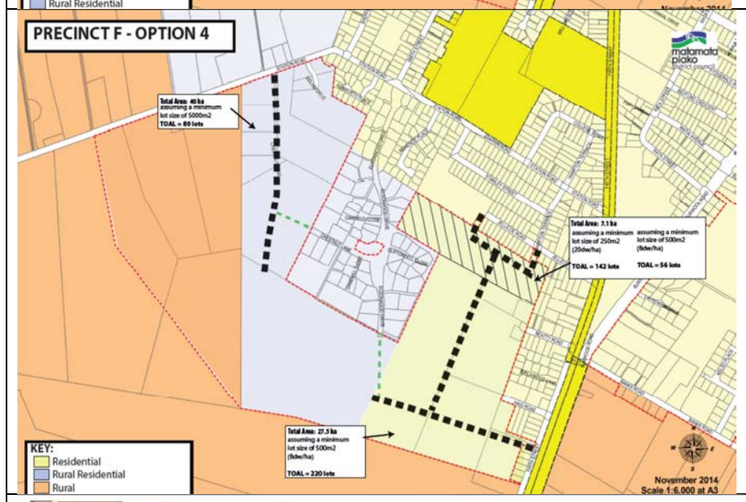
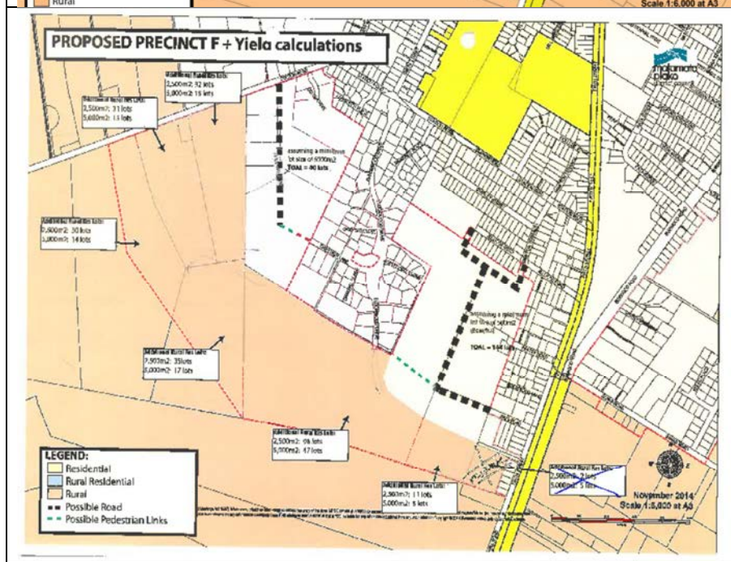
Appendix A: Precinct F: Existing and Proposed Extents

