Dear Amanda,

**PROPOSED DEVELOPMENT PLAN AMENDMENT - MAIN NORTH ROAD / SAINTS ROAD, SALISBURY PLAIN - ADDITIONAL TRAFFIC CONSIDERATIONS**

I refer to our previous discussions with respect to the proposed Development Plan Amendment (DPA) relating to land located on the south western corner of the intersection of Main North Road with Saints Road and The Grove Way, Salisbury Plain.

I am aware that Council deferred consideration of the DPA on Monday 8\textsuperscript{th} December 2014 in order that an assessment of the traffic impact be undertaken of the functionality of the Carlingford Drive / Saints Road and Terrigal Drive / Saints Road junctions in respect to the potential traffic impacts associated with a future proposal to construct a neighbourhood shopping centre on the above site.

I have therefore undertaken the following additional traffic assessment based upon peak hour traffic flows on the adjoining road network combined with the peak flows expected from the development and have identified to what extent the proposed rezoning will impact upon / exacerbate the existing traffic situation at the above intersections.

**Existing Road layout**

As previously identified the subject site is located on the south western corner of the intersection of Main North Road with Saints Road and The Grove Way, Salisbury Plain.

The subject site has a frontage of approximately 155m to Main North Road and a frontage of approximately 200m to Saints Road. There is an existing access point which provides vehicular access into the subject site off Saints Road and also the adjoining property to the immediate north-west of the subject site. The adjoining property to the west is also serviced via Boolcunda Avenue.
Saints Road, adjacent to the subject site, provides two traffic lanes in each direction separated by a central median and also provides dedicated left and right turn lanes onto Main North Road. The central median is approximately 160m in length and extends as far back as the existing access point into the car parking area. There is a right turn lane for traffic on Saints Road turning into the car parking area. The right turn lane is approximately 45m in length including a 15m taper.

Saints Road to the north–west of the access point onto the subject land narrows to a width of approximately 9.5m and includes a single traffic lane in each direction and a bicycle lane on both sides of this roadway.

The intersections (T-junctions) of Terrigal Drive and Carlingford Drive with Saints Road are located approximately 100m and 150m respectively to the north-west of the above access point. The subject section of Saints Road is identified within Figure 1 below.

![Figure 1: Subject Section of Saints Road](image)

The speed limit on the relevant sections of Terrigal Drive, Carlingford Drive and Saints Road are all 50km/h.

The road verge widths on the south-western side of Saints Road within the vicinity of the intersections of Terrigal Drive and Carlingford Drive are identified as being of the order of 14m.

**Terrigal Drive /Saints Road junction**

The intersection of Terrigal Drive with Saints Road is constructed with the side road intersecting Saints Road at an angle of approximately 90 degrees. The design of the intersection permits all traffic turning movements into and out of the intersection. The kerb to kerb width of Terrigal Drive on the approach to the intersection is approximately 7.5m with the entry and exit movements separated by a painted median with pavement bars.
Sight distance for drivers turning out of the intersection from Terrigal Drive substantially exceeds the minimum requirements for a speed limit of 50km/h in both directions given the wide open road reserve across both the north-eastern and north-western corners of the intersection.

Drivers turning right onto Terrigal Drive from Saints Road are required to do so from the through lane of the major road resulting in a potential for some delay to through traffic travelling to the west along Saints Road.

However, it is noted that there is an opportunity for through traffic to pass on the inside of right turning vehicles given the location of an embayment on the southern side of the intersection directly opposite Terrigal Drive.

**Carlingford Drive /Saints Road junction**

The intersection of Carlingford Drive with Saints Road is similar in layout to that of the intersection with Terrigal Drive and Saints Road, in that:-

- Carlingford Drive intersects Saints Road at an angle of approximately 90 degrees,
- the design of the intersection permits all traffic turning movements into and out of the intersection,
- the kerb to kerb width of Carlingford Drive on the approach to the intersection is approximately 7.5m. However, there is no centre line separating entry and exit movements on Carlingford Drive,
- Sight distance for drivers turning out of the intersection from Carlingford Drive also substantially exceeds the minimum requirements for a speed limit of 50kmh in both directions given the wide open road reserve across both the north-eastern and north-western corners of the intersection.
- Drivers turning right onto Carlingford Drive from Saints Road are required to do so from the through lane of the major road resulting in a potential for delays to through traffic travelling to the west along Saints Road.

However, there is an existing vehicular access point located directly opposite the intersection of Carlingford Drive with Saints Road and two additional access points located between the two intersections. These various entry / exit points provide vehicular access into the following commercial developments, namely:-

- Central Grocers located at 77 Saints Road,
- Mitani Products also located at 77 Saints Road, and
- Stratham Motors located at 81 Saints Road.
Traffic Volumes

Details of traffic volumes at the intersection of Main North Road with Saints Road and The Grove Way have previously been obtained from the Department of Planning, Transport and Infrastructure (DPTI). From a traffic count undertaken on Wednesday, 17th October 2012 it is identified that there are currently two-way Annual Average Daily Traffic (AADT) volumes of:-

- approximately 45,400 vpd on Main North Road, adjacent to the site, and
- approximately 11,900 vpd on Saints Road, adjacent to the subject site. This volume would be very similar to that to the immediate south-east of the intersection with Terrigal Drive.

