Before an Independent Hearings Panel Appointed by the Waimakariri District Council

Under	the Resource Management Act 1991
In the matter	of submissions and further submissions in relation to the proposed Waimakariri District Plan
And	
In the matter	of Hearing Stream 12A: Special Purpose Zone Pegasus Resort
And	submissions by DEXIN Investments Ltd (**DEXIN**)

Statement of Evidence of **David John Robert Smith** for DEXIN (Submitter 377)

Dated: 17 May 2024

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INTRODUCTION

Qualifications and Experience

1. My full name is David (Dave) John Robert Smith.

2. I am a Technical Director of Transportation Planning at Abley Limited. I have been in this position since 2018 and have been at Abley for 12 years. I lead a range of development planning and transportation planning projects for both public and private sector clients.

3. My previous work experience includes 23 years of transportation planning and engineering experience. I have managed and led numerous projects related to transportation business cases, transportation research and Resource Management Act (**RMA**) related matters for public and private sector clients. As an expert witness, I was engaged by the Environmental Protection Authority (EPA) to provide transportation advice and evidence directly to the Board of Inquiry presiding over the Basin Bridge hearing. I have also recently been engaged by Foodstuffs South Island Limited, Auckland Council, Selwyn District Council, Queenstown-Lakes District Council, Ports of Auckland and Fonterra as an expert witness.

4. I hold a Bachelor of Technology (with Honours) in Industrial Operations Research and Master of Philosophy in Operations Research from Massey University. I am a Chartered Member of the Institute of Logistics and Transport (CMILT), a member of Engineering New Zealand (MEngNZ) and a member of the NZ Modelling User Group sub-group of ENZ. I have been appointed to the NZ Transport Agency Independent Professional Advisors panel for Transportation Modelling. I am also certified as a Hearings Commissioner having completed the Making Good Decisions course in 2019.

SCOPE OF EVIDENCE

5. I prepared a report titled Pegasus Resort Special Purpose Zone Expansion Integrated Transportation Assessment (**ITA**) dated 17th November 2022[1] that was provided to the Waimakariri District Council (**Council**) as part of DEXIN's rezoning submission for 1250 Main North Road, Woodend (**the site**).

[1] This expanded on a high-level November 2021 Abley assessment report prepared with the original submission.

6. The scope of my evidence includes the following:

   (a) Overview of my ITA report;

   (b) Presents an overview of changes subsequent to issuing the ITA relating to the DEXIN submissions including: an updated ODP; the updated status of the Woodend Bypass project; and changes in activity status under the zoning sought; and

   (c) Responds where necessary to the Council's s42A report for Stream 12A dated 1 May 2024, specifically the assessment of Mr Binder of Waimakariri District Council.

CODE OF CONDUCT STATEMENT

7. While this is not an Environment Court hearing, I nonetheless confirm that I have read and agree to comply with the Code of Conduct for Expert Witnesses in the Environment Court Practice Note 2023.

8. I am satisfied that the matters which I address in my evidence are within my field of expertise. I am not aware of any material facts that I have omitted which might alter or detract from the opinions I express in my evidence.

OVERVIEW OF ITA REPORT

9. The ITA identified, evaluated and assessed the various transport and access elements of a rezoning request for land located at the Pegasus Golf Course to provide an extension to the golf resort with tourist focused mixed use activities including hospitality, and residential activities. The development that would be facilitated by the rezoning will result in an increased level of activity compared to the current zoning and the effects of this increase in activity were assessed.

10. I assessed the current level of service of the surrounding roading network, to account for traffic growth expected at Pegasus Resort, Pegasus Town and Ravenswood. Intersection traffic modelling was undertaken to assess the operation of nearby intersections for the evening peak hour and Sunday afternoon peak hour under two future development scenarios. The results of the analysis demonstrated that the receiving transport network has some

capacity to accommodate the traffic generated from the site and development of Pegasus Resort.

11. However, when Ravenswood subdivision is fully developed, some relatively minor design and traffic management changes will be required to the SH1/Pegasus Boulevard roundabout to improve traffic operations with the forecast higher traffic flows.

12. I analysed the current crash history along Pegasus Boulevard and concluded there are no underlying safety issues. Accordingly, I considered it unlikely that the proposed development related traffic will compromise road safety within the vicinity.

13. I noted that with growth projected for nearby subdivisions an appropriate pedestrian/ cycle crossing facility may be required to ensure users can cross the State Highway safely, however this is an existing network deficiency and is not unique to the rezoning proposal or caused by it. The site has excellent public transport accessibility with bus stops located directly adjacent to the southern edge of the site on Pegasus Boulevard.

14. I assessed the proposed rezoning against the relevant transport planning framework contained in regional and local strategies and policies, and overall, I concluded that the proposal would be consistent with the transport-related objectives and policies of those documents.

15. At the time of preparing the ITA there was uncertainty around the future receiving environment in the vicinity of the SH1/ Pegasus Boulevard roundabout in particular the layout and timing of the proposed Woodend Bypass, and I recommended that discussions should be held with the NZ Transport Agency Waka Kotahi (NZTA). I have since engaged with NZTA and there is more certainty with respect to this project which I address later in this statement of evidence.

CHANGES SUBSEQUENT TO ITA

Updated ODP

16. Subsequent to publishing the ITA there have been several key changes in response to my engagement with NZTA (in their role as the road controlling

authority for SH1 Main North Road), and with Council (in their role as the road controlling authority for the local road network including Pegasus Boulevard).

17. These changes are as follows:

    (a) Access to the site has been changed such that:

        (i) there is no direct day-to-day access to SH1 from the site other than an emergency access which would only operate under temporary traffic management and only when required;

        (ii) the main access is a right of way (ROW) directly onto Pegasus Boulevard;

        (iii) a secondary access is available as a private ROW for the four lots located at the end of Burntwood Lane; and

        (iv) walk and cycle connectivity to the wider network is available via Burntwood Lane.

    (b) The layout of the site has been modified to locate residential activity to the north and east and commercial activity with associated car parking in the south.

    (c) The activities anticipated under the zoning are generally unchanged and include 27 medium density residential units and 2,460 sqm GFA of market and hospitality.

18. The updated Masterplan is shown below with details as to each of the external accesses.

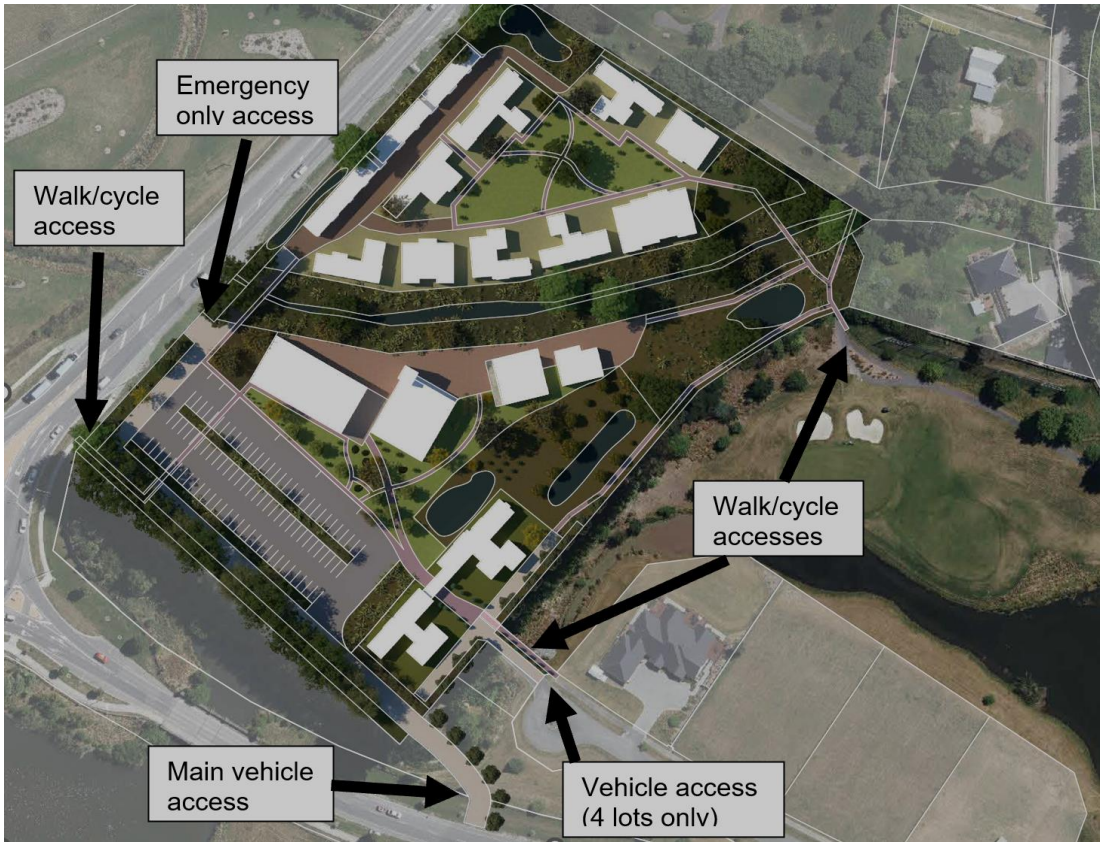


Figure 1: Pegasus Mākete Masterplan

19. I have reviewed the Outline Development Plan (ODP) and can confirm that these accesses are suitably represented and provide excellent connectivity for all modes of transport. The ODP is reproduced below.

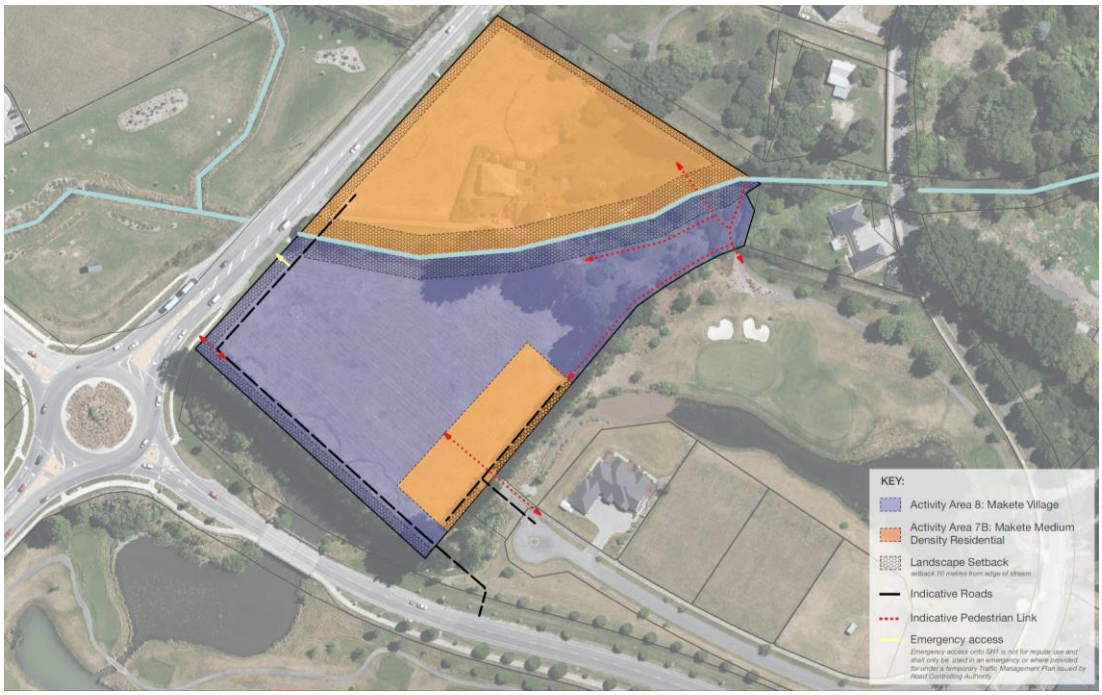


Figure 2: Pegasus Mākete ODP

Updated Status of Woodend Bypass

20. Of note, there is now a much higher degree of certainty with respect to the delivery of the Woodend Bypass on SH1. This project delivers a four-lane median divided motorway from Pegasus Boulevard in the north through to the existing four-lane motorway in the vicinity of the Lineside Road interchange. Below is the most recent published alignment in the vicinity of the site.

Figure 3: Woodend Bypass Designated Alignment (Source: NZTA)

21. Subsequent to the ITA the National Coalition Government has published two key documents relating to the delivery of transportation infrastructure.

22. The draft Government Policy Statement (GPS) on Land Transport 2024[2] was made available for consultation in March 2024 and sets out investment priorities and funding for land transport projects. The Belfast to Pegasus Motorway and Woodend Bypass Project is included as one of the Roads of National Significance, signalling a commitment to fund and deliver this project. I note that the Belfast to Pegasus Motorway and Woodend Bypass Project is a single project and for the purposes of brevity I refer to this elsewhere as the 'Woodend Bypass'.

