

Flat Bush Primary School – Notice of Requirement Integrated Transportation Assessment



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Flat Bush Primary School Notice of Requirement – Integrated Transportation Assessment

Quality Assurance Information

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Date issued	Status	Approved by
19 October 2022	Draft	Kate Brill
13 December 2022	Draft (with AT & AC revisions)	Kate Brill
11 January 2023	Final	Kate Brill

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1. Introduction

The Ministry of Education (MOE) commissioned Abley Limited (Abley) to prepare an Integrated Transport Assessment (ITA) for the Notice of Requirement (NoR) for a full primary school (Years 0-8) at 121 Murphys Road in Flat Bush. The MOE serve NoRs to designate land for educational purposes and protect the land for future development. In the case of schools, the designation authorises the MOE to undertake property projects on designated school sites within the scope of 'education purpose'.

The Flat Bush area has developed rapidly in recent years and the need for a primary school is urgent. The catchment for this school will lie to the south-east of the site and include the new extensive housing development in Murphys Park which is understood to comprise of approximately 1,400 new dwellings and lies immediately south of Murphys Park Drive.

The catchment area for the school is mainly residential zoning, with rural zoning on the outskirts of the proposed school zone. The recent extensive development in the area has resulted in a current mix of rural and urbanised roads. Murphys Road is the main arterial running through the immediate area which is yet to be upgraded to serve the accelerated development. This is discussed further throughout the report.

The purpose of this ITA report is to evaluate and assess the transportation effects of the school development at this site.

1.1 School Overview

The Murphys Road school site has been identified as a solution to accommodate up to 1250 students residing in the rapidly developing areas of Flat Bush to the east of Murphys Road. The school will accommodate Years 0-8 school aged children.

The Flat Bush area where the school is located has a mix of urban and rural roads. The school site is located within Flat Bush sub-precinct C within the Flat Bush Precinct Plan, which encourages future medium to high density residential development in the local area surrounding the proposed school. The need for a primary school in the area is based on this future residential growth.

As is typical for a school catering for Years 0 to 8, some or all of the following are expected to be developed on the site:

- Buildings; including classrooms, hall, library, administration office space, staff workspace, caretakers' facilities, sick bay etc.
- Playing fields, hardcourts, playground structures
- Vehicle accessways, parking space for staff and visitors; and a pick-up and drop-off area.
- Footpaths, landscaping and fencing
- Servicing; including water, sewer, stormwater, electricity, heating, telecommunications and outdoor lighting

2. Site Description

2.1 Site Location

The proposed school site is located at 121 Murphys Road at the southern end of Flat Bush as shown in Figure 1 with a total site area of approximately 3 hectares.

The site has a 110m frontage onto Murphys Road and a 310m northern boundary, most of which will have frontage onto a newly constructed road. Murphys Road is a sealed rural road, which has one lane in each direction. There are currently no pedestrian or cyclist facilities on Murphys Road, nor is there provision for on-street parking. The current speed limit outside the site is 80km/h. Murphys Road is identified as an arterial road under the Auckland Unitary Plan – Operative in Part (AUPOP).

It is anticipated that Murphys Road will be upgraded in the future as part of the New Zealand Upgrade Programme (NZ UP), which will be managed by Waka Kotahi. An upgrade may include a re-grading, re-aligning, and widening of Murphys Road to improve safety and capacity to cater for increased travel demand along the corridor. An upgrade is also likely to include active modes infrastructure and a reduced speed limit appropriate for an urban environment. At a meeting with MOE and Waka Kotahi in December 2022, it was confirmed that there were no updates on the scale, scope or delivery date of upgrades to Murphys Road. Waka Kotahi are currently working on a business case for the upgrades, which may include physical works starting as early as 2025. However, there is no certainty around timing or scale of works.

An Auckland Transport road widening designation of approximately 12 metres exists on the site frontage, as seen on Figure 2. This future land take has been incorporated into the design of the school. The design of the proposed access will be relatively unaffected by any such land take and can be accommodated without a redesign of the access points.

There is also a Transpower New Zealand designation on the land parcel immediately north of the site, which covers the future Road 3.



Figure 1 Site Location

2.2 Zoning and Surrounding Land Use

The proposed Murphys Road primary school site is situated in a Residential Mixed Housing Urban Zone in the Auckland Unitary Plan Operative in Part (AUPOP), as shown in Figure 2.

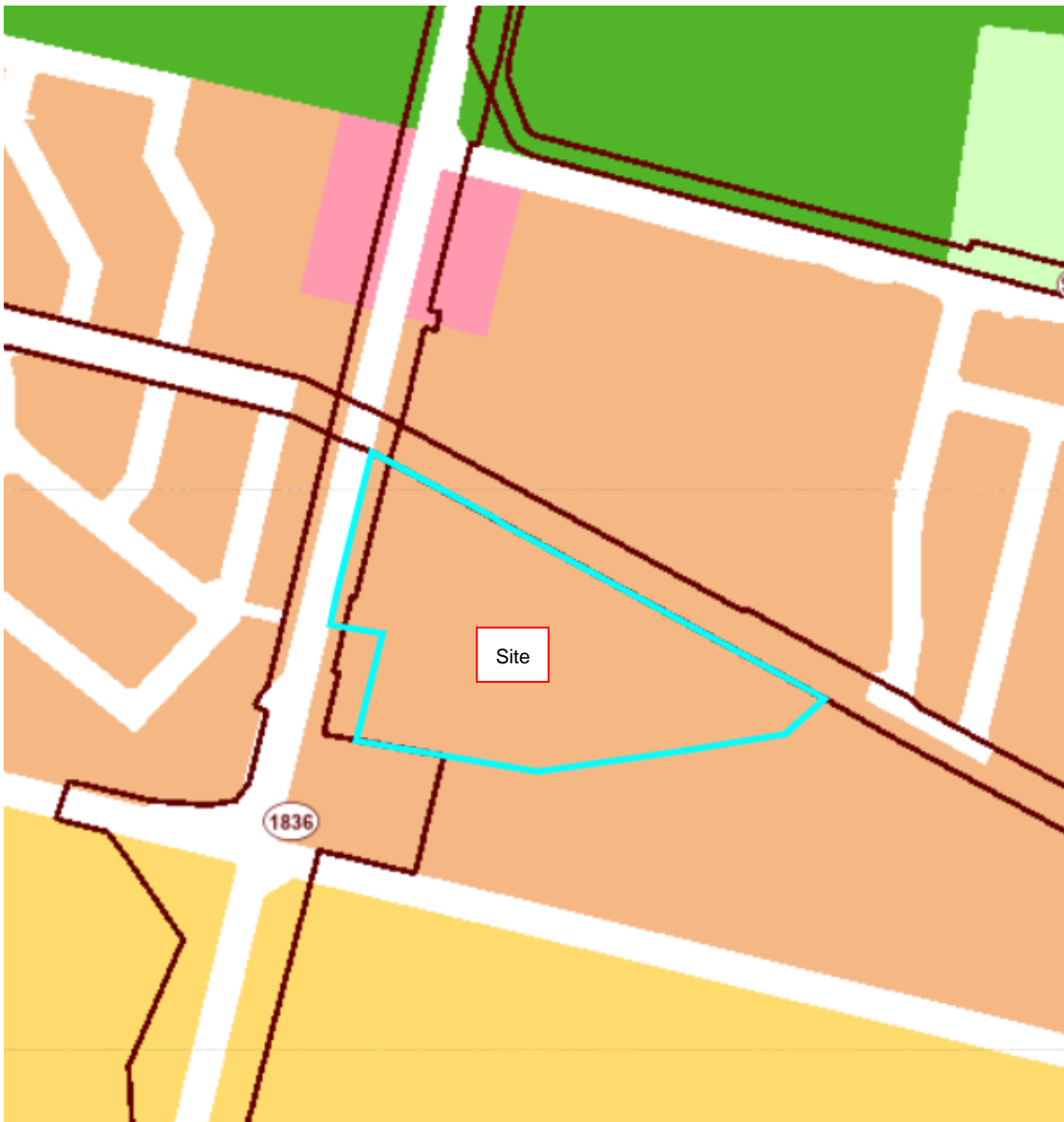


Figure 2 Zoning and Designation Map

Flat Bush Sub-precinct C

Auckland Council has created the Flat Bush Sub-precinct C, which provides the vision for the area of Flat Bush south of Murphys Bush in proximity to Thomas and Murphys Roads, and identifies the goals and areas for future urban development. The Sub-precinct aims to develop an integrated, medium to high density residential environment which has high levels of amenity and supports a range of travel modes.

There are two residential developments referred to throughout this report, namely 125 Murphys Road development and Murphys Park Development. The location of the residential developments are overlaid onto the indicative school catchment zone and presented in Figure 3.