I have also obtained details of traffic surveys undertaken by the City of Salisbury on Carlingford Drive and Terrigal Drive during November 2012.

The traffic counts provided by Council included details of traffic volumes recorded between Wednesday 21st November and Tuesday 27th November 2012 adjacent to:-

- 1 Carlingford Drive, and
- 3 Terrigal Drive.

Hence, the volumes of traffic recorded at these locations would reflect the volumes of traffic entering and exiting the respective intersections of Carlingford Drive and Terrigal Drive.

Based on the data provided by Council, I understand that the Average Weekday Traffic volumes on these two roads are currently of the order of:-

- 880 vpd on Carlingford Drive, and
- 1550 vpd on Terrigal Drive.

I further note that:-

- The am peak hour volume on Carlingford Drive on a weekday is of the order of 90 vph and typically occurs between 8.00 am and 9.00 am,
- The pm peak hour volume on Carlingford Drive on a weekday is of the order of 85 vph and may occur in any one hour period between 3.00 pm and 6.00 pm,
- The am peak hour volume on Terrigal Drive on a weekday is of the order of 160 vph and typically occurs between 8.00 am and 9.00 am,
- The pm peak hour volume on Terrigal Drive on a weekday is of the order of 150 vph and typically occurs between 3.00 pm and 4.00 pm.
Council traffic data indicates that the traffic volumes on both of the above roads is less on weekends with lower volumes in peak periods and a more even spread of traffic throughout both the Saturday and the Sunday than occurs on a weekday.

The am and pm peak hour volumes on Saints Road are of the order of 1191 vph and 1239 vph, respectively, during weekday periods.

**Crash Data**

Details of crash data recorded at the intersections of Carlingford Drive / Saints Road and Terrigal Drive / Saints Road and in the mid-block section of Saints Road have also been obtained from the Department of Planning, Transport and Infrastructure (DPTI).

I am advised that in the period between 2009 and October 2014 a total of 10 crashes were reported along the subject section of Saints Road. The breakdown is as follows:

- 3 crashes at the intersection of Carlingford Drive and Saints Road,
- 2 crashes at the intersection of Terrigal Drive and Saints Road, and
- 5 crashes within the midblock section of Saints Road between Terrigal Drive and Carlingford Drive.

Each of the above crashes resulted in Property Damage only and none of the crashes resulted in casualties or fatalities.

While the majority of these crashes involved rear end collisions between through and right turning traffic the number and severity of these crashes is equivalent to an average of only two crashes per year and is considered to be very low given the relative volume of traffic on the subject section of Saints Road.

**Comparison of existing and forecast traffic volumes**

I have previously identified that there should be an increase of at most 80 vpd on Carlingford Drive and 180 vpd on Terrigal Drive, on a weekday period, as a consequence of the potential shopping centre development on the subject land. The resultant forecast daily traffic volumes would be of the order of 960 vpd and 1730 vpd, which would be equivalent to an increase of approximately 9% on Carlingford Drive and approximately 12% on Terrigal Drive, with the resulting traffic volumes remaining well within the capacity of both of these roadways.

The above forecast traffic volumes would be distributed throughout the day but there would be very little change to the volumes of traffic entering and exiting the intersections in the am period. Hence, there should be no noticeable change to either intersection during this period as a result of the potential shopping centre development on the subject land.

I anticipate that the increase in peak hour volumes using both intersections on a weekday would be equivalent to at most 10% of the above forecast weekday increases in traffic resulting in:

- an increase of 8 vpd on Carlingford Drive, and
• an increase of 18 vpd on Terrigal Drive during the pm peak hour period.

The resulting increases in traffic movements at both intersections would have minimal impact on the operation of either intersection. Notwithstanding this, I have undertaken the following assessment on the impact of the capacity of both intersections using Sidra Intersection analysis software. From this analysis it is identified that there would mostly be minimal traffic impacts relating to the forecast additional movements using the above intersections as a result of the proposed future neighbourhood shopping centre.

**Intersection Capacity analysis**

Figures 2 and 3 (below) identify, respectively, the existing pm peak hour traffic movements during a weekday period and the forecast pm peak hour traffic movements during a weekday period.

Figure 2 has been based upon the traffic data provided by Council as recorded on both Carlingford Drive and on Terrigal Drive and also the traffic data previously provided by DPTI at the intersection of Saints Road with Main North Road. This figure also takes into account the traffic volumes most recently recorded entering and exiting the subject land via the Saints Road access point.