23. The State Highway Investment Proposal (SHIP) 2024-34[3] was published in April 2024 and takes this commitment one step further by setting out the

[2] https://www.transport.govt.nz/area-of-interest/strategy-and-direction/government-policy-statement-on-land-transport-2024/
[3] https://www.nzta.govt.nz/resources/state-highway-investment-proposal-2024-34/

intended priorities and timings for delivering the projects identified in the GPS. On page 105 of the SHIP the Belfast to Pegasus Motorway and Woodend Bypass Project is scheduled for construction to begin in the 2024-27 phase of delivery and scheduled for completion in 2030-34.

24. These key documents provide confidence as to the delivery and likely timing of completion, such that the Woodend Bypass section of the Project is expected to be operational in 6-10 years. Notably, through my recent engagement with NZTA I understand that design work is already underway. I have shared traffic survey data more recently collected for DEXIN with NZTA and Council to assist with this ongoing design work for the Woodend Bypass and wider transport network.

25. Of particular relevance to the rezoning of the site, the commitment to the Woodend Bypass project helpfully demonstrates there is a medium-long term solution to increase the capacity of the wider transport network. However, there is some uncertainty as to the form of the SH1 / Pegasus Boulevard connection. I understand from engagement with NZTA that this may require grade separation to provide sufficient long-term capacity. This is a matter I address in more detail in response to the s42A report.

Updated Definition of Mākete tourism activity

26. The activities proposed for the rezoned site and the associated provisions have also been refined from when the original ITA was produced. I have reproduced an amended proposed definition of 'Mākete tourism activity' supplied by Ms Pearson below, which outlines the range of activities anticipated within Activity Area 8 of the ODP:

"Means activities that support the tourism activities in the zone, including:

1. *wellness activities;*
2. *~~food and beverage retail;~~ cafes;*
3. *restaurants;*
4. *wine bars;*
5. *farmers markets;*
6. *artisan workshops and associated retail of products;*
7. *gift/souvenir shops;*
8. *~~manufacturing of food or beverage goods;~~*
9. *cultural facilities;*
10. *entertainment activities;*
11. *~~horticulture~~ agri-tourism and wine tourism; and*
12. *associated educational facilities."*

27. The key change in terms of transport effects is the removal of food and beverage retail which is potentially a high generating activity within the site. The activities included in the definition represent a wide range of activities and associated traffic generating rates, however I note a less pronounced focus on retail. This is a matter I revisit in more detail in my response to the s42A report comments.

RESPONSE TO COUNCIL OFFICER REPORT

28. I have reviewed the transportation matters addressed in the s42A report and the assessment undertaken by Mr Binder on behalf of Council. The key sections of the s42A report are section 3.2.1.3 (paragraphs 115-125) addressing transportation infrastructure and accessibility, and Appendix D Attachment A and Appendix E memoranda prepared by Mr Binder.

29. Mr Binder prepared the Appendix E memorandum subsequent to a meeting Mr Joseph and I attended with Mr Binder and Ms McSloy on the 15th April 2024 to discuss the rezoning submission. The memorandum helpfully highlights five areas where Mr Binder seeks more information, as follows:

    (a) Viability of any direct access to/from SH1 Main North Road;

    (b) Design and effects of accesses onto Pegasus Boulevard and Burntwood Lane;

    (c) Non-motorised connections to Ravenswood Key Activity Centre (KAC), existing public transport (PT) stops and the future major cycleway network;

    (d) Final composition of the development and resulting trip generation and distribution; and

    (e) Capacity limitations and safety impacts of the additional traffic on Main North Road in the unlikely event that the Woodend Bypass is not constructed.

30. The matters raised by Mr Binder are mitigated or otherwise addressed through the changes to the ODP and Masterplan, and other changes subsequent to issuing the ITA, as documented in paragraphs 16-27. In the following sections, I present additional assessment to demonstrate how these changes address each point.

Viability of Direct Access to SH1 Main North Road

31. In Appendix D Attachment A, Mr Binder states "*Waka Kotahi generally requires access from a local road, not a limited-access State Highway*", acknowledges the potential that "*Waka Kotahi may be considering a double laned, fully grade separated interchange at Pegasus Boulevard / Bob Robertson Drive*"[4] and strongly recommends consultation with Waka Kotahi.

32. I have engaged with Mr James Long, a Senior Safety Engineer, and Mr Jack McCulloch, a planner on the Environmental Planning team, both with NZTA, with respect to access to SH1 and future SH1 upgrade plans in the vicinity. NZTA are the road controlling authority for New Zealand's State Highway network.

33. I understand from Mr Long that the Woodend Bypass project is currently undergoing a design review and there is the potential that the current Pegasus roundabout may be replaced by a grade separated interchange. This concurs with Mr Binder's statement. The grade separation would separate the north - south SH1 through movements by elevating them above Pegasus Boulevard and Bob Robertson Drive. Whilst the design details are not confirmed, it is evident that the future receiving environment will be different to the current environment.

34. Mr Long advised that as SH1 is classified as a Limited Access Road (LAR)[5], NZTA's position is that there should be no direct access to SH1 if there are viable alternatives elsewhere. There is also some likelihood that if a SH1 access were formed in the short term, NZTA would require this to be closed again when the Woodend Bypass is being constructed and/or is operational.

35. In light of the LAR status and future changes to SH1, I consider that it is no longer viable for the site to have a direct vehicle access to SH1, and this has now been removed from the Masterplan (**figure 1**) and ODP (**figure 2**). Instead, access is proposed via Pegasus Boulevard.

[4] For clarity, this is in reference to a proposed upgrade to the existing SH1 / Pegasus Boulevard / Bob Robertson Drive roundabout adjacent to the site. The upgrade would be delivered as part of the delivery of the Woodend Bypass project shown in **Figure 3.**

[5] https://www.nzta.govt.nz/roads-and-rail/management-and-maintenance-development-and-the-state-highway-network/limited-access-roads-and-accessways-onto-the-state-highway/

36. However, I recommend that an emergency access to SH1 be provided into the site to enable direct access for emergency vehicles (should that be required) and to use as an alternative if for any reason the sole access to Pegasus Boulevard were closed (such as a crash or road maintenance). This in my view will make for a more resilient network by adding an alternative connection that may be used only when absolutely required.

37. During my engagement, Mr Long agreed that establishing an emergency access onto SH1 is acceptable but should not be used for everyday use. This access would therefore only be open to traffic on an as-required basis and I recommend that a Temporary Traffic Management plan should be implemented to safely and efficiently manage the use of this access. I have recommended to Ms Pearson that a note be added to the ODP to this effect; this is now included in the ODP 'Key' as shown in **Figure 2**.

Design and Effects of Accesses onto Pegasus Boulevard and Burntwood Lane

38. In Appendix D Attachment A, Mr Binder states "…*access should be from Burntwood/Mapleham. Access from Pegasus Boulevard is not supported; a commercial access will not fit between the bridge and the edge of the site either.*". The underlying concerns relate to the available sight distance at the access, and a requirement under the proposed District Plan to achieve access from the lowest ranking road the lot has frontage to.

39. Mr Binder observes that the sight distances that can be achieved along Pegasus Boulevard do not meet the sight distance standards from Table APP5B/1 of the NZTA Planning and Policy Manual 5B. However, the NZTA standards are intended for the State Highway network and not local roads. State Highways generally serve a different purpose with respect to inter-regional travel and have a higher proportion of heavy vehicles.

40. I consider that the minimum sight distances in Table 30.5 of the operative District Plan (**operative DP**) and TRAN-19 of the proposed District Plan (**proposed DP**) are the appropriate standards and I agree with Mr Binder that these can be met. Of the two standards the minimum requirement under table TRAN-19 of the proposed DP is more demanding and is 120m for residential and 150m for other activities in a 70 kph environment. I further note it is 80m for residential and 100m for other activities in a 50 kph environment.

41. I undertook a site visit on the 5 May 2024 to determine the most appropriate location for a vehicle crossing on Pegasus Boulevard and to determine the operating speed on the corridor. I calculated the speed of vehicles from the point at which they become visible (in the vicinity of the bridge) up to the vehicle access. The range of speeds observed was 43-68 kph with an average speed of 54.5 kph. Noting that the legal speed limit is 70 kph, the actual speeds along the corridor are substantially lower than 70 kph as eastbound vehicles are generally accelerating away from the roundabout.

42. In my view and based on my observations the western approach (from the roundabout) of the road corridor is consistent with a 50 kph environment in terms of the observed vehicle operating speeds and the eastern approach (from Pegasus town) is consistent with a 70 kph environment. On this basis 100m sight distance is required to the west and 150m to the east to meet the proposed DP requirements.

43. The location along Pegasus Boulevard that I have confirmed meets the corresponding sight distance requirements in both directions is shown in **Figure 4** and corresponding high-level concept plan (**Figure 5**). I have confirmed that there is 100m sight distance to the west (the operative DP standard for a 70 kph environment and proposed DP standard for a 50 kph environment) and over 200m sight distance available to the east. This is consistent with the location on the updated Masterplan and ODP. The access shown in the concept plan has been designed to accommodate a 12.6m coach.

Figure 4: Sight distance from proposed access location (Source: Canterbury Maps)

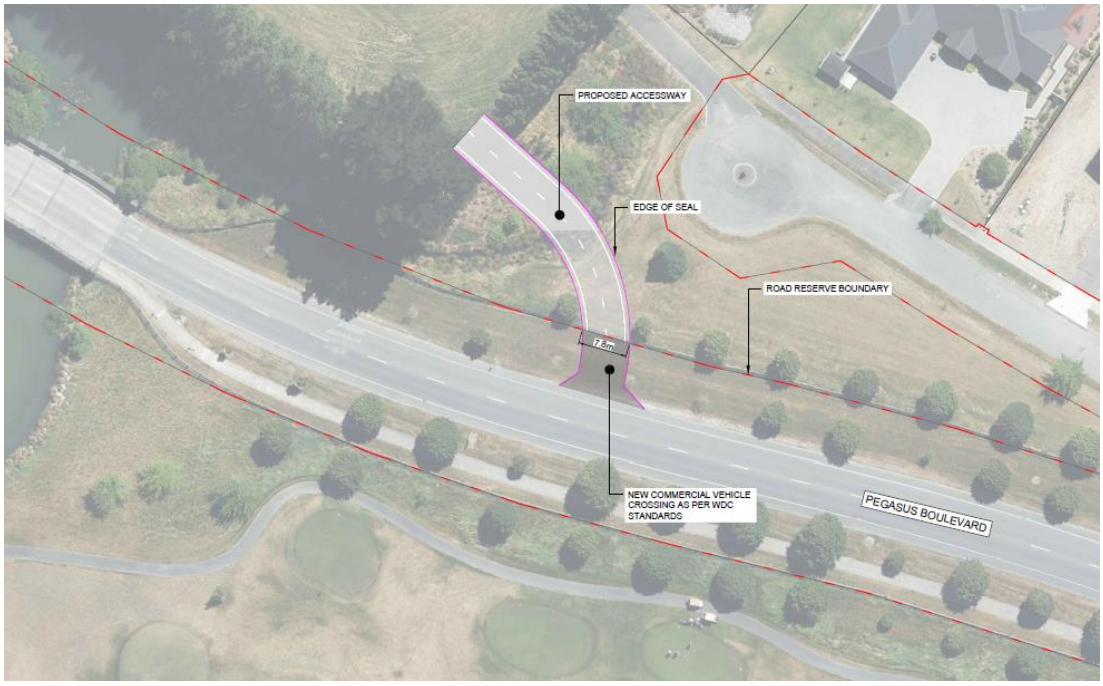


Figure 5: High-level concept plan for Pegasus Boulevard vehicle access

44. Technically, Mr Binder's statement that a commercial access will not fit between the bridge and the edge of the site is correct as minimum sight distances cannot be achieved directly adjacent to the south/eastern edge of the site. However, the plan in Figure 5 clearly demonstrates that access can be achieved by shifting the access to the east which is still on the same block of land owned by the submitter and already zoned SPZ PR. The land in question is not intended for any other development purpose.

45. I therefore do not consider that it is necessary or indeed appropriate to provide a main access to Mapleham Drive or Burntwood Lane as recommended by Mr Binder. Mapleham Drive and Burntwood Lane are both local roads servicing low density residential activity. They have not been designed to regularly accommodate commercial traffic such as buses and coaches, delivery vehicles and higher levels of traffic such as would be experienced under the zoning sought. However, a private residential-only vehicle access has been included on the ODP to connect to the four residential lots on the southeast corner of the site.

46. I have also explored the possibility that a higher-order access to the site may be required in the longer term. The following high-level concept plan in **Figure 6** shows that there is sufficient space to accommodate a roundabout intersection at the access which meets the geometric design standards for a 70 kph corridor.