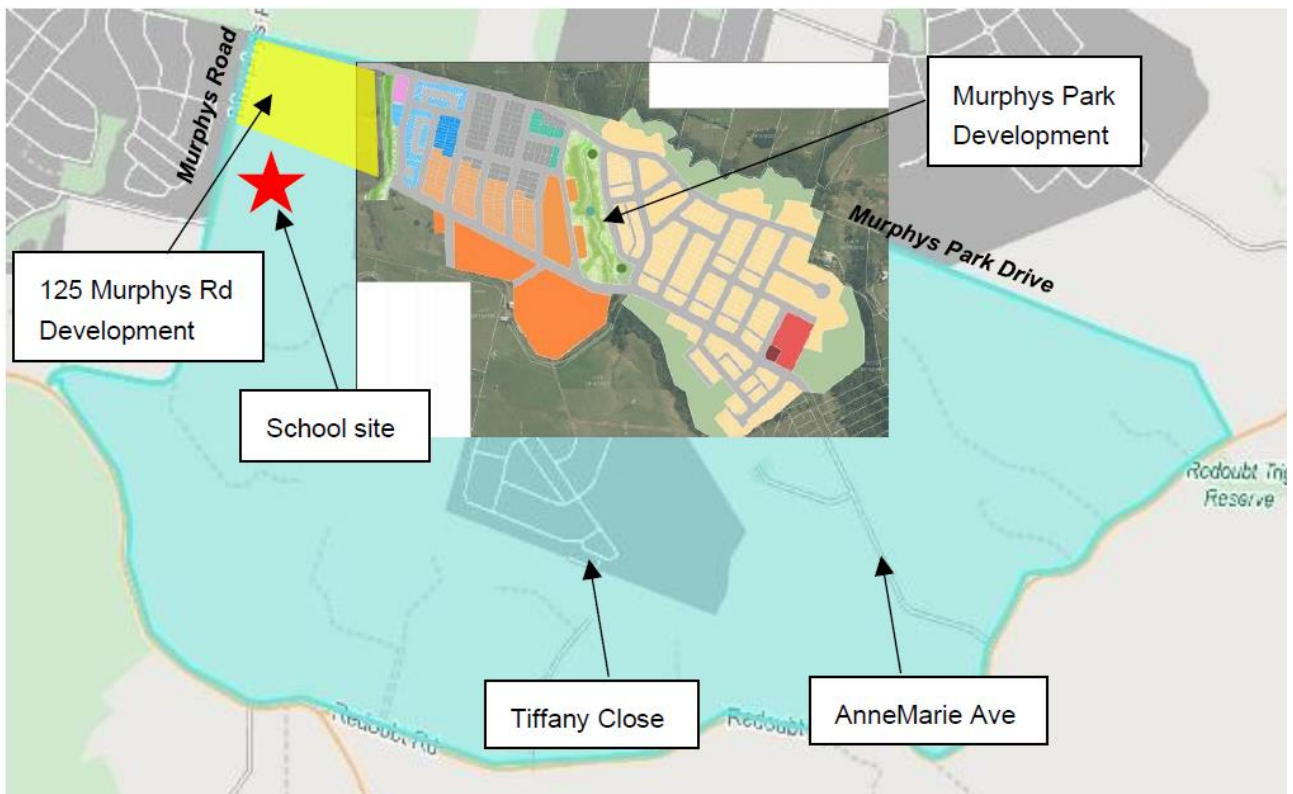


Figure 3 Adjacent residential developments presented in the indicative school catchment context (Source: <http://murphys.co.nz/>)

3. Transport Environment

3.1 Existing Road Network

The existing road network surrounding the site is a mix of rural, urban and soon to be constructed roads. The main arterial network, including Murphys Road and Redoubt Road, are essentially rural roads with no footpaths or kerb and channel. The new local roads that are constructed as part of the housing development are built to an urban standard with pedestrian facilities, parking bays and kerb and channel.

Murphys Road

The section of Murphys Road, between Flat Bush School Road and Redoubt Road, is a rural road with one lane in each direction and narrow shoulders, as seen in Figure 4. There are currently no pedestrian or cyclist facilities on Murphys Road, nor is there provision for on-street parking or kerb and channel. It is classified as an Arterial Road in the AUPOP, with a posted speed limit of 80km/h.

Murphys Road is long and straight with a total road reserve width of around 20 metres outside the site. The carriageway is approximately 6.6m wide with two 3.3m traffic lanes. The road has a significant crest just south of the site frontage which restricts visibility and prevents access on the site frontage to cater for right turning movements.



Figure 4 Murphys Road (looking north with the school site on the right side)

Murphys Park Drive

Murphys Park Drive runs west to east and will function as a collector road. It is a sealed two-way road with one lane in each direction. There is a footpath on the southern side of the road only, with indented parking bays along the entire length other than on the 100m bridge section over the Council waterway, as seen in Figure 5. The posted speed limit is 50km/h.

Murphys Park Drive is long and straight with very good visibility. The road reserve width is 20m with a 6m wide carriageway and 2.8m wide indented parking bays on both sides of the road.



Figure 5 Murphys Park Drive (looking west from the eastern end of the bridge)

Murphys Road / Murphys Park Drive Intersection

The western end of Murphys Park Drive intersects with Murphys Road, which is currently formed as a priority intersection. The Murphys Park Drive approach has two lanes for left and right turning vehicles. The intersection has a slip lane for left turning movements from Murphys Road onto Murphys Park Drive. There are no pedestrian crossing facilities at the intersection, as seen in Figure 6.



Figure 6 Murphys Road / Murphys Park Drive Intersection

New residential streets within school catchment zone

Google maps provides the most recent aerial of the road network within the indicative catchment area, as shown in Figure 7. Hodges Road is constructed linking the residential developments to the south of the catchment. The road link between Picturesque Drive and Hodges Road has been constructed allowing walking and cycling access, with restricted vehicle access at this stage. Caregivers using the remote PUDO on Picturesque Drive can utilise Hearth Street.

All new roads have a footpath on both sides and some roads such as Hodges Road have cycle infrastructure.



Figure 7 Recently constructed local road network

Walking and Cycling Facilities

Murphys Road has no provision for walking or cycling. There is a footpath on the southern side of Murphys Park Drive only.

All the local streets which gain access off Murphys Park Drive have footpaths on both sides and are designed to be low speed environments appropriate for cycling.

3.2 Consented Road Network

The site immediately north of the proposed school (125 Murphys Road) has consent to build three new local roads which will link the school site with Murphys Park Drive. One new road (Road 3) will run east-

west on the northern boundary of the school site, and two roads running north-south between Road 3 and Murphys Park Drive.

The development at 125 Murphys Road will also include the construction of a walkway along the eastern boundary of the site, adjacent to a Council-owned riparian reserve, which will link the eastern end of the school site with Murphys Park Drive. It is understood that the consented road network is currently progressing through Engineering Plan Approval, as shown in Figure 8.

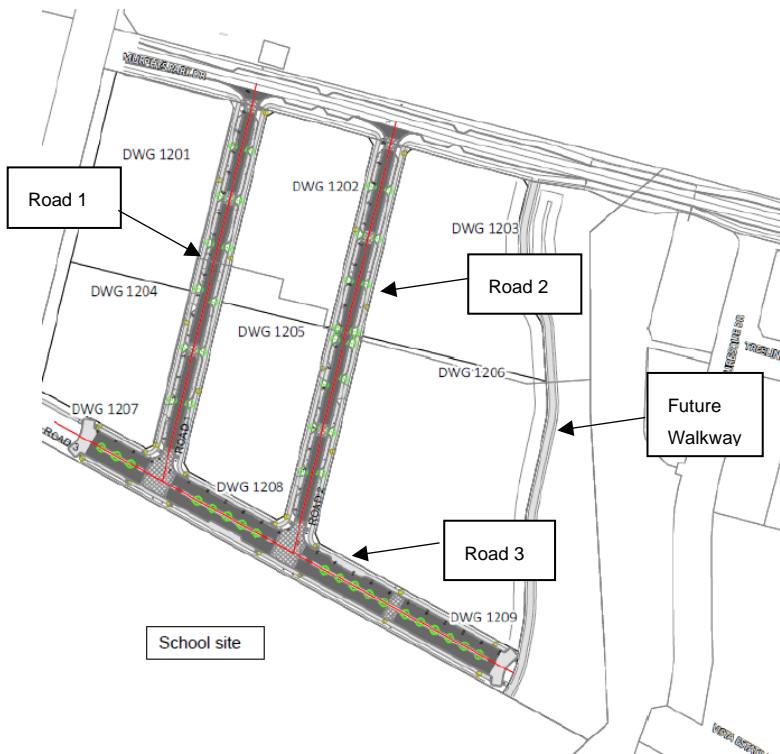


Figure 8 EPA Plans for 125 Murphys Road

The majority of the residential development at 125 Murphys Road takes access from Road 1 and Road 2, with only one JOAL proposed on Road 3. This is circled in Figure 9.

13: Typology Plan and Schedule of apartment and terraced housing.

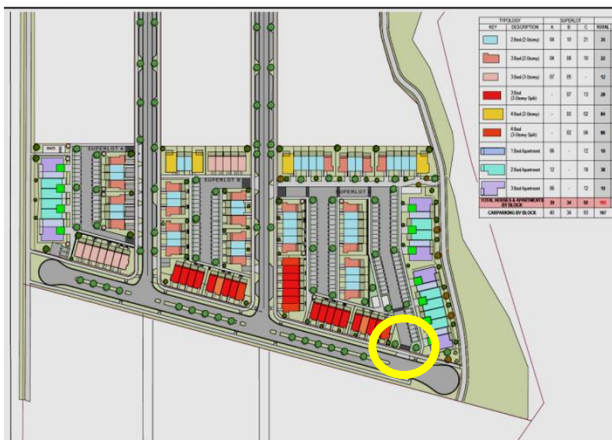


Figure 9 Residential development at 125 Murphys Road showing JOAL on Road 3.

3.3 Proposed Road Network

The transport environment in the southern end of Flat Bush has some challenges. Development was progressed with the understanding that the Mill Road Corridor project would provide the road network to cater for the development including the upgrade of Murphys Road, between Reboubt Road to the south and Flat Bush School Road to the north, including the signalisation of key intersections along the Murphys Road Corridor.

The Mill Road Corridor Programme has since been downscaled and no longer includes the upgrade of the section of Murphys Road south of Flat Bush School Road. The project is now managed by Waka Kotahi as part of the New Zealand Upgrade Programme. It is understood that the NZ Upgrade Programme (NZ UP) may have targeted funds for upgrades in the vicinity of the school site. No formal announcements on the scale of the proposed upgrades were issued at the time of issuing this report. Abley / MOE met with Waka Kotahi on 7 December 2022. Waka Kotahi confirmed that there were no updates on the scale, scope or delivery date of upgrades to Murphys Road. Waka Kotahi are currently working on a business case for the upgrades, which may include physical works starting as early as 2025. However, there is no certainty around timing or scale of works.

Where necessary, the Outline Plan of Works stage for the school will incorporate any future changes to the road network into the design.

3.4 Public Transport

There are currently no bus routes in close proximity to the site, with the closest bus route at a distance of approximately 1.5km as seen in Figure 10. It is anticipated that Auckland Transport will provide bus services closer to the site in the future given the anticipated housing density in the Murphys Park area.



Figure 10 Bus Services in Flat Bush

3.5 Road Safety

To understand the existing safety performance of the road network in the vicinity of the site, crashes that were recorded within the last five years (2017 – 2022 inclusive) were obtained through the Waka Kotahi NZ Transport Agency Crash Analysis System (CAS) database. The extent of the crash search area including Murphys Road between Murphys Park Drive and Thomas Road, and the length of Murphys Park Drive. A total of six crashes were recorded on Murphys Road between Thomas Road and Murphys Park Drive. Five of these crashes were non-injury crashes, whilst one was a minor-injury crash. No crashes were recorded at the Murphys Road / Murphys Park Drive intersection, nor were there any crashes recorded on the length of Murphys Park Drive.

The crash rate is relatively low on the roads surrounding the site, as seen on Figure 11, and there is no evidence of a pattern of crashes.