![Figure 2: Existing PM peak hour traffic volumes on the subject section of Saints Road](image)

Figure 3 has been based upon consideration of the existing traffic data and also the potential increases in peak hour traffic during the pm weekday period on both Carlingford Drive and on Terrigal Drive.
Figure 3: Forecast PM peak hour traffic volumes on the subject section of Saints Road

For the purpose of the comparative assessment of existing and future conditions, the additional traffic volumes entering the intersection of Saints Road and Carlingford Drive have not been included within this assessment. However, there should be minimal if any increase in the number of these movements as result of future development on the subject land.

Based on the review of the subject intersections using Sidra Intersection analysis software, it is identified that there would be minimal impacts relating to the forecast additional movements using the two intersections as a result of the potential future redevelopment of the subject land as a neighbourhood shopping centre.

For example, comparison of the existing volumes and forecast volumes identifies that:-

- The average delay to drivers entering the intersection of Carlingford Drive from the eastern approach of Saints Road would increase from 8.4 seconds to 9.8 seconds for through traffic and would increase from 16.8 seconds to 18.1 seconds for the right turn movements,

- The length of queues (at the 95th percentile probability level) associated with the right and through movements travelling westbound along Saints Road on the eastern approach to Carlingford Drive would remain acceptable, increasing from 2.9 vehicles to 4.2 vehicles,

- The average delay to drivers entering the intersection from Carlingford Drive to turn left or right onto Saints Road would increase from 31.9 seconds to 38.1 seconds, and

- The Degree of Saturation (0.467) associated with the future operation of the Carlingford Drive intersection would remain well below that typically considered to be the upper limit for such an intersection (0.75),
The average delay to drivers entering the intersection of Terrigal Drive from the eastern approach of Saints Road would increase from 9.1 seconds to 11.9 seconds for through traffic and would increase from 17.4 seconds to 20.2 seconds for the right turn movements.

The length of queues (at the 95th percentile probability level) associated with the right and through movements travelling westbound along Saints Road on the eastern approach to Terrigal Drive would remain acceptable, increasing from 3.4 vehicles to 5.3 vehicles.

The average delay to drivers entering the intersection from Terrigal Drive to turn left or right onto Saints Road would increase from 28.2 seconds to 37.2 seconds, and

The Degree of Saturation (0.490) associated with the future operation of the Terrigal Drive intersection would also continue to be well below that typically considered to be the upper limit for such an intersection (0.75).

In summary the above assessment indicates that there would be no significant change to the current operation of the intersection of either side road as a result of the potential future development of a shopping centre facility on the subject land.

As previously identified, I consider that there would also be no adverse traffic impacts on the mid-block capacity of either Carlingford Drive or Terrigal Drive as a result of the potential future development of a shopping centre facility on the subject land.

Summary and Conclusions

As requested, I have undertaken the above assessment of the potential traffic impacts associated with the functionality of the Carlingford Drive / Saints Road and Terrigal Drive / Saints Road junctions in respect to the potential traffic impacts associated with a future proposal to construct a neighbourhood shopping centre on the subject site.

In summary this analysis has identified that:

- There will be negligible if any traffic increases on either Carlingford Drive or Terrigal Drive during the am peak hour period on weekdays given the nature of the potential development which would generate minimal traffic during such a period,

- Given the existing volumes of traffic movements using the subject section of Saints Road it is not considered that there is a significant level of crashes occurring on the subject section of roadway,

- The increase in traffic movements on either of the above side roads during weekday periods would be small. Based on the most recent traffic data provided by Council, I estimate that the resultant forecast daily traffic volumes on Carlingford Drive and Terrigal Drive would be of the order of 960 vpd and 1730 vpd, respectively. These forecast volumes would be equivalent to an increase of approximately 9% on Carlingford Drive and approximately 12% on Terrigal Drive, with the resulting traffic volumes remaining well within the capacity of both of these roadways. This reflects previous advice provided to Council by this firm,
• While there is an existing level of side friction associated with the various driveways on the southern side of the subject section of Saints Road the extent of this issue will not change as a result of the potential future shopping centre development, and

• Based on a review of the traffic data it is considered that the potential worst-case traffic impacts relating to the potential future shopping centre would occur during the pm peak hour period on a weekday. However, based on the above analysis there would be no significant increase in delays or congestion associated with either intersection as a result of the forecast increases in peak hour traffic movements on Carlingford Drive and Terrigal Drive.

In summary, it is identified from the above analysis that the relatively minor increases in predicted traffic movements on Carlingford Drive and Terrigal Drive as a result of the potential future neighbourhood shopping centre on the land would not exacerbate the existing traffic situation at either of these intersections.

Hence, it is concluded that traffic augmentation works associated with either of these intersections would not be required as a result of a potential future neighbourhood shopping centre on the land being the subject of the proposed Development Plan Amendment.

Yours sincerely

Phil Weaver
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