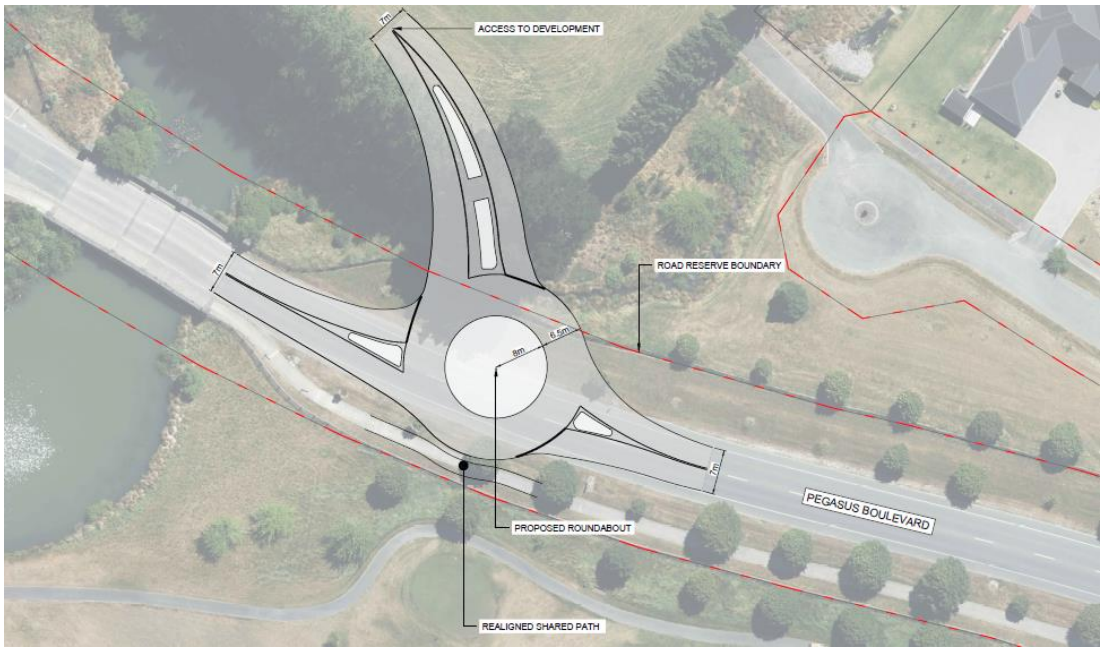


Figure 6: High-level concept plan for roundabout at Pegasus Boulevard access

47. I have undertaken traffic modelling using Sidra Intersection 9.1 software to determine the most appropriate form of access onto Pegasus Boulevard. I have modelled a standard vehicle crossing as shown in Figure 5, and a roundabout as shown on Figure 6 as a higher order treatment should that be required at some stage in the future.

48. The modelling is based on surveyed traffic flows along Pegasus Boulevard surveyed by Team Traffic on Thursday 22nd and Saturday 24th February 2024. The modelling conservatively includes the following future development assumptions:

    (a) The full development of Pegasus Mākete as sought under the rezoning submission;

    (b) The development of the majority of the Pegasus Resort. I understand that the Hotel in Activity Area 1 and spa village in Activity Area 2 (which are two of the larger traffic generating areas) are likely to be last areas within the resort to be developed and the traffic generation

corresponding to these two areas has been excluded from this assessment (see paragraph 49 for further explanation); and

(c) As a sensitivity test, background growth of 20% additional traffic to/from Pegasus town corresponding to up to ten years of growth at 2% per annum has been added[6];

49. Preliminary modelling indicated that with the full development of Pegasus Mākete and Pegasus Resort (with a suitable allowance for background growth in traffic), the Pegasus Mākete access would no longer operate satisfactorily with a standard vehicle crossing. Instead, a roundabout would most likely be required. I have therefore modelled the extent of development that can be supported prior to the vehicle crossing failing, noting that the development of Pegasus Mākete and Pegasus Resort could occur in a different order. The specific scenario modelling here is included as a practical demonstration of the extent of development that I can support prior to further assessment of the access configuration and layout. I also note that this modelling is based on the physical transport network remaining unchanged, that is, without the Woodend Bypass project or other infrastructure improvements going ahead. If these projects do go ahead, I anticipate a substantial reduction in traffic demand along Pegasus Boulevard, which may result in the Pegasus Mākete access continuing to operate satisfactorily once the Pegasus Resort and Pegasus Mākete are fully developed.

50. I have modelled the weekday evening peak and the weekend peak hours. These correspond to Thursday 4:30pm-5:30pm and Saturday 11:30am-12:30pm which were the two peak times in the February 2024 surveys. The modelling results are shown for the critical right turn in and right turn out movements in **Table One** below (with full results in **Annexure A**).

51. The key metrics presented are the average seconds delay for right turners and the Level of Service (**LoS**). LoS is a traffic engineering classification demonstrating the extent to which the transport system may be operating at capacity with LoS A representing free flow conditions and LoS F being reached when an intersection has reached or is exceeding capacity. Notably LoS E is the classification at which an intersection is approaching but has not reached

[6] The 2% growth rate has been calibrated from NZTA count station 01S00313 to the north of the Pegasus roundabout which grew from 10,458 in 2012 to 13,060 vehicles in 2022, geometric growth 260 vehicles per annum or 260/13,060 = 2% projecting forward.

capacity and occurs when intersection delays are in the order of 35-50 seconds. I consider that during peak traffic conditions it is desirable that urban intersections operate at LoS E or better, however there are many examples of LoS F being experienced at peak in busy urban environments.

Table One Pegasus Boulevard vehicle crossing access performance –

**excluding the hotel in Activity Area 1 and the spa village in Activity Area 2.*

Period	Movement	Mākete		Mākete + Pegasus Resort*		Mākete + Pegasus Resort* + 20%	
		Delay (sec)	LoS	Delay (sec)	LoS	Delay (sec)	LoS
Weekday peak	Right In	19	C	28	D	39	E
	Right Out	15	C	28	D	43	E
Weekend peak	Right In	10	A	12	B	14	B
	Right Out	12	B	21	C	30	D

52. I conclude that with the addition of Pegasus Mākete and a large proportion of Pegasus Resort traffic, the vehicle crossing on Pegasus Boulevard shown in Figure 4 will operate with modest delays for right turners of on average less than 30 seconds, and good LoS. The sensitivity test including ten years of growth demonstrates that delays may increase by a further 10-15 seconds however the access continues to operate below capacity at LoS E.

53. The intersection modelling results assuming a roundabout is installed at the Pegasus Boulevard access (as per the concept in Figure 6) are presented below in Table Two (with full results in Annexure A). In all instances the roundabout will perform with very low levels of delay and an excellent Level of Service (including with the addition of ten years of background growth). There is also a substantial amount of residual capacity such that the full development of the Pegasus Resort can be accommodated.

Table Two Pegasus Boulevard roundabout access performance –

**excluding the hotel in Activity Area 1 and the spa village in Activity Area 2.*

Period	Movement	Mākete		Mākete + Pegasus Resort*		Mākete + Pegasus Resort* + 20%	
		Delay (sec)	LoS	Delay (sec)	LoS	Delay (sec)	LoS
Weekday	rt in	10	B	10	B	10	B
	rt out	11	B	12	B	14	B
Weekend	rt in	11	B	11	B	11	B
	rt out	10	A	11	B	11	B

54. I conclude that a main access on Pegasus Boulevard can be supported and is preferable to establishing a main access on a lower order residential street. I have designed a vehicle crossing access (Figure 5) as well as a roundabout configuration and can confirm a standard vehicle crossing:

    (a) can be located as shown to meet appropriate design standards, supporting the safe operation of the access;

    (b) can accommodate all traffic movements including coaches and delivery vehicles;

    (c) will operate with modest delays including with the addition of traffic from development of a large proportion of Pegasus Resort and approximately ten years of background growth; and

    (d) could be replaced at some stage in the future by a roundabout should that be required to ensure the safe and efficient operation of the access.

55. I consider that during the development of Pegasus Resort, the preparation of at least one Integrated Transportation Assessment (**ITA**) will be required and that it will need to include suitable monitoring and assessment of the performance of the Pegasus Mākete access. Multiple ITAs may be required at various points in the development of the SPZ(PR), particularly when larger scale activities such as hotels or the spa/wellness and hot pools facility are being applied for.

56. I have reviewed the matter of discretion SPZ(PR)-MCD3 – Transport, which is the relevant matter for the majority of restricted discretionary activities provided for in the SPZ(PR)[7]. I consider that the notified wording of this matter of discretion is sufficiently broad to allow Council to request an ITA at any stage of the Pegasus Resort and/or Pegasus Mākete development to assess whether the access points onto Pegasus Boulevard from the SPZ(PR) are still performing at an acceptable level. However, I consider that an explicit reference to the need for an ITA with respect to the Pegasus Mākete access and how that serves Activity Area 8 would be useful. I have recommended to

[7] Including Mākete tourism activities, hotels, visitor accommodation, commercial golf activities and the spa/wellness and hot pools facility.

Ms Pearson that SPZ(PR)-MCD3 – Transport be amended as follows (with changes underlined):

1. *Safe, resilient, efficient functioning and sustainable transport network[8] for all transport modes, including:*

    (a) *In relation to Activity Area 8, the preparation of an Integrated Transportation Assessment that includes a modelling assessment of the impacts of the development enabled by the application on the future performance of:*

        (i) *the site accesses along Pegasus Boulevard adjacent to the SPZ(PR); and*

        (ii) *the SH1 / Pegasus Boulevard roundabout or any future upgraded intersection replacing the roundabout.*

2. *Adverse effects on the character and amenity values of the surrounding area in terms of noise, vibration, dust, nuisance, glare or fumes.*

3. *Provision of safe vehicle access and adequate on-site car parking and circulation and on-site manoeuvring.*

4. *Road and intersection design in accordance with SPZ(PR)-APP1.*

5. *Compliance with the relevant standards contained within the Transport Chapter.*

57. I further understand that from engagement with Mr Binder that following the completion of the Woodend Bypass, Council may open the Pegasus town emergency access which connects to Gladstone Road in Woodend. This would provide a second vehicle access as an alternative to Pegasus Boulevard, enabling local traffic to connect to Woodend township and further afield without using Pegasus Boulevard. If this second vehicle connection were to be open to general traffic, I would anticipate a substantial reduction in traffic demand past the Mākete proposed site access on Pegasus Boulevard, with subsequent improvement in the performance of the access. The location of the Pegasus Town emergency access is shown in **Figure 7**

[8] Consequential amendment as these words appeared to be missing.

Figure 7: Pegasus emergency access (potential future connection) (Source: Canterbury Maps)

Non-motorised connections to Ravenswood, PT stops and future cycleway

58. Mr Binder recommends in Appendix D Attachment A, that "*a more direct pedestrian link should be included to the Pegasus Roundabout, bus stops, and potentially Ravenswood".*

59. There is currently limited provision for cyclists and pedestrians in the vicinity of the site and Pegasus roundabout. The current 70 kph speed limit on SH1 and Pegasus Boulevard does not support pedestrian and cycle movement through the roundabout, however there is off road infrastructure available as shown in **Figure 8** and as follows:

    (a) There are two connections to Pegasus Resort and town, one on the south side of Pegasus Boulevard and the other via Burntwood Lane immediately to the east of the site. Both provide high-quality, continuous off-road connections to the remainder of Pegasus.

    (b) There is footpath provision on the west side of the Pegasus roundabout to Ravenswood commercial and residential activities.

(c) Three crossing points are provided on the western, southern and eastern legs of the Pegasus Boulevard with kerb cutdowns and median refuges.

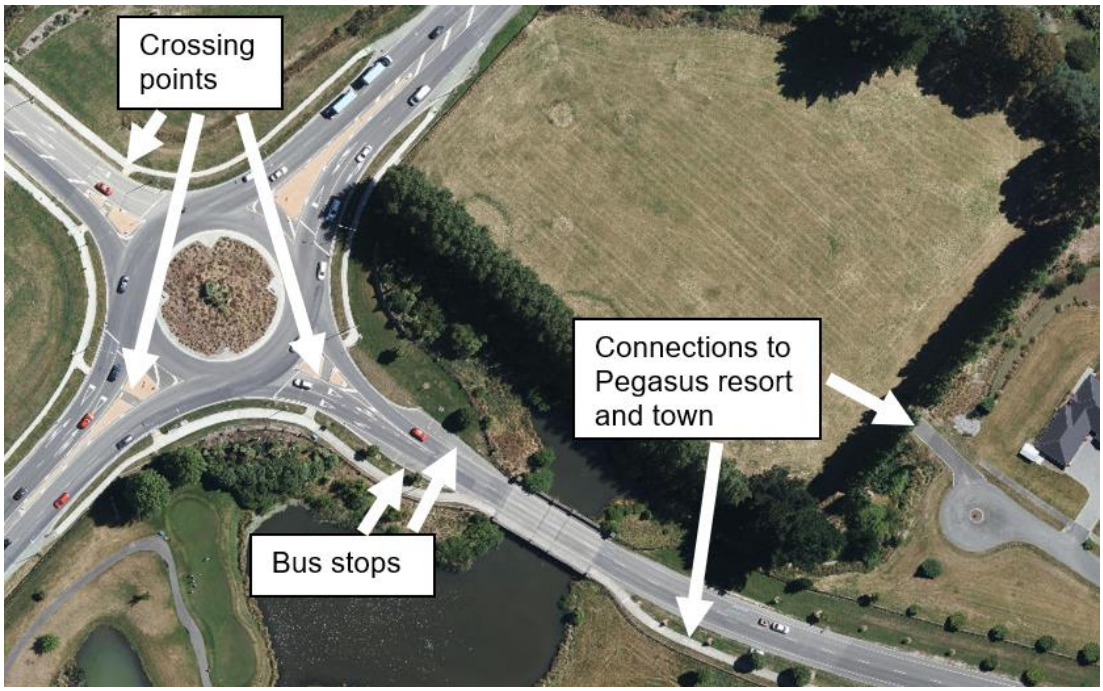


Figure 8: Existing pedestrian infrastructure (Source: Canterbury Maps)

60. I acknowledge that the current infrastructure for pedestrians, which has been designed and installed by the road controlling authorities, is deficient based on the current 70 kph speed environment. I encourage both NZTA and Council to review the speed environment, which in my view should be reduced to 60 kph in keeping with the increasingly urban environment. However, it is important to note that reducing posted speeds is not a matter for submitters seeking rezoning or indeed any developer.