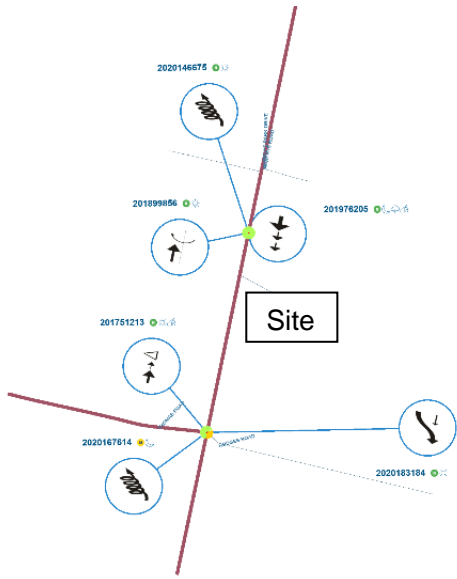


Figure 11 CAS Analysis - Collision Diagram

4. Strategic Context

4.1 Relevant Strategies and Policies

The following relevant regional and local plans need to be considered from a transport perspective to ensure consistency with outcomes.

Auckland Plan

A 30-year strategy to manage Auckland's growth and development. The plan identified three major challenges facing Auckland:

- Population growth and its implications
- Sharing prosperity with all Aucklanders
- Reducing environmental degradation

Some of the transport related focus areas of the plan include making walking, cycling and public transport preferred choices, reducing death and serious injuries on the road, and developing a sustainable and resilient transport network. The plan acknowledges that not many Aucklanders use their bikes to travel to school. Getting more children to cycle will ease congestion, reduce the environmental impact of travel, and improve the health of those that cycle. Auckland Council has indicated cycling infrastructure as an area for increased investment.

Auckland Regional Land Transport Plan

A 10-year transport investment programme for Auckland. The programme aims to encourage a move away from single-occupant vehicles as the dominant mode of travel, and toward public transport, walking, and cycling. It will lead Auckland towards being a city where there is growth without increased congestion and one with multiple and genuine travel choices. In order to address Auckland's challenges, the plan tracks the active and sustainable mode share at schools as a performance measure.

The RLTP does not refer to any road upgrade works in proximity to 121 Murphys Road.

New Zealand Upgrade Programme

The New Zealand Upgrade Programme is an investment fund to provide growing communities, such as Flat Bush, with transport upgrades such as public transport, new or upgraded roads and active modes infrastructure. Waka Kotahi is delivering the projects for the upgrade programme.

The Mill Road Corridor Programme is now managed by Waka Kotahi as part of the New Zealand Upgrade Programme. This project has been downscaled and no longer includes the upgrade of the section of Murphys Road south of Flat Bush School Road. No formal announcements on the scale of the proposed upgrades were issued at the time of issuing this report. Abley / MOE met with Waka Kotahi on 7 December 2022. Waka Kotahi confirmed that there were no updates on the scale, scope or delivery date of upgrades to Murphys Road. Waka Kotahi are currently working on a business case for the upgrades, which may include physical works starting as early as 2025. However, there is no certainty around timing or scale of works.

4.2 Engagement with Auckland Transport and Auckland Council

Engagement with Auckland Transport (AT) and Auckland Council’s Consultant traffic engineer was undertaken as part of the preparation for this ITA. Both AT and AC provided comprehensive feedback to our preliminary transport strategy report and subsequently a draft ITA. We have responded to the feedback provided by AT and AC in Appendix A, and have incorporated relevant sections into this report where appropriate.

5. Proposal

A new primary school (Years 0-8) is proposed in response to the residential growth in Murphys Park area. The school will grow as development continues to increase throughout the catchment area. The initial build will cater for up to 600 students, with a masterplan roll of 1,250 students.

5.1 School catchment

The core school catchment anticipated for the Flat Bush Primary School is the recently built and future residential development planned to the southeast of the site. The area is bounded by Murphys Park Drive to the north, Murphys Road to the west and Redoubt Road to the south and east, as shown in Figure 12.

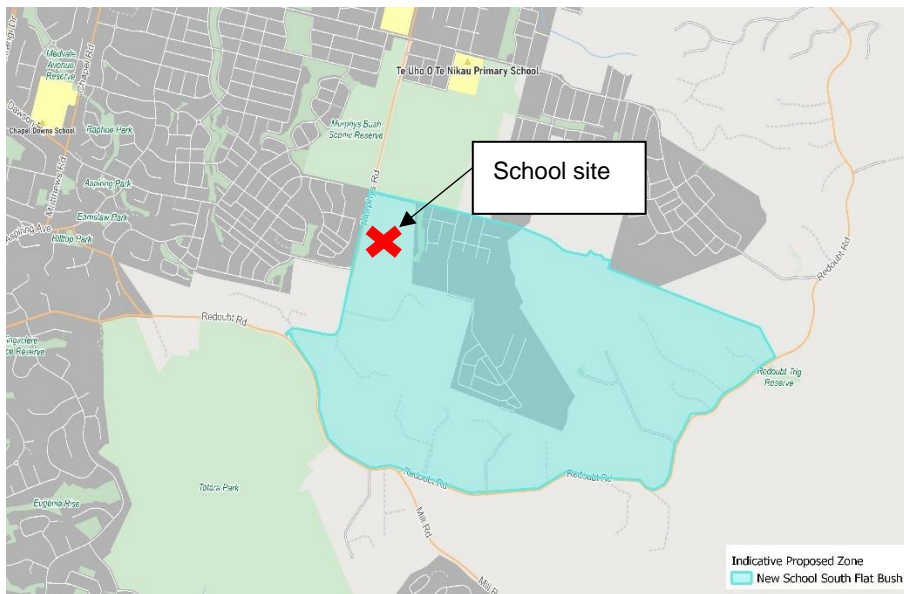


Figure 12 Indicative school zone from MoE

To date, there has been approximately 1,400 dwellings consented, with an estimated 1,636 dwellings within the school catchment area. The maximum masterplan roll of 1,250 students allows for the event of more intensive residential housing than what the zoning anticipates.

The indicative catchment zone is bordered by arterial roads which ensures that the key routes to school are via local roads and minimises the need for young school children to cross busy arterial roads. The surrounding school zones will likely be amended so as to align with catchment for the new school as and when the new school catchment is confirmed.

The basis of this transport assessment is built on the assumption that the catchment zone will be as proposed. The location of the catchment will be less of a concern once Murphys Road has been upgraded and can cater for active modes and safe crossing facilities.

5.1 Proposed Transport Strategy

This section outlines the transport strategy for the new school, which is on the basis that the majority, if not all, of the school trips will travel to school via the recently built local roads within the Murphys Park development. This includes linkages to the residential subdivisions at the south and south-eastern corners of the catchment (i.e. Tiffany Close and Annemarie Avenue developments).

A large proportion of the school traffic will continue on to their journey to work or study after dropping their child/ren at school. These trips are considered pass-by trips which will be vehicle trips already on the road network. It is also worth noting that the students residing in this catchment will need to travel to school, whether it be the proposed site or a school further afield. The advantage of a school at this site reduces the number of vehicles entering the arterial road network to travel to a school in the wider area.

The proposed transport strategy is described below:

- The majority of the school traffic will travel via the recently constructed local roads within the catchment area and exit via several intersections onto Murphys Park Drive. Access to the school will be via the north-south roads that are to be constructed as part of the 125 Murphys Road development.
- MOE proposes a new left out access from the school site to Murphys Road. A physical median island will be provided on Murphys Road to restrict right turning movements out of the school site. AT has identified that some localised pavement widening may also be required and this can be accommodated in both OPW and EPA stages of developed design. An entry (left in) is not proposed at the Murphys Road access as no school traffic is anticipated to be travelling from the north. The exception may be staff or visitors that can turn left into Murphys Park Drive and access the school via Road 1 or 2.
- A Pick up / Drop off (PUDO) will be provided on the school site, with access from Road 3. School traffic will exit the PUDO via either the left out access on Murphys Road or returning back to Murphys Park Drive via Road 1 or Road 2.
- A remote PUDO is proposed on Picturesque Drive. There is an existing 25m long indented parking bay on the western side of Picturesque Drive, located on the frontage of the existing Council riparian reserve. MOE propose to construct a second indented parking bay directly to the south of the existing bay. It is expected that parking demand for the existing parking bays will be low given the absence of housing on the western side of Picturesque Drive. The additional parking proposed by MOE is considered beneficial to the local community. It is recommended that a parking restriction is imposed on the parking bays to allow for pick up / drop off at school start and finish times, as is typical outside of a school. The remote PUDO is a 450m (5 minute) walk to school via the walkway which will be vested and constructed within 125 Murphys Road along the riparian corridor. A school travel plan can manage the safe operation of the remote PUDO route by measures such as walking school buses between Picturesque Drive and the school.

It is anticipated that the majority of caregivers that wish to drop off near the school and return home will utilise the remote PUDO. This option will be attractive as it will likely avoid any traffic congestion on Murphys Park Drive; or having to enter the arterial road network to circle back to return home. The remote PUDO is also likely to be used by drivers that wish to travel north and therefore turn right onto Murphys Road. Drivers that wish to continue their journey to work and are travelling south towards the motorway are likely to utilise the on-site school PUDO and exit via Murphys Road.

Figure 13 illustrates the inbound (red arrows) and outbound (blue arrows) vehicle movements and the location of the remote PUDO and the proposed walking school bus route.