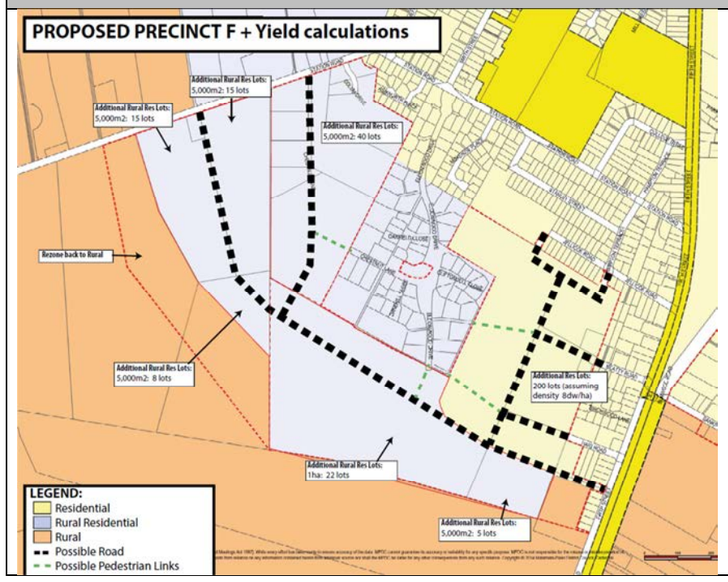




Appendix B: Revised Option Assessment

Option	Proposed Development and Trip Generation	Station Road (west)	Station Road (east)	Hampton Terrace	Smith Street	Station Road/ Firth St	Hinuera Road/ Firth Street	Haig Road
	700 lots at a range of densities Trip generation = 5,600vpd	Additional traffic = 500vpd west of collector and 2,000vpd east of collector Pavement = 490mm Length = 540m Widening and pavement overlay along 540m of Station Road west of the intersection with Sheffield St $1,415,000	Additional traffic = 1,200vpd Pavement = 510mm Widening and pavement reconstruction of 1,090mof Station Road east of the intersection with Sheffield St $3,300,000	Additional traffic = 1,600vpd Pavement = 460mm Carriageway widening and pavement reconstruction (220m) $690,000	Additional traffic = 1,800vpd Pavement overlay = 30mm $250,000	Minor intersection improvements $60,000 (MPDC contribution = $25,000)	Minor intersection improvements $55,000	No works required, pedestrian link only
	Residential = 200-286 lots Rural residential = 40 lots Total = 240-306 lots Trip generation = 1,920-2,448vpd	Additional traffic = 320vpd Pavement = 440mm Length = 360m $1,080,000	Additional traffic = 160vpd Pavement = 500mm $3,250,000	Additional traffic = 1,248vpd Pavement = 450mm $685,000	Additional traffic = 944vpd Pavement overlay = 15mm $220,000	Minor intersection improvements $60,000 (MPDC contribution = $25,000)	Minor intersection improvements $55,000	Widening and full depth pavement reconstruction Additional traffic = 1,200vpd Pavement = 445mm $525,000
	Rural residential = 90 lots Total = 90 lots Trip generation = 720vpd	Additional traffic = 720vpd Pavement = 460mm Length = 360m $1,080,000	Additional traffic = 180vpd Pavement = 490mm $3,250,000	Additional traffic = 720vpd Pavement = 420mm $675,000	Additional traffic = 900vpd Pavement overlay = 15mm $220,000	Minor intersection improvements $60,000 (MPDC contribution = $25,000)	Minor intersection improvements $55,000	Widening and full depth pavement reconstruction Additional traffic = 360vpd Pavement = 385mm $510,000

Option	Proposed Development and Trip Generation	Station Road (west)	Station Road (east)	Hampton Terrace	Smith Street	Station Road/ Firth St	Hinuera Road/ Firth Street	Haig Road
	Residential = 80-200 lots Rural residential = 40 lots Total = 120-240 lots Trip generation =960-1,920vpd	Additional traffic = 320vpd Pavement = 440mm Length = 360m $1,080,000	Additional traffic = 800vpd Pavement = 500mm $3,250,000	Additional traffic = 1,600vpd Pavement = 460mm $690,000	Additional traffic = 1,120vpd Pavement overlay = 20mm $225,000	Minor intersection improvements $60,000 (MPDC contribution = $25,000)	Minor intersection improvements $55,000	Widening and full depth pavement reconstruction Additional traffic = 240vpd Pavement = 370mm $505,000
	Residential =276-362 lots Rural residential = 80 lots Total = 356-442lots Trip generation = 2,848-3,536vpd	Additional traffic = 640vpd Pavement = 455mm Length = 360m $1,080,000	Additional traffic = 698vpd Pavement = 500mm $3,250,000	Additional traffic = 1,396vpd Pavement = 455mm $690,000	Additional traffic = 1,338vpd Pavement overlay = 25mm $235,000	Minor intersection improvements $60,000 (MPDC contribution = $25,000)	Minor intersection improvements $55,000	Widening and full depth pavement reconstruction Additional traffic = 1,500vpd Pavement = 460mm $525,000
	Residential = 144 lots Rural residential = 153-275 lots Total = 297-419 lots Trip generation = 2,376-3,352vpd	Additional traffic = 1,024vpd Pavement = 4650mm Length = 360m $1,080,000	Additional traffic = 688vpd Pavement = 500mm $3,250,000	Additional traffic = 864vpd Pavement = 430mm $680,000	Additional traffic = 1,200vpd Pavement overlay = 20mm $220,000	Minor intersection improvements $60,000 (MPDC contribution = $25,000)	Minor intersection improvements $55,000	Widening and full depth pavement reconstruction Additional traffic = 1,160vpd Pavement = 445mm $525,000

Option	Proposed Development and Trip Generation	Station Road (west)	Station Road (east)	Hampton Terrace	Smith Street	Station Road/ Firth St	Hinuera Road/ Firth Street	Haig Road
	Residential = 200 lots Rural residential = 105 lots Total = 305 lots Trip generation = 2,440vpd	Additional traffic = 624vpd Pavement = 455mm Length = 540m $1,400,000	Additional traffic = 720vpd Pavement = 500mm $3,250,000	Additional traffic = 600vpd Pavement = 410mm $670,000	Additional traffic = 704vpd Pavement overlay = 10mm $215,000	Minor intersection improvements $60,000 (MPDC contribution = $25,000)	Minor intersection improvements $55,000	Widening and full depth pavement reconstruction Additional traffic = 100vpd Pavement = 336mm $495,000 **Beatty Road** Widening and full depth pavement reconstruction Additional traffic = 400vpd Pavement = 390mm $510,000