61. This notwithstanding I have recommended the following improvements to the local network to provide an excellent level of connectivity and improved pedestrian safety which are included in the updated ODP and Masterplan. This includes:

(a) a walk/cycle/golf buggy connection through the site connecting to the Burntwood Lane corridor;

(b) a walk/golf buggy connection to Mapleham Drive from the residential portion of the site;

(c) strong internal connections between the residential and commercial areas; and

(d) a convenient walk/cycle connection between the site and the bus stops along Pegasus Boulevard (I note that the actual alignment of this connection will require additional design work therefore it is annotated as an indicative alignment only).

62. These active mode connections provide access to current and proposed future infrastructure.

63. During engagement with NZTA, we discussed the feasibility of providing infrastructure improvements to assist pedestrians in crossing SH1. NZTA advised that the Woodend Bypass design would likely provide an improved crossing facility, and that any crossing infrastructure provided in the interim would almost certainly need to be removed.

64. This notwithstanding I consider that, should the road controlling authorities choose to do so, raised pedestrian platforms could be installed at the existing crossings on the roundabout approaches. I understand that these improvements were proposed as part of NZTA's SH1 Saltwater Creek to Cam River Safety Improvements Programme[9]. I further understand that this programme is now less likely to be delivered with the focus shifting to delivering the Woodend Bypass instead.

65. My view is that these crossings could be raised by the road controlling authorities, which would address an existing deficiency on the transport network with respect to pedestrian connectivity.

66. I conclude that with the excellent level of internal connectivity for active modes coupled with connections to Burntwood Lane, Mapleham Drive and the bus stops on Pegasus Boulevard, the site integrates well with the wider pedestrian and cycle network. Further improvements in provision for these modes are signalled through the delivery of the Woodend Bypass project, the Pegasus to Woodend future cycleway referred to by Mr Binder, and potential design improvements such as installing raised pedestrian platforms and reducing the speed limit. These are all matters which in my view are not for submitters seeking rezoning and would be delivered by the NZTA and Council as road

[9] ttps://www.nzta.govt.nz/projects/sh1-north-canterbury-corridor/saltwater-to-cam/

controlling authorities. I consider that these improvements will be delivered irrespective of whether the site is rezoned or not.

Trip rates and traffic generation

67. The s42A Appendix D Attachment A assessment prepared by Mr Binder highlights concerns relating to the trip chaining discounts and trip generation included in the ITA. Mr Binder recommends the adoption of NZTA Research Report 453 rates.

68. My revised assessment focuses on using RR453 rates exclusively as recommended by Mr Binder including the "Market" activity highlighted in Attachment A. The ITA prepared was in my view overly conservative in assuming a standard shopping centre trip rate (instead of a Market rate) and I consider that the revised assessment is more in line with the likely level of traffic generation on the site.

69. I further note that the activity definitions have also been refined as discussed in paragraphs 26-27 of my evidence. The removal of food and beverage retail reduces the potential for "standard shopping centre" traffic generation levels to emerge on the site and further supports placing an emphasis on the lower market rates as recommended by Mr Binder.

70. The resultant trip generation rate in peak hour is 230 two-way vehicle movements, without the application of any trip reduction factors and summarised in Table Three below.

Table Three Trip rate summary for Pegasus Mākete

Trip rate	Source	Unit	Area	Trips
2.4	RR453 Table 7.4 - 8.11 Market	/100sqm GFA	1220	29.28
15.6	RR453 Table 7.4 - 8.9 Bar	/100sqm GFA	1150	175.95
15	RR453 Table 8.10 Restaurant 85th%ile / 1.2	/100sqm GFA		
15.75	RR453 Table 8.10 Small shopping centre 85th %ile / 1.2	/100sqm GFA		
0.9	RR453 Table 7.4 - 7.1.3 Dwelling (outer suburban)	/dwelling	27	24
	Total without trip reduction factors			**230**
	If 10% of visitors visit two activities			207
	If 50% of visitors visit two activities			115

71. Mr Binder also requests more justification in relation to trip chaining assumptions. This refers to the behaviour whereby a visitor to the site will visit several activities, thereby reducing the total number of vehicle trips that are external to the site. For example, a visitor may visit the market and then visit a restaurant and the wine cellar in a single vehicle trip. This would be an example of three trips to and from the site being calculated based on the individual activities but in reality, there would be only one trip to and from the site by the visitor. There is limited research to define how many individual activities a visitor may frequent in a single trip in a mixed-use development, and in my experience this is unique to each individual site.

72. I have run the ITE Mixed Use Development tool[10] to determine the likely level of internalisation of trips within the site. This is a US based resource but is the only such tool that is publicly available that I am aware of. In short, this tool estimates the trip rate reduction percentage based on the mix of activities within the site. The tool estimated a 10% reduction on this basis of the mix of residential, retail (market) and hospitality activities in the Mākete site.

73. My view is that this is highly conservative as with Pegasus Mākete being a destination and with activities intended to be complementary, there is a higher than typical likelihood of visitors visiting two or more activities. This is especially the case when considering the Pegasus Mākete and the remainder of the Pegasus Resort zone as a whole with higher potential for internal trips between activities located at the two adjacent sites. For instance, the 650-800m separation between the site and the Pegasus golf clubhouse is an approximate 8-10 minute walk[11] and a much quicker cycle or golf-buggy ride.

74. On this basis I would consider 10% to be a lower limit, 30% (as assumed in the Abley ITA) to be more representative and 50% to be an upper limit on the extent of trip reduction that may eventuate on this site. I conclude there is some uncertainty as to the likely trip rate however it is likely in the range of 115 - 207 trips in peak hour. This is less than the conservative initial assessment in the ITA of 228-269 trips in the peak hour.

75. For simplicity I have not updated my modelling assessment to reflect the likely lower trip rate, but confirm that in my view it is highly conservative as noted in the ITA.

[10] https://www.epa.gov/smartgrowth/mixed-use-trip-generation-model
[11] Based on average walk speed of 1.3ms^{-1}

Capacity and safety on Main North Rd if Woodend Bypass not built

76. In Appendix E, Mr Binder raises a concern relating to "*capacity limitations and safety impacts of additional traffic on Main North Road in the unlikely event that the Woodend Bypass is not constructed*."

77. My understanding is that there is now a firm commitment to the delivery of the Woodend Bypass as signalled in the GPS and SHIP documents. This provides confidence that this project is funded and committed and will be delivered in the next 6-10 years.

78. Should the Woodend Bypass not be delivered or be delayed, my considered view is that there would need to be other improvements to manage traffic in the medium to long term at this location.

79. Potential alternatives include some or all of:

    (a) signalising critical approaches on the existing roundabouts to manage conflicts that may cause lengthy delays;

    (b) signalising the full Pegasus intersection to add capacity and include pedestrian crosswalks;

    (c) opening the 'emergency only' link from Pegasus Town to Gladstone Road providing a second connection to Woodend from the development; and

    (d) raising the pedestrian crossings on the Pegasus roundabout intersection approaches.

80. My view is that if the Woodend Bypass project were cancelled or deferred, there are a range of interim improvements that could be delivered to meet the future demands through the current roundabout, and these are matters that would require action irrespective of the rezoning sought through the DEXIN submission.

81. To understand the likely remaining capacity of the roundabout, I have modelled the intersection based on the traffic surveys completed by Team Traffic on Thursday 22nd and Saturday 24th February 2024. As with the access modelling, the following future development assumptions apply:

(a) The full development of Pegasus Mākete as sought under the rezoning submission;

(b) The development of the majority of the Pegasus Resort (excluding the Hotel in Activity Area 1 and spa village in Activity Area 2 for consistency with the access modelling); and

(c) As a sensitivity test, background growth of 10% and 20% additional traffic corresponding to up to five and ten years of growth at 2% per annum[12] has been added.

82. I have modelled the weekday evening peak and the weekend peak hours. These correspond to Thursday 4:30pm-5:30pm and Saturday 11:30am-12:30pm which were the peak times in the February 2024 surveys. The modelling results are shown for the overall roundabout performance in **Table Four** below (with full results in Annexure B).

83. The key metrics presented are the average seconds delay for right turners and the Level of Service which as discussed above is a traffic engineering classification demonstrating the extent to which the transport system may be operating at capacity.

Table Four SH1 / Pegasus Boulevard / Bob Robertson roundabout performance

**excluding the hotel in Activity Area 1 and the spa village in Activity Area 2*

Period	Mākete		Mākete + Pegasus Resort*		Mākete + Pegasus Resort* + 10%		Mākete + Pegasus Resort* + 20%	
	Delay (sec)	LoS	Delay (sec)	Delay (sec)	LoS	Delay (sec)	Delay (sec)	LoS
Weekday Peak	14	B	22	C	53	E	90	F
Weekend Peak	10	A	12	B	14	B	20	C

84. The modelling demonstrates that there is sufficient capacity in the weekend peak period, however the existing roundabout is expected to fail in 5-10 years (LoS E in five years deteriorating to LoS F in ten years) which is the timeframe for the completion of the Woodend Bypass. This result includes the full

[12] The 2% growth rate has been calibrated from NZTA count station 01S00313 to the north of the Pegasus roundabout which grew from 10,458 in 2012 to 13,060 vehicles in 2022, geometric growth 260 vehicles per annum or 260/13,060 = 2% projecting forward.

development of Pegasus Mākete and the majority of the Pegasus Resort (with the assumptions in Table 4 above).

85. The incremental traffic from the Pegasus Mākete rezoning proposal through the roundabout is 2-3 vehicles every minute in peak hour. The addition of this traffic is equivalent to 5.8% and 8.0% of current traffic levels through the roundabout in the weekday and weekend peaks respectively, so is in relative terms a small amount. The Mākete traffic (in the unlikely event that the Woodend Bypass is not delivered within the next 5-10 years) will not in isolation be the catalyst for upgrading the roundabout, and there are a range if interim upgrade options which are available for consideration.

86. These are matters that can be assessed in more detail as part of an ITA for future resource consent applications. I consider that is the appropriate time to undertake these assessments as there will be more information available with respect to the final form of design and timing of delivery of the Woodend Bypass and any other infrastructure improvements (including interim improvements) along the SH1 corridor. I have recommended additions to SPZ(PR)-MCD3 – Transport to include specific reference to the need for an ITA to be required in relation to the Mākete access and development of Activity Area 8.

CONCLUSION

87. I have provided input into, and reviewed the changes proposed to, the Outline Development Plan and Masterplan following engagement with NZTA and Council, updates on the status of the Woodend Bypass, and changes in activity definitions. I can confirm that I support these changes.

88. There remains some uncertainty in the future receiving environment with respect to the form and year of opening of the Woodend Bypass, the potential use of the Gladstone Road link to provide a second road link to Pegasus Town, and the potential traffic generation of new development including the Pegasus Mākete.

89. Therefore, I have recommended that the SPZ(PR) chapter matters of discretion be updated to include a reference in SPZ(PR)-MCD3 – Transport to requiring an ITA that models the impacts on the Pegasus Boulevard site access and SH1 / Pegasus Boulevard roundabout (or any future replacement

intersection) from the development of Activity Area 8. I can confirm this has been included in the revised SPZ(PR) chapter appended to Ms Pearson's evidence.

90. I have read the transportation comments prepared by Mr Binder in the s42A report and consider that these are satisfactorily addressed through the changes in access for all modes of transport as shown in the updated ODP and Masterplan, and the amendment of the aforementioned transportation matter of discretion.

91. I consider that the transportation effects of the rezoning submission are therefore satisfactorily managed or mitigated, and the rezoning sought can be supported from a transportation perspective.