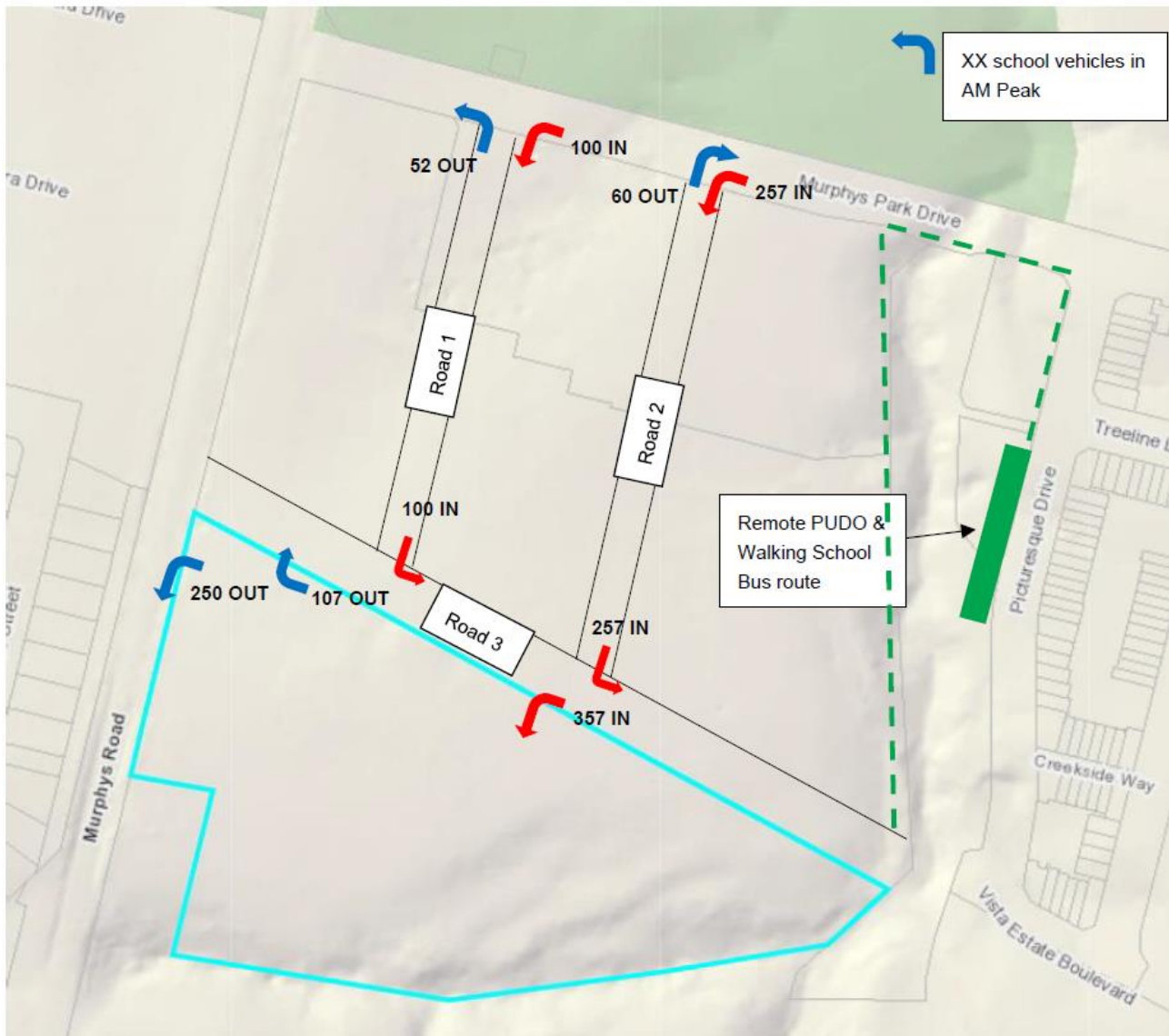


Figure 13 Vehicle and pedestrian movements to school.

5.2 Site Layout and Access

The existing site has road frontage onto Murphys Road and the soon to be constructed west-east road, which is referred to as 'Road 3'. The main access points for the school will be taken from Road 3, with an exit only proposed for Murphys Road.

A left out only exit is proposed onto Murphys Road. A vertical crest on Murphys Road outside the site restricts visibility for most of the site frontage, preventing any right turn manoeuvres at the Murphys Road access. A central median island is proposed to ensure no vehicles will turn right out of the proposed exit along with other on-road improvements (e.g. localised pavement widening) to be designed at a later stage and certified by AT.

There are three vehicle accesses proposed on Road 3, an entry and exit for the staff car park. The PUDO entry centred on the site frontage and an exit only at the western end of Road 3. Vehicles using the pick up / drop off zone (PUDO) will enter through the centrally located access and travel through the one-way PUDO before exiting either onto Murphys Road or right onto Road 3.

The PUDO will be a one-way system with two vehicle crossings, an entry only access at the centre of the site on Road 3, and an exit only, approximately 70 metres to the west. The one-way operation of the access results in fewer conflict points and a safer arrangement. One option that illustrates this layout is shown in Figure 14.

The access points and internal circulation will be designed to accommodate tracking for buses, service vehicles and emergency vehicles. The width and gradient of all proposed vehicle crossings are expected to be compliant with the AUPOP, which will be confirmed at Outline Plan of Works (OPW) stage of works.

Pedestrian and cycle access will be separated from the vehicle access allowing for a separation between vehicles and school children entering and exiting the school grounds on foot. The main pedestrian entrance is proposed to be taken from Road 3 and located between the staff carpark access and the PUDO access. Further design of the pedestrian and cyclist access points will be developed at OPW stage taking into account accessibility, safety and desire lines.

A pedestrian crossing will be provided outside the school on Road 3 to ensure a safe crossing point for students walking or cycling to school. It should be noted that the location of the on-street pedestrian crossing on the Site Plan is indicative only and the final location of the crossing will be determined at OPW stage, in consultation with Auckland Transport.

The EPA drawings for Road 3 include a solid central median. Rationalisation of the median island along Road 3 will be designed to ensure optimal access to the school, and the proposed JOAL to the residential development on the northern side of Road 3 (as per Figure 9). A solid median would allow for stacking space for vehicles entering the school PUDO, allowing any queues for the PUDO to occur on Road 3, and reducing queueing on Road 1 or 2. Any changes to the central median will be proposed at OPW stage and form part of the establishment OPW designation condition proposed by the NOR.



Figure 14 Indicative Site Layout Plan

5.3 Visibility Assessment

Appropriate sight distance between drivers exiting the site and approaching drivers on the frontage road should be provided at all accessways. The Austroads Guide to Road Design Part 4A provides the types of sight distance to consider when designing intersections. The Safe Intersection Sight Distance (SISD) has been adopted which is the distance for a driver on a major road to observe a vehicle on a minor approach moving into a collision situation and to decelerate to a stop before reaching the collision point.

The guidelines on the SISD are based on Austroads 2017, Guide to Road Design Part 4A (Unsignalised and Signalised Intersections). The minimum sight distance should be provided on the major road at any intersection. The available sight distance has been assessed for existing (80km/h) and proposed (50km/h) speed limits at the proposed access location on Murphys Road.

The sight distance requirements and available sight distances from the proposed access location on Murphys Road are shown in Table 1. The proposed access location is positioned at the northern end of the Murphys Road site frontage as illustrated in Figure 14.

Table 1 Safe Intersection Site Distance on the site frontage on Murphys Road

Direction on Murphys Road	Speed limit (km/h)	Recommended Sight Distance	Available Sight Distance
Looking North	80	181 metres	>200 metres
Looking South	80	181 metres	70 metres

Looking North	50	97 metres	>200 metres
Looking South	50	97 metres	70 metres

Sight distance looking south from the proposed access does not achieve SISD for either an 80km/h or 50km/h speed limit. Sight distance looking north exceeds the minimum recommended SISD requirements for both speed limits, as shown in Figure 15. The visibility constraints restrict right turning movements at the proposed access. A left out exit only is therefore proposed with a solid central median proposed to physically restrict vehicles turning right out of the school site.



Figure 15 Looking north from proposed Left Out Access on Murphys Road

5.4 On-site Pick Up Drop Off (PUDO) Area

An on-site Pick Up Drop Off (PUDO) zone is proposed on the northern boundary of the site. The PUDO will operate as one-way system with an entry only via the centrally located access, and an exit only at the western end. Vehicles can exit onto Murphy's Road via a left turn only, or alternatively turn right onto Road 3 at the turning head.

The PUDO will have approximately 16 parallel parking spaces. Design options will be worked through at OPW stage, however a preliminary design can be seen in Figure 14. The parking bays are proposed to be 2.2m wide with a 3.5m wide traffic lane. The total width for manoeuvring is compliant with the AUPOP.

The PUDO can also be used during the school day for visitors, service vehicles and buses for field trips.

The School Travel Plan will manage the operation of the PUDO. As the school roll increases, management strategies such as time staggering pickups for different year groups can help to run an efficient PUDO system.

5.5 Modal Share

The masterplan school roll is expected to be 1,250 students. The school will require an assumed staff of 60-65 staff based on a 1:20 staff to pupil ratio.

Auckland Transport have provided Abley with the average modal share for Primary TravelWise schools for 2020. Primary schools had an average car modal share of 49% in the morning peak. The Travelwise modal share data is only collected in the mornings. However, it is well understood that car use is significantly reduced in the afternoons for several reasons such as after school programmes, extra-curricular classes at school or going home with friends. The New Zealand Household Travel Survey (NZHTS)¹ indicates that primary school children in Auckland experience a 5% reduction in car trips in the afternoons.

The proposed school is considered to have a lower than average vehicle use, mainly due to the remote PUDO and restricted left turn exit onto Murphys Road. It is anticipated that 40% of students will be driven to the school grounds in the mornings with 35% in the afternoons (as shown in Table 2), for the reasons provided below:

- A remote PUDO on Picturesque Drive will be provided with a safe, escorted route directly to/from the school. This will be an attractive option for drivers returning home or wishing to turn right at Murphys Park Drive to travel north.
- The catchment area for the school is relatively contained with the majority of houses within the Murphys Park residential development with a 1km walk (12 minute) to the school.
- The key walking routes linking the housing developments to the school are new local roads that are low-speed environments with good footpaths and safe crossing points. This is expected to encourage a high active mode share.
- The average provided for Auckland TravelWise schools include 'destination' schools and schools that significantly larger catchment zones, where vehicle use is understandably higher.

It is assumed that the school will not have school buses given the smaller catchment size and primary aged students, however the school will cater for buses for field trips etc.

Table 2 Modal split

	Walk/Cycle/Scooter	Public Transport	Vehicle	Car/Walk (>400m)	Other
Auckland average Travelwise Primary schools	32%	3%	49%	14%	2%
Flat Bush School - Mornings	33%	0%	40%	25%	2%
Flat Bush School - Afternoon	38%	0%	35%	25%	2%

¹ <https://www.nzta.govt.nz/resources/research/reports/467/>

5.6 Walking and Cycling Provision

The new school will be encouraging active modes including walking, cycling and scooting. All the new roads that have been built within the Murphys Park development, to the east of the school site, have footpaths on both sides of the road and are designed to encourage slow speeds. Traffic calming measures such as narrow carriageways, vertical speed tables, raised crossing points, intersection treatments and kerb buildouts are provided throughout the local roads. The low-speed traffic environment provides a safe environment for walking and cycling/scooting to school.

Safe crossing points outside the school and footpaths of an appropriate width along the school frontage are supported to ensure safe routes to school. Pedestrian and cycle access at the school frontage will be separated from the vehicle access allowing for adequate separation between vehicles and school children entering and exiting the school grounds by foot. Further design of the pedestrian and cyclist access points will be developed at OPW stage taking into account accessibility, safety and desire lines outside the school.

Currently Murphys Road does not have any footpaths or cycle facilities and is not a safe environment for pedestrians. Further, the significant crest on Murphys Road outside the site prevents a crossing facility near the site frontage due to the risk of a hidden queue.