Dave Smith
17 May 2024

ANNEXURE A

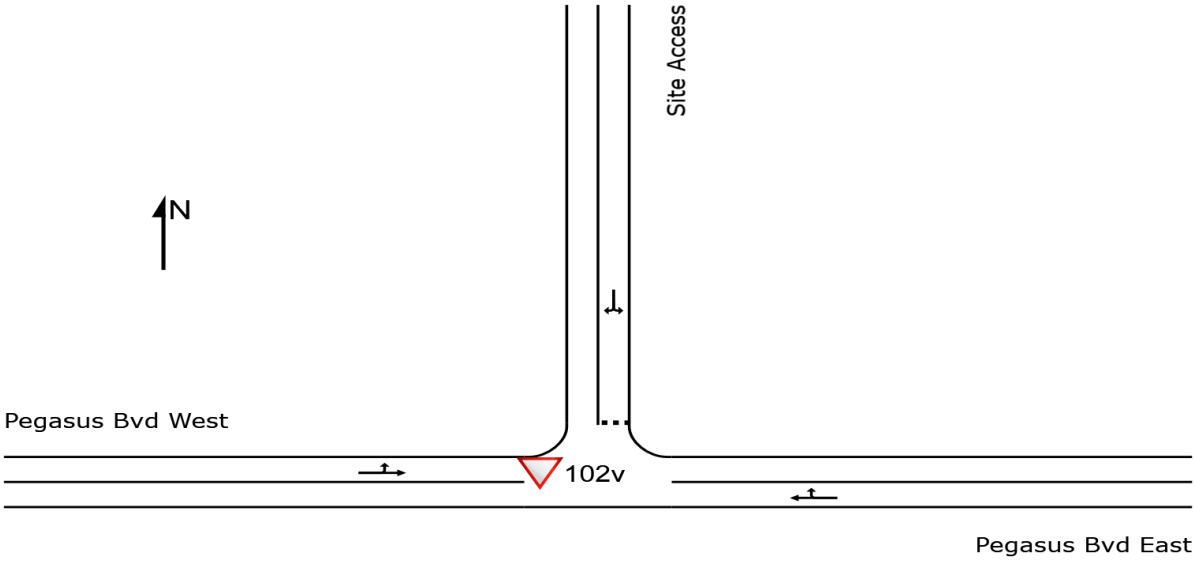
PEGASUS BOULEVARD ACCESS MODELLING OUTPUTS

SITE LAYOUT

Site: 102v [Makete Access Weekday veh crossing (Site Folder: April 2024 Update Peg Boul only)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



MOVEMENT SUMMARY

Site: 102v [Makete Access Weekday veh crossing (Site Folder: April 2024 Update Peg Boul only)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Pegasus Bvd East															
5	T1	All MCs	312	2.0	312	2.0	0.170	0.0	LOS A	0.1	0.7	0.04	0.05	0.04	69.3
6	R2	All MCs	6	2.0	6	2.0	0.170	19.1	LOS C	0.1	0.7	0.04	0.05	0.04	64.2
Approach			318	2.0	318	2.0	0.170	0.4	NA	0.1	0.7	0.04	0.05	0.04	69.1
North: Site Access															
7	L2	All MCs	6	2.0	6	2.0	0.140	8.8	LOS A	0.4	3.2	0.74	0.88	0.74	40.9
9	R2	All MCs	40	2.0	40	2.0	0.140	15.1	LOS C	0.4	3.2	0.74	0.88	0.74	37.5
Approach			46	2.0	46	2.0	0.140	14.3	LOS B	0.4	3.2	0.74	0.88	0.74	38.1
West: Pegasus Bvd West															
10	L2	All MCs	176	2.0	176	2.0	0.385	6.4	LOS A	0.0	0.0	0.00	0.15	0.00	60.3
11	T1	All MCs	557	2.0	557	2.0	0.385	0.0	LOS A	0.0	0.0	0.00	0.15	0.00	66.9
Approach			733	2.0	733	2.0	0.385	1.6	NA	0.0	0.0	0.00	0.15	0.00	65.2
All Vehicles			1097	2.0	1097	2.0	0.385	1.8	NA	0.4	3.2	0.04	0.15	0.04	64.2

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 102v [Makete Access Weekday veh crossing +resort (Site Folder: April 2024 Update Peg Boul only)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Pegasus Bvd East															
5	T1	All MCs	454	2.0	454	2.0	0.246	0.0	LOS A	0.1	0.9	0.03	0.04	0.03	69.3
6	R2	All MCs	6	2.0	6	2.0	0.246	27.7	LOS D	0.1	0.9	0.03	0.04	0.03	64.2
Approach			460	2.0	460	2.0	0.246	0.4	NA	0.1	0.9	0.03	0.04	0.03	69.2
North: Site Access															
7	L2	All MCs	6	2.0	6	2.0	0.246	12.4	LOS B	0.8	5.5	0.87	0.97	0.96	36.6
9	R2	All MCs	40	2.0	40	2.0	0.246	26.6	LOS D	0.8	5.5	0.87	0.97	0.96	32.4
Approach			46	2.0	46	2.0	0.246	24.8	LOS C	0.8	5.5	0.87	0.97	0.96	33.1
West: Pegasus Bvd West															
10	L2	All MCs	176	2.0	176	2.0	0.460	6.4	LOS A	0.0	0.0	0.00	0.13	0.00	60.6
11	T1	All MCs	700	2.0	700	2.0	0.460	0.1	LOS A	0.0	0.0	0.00	0.13	0.00	67.2
Approach			876	2.0	876	2.0	0.460	1.3	NA	0.0	0.0	0.00	0.13	0.00	65.8
All Vehicles			1382	2.0	1382	2.0	0.460	1.8	NA	0.8	5.5	0.04	0.13	0.04	64.6

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 102v [Makete Access Weekday veh crossing +resort +20PC (Site Folder: April 2024 Update Peg Boul only)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Pegasus Bvd East															
5	T1	All MCs	517	2.0	517	2.0	0.282	0.0	LOS A	0.2	1.2	0.04	0.04	0.04	69.1
6	R2	All MCs	6	2.0	6	2.0	0.282	38.6	LOS E	0.2	1.2	0.04	0.04	0.04	64.1
Approach			523	2.0	523	2.0	0.282	0.4	NA	0.2	1.2	0.04	0.04	0.04	69.0
North: Site Access															
7	L2	All MCs	6	2.0	6	2.0	0.379	19.1	LOS C	1.2	8.2	0.93	1.02	1.11	31.8
9	R2	All MCs	40	2.0	40	2.0	0.379	42.7	LOS E	1.2	8.2	0.93	1.02	1.11	27.2
Approach			46	2.0	46	2.0	0.379	39.6	LOS E	1.2	8.2	0.93	1.02	1.11	27.9
West: Pegasus Bvd West															
10	L2	All MCs	176	2.0	176	2.0	0.517	6.4	LOS A	0.0	0.0	0.00	0.11	0.00	60.8
11	T1	All MCs	811	2.0	811	2.0	0.517	0.1	LOS A	0.0	0.0	0.00	0.11	0.00	67.4
Approach			987	2.0	987	2.0	0.517	1.2	NA	0.0	0.0	0.00	0.11	0.00	66.1
All Vehicles			1556	2.0	1556	2.0	0.517	2.1	NA	1.2	8.2	0.04	0.12	0.04	64.3

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 102v [Makete Access Weekend veh crossing (Site Folder: April 2024 Update Peg Boul only)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Pegasus Bvd East															
5	T1	All MCs	321	2.0	321	2.0	0.171	0.0	LOS A	0.0	0.3	0.02	0.02	0.02	69.7
6	R2	All MCs	4	2.0	4	2.0	0.171	9.8	LOS A	0.0	0.3	0.02	0.02	0.02	64.5
Approach			325	2.0	325	2.0	0.171	0.1	NA	0.0	0.3	0.02	0.02	0.02	69.6
North: Site Access															
7	L2	All MCs	17	2.0	17	2.0	0.261	7.2	LOS A	1.0	7.3	0.63	0.86	0.71	42.5
9	R2	All MCs	113	2.0	113	2.0	0.261	11.5	LOS B	1.0	7.3	0.63	0.86	0.71	39.5
Approach			130	2.0	130	2.0	0.261	11.0	LOS B	1.0	7.3	0.63	0.86	0.71	40.0
West: Pegasus Bvd West															
10	L2	All MCs	126	2.0	126	2.0	0.250	6.4	LOS A	0.0	0.0	0.00	0.17	0.00	60.2
11	T1	All MCs	349	2.0	349	2.0	0.250	0.0	LOS A	0.0	0.0	0.00	0.17	0.00	66.7
Approach			475	2.0	475	2.0	0.250	1.7	NA	0.0	0.0	0.00	0.17	0.00	64.8
All Vehicles			930	2.0	930	2.0	0.261	2.5	NA	1.0	7.3	0.09	0.21	0.10	60.7

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 102v [Makete Access Weekend veh crossing +resort (Site Folder: April 2024 Update Peg Boul only)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Pegasus Bvd East															
5	T1	All MCs	482	2.0	482	2.0	0.255	0.0	LOS A	0.1	0.4	0.01	0.02	0.01	69.8
6	R2	All MCs	4	2.0	4	2.0	0.255	12.3	LOS B	0.1	0.4	0.01	0.02	0.01	64.5
Approach			486	2.0	486	2.0	0.255	0.1	NA	0.1	0.4	0.01	0.02	0.01	69.7
North: Site Access															
7	L2	All MCs	17	2.0	17	2.0	0.441	11.4	LOS B	1.8	12.9	0.83	1.03	1.15	38.5
9	R2	All MCs	113	2.0	113	2.0	0.441	21.2	LOS C	1.8	12.9	0.83	1.03	1.15	34.6
Approach			130	2.0	130	2.0	0.441	19.9	LOS C	1.8	12.9	0.83	1.03	1.15	35.3
West: Pegasus Bvd West															
10	L2	All MCs	126	2.0	126	2.0	0.334	6.4	LOS A	0.0	0.0	0.00	0.12	0.00	60.8
11	T1	All MCs	510	2.0	510	2.0	0.334	0.0	LOS A	0.0	0.0	0.00	0.12	0.00	67.4
Approach			636	2.0	636	2.0	0.334	1.3	NA	0.0	0.0	0.00	0.12	0.00	66.0
All Vehicles			1252	2.0	1252	2.0	0.441	2.8	NA	1.8	12.9	0.09	0.18	0.13	61.4

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 102v [Makete Access Weekend veh crossing+resort +20PC (Site Folder: April 2024 Update Peg Boul only)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Pegasus Bvd East															
5	T1	All MCs	546	2.0	546	2.0	0.289	0.0	LOS A	0.1	0.5	0.01	0.02	0.01	69.8
6	R2	All MCs	4	2.0	4	2.0	0.289	14.1	LOS B	0.1	0.5	0.01	0.02	0.01	64.5
Approach			550	2.0	550	2.0	0.289	0.1	NA	0.1	0.5	0.01	0.02	0.01	69.7
North: Site Access															
7	L2	All MCs	17	2.0	17	2.0	0.569	15.9	LOS C	2.4	17.0	0.90	1.10	1.40	35.5
9	R2	All MCs	113	2.0	113	2.0	0.569	29.5	LOS D	2.4	17.0	0.90	1.10	1.40	31.2
Approach			130	2.0	130	2.0	0.569	27.8	LOS D	2.4	17.0	0.90	1.10	1.40	31.9
West: Pegasus Bvd West															
10	L2	All MCs	126	2.0	126	2.0	0.370	6.4	LOS A	0.0	0.0	0.00	0.11	0.00	60.9
11	T1	All MCs	580	2.0	580	2.0	0.370	0.0	LOS A	0.0	0.0	0.00	0.11	0.00	67.6
Approach			706	2.0	706	2.0	0.370	1.2	NA	0.0	0.0	0.00	0.11	0.00	66.3
All Vehicles			1386	2.0	1386	2.0	0.569	3.2	NA	2.4	17.0	0.09	0.17	0.14	61.0

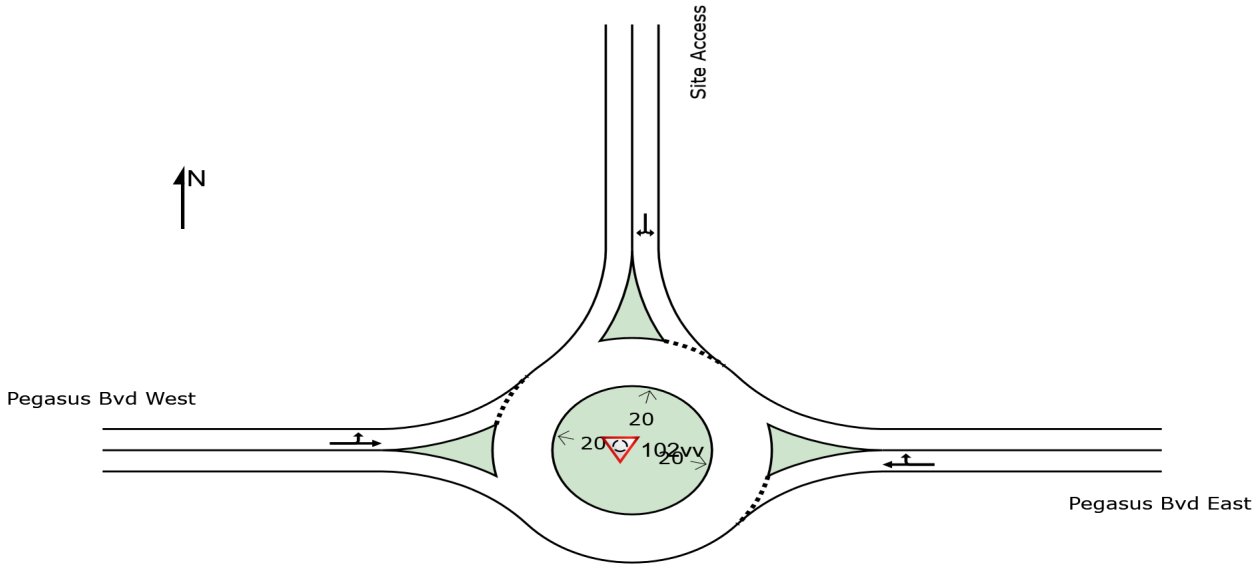
Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

SITE LAYOUT

Site: 102vv [Makete Access Weekday roundabout (Site Folder: April 2024 Update Ped Boul roundabout)]

New Site
Site Category: (None)
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



MOVEMENT SUMMARY

Site: 102vv [Makete Access Weekday roundabout (Site Folder: April 2024 Update Ped Boul roundabout)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Pegasus Bvd East															
5	T1	All MCs	312	2.0	312	2.0	0.219	5.4	LOS A	1.6	11.6	0.21	0.44	0.21	56.7
6	R2	All MCs	6	2.0	6	2.0	0.219	10.1	LOS B	1.6	11.6	0.21	0.44	0.21	58.6
Approach			318	2.0	318	2.0	0.219	5.5	LOS A	1.6	11.6	0.21	0.44	0.21	56.7
North: Site Access															
7	L2	All MCs	6	2.0	6	2.0	0.055	6.4	LOS A	0.3	2.2	0.63	0.68	0.63	43.5
9	R2	All MCs	40	2.0	40	2.0	0.055	10.8	LOS B	0.3	2.2	0.63	0.68	0.63	40.6
Approach			46	2.0	46	2.0	0.055	10.3	LOS B	0.3	2.2	0.63	0.68	0.63	41.1
West: Pegasus Bvd West															
10	L2	All MCs	176	2.0	176	2.0	0.433	4.8	LOS A	3.8	26.9	0.08	0.46	0.08	56.8
11	T1	All MCs	557	2.0	557	2.0	0.433	5.2	LOS A	3.8	26.9	0.08	0.46	0.08	57.4
Approach			733	2.0	733	2.0	0.433	5.1	LOS A	3.8	26.9	0.08	0.46	0.08	57.3
All Vehicles			1097	2.0	1097	2.0	0.433	5.4	LOS A	3.8	26.9	0.14	0.46	0.14	56.1

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 102vv [Makete Access Weekday roundabout +resort (Site Folder: April 2024 Update Ped Boul roundabout)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Pegasus Bvd East															
5	T1	All MCs	454	2.0	454	2.0	0.310	5.4	LOS A	2.6	18.5	0.24	0.43	0.24	56.5
6	R2	All MCs	6	2.0	6	2.0	0.310	10.1	LOS B	2.6	18.5	0.24	0.43	0.24	58.5
Approach			460	2.0	460	2.0	0.310	5.5	LOS A	2.6	18.5	0.24	0.43	0.24	56.6
North: Site Access															
7	L2	All MCs	6	2.0	6	2.0	0.062	7.7	LOS A	0.4	2.6	0.70	0.72	0.70	42.8
9	R2	All MCs	40	2.0	40	2.0	0.062	12.2	LOS B	0.4	2.6	0.70	0.72	0.70	39.8
Approach			46	2.0	46	2.0	0.062	11.6	LOS B	0.4	2.6	0.70	0.72	0.70	40.3
West: Pegasus Bvd West															
10	L2	All MCs	176	2.0	176	2.0	0.516	4.8	LOS A	5.1	36.6	0.09	0.45	0.09	56.7
11	T1	All MCs	700	2.0	700	2.0	0.516	5.2	LOS A	5.1	36.6	0.09	0.45	0.09	57.3
Approach			876	2.0	876	2.0	0.516	5.1	LOS A	5.1	36.6	0.09	0.45	0.09	57.2
All Vehicles			1382	2.0	1382	2.0	0.516	5.5	LOS A	5.1	36.6	0.16	0.46	0.16	56.2

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 102vv [Makete Access Weekday roundabout +resort +20PC (Site Folder: April 2024 Update Ped Boul roundabout)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Pegasus Bvd East															
5	T1	All MCs	517	2.0	517	2.0	0.351	5.5	LOS A	3.1	22.3	0.25	0.43	0.25	56.4
6	R2	All MCs	6	2.0	6	2.0	0.351	10.2	LOS B	3.1	22.3	0.25	0.43	0.25	58.5
Approach			523	2.0	523	2.0	0.351	5.5	LOS A	3.1	22.3	0.25	0.43	0.25	56.5
North: Site Access															
7	L2	All MCs	6	2.0	6	2.0	0.069	9.0	LOS A	0.4	3.0	0.75	0.74	0.75	42.2
9	R2	All MCs	40	2.0	40	2.0	0.069	13.5	LOS B	0.4	3.0	0.75	0.74	0.75	39.0
Approach			46	2.0	46	2.0	0.069	12.9	LOS B	0.4	3.0	0.75	0.74	0.75	39.5
West: Pegasus Bvd West															
10	L2	All MCs	176	2.0	176	2.0	0.581	4.8	LOS A	6.6	47.0	0.10	0.45	0.10	56.6
11	T1	All MCs	811	2.0	811	2.0	0.581	5.2	LOS A	6.6	47.0	0.10	0.45	0.10	57.2
Approach			987	2.0	987	2.0	0.581	5.1	LOS A	6.6	47.0	0.10	0.45	0.10	57.1
All Vehicles			1556	2.0	1556	2.0	0.581	5.5	LOS A	6.6	47.0	0.17	0.45	0.17	56.1

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 102vv [Makete Access Weekend roundabout (Site Folder: April 2024 Update Ped Boul roundabout)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Pegasus Bvd East															
5	T1	All MCs	321	2.0	321	2.0	0.255	6.0	LOS A	1.8	13.1	0.38	0.47	0.38	55.5
6	R2	All MCs	4	2.0	4	2.0	0.255	10.6	LOS B	1.8	13.1	0.38	0.47	0.38	57.8
Approach			325	2.0	325	2.0	0.255	6.0	LOS A	1.8	13.1	0.38	0.47	0.38	55.6
North: Site Access															
7	L2	All MCs	17	2.0	17	2.0	0.131	5.0	LOS A	0.7	5.3	0.53	0.63	0.53	44.2
9	R2	All MCs	113	2.0	113	2.0	0.131	9.5	LOS A	0.7	5.3	0.53	0.63	0.53	41.4
Approach			130	2.0	130	2.0	0.131	8.9	LOS A	0.7	5.3	0.53	0.63	0.53	41.9
West: Pegasus Bvd West															
10	L2	All MCs	126	2.0	126	2.0	0.280	4.8	LOS A	2.1	15.1	0.05	0.47	0.05	56.9
11	T1	All MCs	349	2.0	349	2.0	0.280	5.2	LOS A	2.1	15.1	0.05	0.47	0.05	57.6
Approach			475	2.0	475	2.0	0.280	5.1	LOS A	2.1	15.1	0.05	0.47	0.05	57.4
All Vehicles			930	2.0	930	2.0	0.280	5.9	LOS A	2.1	15.1	0.23	0.49	0.23	53.8

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 102vv [Makete Access Weekend roundabout +resort (Site Folder: April 2024 Update Ped Boul roundabout)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Pegasus Bvd East															
5	T1	All MCs	482	2.0	482	2.0	0.376	6.0	LOS A	3.1	22.4	0.43	0.47	0.43	55.2
6	R2	All MCs	4	2.0	4	2.0	0.376	10.7	LOS B	3.1	22.4	0.43	0.47	0.43	57.5
Approach			486	2.0	486	2.0	0.376	6.1	LOS A	3.1	22.4	0.43	0.47	0.43	55.2
North: Site Access															
7	L2	All MCs	17	2.0	17	2.0	0.150	6.3	LOS A	0.9	6.2	0.63	0.68	0.63	43.5
9	R2	All MCs	113	2.0	113	2.0	0.150	10.8	LOS B	0.9	6.2	0.63	0.68	0.63	40.6
Approach			130	2.0	130	2.0	0.150	10.2	LOS B	0.9	6.2	0.63	0.68	0.63	41.1
West: Pegasus Bvd West															
10	L2	All MCs	126	2.0	126	2.0	0.374	4.8	LOS A	3.3	23.3	0.06	0.46	0.06	56.9
11	T1	All MCs	510	2.0	510	2.0	0.374	5.2	LOS A	3.3	23.3	0.06	0.46	0.06	57.5
Approach			636	2.0	636	2.0	0.374	5.1	LOS A	3.3	23.3	0.06	0.46	0.06	57.4
All Vehicles			1252	2.0	1252	2.0	0.376	6.0	LOS A	3.3	23.3	0.26	0.49	0.26	54.2

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 102vv [Makete Access Weekend roundabout +resort +20PC (Site Folder: April 2024 Update Ped Boul roundabout)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Pegasus Bvd East															
5	T1	All MCs	546	2.0	546	2.0	0.423	6.1	LOS A	3.8	26.8	0.46	0.47	0.46	55.0
6	R2	All MCs	4	2.0	4	2.0	0.423	10.8	LOS B	3.8	26.8	0.46	0.47	0.46	57.4
Approach			550	2.0	550	2.0	0.423	6.1	LOS A	3.8	26.8	0.46	0.47	0.46	55.0
North: Site Access															
7	L2	All MCs	17	2.0	17	2.0	0.159	6.9	LOS A	0.9	6.7	0.67	0.70	0.67	43.2
9	R2	All MCs	113	2.0	113	2.0	0.159	11.4	LOS B	0.9	6.7	0.67	0.70	0.67	40.3
Approach			130	2.0	130	2.0	0.159	10.8	LOS B	0.9	6.7	0.67	0.70	0.67	40.8
West: Pegasus Bvd West															
10	L2	All MCs	126	2.0	126	2.0	0.414	4.8	LOS A	3.9	27.5	0.06	0.46	0.06	56.8
11	T1	All MCs	580	2.0	580	2.0	0.414	5.2	LOS A	3.9	27.5	0.06	0.46	0.06	57.5
Approach			706	2.0	706	2.0	0.414	5.1	LOS A	3.9	27.5	0.06	0.46	0.06	57.4
All Vehicles			1386	2.0	1386	2.0	0.423	6.1	LOS A	3.9	27.5	0.28	0.49	0.28	54.2

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

ANNEXURE B

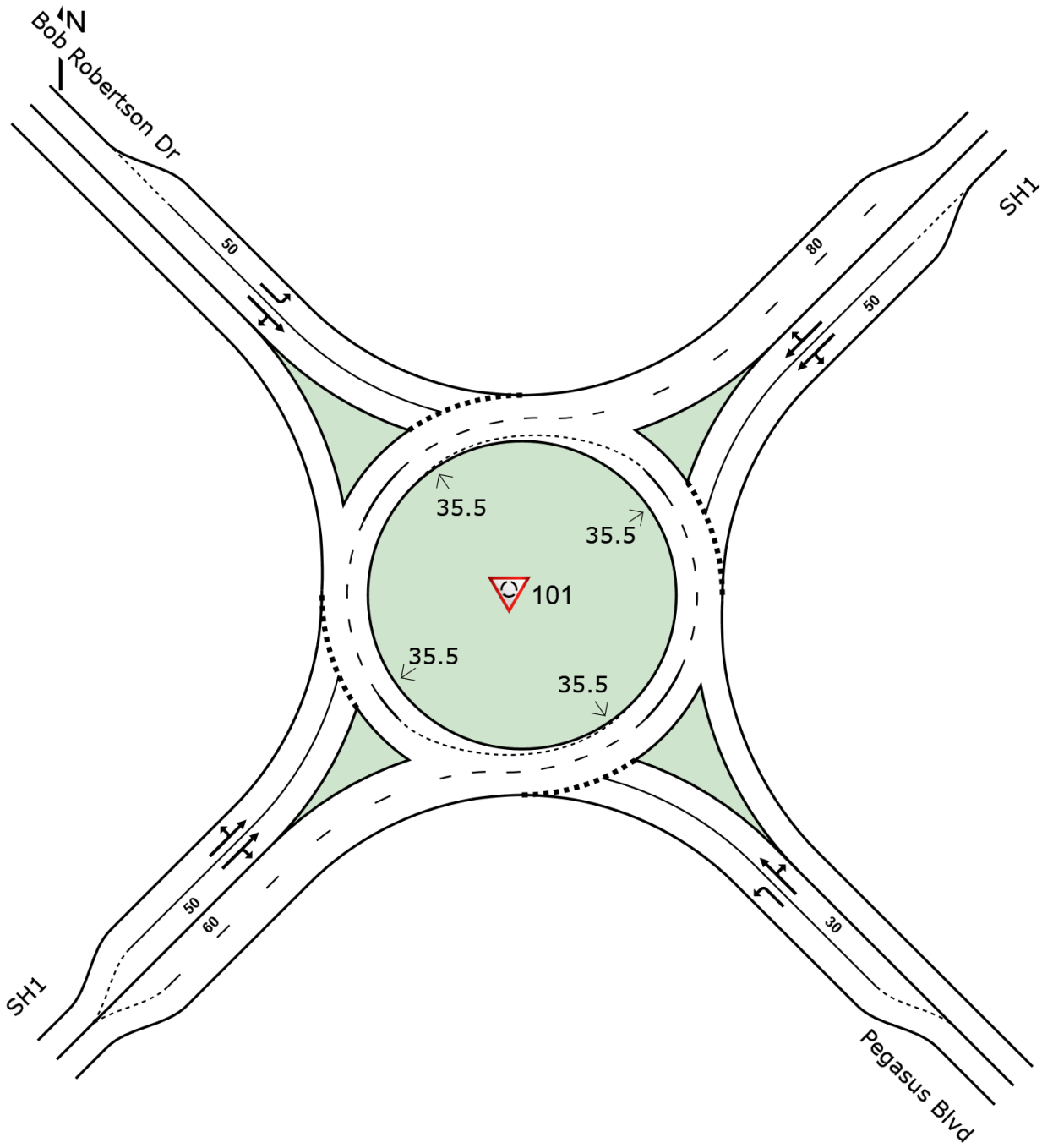
SH1 PEGASUS BOULEVARD ROUNDABOUT MODELLING OUTPUTS

SITE LAYOUT

Site: 101 [SH1 / Pegasus Blvd Rbt Weekday 2024 + Makete (Site Folder: March 24 Update)]