Based on the assumed catchment, no school children are expected to live to the west or north of the school, restricting any travel by active modes expected on Murphys Road.

Provision of adequate on-site cycle/scooting facilities within the school grounds is important to encourage a high level of active travel and will be considered at OPW stage.

5.7 Remote PUDO on Picturesque Drive

A remote PUDO is proposed on Picturesque Drive, as seen on Figure 16. There is an existing 25m long indented parking bay on the western side of Picturesque Drive, located on the frontage of the existing Council riparian reserve. MOE propose to construct a second indented parking bay directly to the south of the existing bay. It is expected that parking demand for the existing parking bays will be low given the absence of housing on the western side of Picturesque Drive.

It is recommended that a parking restriction is imposed on the parking bays to allow for pick up / drop off at school start and finish times, as is typical outside of a school. The remote PUDO is an approximate 450m (5 minute) walk to school via Murphys Park Drive and the walkway constructed for 125 Murphys Road.

The school travel plan will manage the safe operation of the remote PUDO route by measures such as walking school buses between Picturesque Drive and the school.

The location of the remote PUDO bays allows for a one-way traffic system from Hodges Road and Hearth Street and returning via Treeline Lane as shown in Figure 16. This one-way system restricts any u-turning to access the PUDO facility. The proposed one-way system will be promoted and encouraged as part of the School Travel Plan.

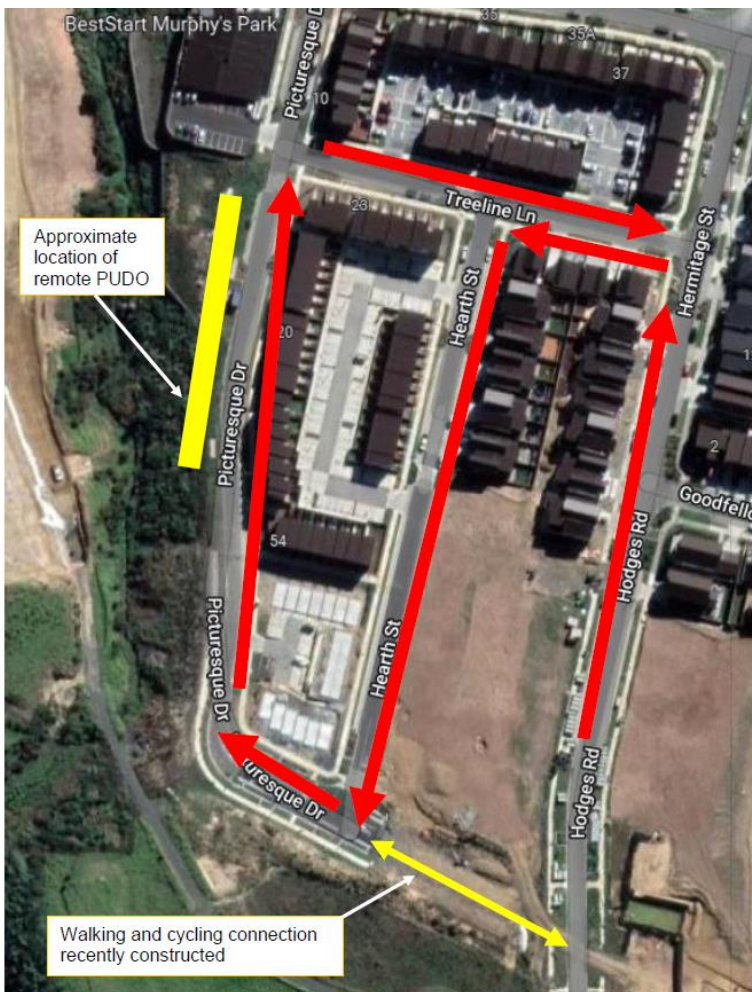


Figure 16 Expected traffic flow for Remote PUDO

There is currently no footpath on the southern end of Picturesque Drive alongside the indented parking bays, as can be seen in Figure 17. The Ministry of Education proposes to build an additional parking bay south of Treeline Lane and extend the existing footpath on the western side of Picturesque Drive to service the new parking bays. The number of parking bays required to meet demand will be assessed at OPW stage.



Figure 17 Photo looking south on Picturesque Drive

The aerial photography in Auckland Council Geomaps does not yet show the construction of Picturesque Drive. To determine if the proposed parking bays for the remote PUDO will be on Auckland Transport land and not encroach into Council reserve, we have interrogated the width of the road reserve on Picturesque Drive. We confirm it is consistently 18m wide along the entire length, which demonstrates a consistent cross-section along the length of Picturesque Drive, as shown in Figure 18. The proposed parking bays will therefore comfortably be accommodated on AT land and not encroach onto Council reserve.



Figure 18 Image showing consistent road reserve width along the entire length of Picturesque Drive

5.8 School Travel Plan

A School Travel Plan (STP) is proposed to be developed prior to the school opening and is required to be ongoing by proposed designation conditions. The STP will be produced in conjunction with Auckland Transport's TravelWise programme.

The STP will provide measures to encourage and incentivise safety for active travel to school and reduce vehicle dependence for students and staff. The Travel Plan is envisaged to be a live document that addresses traffic-related and road safety concerns from school activities on an ongoing basis.

The STP will provide education and encouragement measures to ensure a high uptake of the remote PUDO on Picturesque Drive and other car/walk initiatives.

Walking School Buses (WSB) are an important component for the journey to school for primary school students. The STP will have a WSB programme which will specifically focus on a successful walking school bus between the remote PUDO on Picturesque Drive and the school.

5.9 Parking

The 'AUPOP Chapter K – Designations - Minister of Education' standard conditions for all education designations require that:

- On-site car parking shall be provided at the rate of two carparks per new classroom or classroom equivalent, except where the council accepts, on the basis of a specifically commissioned parking study by an appropriately qualified engineer and/or transportation planner, that a lesser level is appropriate.

Provision of Parking

A total of 53 teaching spaces / classrooms are proposed for the masterplan build. At a rate of two car parks per teaching space as per the standard designation condition in the AUPOP, the requirement for on-site parking would be 106 car parks for staff and visitors. Preliminary site layout options confirm the site can accommodate approximately 110 car parks including 94 staff car parks and at least 16 PUDO / visitor car parks. Visitors that arrive during school hours (outside of school start and finish times) can utilise the student PUDO area. Utilising the PUDO area for different users, at different times of the day, results in a more efficient use of land.

The total number of on-site parking spaces slightly exceeds the standard designation requirement. The shared use of the PUDO car parks for use by visitors during the day is supported and encouraged. Road 3 will also have on-street parking which is unlikely to be utilised by other land use activities and can cater for any overflow if required. Therefore, the NOR confirms that the standard designation condition can be met.

6. Transport Effects

6.1 Traffic volumes

Traffic volumes for Murphys Road outside the site were taken from AT's website. The most recent count was taken on 7 June 2021 which occurred during the school term and was not affected by any COVID-19 restrictions at the time. The counts recorded on Murphys Road, near Thomas Road, was 1,344 vehicles in the AM peak and 1,298 vehicles in the PM peak.

The morning peak hour on Murphys Road is consistently recorded in AT's traffic counts to occur at 7.30am, with the earlier time likely due to its distance from Auckland CBD and consequently longer journey times to work/study. Traffic flows at the school start time (between 8.45-9.00am) will therefore be lower than the peak hour and have been estimated at 90% of the peak demand. This is also the case in the afternoon, as school finish time does not occur during the commuter peak period.

New and future residential development traffic has been added to the base traffic volumes. The following assumptions have been made for the residential traffic:

- The dwellings shown in the aerial photography of the area were occupied when traffic counts were taken in 2021 (this is based on the street view data).
- Half of the trips generated by the new residential development throughout the catchment will use Murphys Park Drive and the remaining half will exit via Redoubt Road / future roads.
- MOE have calculated approximately 1,635 dwellings will be constructed within the school catchment zone.
- A trip generation rate of 0.65 trips per dwelling has been applied as per the RTA guidance. A typical 25% inbound and 75% outbound rate for the AM peak has been used.
- We have assumed half of the trips generated by the residential development exiting Murphys Park Drive will travel north and the other half will travel south.
- We have assumed that school start time will occur at the tail end of the morning peak and have therefore assumed 90% of the peak hour traffic.
- It is generally recognised that a large proportion of school traffic is pass-by traffic where students are being dropped off by caregivers on the way to work or study. We have not allowed for any pass-by trips in our assessment, to ensure a conservative approach.

Table 3 Current and Forecasted Traffic Volumes in AM Peak on site frontage on Murphys Road

Source	Year	AM Both directions Veh/hr
AT Website	2021	1,377 (90% - 1,240)
Development Traffic (on site frontage only)	Future	227 (90% - 204)

6.2 Trip Generation and Distribution

Trip Generation

The number of vehicle trips generated by the school at full masterplan roll is estimated at 714 (357 vehicles) in the mornings and 626 (313 vehicles) in the afternoons, as seen in Table 4.

The number of vehicle trips is estimated based on the anticipated modal split for the school and the average number of students per vehicle.

Table 4 Number of school vehicle trips for Flat Bush School

School start/finish time	Maximum School Roll	Vehicle use	Ave students per vehicle	No. of Vehicles / Trips
Mornings	1,250	40% Drive	1.4	357 / 714
Afternoons	1,250	35% Drive	1.4	313 / 626

Trip Distribution

A trip distribution exercise has been undertaken to anticipate the arrival and departure flows of school traffic. The distribution flows will input into the SIDRA model for the school access on Murphys Road. The assumptions for the trip distribution are as follows:

- The majority of school traffic entering the school is likely to come from the east on Murphys Park Drive and turn left into Road 1 or Road 2 to access the school. No school traffic is expected to turn right into Road 1 or 2 as no students will reside to the west of Murphys Road. The high left turn movements are not expected to affect the operation of the network as there will be minimal opposing traffic movements.
- Murphys Park Drive is likely to be a busy road until such a time that future roads are constructed in the area which link the residential development to Murphys Road. A large proportion of school traffic (70% of drivers) are expected to avoid Murphys Park Drive and exit the school via the left turn onto Murphys Road which leads to the motorway interchange.
- The remaining 30% of drivers may exit the school via Road 1 or Road 2 with some returning to their home within the catchment area and some using the Murphys Road / Murphy Park Drive intersection to continue their travel northbound.
- It is assumed that a high proportion of school traffic (25%) will utilise the remote PUDO on Picturesque Drive or other local roads which are in close walking distance to the school. The remote PUDO is considered a very attractive option as caregivers who wish to return home after dropping their children at school can avoid any school traffic on Road 3 or driving the circuitous route via Murphys Road. It should be noted that the average Park & Walk option for Auckland TravelWise schools is 14%.
- Traffic counts are not available for Murphys Park Drive. The proposed number of dwellings have been used to estimate future traffic volumes, with a trip generation rate of 0.65 trips per dwelling. An additional 200 trips has been assumed for other landuse activities such as the childcare centre. It is assumed that vehicle trips generated by the development will be equally distributed between Murphys Park Drive and Redoubt Road.