SH1 / Pegasus Blvd Rbt
Site Category: Existing
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



MOVEMENT SUMMARY

Site: 101 [SH1 / Pegasus Blvd Rbt Weekday Existing 2024 (Site Folder: March 24 Update)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

SH1 / Pegasus Blvd Rbt
Site Category: Existing
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
SouthEast: Pegasus Blvd															
21	L2	All MCs	121	5.0	121	5.0	0.200	8.5	LOS A	1.0	7.4	0.73	0.77	0.73	58.3
22	T1	All MCs	166	0.0	166	0.0	0.232	6.7	LOS A	1.3	9.2	0.73	0.68	0.73	51.3
23	R2	All MCs	25	4.2	25	4.2	0.232	13.7	LOS B	1.3	9.2	0.73	0.68	0.73	56.3
Approach			312	2.3	312	2.3	0.232	8.0	LOS A	1.3	9.2	0.73	0.71	0.73	54.2
NorthEast: SH1															
24	L2	All MCs	29	3.4	29	3.4	0.694	16.5	LOS B	8.3	65.5	1.00	0.98	1.46	51.7
25	T1	All MCs	535	16.1	535	16.1	0.694	16.3	LOS B	8.3	65.5	0.97	0.95	1.36	52.3
26	R2	All MCs	72	8.3	72	8.3	0.343	18.3	LOS B	2.1	16.3	0.84	0.80	0.84	47.1
Approach			636	14.6	636	14.6	0.694	16.5	LOS B	8.3	65.5	0.96	0.94	1.30	51.6
NorthWest: Bob Robertson Dr															
27	L2	All MCs	168	5.4	168	5.4	0.334	8.9	LOS A	1.9	13.7	0.80	0.77	0.81	49.5
28	T1	All MCs	261	2.7	261	2.7	0.617	9.3	LOS A	5.8	42.0	0.92	0.93	1.21	48.1
29	R2	All MCs	202	7.4	202	7.4	0.617	16.1	LOS B	5.8	42.0	0.92	0.93	1.21	46.0
Approach			631	4.9	631	4.9	0.617	11.4	LOS B	5.8	42.0	0.88	0.89	1.10	47.8
SouthWest: SH1															
30	L2	All MCs	247	4.5	247	4.5	0.357	6.5	LOS A	2.3	17.1	0.58	0.57	0.58	52.2
31	T1	All MCs	502	9.8	502	9.8	0.603	6.3	LOS A	5.5	40.4	0.67	0.61	0.68	58.0
32	R2	All MCs	295	2.1	295	2.1	0.603	12.7	LOS B	5.5	40.4	0.69	0.61	0.69	56.0
Approach			1044	6.4	1044	6.4	0.603	8.2	LOS A	5.5	40.4	0.66	0.60	0.66	56.0
All Vehicles			2623	7.5	2623	7.5	0.694	10.9	LOS B	8.3	65.5	0.79	0.76	0.93	52.5

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 101 [SH1 / Pegasus Blvd Rbt Weekday 2024 + Makete + Resort (Site Folder: March 24 Update)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

SH1 / Pegasus Blvd Rbt
Site Category: Existing
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
SouthEast: Pegasus Blvd															
21	L2	All MCs	226	5.0	226	5.0	0.351	8.6	LOS A	1.9	14.1	0.77	0.79	0.78	58.2
22	T1	All MCs	195	0.0	195	0.0	0.323	6.8	LOS A	1.9	13.3	0.75	0.71	0.75	50.9
23	R2	All MCs	73	4.2	73	4.2	0.323	13.8	LOS B	1.9	13.3	0.75	0.71	0.75	55.7
Approach			494	2.9	494	2.9	0.351	8.6	LOS A	1.9	14.1	0.76	0.74	0.77	54.7
NorthEast: SH1															
24	L2	All MCs	108	3.4	108	3.4	0.960	63.5	LOS E	25.9	202.0	1.00	1.83	3.40	31.3
25	T1	All MCs	513	16.1	513	16.1	0.960	55.8	LOS E	25.9	202.0	0.99	1.66	2.97	33.7
26	R2	All MCs	72	8.3	72	8.3	0.474	26.0	LOS C	3.5	26.8	0.94	0.94	1.17	43.0
Approach			693	13.3	693	13.3	0.960	53.9	LOS E	25.9	202.0	0.98	1.61	2.85	34.1
NorthWest: Bob Robertson Dr															
27	L2	All MCs	161	5.4	161	5.4	0.402	12.1	LOS B	2.5	18.0	0.87	0.88	0.99	47.5
28	T1	All MCs	308	2.7	308	2.7	0.804	18.9	LOS B	10.4	75.4	1.00	1.24	1.79	43.0
29	R2	All MCs	195	7.4	195	7.4	0.804	26.0	LOS C	10.4	75.4	1.00	1.24	1.79	41.3
Approach			664	4.7	664	4.7	0.804	19.3	LOS B	10.4	75.4	0.97	1.16	1.59	43.5
SouthWest: SH1															
30	L2	All MCs	247	4.5	247	4.5	0.432	7.4	LOS A	3.0	21.8	0.68	0.63	0.68	51.8
31	T1	All MCs	454	9.8	454	9.8	0.729	8.9	LOS A	9.6	70.0	0.82	0.73	0.95	56.1
32	R2	All MCs	468	2.1	468	2.1	0.729	15.7	LOS B	9.6	70.0	0.87	0.76	1.03	53.8
Approach			1169	5.6	1169	5.6	0.729	11.3	LOS B	9.6	70.0	0.81	0.72	0.92	54.2
All Vehicles			3020	6.7	3020	6.7	0.960	22.4	LOS C	25.9	202.0	0.88	1.02	1.49	45.6

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 101 [SH1 / Pegasus Blvd Rbt Weekday 2024 + Makete + Resort + 10pc (Site Folder: March 24 Update)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

SH1 / Pegasus Blvd Rbt
Site Category: Existing
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
SouthEast: Pegasus Blvd															
21	L2	All MCs	238	5.0	238	5.0	0.378	8.9	LOS A	2.1	15.4	0.78	0.81	0.82	57.9
22	T1	All MCs	211	0.0	211	0.0	0.350	6.8	LOS A	2.0	14.3	0.76	0.71	0.76	50.8
23	R2	All MCs	75	4.2	75	4.2	0.350	13.9	LOS B	2.0	14.3	0.76	0.71	0.76	55.7
Approach			524	2.9	524	2.9	0.378	8.8	LOS A	2.1	15.4	0.77	0.75	0.79	54.5
NorthEast: SH1															
24	L2	All MCs	110	3.4	110	3.4	1.165	194.1	LOS F	68.5	535.9	1.00	3.29	7.52	14.9
25	T1	All MCs	567	16.1	567	16.1	1.165	162.9	LOS F	68.5	535.9	1.00	2.86	6.35	17.2
26	R2	All MCs	79	8.3	79	8.3	0.575	32.9	LOS C	4.7	36.6	0.98	1.02	1.40	39.9
Approach			756	13.4	756	13.4	1.165	153.9	LOS F	68.5	535.9	1.00	2.73	6.00	17.9
NorthWest: Bob Robertson Dr															
27	L2	All MCs	178	5.4	178	5.4	0.497	15.3	LOS B	3.4	24.5	0.92	0.96	1.15	45.6
28	T1	All MCs	334	2.7	334	2.7	0.989	58.5	LOS E	26.1	189.8	1.00	2.13	3.63	29.7
29	R2	All MCs	216	7.4	216	7.4	0.989	65.7	LOS E	26.1	189.8	1.00	2.13	3.63	28.9
Approach			728	4.8	728	4.8	0.989	50.1	LOS E	26.1	189.8	0.98	1.85	3.03	32.1
SouthWest: SH1															
30	L2	All MCs	272	4.5	272	4.5	0.481	8.0	LOS A	3.5	25.9	0.72	0.66	0.75	51.4
31	T1	All MCs	504	9.8	504	9.8	0.813	11.2	LOS B	13.6	100.0	0.92	0.82	1.17	54.4
32	R2	All MCs	497	2.1	497	2.1	0.813	18.4	LOS B	13.6	100.0	0.97	0.87	1.29	51.9
Approach			1273	5.7	1273	5.7	0.813	13.3	LOS B	13.6	100.0	0.90	0.80	1.13	52.8
All Vehicles			3281	6.8	3281	6.8	1.165	53.1	LOS E	68.5	535.9	0.92	1.47	2.62	33.3

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 101 [SH1 / Pegasus Blvd Rbt Weekday 2024 + Makete + Resort +20pc (Site Folder: March 24 Update)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

SH1 / Pegasus Blvd Rbt
Site Category: Existing
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
SouthEast: Pegasus Blvd															
21	L2	All MCs	250	5.0	250	5.0	0.400	9.2	LOS A	2.3	16.9	0.79	0.82	0.86	57.7
22	T1	All MCs	228	0.0	228	0.0	0.376	7.0	LOS A	2.3	16.0	0.77	0.73	0.79	50.8
23	R2	All MCs	78	4.2	78	4.2	0.376	14.1	LOS B	2.3	16.0	0.77	0.73	0.79	55.6
Approach			556	2.8	556	2.8	0.400	9.0	LOS A	2.3	16.9	0.78	0.77	0.82	54.3
NorthEast: SH1															
24	L2	All MCs	113	3.4	113	3.4	1.233	246.5	LOS F	88.7	693.9	1.00	3.90	9.23	12.4
25	T1	All MCs	620	16.1	620	16.1	1.233	206.0	LOS F	88.7	693.9	1.00	3.36	7.77	14.4
26	R2	All MCs	86	8.3	86	8.3	0.609	33.5	LOS C	5.1	39.8	0.99	1.04	1.46	39.6
Approach			819	13.5	819	13.5	1.233	193.5	LOS F	88.7	693.9	1.00	3.19	7.31	15.0
NorthWest: Bob Robertson Dr															
27	L2	All MCs	195	5.4	195	5.4	0.607	20.5	LOS C	4.5	32.9	0.96	1.05	1.34	42.8
28	T1	All MCs	360	2.7	360	2.7	1.199	206.7	LOS F	75.4	548.7	1.00	4.32	8.77	13.8
29	R2	All MCs	236	7.4	236	7.4	1.199	213.9	LOS F	75.4	548.7	1.00	4.32	8.77	13.6
Approach			791	4.8	791	4.8	1.199	162.9	LOS F	75.4	548.7	0.99	3.52	6.94	16.4
SouthWest: SH1															
30	L2	All MCs	296	4.5	296	4.5	0.535	9.1	LOS A	4.4	32.1	0.77	0.71	0.85	50.8
31	T1	All MCs	554	9.8	554	9.8	0.904	16.5	LOS B	21.7	159.3	0.95	1.05	1.52	50.6
32	R2	All MCs	527	2.1	527	2.1	0.904	24.8	LOS C	21.7	159.3	1.00	1.14	1.70	47.8
Approach			1377	5.7	1377	5.7	0.904	18.1	LOS B	21.7	159.3	0.93	1.01	1.45	49.6
All Vehicles			3543	6.9	3543	6.9	1.233	89.5	LOS F	88.7	693.9	0.94	2.04	3.93	25.2

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 101 [SH1 / Pegasus Blvd Rbt Saturday Existing 2024 (Site Folder: March 24 Update)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