Estimated vehicle numbers generated by the school in the morning peak are illustrated in Figure 13.

6.3 SIDRA Modelling

Five SIDRA models have been produced with the results and assumptions provided below. Three of the five models have been undertaken for the purpose of sensitivity testing, including:

- (1) The school access left out exit on Murphys Road
- (2) Road 1 / Murphys Park Drive intersection

Sensitivity Tests:

- (3) The School access left out exit on Murphys Road - Sensitivity test assuming 14% of school traffic use the remote PUDO (rather than 25%).
- (4) Road 2 / Murphys Park Drive intersection - Sensitivity test assuming 14% of school traffic use the remote PUDO (rather than 25%). This model also assumes all school traffic uses Road 2.
- (5) No School Exit onto Murphys Road, with all school traffic using Murphy Park Drive – Sensitivity Test.

The school access on Road 3 has not been modelled as Road 3 is mainly to be utilised by school traffic only as it is not a through route, and has only one access (residential JOAL) taking access from Road 3. Both the Road 2 / Road 3 intersection, and the school PUDO access are both left in, left out only, so there will be no opposing traffic movements at either of these locations.

Assumptions for SIDRA Modelling

The following assumptions and inputs were adopted for the SIDRA model:

- The morning peak for school drop off has been modelled over a 30-minute period. This is based on the knowledge that schools typically allow students into the classrooms/school grounds at least 30 minutes before the start of school.
- Staff vehicle trips are outside of the peak school pick up/ drop off period and have therefore not been included in the SIDRA peak model. Staff trips are considerably lower than PUDO trips are often distributed over a longer time period.
- The full masterplan roll 1,250 students has been modelled, with application of the modal share, trip distribution and traffic counts assumptions discussed earlier in the report.
- The morning only peak is modelled as the traffic environment is the busiest at the time i.e. the afternoon peak does not coincide with the commuter peak.

Model (1): School Exit on Murphys Road

The SIDRA model for the school exit onto Murphys Road in the morning peak operates efficiently with a Level of Service (LOS) C for the school access, with the traffic flows on Murphys Road unaffected by the access and continuing to have a Level of Service A. A summary of the SIDRA results is provided in Table 5 with more detailed results in Appendix B.

A SIDRA model has not been run for the afternoon period as traffic volumes on Murphys Road are higher in the morning, so the afternoon will always operate at a higher LOS than the morning.

Table 5 Sidra results for School Access: Exit only on Murphys Road

Approach	Movement	AM Peak Hour		
		Demand Flow (vph)	Avg Delay (seconds)	LOS
Murphys Road South	Through	706	0.1	A
School Exit	Left	500	17.4	C
Murphys Road North	Through	814	0.2	A

Model (2): Road 2 / Murphys Park Drive Intersection

In order to produce a conservative model, we have assumed that *all* of the school traffic will enter and exit via the one intersection, whereas in reality the traffic will be distributed over two intersections, being Road 1 and Road 2. The model does not account for passer-by trips (i.e. assumes that all school trips are additional to the baseline traffic) which allows for a further degree of conservatism.

The SIDRA model for the Road 2 / Murphys Park Drive Intersection in the morning peak operates efficiently with the majority of movements operating at a high Level of Service (LOS) A and the right turning movements expected to operate at a LOS C. A summary of the SIDRA results is provided in Table 6 with more detailed results in Appendix B.

A SIDRA model has not been run for the afternoon period as traffic volumes on Murphys Park Drive are higher in the morning, so the afternoon will always operate at a higher LOS than the morning.

Table 6 Sidra results for Road 2 / Murphys Park Drive Intersection

Approach	Movement	AM Peak Hour		
		Demand Flow (vph)	Avg Delay (seconds)	LOS
Road 2	Left	113	9.7	A
	Right	120	19.6	C
Murphys Park Drive East	Left	714	5.0	A
	Through	524	0.5	A
Murphys Park Drive West	Through	245	7.2	A
	Right	29	21.9	C

Model (3): School Exit on Murphys Road [Sensitivity Test 14% Use of remote PUDO]

Sensitivity testing has been undertaken for the proposed school exit onto Murphys Road in the morning peak, assuming only 14% use the remote PUDO and 50% of school traffic use the on-site PUDO. The

model shows the access operates at an acceptable level with a Level of Service (LOS) E for the school exit, and the traffic flows on Murphys Road unaffected by the access and continuing to have a Level of Service A. The model shows that the PUDO will likely operate as a moving queue which is acceptable for the short peak time of a school. The queue will be contained on-site and not affect the operation of the arterial road network. A summary of the SIDRA results is provided in Table 7 Table 5 with more detailed results in Appendix B.

Table 7 Sidra results for School Access: Exit only on Murphys Road [Sensitivity Test]

Approach	Movement	AM Peak Hour		
		Demand Flow (vph)	Avg Delay (seconds)	LOS
Murphys Road South	Through	706	0.1	A
School Exit	Left	626	44	E
Murphys Road North	Through	814	0.2	A

Model (4): Road 2 / Murphys Park Drive Intersection [Sensitivity Test 14% Use of remote PUDO]

Sensitivity testing has been undertaken for the Road 2 / Murphys Park Drive intersection in the morning peak, assuming only 14% use the remote PUDO and 50% of school traffic use the on-site PUDO. We have also assumed that *all* the school traffic will enter and exit via the one intersection, whereas in reality the traffic will be distributed over two intersections, being Road 1 and Road 2. The model does not account for passer-by trips (i.e. assumes that all school trips are additional to the baseline traffic) which allows for a further degree of conservatism.

The SIDRA model for the Road 2 / Murphys Park Drive Intersection in the morning peak operates at an acceptable LOS with the majority of movements operating at a Level of Service (LOS) C/D, with the right turning movement into Road 2 expected to operate at a LOS E. A summary of the SIDRA results is provided in Table 8 with more detailed results in Appendix B. This scenario is unlikely to occur given there are two intersections over which left-turning traffic will be distributed.

Table 8 Sidra results for Road 2 / Murphys Park Drive Intersection [Sensitivity Test 14% remote PUDO]

Approach	Movement	AM Peak Hour		
		Demand Flow (vph)	Avg Delay (seconds)	LOS
Road 2	Left	165	17.2	C
	Right	154	31.3	D
Murphys Park Drive East	Left	892	5.2	A
	Through	524	0.7	A
	Through	245	19.7	C

Murphys Park Drive West	Right	29	38.6	E
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Model (5): Road 2 / Murphys Park Drive Intersection [Sensitivity Test No School Exit on Murphys Road]

Sensitivity testing has been undertaken for the Road 2 / Murphys Park Drive intersection in the morning peak, assuming there is no school exit onto Murphys Road. We have assumed that the school traffic be distributed over the two intersections (Road 1 and Road 2), with all right turning traffic occurring at Road 2, given Road 1 is expected to have a solid median preventing right turn movements. The model does not account for passer-by trips (i.e. assumes that all school trips are additional to the baseline traffic) which allows for a degree of conservatism.

The SIDRA model for the Road 2 / Murphys Park Drive Intersection in the morning peak operates at an acceptable LOS with the majority of movements operating at a Level of Service (LOS) C/D, with the right turning movement into Road 2 expected to operate at a LOS B. A summary of the SIDRA results is provided in Table 9 with more detailed results in Appendix B. This scenario performs better than Model (4) as we have distributed the school traffic over the Road 1 and Road 2 intersections (apart from the right turning movements which all travel through Road 2).

It should be noted that we have provided the sensitivity test on request by AT. Although the model shows Roads 1 and 2 can accommodate the school traffic without an access onto Murphys Road, we consider the left out exit onto Murphys Road is required to reduce congestion on the Murphys Park Drive / Murphys Road intersection.

Table 9 Sidra results for Road 2 / Murphys Park Drive Intersection [Sensitivity Test, No school Exit onto Murphys Road]

Approach	Movement	AM Peak Hour		
		Demand Flow (vph)	Avg Delay (seconds)	LOS
Road 2	Left	308	22.4	C
	Right	214	32.2	D
Murphys Park Drive East	Left	514	4.8	A
	Through	524	0.3	A
Murphys Park Drive West	Through	245	2.9	A
	Right	29	14	B

7. Infrastructure Requirements

The following infrastructure requirements are supported for the operation of the school, which are shown on the site plan in Figure 14. The Ministry of Education proposes to implement the following:

- Pedestrian crossing outside school entrance on Road 3
- Turning heads at both ends of Road 3 (if deemed necessary, in consultation with Auckland Transport).
- Solid central median island on Murphys Road to restrict right turning movements exiting the proposed school access (if deemed necessary at OPW stage, in consultation with Auckland Transport)
- Additional indented parking bay and extension of footpath on Picturesque Drive to service remote PUDO.
- Parking restrictions (P2 mins) for the remote PUDO on Picturesque Drive, at school start and finish times.

8. Conclusions

It is considered that the land to be designated for educational purposes and the existing surrounding roading network can accommodate the anticipated traffic of the proposed school with the provision of adequate access arrangements. Some key findings have been summarised below:

- This report has assessed the full masterplan roll of 1,250 students. It is likely to take many years for the masterplan roll to be reached, at which time significant road upgrades may be in place. However the traffic generated by the school can be accommodated on the existing road network with the use of a remote PUDO.
- The school catchment is anticipated to lie to the south-east of the site and is not expected to result in any school students needing to cross Murphys Road.
- The proposed left out only exit on Murphys Road is expected to operate safely and have sufficient capacity to cater for the expected student pick up, drop off demand.
- The Road 1 and Road 2 intersections with Murphys Park Drive have been modelled and expected to operate safely and have sufficient capacity to cater for the expected student pick up, drop off demand.
- The site can cater for the required parking demand for staff, visitors and student pick up and drop off.
- Detail of car and cycle parking, access arrangements and pedestrian crossings will be considered further during the OPW stage.
- A remote PUDO will be provided on Picturesque Drive, with indented parking bays and restricted parking during school start and finish times.
- A Travel Plan for the school will be developed prior to the school opening to promote road safety, encourage active modes, and manage an organised walking school bus between the remote PUDO and the school.
- The infrastructure requirements for the school include:
 - Pedestrian crossing outside school entrance on Road 3
 - Turning heads at both ends of Road 3 if deemed necessary.
 - Solid central median island on Murphys Road to restrict right turning movements exiting the proposed school access.
 - Additional indented parking bay and extension of footpath on Picturesque Drive to service remote PUDO.
 - Parking restrictions (P2 mins) for the remote PUDO on Picturesque Drive at school start and finish times.