SH1 / Pegasus Blvd Rbt
Site Category: Existing
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
SouthEast: Pegasus Blvd															
21	L2	All MCs	169	2.1	169	2.1	0.250	8.1	LOS A	1.3	9.1	0.71	0.75	0.71	58.7
22	T1	All MCs	212	1.4	212	1.4	0.288	6.8	LOS A	1.6	11.4	0.71	0.68	0.71	51.3
23	R2	All MCs	40	0.0	40	0.0	0.288	13.5	LOS B	1.6	11.4	0.71	0.68	0.71	57.3
Approach			421	1.5	421	1.5	0.288	7.9	LOS A	1.6	11.4	0.71	0.71	0.71	54.6
NorthEast: SH1															
24	L2	All MCs	35	0.0	35	0.0	0.506	8.4	LOS A	4.3	31.2	0.81	0.70	0.88	58.1
25	T1	All MCs	496	6.0	496	6.0	0.506	8.5	LOS A	4.3	31.2	0.80	0.71	0.86	58.2
26	R2	All MCs	96	2.4	96	2.4	0.250	15.1	LOS B	1.5	10.7	0.71	0.73	0.71	48.6
Approach			627	5.1	627	5.1	0.506	9.5	LOS A	4.3	31.2	0.79	0.71	0.83	56.5
NorthWest: Bob Robertson Dr															
27	L2	All MCs	132	2.4	132	2.4	0.230	7.3	LOS A	1.2	8.8	0.72	0.70	0.72	50.8
28	T1	All MCs	189	1.6	189	1.6	0.450	5.3	LOS A	3.2	22.9	0.79	0.75	0.85	50.1
29	R2	All MCs	197	3.1	197	3.1	0.450	11.8	LOS B	3.2	22.9	0.79	0.75	0.85	48.6
Approach			518	2.4	518	2.4	0.450	8.3	LOS A	3.2	22.9	0.78	0.73	0.82	49.7
SouthWest: SH1															
30	L2	All MCs	184	2.4	184	2.4	0.306	7.0	LOS A	1.9	13.7	0.61	0.60	0.61	52.1
31	T1	All MCs	488	7.2	488	7.2	0.517	6.6	LOS A	4.1	30.1	0.68	0.62	0.68	58.4
32	R2	All MCs	155	3.0	155	3.0	0.517	13.0	LOS B	4.1	30.1	0.70	0.62	0.70	56.2
Approach			827	5.3	827	5.3	0.517	7.9	LOS A	4.1	30.1	0.67	0.62	0.67	56.5
All Vehicles			2393	4.0	2393	4.0	0.517	8.4	LOS A	4.3	31.2	0.73	0.68	0.75	54.5

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 101 [SH1 / Pegasus Blvd Rbt Saturday 2024 + Makete (Site Folder: March 24 Update)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

SH1 / Pegasus Blvd Rbt
Site Category: Existing
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
SouthEast: Pegasus Blvd															
21	L2	All MCs	234	2.1	234	2.1	0.338	8.2	LOS A	1.8	13.0	0.74	0.76	0.74	58.7
22	T1	All MCs	230	1.4	230	1.4	0.343	6.8	LOS A	2.0	14.0	0.73	0.70	0.73	51.0
23	R2	All MCs	69	0.0	69	0.0	0.343	13.5	LOS B	2.0	14.0	0.73	0.70	0.73	56.9
Approach			533	1.5	533	1.5	0.343	8.3	LOS A	2.0	14.0	0.74	0.73	0.74	54.8
NorthEast: SH1															
24	L2	All MCs	64	0.0	64	0.0	0.563	10.2	LOS B	5.4	39.2	0.88	0.78	1.04	57.1
25	T1	All MCs	488	6.0	488	6.0	0.563	10.2	LOS B	5.4	39.2	0.86	0.78	1.00	57.2
26	R2	All MCs	96	2.4	96	2.4	0.278	16.0	LOS B	1.7	12.1	0.76	0.76	0.76	48.1
Approach			648	4.9	648	4.9	0.563	11.1	LOS B	5.4	39.2	0.85	0.78	0.97	55.6
NorthWest: Bob Robertson Dr															
27	L2	All MCs	130	2.4	130	2.4	0.248	7.9	LOS A	1.3	9.5	0.76	0.73	0.76	50.3
28	T1	All MCs	207	1.6	207	1.6	0.499	6.4	LOS A	3.9	27.7	0.84	0.81	0.96	49.8
29	R2	All MCs	195	3.1	195	3.1	0.499	13.0	LOS B	3.9	27.7	0.84	0.81	0.96	48.2
Approach			532	2.3	532	2.3	0.499	9.2	LOS A	3.9	27.7	0.82	0.79	0.91	49.3
SouthWest: SH1															
30	L2	All MCs	184	2.4	184	2.4	0.338	7.4	LOS A	2.1	15.6	0.66	0.63	0.66	51.8
31	T1	All MCs	470	7.2	470	7.2	0.571	7.5	LOS A	5.2	38.2	0.75	0.68	0.79	57.6
32	R2	All MCs	220	3.0	220	3.0	0.571	14.1	LOS B	5.2	38.2	0.77	0.69	0.82	55.3
Approach			874	5.1	874	5.1	0.571	9.2	LOS A	5.2	38.2	0.73	0.67	0.77	55.7
All Vehicles			2587	3.8	2587	3.8	0.571	9.5	LOS A	5.4	39.2	0.78	0.73	0.84	54.1

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 101 [SH1 / Pegasus Blvd Rbt Saturday 2024 + Makete + Resort (Site Folder: March 24 Update)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

SH1 / Pegasus Blvd Rbt
Site Category: Existing
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
SouthEast: Pegasus Blvd															
21	L2	All MCs	327	2.1	327	2.1	0.463	9.1	LOS A	3.0	21.1	0.79	0.82	0.89	57.8
22	T1	All MCs	255	1.4	255	1.4	0.421	7.2	LOS A	2.7	18.9	0.76	0.75	0.81	50.6
23	R2	All MCs	112	0.0	112	0.0	0.421	13.9	LOS B	2.7	18.9	0.76	0.75	0.81	56.4
Approach			694	1.5	694	1.5	0.463	9.2	LOS A	3.0	21.1	0.78	0.78	0.85	54.7
NorthEast: SH1															
24	L2	All MCs	107	0.0	107	0.0	0.658	14.3	LOS B	7.6	55.4	0.97	0.92	1.33	53.7
25	T1	All MCs	476	6.0	476	6.0	0.658	13.9	LOS B	7.6	55.4	0.95	0.90	1.25	54.2
26	R2	All MCs	96	2.4	96	2.4	0.325	17.5	LOS B	2.0	14.7	0.82	0.79	0.82	47.3
Approach			679	4.5	679	4.5	0.658	14.5	LOS B	7.6	55.4	0.94	0.89	1.21	53.0
NorthWest: Bob Robertson Dr															
27	L2	All MCs	126	2.4	126	2.4	0.275	9.0	LOS A	1.5	10.7	0.80	0.78	0.80	49.6
28	T1	All MCs	232	1.6	232	1.6	0.580	8.5	LOS A	5.1	36.5	0.91	0.91	1.15	48.6
29	R2	All MCs	191	3.1	191	3.1	0.580	15.3	LOS B	5.1	36.5	0.91	0.91	1.15	47.1
Approach			549	2.3	549	2.3	0.580	11.0	LOS B	5.1	36.5	0.89	0.88	1.07	48.3
SouthWest: SH1															
30	L2	All MCs	184	2.4	184	2.4	0.390	8.1	LOS A	2.6	18.6	0.73	0.67	0.73	51.3
31	T1	All MCs	444	7.2	444	7.2	0.658	9.4	LOS A	7.4	54.0	0.84	0.76	0.97	56.3
32	R2	All MCs	313	3.0	313	3.0	0.658	16.3	LOS B	7.4	54.0	0.87	0.79	1.05	53.7
Approach			941	4.9	941	4.9	0.658	11.4	LOS B	7.4	54.0	0.83	0.75	0.95	54.4
All Vehicles			2863	3.5	2863	3.5	0.658	11.5	LOS B	7.6	55.4	0.85	0.82	1.01	52.8

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 101 [SH1 / Pegasus Blvd Rbt Saturday 2024 + Makete + Resort + 10pc (Site Folder: March 24 Update)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

SH1 / Pegasus Blvd Rbt
Site Category: Existing
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
SouthEast: Pegasus Blvd															
21	L2	All MCs	344	2.1	344	2.1	0.528	10.3	LOS B	3.6	25.6	0.83	0.87	1.01	56.8
22	T1	All MCs	276	1.4	276	1.4	0.479	8.0	LOS A	3.3	23.1	0.81	0.82	0.91	50.3
23	R2	All MCs	116	0.0	116	0.0	0.479	14.7	LOS B	3.3	23.1	0.81	0.82	0.91	56.0
Approach			736	1.5	736	1.5	0.528	10.1	LOS B	3.6	25.6	0.82	0.85	0.96	54.0
NorthEast: SH1															
24	L2	All MCs	110	0.0	110	0.0	0.778	20.8	LOS C	11.6	84.6	1.00	1.11	1.70	49.1
25	T1	All MCs	526	6.0	526	6.0	0.778	19.8	LOS B	11.6	84.6	0.98	1.07	1.58	50.0
26	R2	All MCs	106	2.4	106	2.4	0.384	18.9	LOS B	2.6	18.6	0.87	0.83	0.92	46.4
Approach			742	4.6	742	4.6	0.778	19.8	LOS B	11.6	84.6	0.97	1.04	1.50	49.3
NorthWest: Bob Robertson Dr															
27	L2	All MCs	139	2.4	139	2.4	0.329	9.9	LOS A	1.9	13.4	0.84	0.82	0.86	49.0
28	T1	All MCs	251	1.6	251	1.6	0.692	12.0	LOS B	7.2	51.2	0.98	1.03	1.41	46.5
29	R2	All MCs	211	3.1	211	3.1	0.692	19.0	LOS B	7.2	51.2	0.98	1.03	1.41	45.1
Approach			601	2.3	601	2.3	0.692	14.0	LOS B	7.2	51.2	0.95	0.98	1.28	46.5
SouthWest: SH1															
30	L2	All MCs	202	2.4	202	2.4	0.441	8.9	LOS A	3.1	22.6	0.78	0.71	0.81	50.9
31	T1	All MCs	493	7.2	493	7.2	0.745	11.6	LOS B	10.2	74.8	0.92	0.85	1.18	54.6
32	R2	All MCs	328	3.0	328	3.0	0.745	18.8	LOS B	10.2	74.8	0.96	0.89	1.29	51.9
Approach			1023	4.9	1023	4.9	0.745	13.4	LOS B	10.2	74.8	0.90	0.83	1.14	53.0
All Vehicles			3102	3.5	3102	3.5	0.778	14.3	LOS B	11.6	84.6	0.91	0.91	1.21	50.9

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
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Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 101 [SH1 / Pegasus Blvd Rbt Saturday 2024 + Makete + Resort +20pc (Site Folder: March 24 Update)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

SH1 / Pegasus Blvd Rbt
Site Category: Existing
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
SouthEast: Pegasus Blvd															
21	L2	All MCs	361	2.1	361	2.1	0.594	11.7	LOS B	4.3	30.6	0.87	0.93	1.12	55.5
22	T1	All MCs	297	1.4	297	1.4	0.537	8.9	LOS A	3.9	27.7	0.85	0.87	1.01	50.1
23	R2	All MCs	120	0.0	120	0.0	0.537	15.6	LOS B	3.9	27.7	0.85	0.87	1.01	55.7
Approach			778	1.5	778	1.5	0.594	11.2	LOS B	4.3	30.6	0.86	0.90	1.06	53.3
NorthEast: SH1															
24	L2	All MCs	114	0.0	114	0.0	0.906	37.9	LOS D	20.4	148.5	1.00	1.49	2.53	40.1
25	T1	All MCs	575	6.0	575	6.0	0.906	34.8	LOS C	20.4	148.5	0.99	1.40	2.31	41.7
26	R2	All MCs	115	2.4	115	2.4	0.447	21.2	LOS C	3.3	23.6	0.91	0.88	1.06	45.2
Approach			804	4.6	804	4.6	0.906	33.3	LOS C	20.4	148.5	0.98	1.34	2.16	41.9
NorthWest: Bob Robertson Dr															
27	L2	All MCs	152	2.4	152	2.4	0.389	11.6	LOS B	2.4	16.9	0.88	0.87	0.97	47.9
28	T1	All MCs	270	1.6	270	1.6	0.813	19.3	LOS B	10.6	75.8	1.00	1.25	1.79	42.7
29	R2	All MCs	230	3.1	230	3.1	0.813	26.5	LOS C	10.6	75.8	1.00	1.25	1.79	41.5
Approach			652	2.3	652	2.3	0.813	20.0	LOS C	10.6	75.8	0.97	1.16	1.60	43.3
SouthWest: SH1															
30	L2	All MCs	221	2.4	221	2.4	0.495	10.1	LOS B	3.9	28.1	0.82	0.76	0.92	50.1
31	T1	All MCs	542	7.2	542	7.2	0.837	15.6	LOS B	14.9	109.4	0.96	1.00	1.46	51.7
32	R2	All MCs	344	3.0	344	3.0	0.837	23.6	LOS C	14.9	109.4	1.00	1.07	1.62	48.8
Approach			1107	4.9	1107	4.9	0.837	17.0	LOS B	14.9	109.4	0.95	0.97	1.40	50.4
All Vehicles			3341	3.6	3341	3.6	0.906	20.2	LOS C	20.4	148.5	0.94	1.08	1.54	47.2

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