This assessment concludes that Auckland Council can recommend confirmation of the NoR to designate the land for education purposes.

Appendix A.
Response Table from Auckland Transport & Auckland
Council Feedback

AT/AC Comment	Abley / Client Response
<p>Auckland Transport have recently received confirmation that Waka Kotahi will be the agency progressing the upgrades to Murphy's Road. Auckland Transport are seeking further clarification from Waka Kotahi on these points and have sought to include them in the above-mentioned meeting to discuss this and include them in the discussions relating to transport matters and effects pertaining to the proposed school.</p>	<p>As per the AEE:</p> <p><i>Noted. At the meeting on 7 December, representatives from Waka Kotahi identified there remain no firm updates on the scale, scope or delivery date of upgrades to Murphys Road. Best case, with the work being undertaken on a business case currently, there could be physical works occurring in 2025 but again, that is an estimate, with no detail available on the scope of works intended, and no clear direction from the Minister to pursue designs.</i></p>
<p>Appendix A of the ITA provides responses to AT's previous feedback however the responses are not considered to adequately address the issues to AT's satisfaction and further assessment and amendments are required.</p>	<p>We consider the response to be adequate and speak to the issues raised. These matters were also discussed at the meeting on 7 December, with points from the meeting included in this table.</p>
<p>AT has significant concerns regarding the form, function, and transport effects of the proposed Pick Up Drop Off (PUDO) operations on Road 3 and Picturesque Drive. Auckland Transport considers that the effects associated with pick up and drop off trips should be accommodated as far as is practicable within the school site. Auckland Transport requests that further work is done to assess the impacts on the road network should the remote PUDO (Picturesque Drive) not be utilised. Bad weather is likely to render the operation of this facility unattractive, particularly given the 450m walking distance between the remote PUDO and the school entrance, therefore modelling should reflect all PUDO vehicle trips utilising the main PUDO.</p>	<p>There is no formal PUDO proposed on Road 3. The formal PUDO spaces are provided within the school site.</p> <p>Auckland Transport (Community Transport) actively promote the use of remote PUDOs for the successful operation of a school. Typically, we would consider AT would support the proposal of a remote PUDO to reduce vehicle movements at the school gate and encourage active modes to school.</p> <p>The ITA assumes 25% of students use the Park & Walk option, whether this be using the remote PUDO on Picturesque Drive or another drop off point where it is safe to finish the journey on foot, such as Hodges Road at the start of the walk/cycle connection (no need to cross roads to reach the school). Given the position of the catchment and the appeal of avoiding the arterial road network, we believe that 25% is a realistic modal share for Park & Walk. However, for the purpose of sensitivity testing, we have assumed that only 14% of students Park & Walk which is the average percentage taken from the TravelWise data. This assessment is provided in Section 6.3 and shows that the left out only access onto Murphys Road can still operate at a satisfactory level.</p> <p>The School Travel Plan will manage how the on-site and remote PUDO operates to ensure a safe and efficient system.</p>
<p>The low level of integration for active modes within the schools catchment area (all access for active modes will need to arrive via Murphy's Park Drive which has a poor level of service) is problematic. Provision of an active mode connection from the school site across the stream to the east of the school site to Picturesque Drive is essential for creating a walkable neighbourhood. This will also improve the attractiveness of the proposed remote PUDO and would reduce the walking distance from the remote PUDO to the school entrance from 450m to approximately 120m.</p>	<p>We disagree that Murphys Park Drive has a poor level of service. The footpath on the southern side of Murphys Park Drive between Picturesque Drive and the walkway (to be vested through 125 Murphys Road) to the school is approximately 3.5m wide. All the roads within the catchment areas are recently constructed and have footpaths of at 1.8m width.</p> <p>As per the AEE:</p> <p><i>The Ministry has investigated a stream crossing, and received a quantity surveyor estimate of \$2m. This is not considered to be a scale of mitigation commensurate with the transport effects of this school proposal, specifically considering the crossing would only be reducing a 450m walk. The ITA explains how the remote PUDO can be implemented and the proposed designation conditions address this expectation including through use of a travel plan, that the school must continue to operate.</i></p>
<p>Auckland Transport is concerned with the proposed left out exit from within the school (on-site) PUDO on to Murphy's Road and would like more detail as there is considered to be insufficient information available within the ITA to determine if the proposal is efficient, effective</p>	<p>The level of detail provided in the ITA is sufficient for the NOR process which demonstrates sufficient visibility to the north to meet the required sight distance. There is also 70m clear sight line between the crest on Murphys Road and the proposed traffic island to ensure adequate visibility for northbound traffic to see the island</p>

<p>and safe. Murphy's Road as currently formed has a constrained width and implementation of a left turn out accessway is challenging. Restricting left in access is also considered challenging.</p> <p>To enable further assessment the sight distance assessment needs to include a plan, if vertical restrictions exist, this should be illustrated with either site photos or longitudinal profile. The proposal as presented raises serious safety concerns and further assessment is needed.</p> <p>However, the preference is that this option is not pursued as the provision of a separate access onto Murphy's Road from the school is not supported by AT. Consideration of an alternative where the PUDO exit is at or just east of Road 1 intersection should be made, this would enable alternative routes out of the school PUDO.</p>	<p>on their approach. School traffic that wishes to head north on Murphys Road has an alternative route via Road 1 and Murphys Park Drive, which eliminates the risk to drivers using the left out only and performing a u-turn to head north.</p> <p>The ITA includes a visibility assessment using Austroads standards and provides photos showing the view from the proposed left out only access.</p> <p>The median island will be subject to an Engineering Plan Approval which will require AT approval.</p> <p>This advice contradicts previous discussions with AT, as it was a logical option to take the pressure from the local roads 1 and 2, and the Murphys Park Drive / Murphys Road intersection. At the meeting with AT on 7 December, we discussed the possibility of 'rat running' through the school PUDO, which all parties seemed to be in agreement that it is not reasonable to think drivers would do this at school PUDO times, and that the Murphys Road access gate will be closed / managed at other times.</p>
<p>Consideration should also be given to the formation of an intersection to connect Road 3 and Murphy's Road which would bring the additional benefit of providing a safe crossing between the development area to the west of Murphys Road and the school. However, the key reason for this request is that it is anticipated that the Murphy's Park Drive intersection with Murphy's Road will fail without that connection or in the alternative, a Hodges Road to Thomas Road connection with an intersection formed on Murphy's Road.</p>	<p>An intersection connecting Road 3 and Murphys Road including a pedestrian crossing would need to be signalised. This will likely be a safety hazard with the existing crest on Murphys Road as the signals would result in a hidden queue. AT was in agreement of this safety hazard in the meeting on 7 Dec and a signalised intersection was ruled out.</p>
<p>The alteration works proposed on Road 3 should be limited to those that pertain to the car park entries/exits. Blocking the median at Road 2 intersection is not acceptable, the ability to right turn from Road 2 to Road 3 needs to be retained. The PUDO entry may need to be moved further east, so that approach is via the turn-around at the east end of road 3. In addition the staff car park access could also be moved further east. There may also be benefit to considering an alternative PUDO placement as its location at the school door creates a conflict for pedestrian/active modes users who will have to cross PUDO circulation.</p>	<p>As per the AEE:</p> <p><i>The ITA confirms the proposed changes to Road 3 would be satisfactory from the Ministry's perspective. Proffered amendments were to alleviate queues and could be pushed to OPW stage. The location of on-site PUDO in the Design Feasibility Study has already taken account of pedestrian separation and safety. Other details are more appropriately addressed at OPW stage.</i></p>
<p>A further assessment of the effects of the below scenarios should be provided:</p> <ol style="list-style-type: none"> 1. not providing the left-out access on to Murphy's Road; 2. a significantly lower utilisation of the remote PUDO; and 3. a combination of 1) and 2) above. 	<p>Section 6.3 demonstrates that the left out turn onto Murphys Road and the Road 1 and 2 intersections can operate at a satisfactory level when 14% of school students using the remote PUDO which aligns with the average Park & Walk usage from the TravelWise data.</p> <p>We have also included a model assuming no left out access onto Murphys Road. The model shows that Road 1 and 2 intersections with Murphy Park Drive can accommodate the school traffic without the left out exit. We do not recommend this approach as it will take more pressure to the Murphys Road / Murphys Park Drive intersection.</p>
<p>AT requests that modelling be undertaken to demonstrate impact on the intersection of Murphy's Park Drive and Murphy's Road and the local road network serving the school based on the above scenarios.</p>	<p>The school is not generating any additional traffic through the Murphys Road / Murphys Park Drive intersection, as the only school traffic that are continuing their journey to work or study will already be using this intersection. These are trips that will be on the road network despite whether a school was built at this site. This is</p>

	<p>correct even if the school did not provide a left out access onto Murphys Road.</p> <p>It should be noted that in the event that the school at 121 Murphys Road does not proceed, school trips for residents living in this catchment will be required to drive through the Murphys Road / Murphys Park Drive intersection. I.e. the school at 121 Murphys Road will result in fewer trips needing to access Murphys Road.</p>
<p>General</p> <ul style="list-style-type: none"> • Auckland Transport acknowledges the need for the school to meet demands arising from population growth and intensification in the Flat Bush area. The subject site shows promise as a location for a school. That said the site is not without some significant challenges. General feedback from AT is that there is a need to consider the wider program of upgrades for Murphys Drive as part of the New Zealand Upgrade Programme. This is a key road that is of significant importance for the proposed school. At the time of writing road design detail is not yet available. • The ITA should reference the upgrade for Murphys Road, including walking and cycling paths. Noting in particular: <ul style="list-style-type: none"> ○ includes vertical alignment modification to deal with the abrupt summit near the site. ○ LILO intersection and signalised crossing need safe visibility. ○ Design speed will be affected by the design and timing of MPD and Thomas Rd intersection safety upgrades. • Notwithstanding the 'indicative' catchment zone identified in the strategy, Auckland Transport understand that it would still be possible for students residing West of Murphys road to be entered onto the school roll. No analysis of the existing school rolls in the area has been provided, it is not clear to Auckland Transport how MoE envisions restricting entrants on to the Flat Bush School role from the West of Murphys road or why, other than to avoid addressing the need for a safe connection across Murphys road, this would be desirable. 	<p>As per the AEE:</p> <p><i>At the meeting on 7 December, representatives from Waka Kotahi identified there remain no firm updates on the scale, scope or delivery date of upgrades to Murphys Road. Best case, with the work being undertaken on a business case currently, there could be physical works occurring in 2025 but again, that is an estimate, with no detail available on the scope of works intended, and no clear direction from the Minister to pursue designs.</i></p> <p>The proposed transport strategy for the school ensures students will not need to use Murphys Road to access the school. At the time that Murphys Road is upgraded, this will only be a benefit to the school. The proposed left out access onto Murphys Road may remain when Murphys Road is upgraded, or there may be opportunity for it to accommodate unrestricted movements in the future if visibility improves with potential flattening of the road crest.</p> <p>The indicative school catchment lies to the south-east of the school and is unlikely to include the residential development to the west of Murphys Road. School zones are often bordered by busy arterial roads to limit the number of busy roads for school children to cross. MOE have indicated that students living in the Donegal Glen development west of Murphys Road will be in zone for Chapel Downs school. Once Murphys Road has been upgraded by NZ UP (or others) and may include safe pedestrian crossings and provision for active modes, then there may be opportunity to revisit the school catchment zones. Until such time, our recommendation is that the school zone is restricted to the east of Murphys Road. MOE (in consultation with the BOT when appointed) will confirm the school zone and are therefore responsible for the establishment of that school zone.</p> <p>A safe crossing point is unlikely to be accommodated near the school frontage on Murphys Road, due to the significant crest in the road. Any crossing on Murphys Road in the vicinity of the school is likely to result in a hidden queue beyond the crest in the road which is an unacceptable safety risk, hence this is not being pursued by MOE.</p>
<p>Walking and Cycling</p> <ul style="list-style-type: none"> • Assessment should detail the walking catchment for the school and assess the adequacy of infrastructure including the area immediately west of Murphys road. There is insufficient commentary around walking and cycling (and wheeling), planning for vulnerable road users needs to be prioritised. Walking and cycling should be considered as the principal mode of access 	<p>The walking catchment for the school lies to the south-east of the school site. This area is made up of newly constructed local roads with footpaths on both sides, designed to cater for low speeds and have safe crossing points. These roads provide an excellent environment for active modes.</p> <p>There is no walking or cycling provision on Murphys Road and it is unlikely that any interim mitigation prior to the full upgrade of</p>

within the school catchment and the requisite infrastructure to enable this needs to be identified.

- The stream crossing from Picturesque Drive will mitigate private vehicle trip generation and contribute to a reduction in emissions, this should link the cycle facility on the other side of the stream promoting school access by active mode and increasing the viability of the proposed remote PUDO.
- ITA should pick up on discussion between MoE and AC Parks regarding an esplanade path continuing South and West from the SE corner of #12 esplanade path through to Murphys Road. This has been planned in the RC and EA for BUN60397121
- The provision of a new school on the subject site will be a significant draw for residents west of Murphys Drive given the travel distance to existing schools. As such a signalised crossing of Murphys Road to connect with Donegal path network must be provided.

Murphys Road will be a safe solution for school students. The ITA assumes that school students will only be travelling from the southeast, resulting in no demand on Murphys Road.

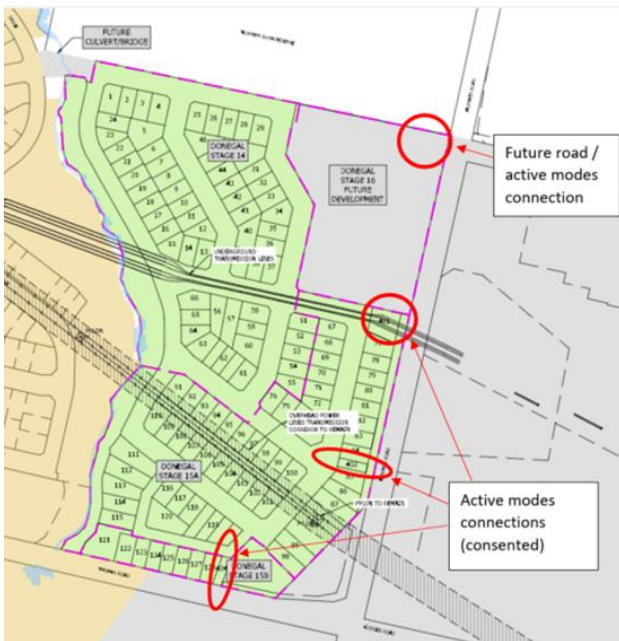
The distance from the remote PUDO to the school site is approximately 450m which equates to a 5-minute walk (via the soon to be constructed and vested walkway through 125 Murphys Road development). This short distance does not warrant the very high expense of an active modes bridge across the stream. We believe the remote PUDO will be successful if managed well through the School Travel Plan and walking school bus programme.

The Ministry has investigated a stream crossing, and received a quantity surveyor estimate of \$2m. This is not considered to be a scale of mitigation commensurate with the transport effects of this school proposal, specifically considering the crossing would only be reducing a 450m walk. The ITA explains how the remote PUDO can be implemented and the proposed designation conditions address this expectation including through use of a travel plan, that the school must continue to operate.

Not clear what this comment refers to.

MOE have indicated that students living in the Donegal Glen development west of Murphys Road will be in zone for and Chapel Downs school. Once Murphys Road has been upgraded by NZ UP (or others) and may include safe pedestrian crossings and provision for active modes, then there may be opportunity to revisit the school catchment zones. Until such time, our recommendation is that the school zone is restricted to the east of Murphys Road.

A safe crossing point such as pedestrian signals is unlikely to be accommodated near the school frontage on Murphys Road, due to the significant crest in the road. Any crossing on Murphys Road in vicinity of the school is likely to result in a hidden queue beyond the crest in the road, causing a safety hazard, hence this is not being pursued by MOE.



Pick up Drop Off, parking and internal circulation

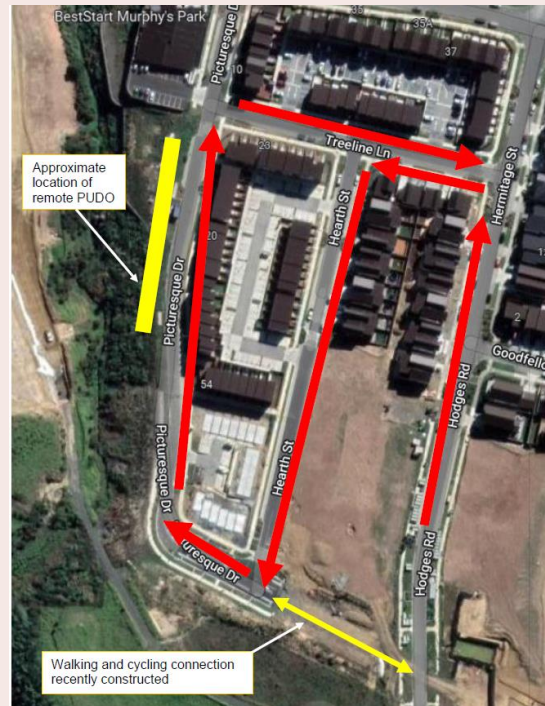
- The east end of the road being constructed by #125 must be reconfigured to form a forward turn head (11 m radius). This end of the road will become effectively PUDO.

Agreed. MOE propose to form both ends of Road 3 into forward turning heads if considered necessary at next stage of design.

- Any PUDO access onto the school grounds must be located so that direct and safe access by children on foot or bike is not put in conflict with cars, priority should be given to vulnerable users.
- Circulation and manoeuvring needs to be carefully scrutinised for both the remote and on site PUDO locations. The remote PUDO is located on a residential road. Detail of expected number of users at each PUDO needs to be provided. Note that Auckland Transport questions the viability of the remote PUDO to attract users away from the on site PUDO given:
 - Likelihood of onward journeys that utilise Murphys road (particularly if direct access on to Murphys is provided for
 - Walking distance to school if stream crossing is not provided for.

Agreed. Pedestrian/cycle access will be separated from vehicle access. This will be confirmed at OPW stage.

The local road network provides an informal one-way system for pick up / drop off at the remote PUDO. A system such as shown in the image below can be promoted and encouraged through the School Travel Plan.




We expect that caregivers with onward journeys will use the on-site PUDO, particularly if they are travelling on to the south. These are trips that will already be on the road network whether the school was in operation or not. Caregivers travelling north however will likely find the remote PUDO more attractive as the school exit onto Murphys Road will not allow them to turn right / to the north.


The walking distance from the remote PUDO is a 5 minute walk, which is easily included into the journey to school, particularly given it is proposed to be escorted (via a walking school bus).

- Picturesque Drive is not built to accommodate a remote PUDO and will require upgrades, adding in parking and footpaths. As noted above the stream crossing from Picturesque Drive is critical for this to be attractive.
- Consider potential of Picturesque drive to be connected through to Hodges Road to the south on its future East West alignment.

Agree. MOE propose to construct additional indented parking bays (number to be confirmed at OPW stage) and footpath.

Construction of Picturesque Drive is complete and links up with Hodges Road, however it provides a walking and cycling link only with no vehicle access at this stage. Photo below.

<ul style="list-style-type: none"> • Need to demonstrate how the school can be served by buses, although too small for a school bus, there will be school trips etc. that present a need for bus access to be designed for. • Auckland Transport has concerns about the feasibility of a one way PUDO operation, it may prompt u turning on Murphys road, please consider option of access back on to road 3. 	 <p>The on-site PUDO will accommodate school buses for field trips etc. The new local roads will be required to cater for a 10.3m rubbish truck, therefore assumption is made that the roads will also be able to accommodate buses. Vehicle tracking for buses will be provided at OPW stage.</p> <p>The design now incorporates an option to return to Road 3 and Murphys Park Drive so there is an alternative route for drivers wishing to travel north on Murphys Road.</p>
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<p>Effects on wider network</p> <ul style="list-style-type: none"> • The feasibility of the LILO has not been assessed in detail at this stage. • There is need to better understand the network to the east and south, in particular the potential future Hodges Road and how access will operate in the interim and once the network is complete. 	<p>A SIDRA model of the left out only access is provided in the ITA.</p> <p>Google maps provides the most recent aerial of the road network within the catchment area. Hodges Road is constructed linking the residential developments to the south of the catchment. The road link between Picturesque Drive and Hodges Road has been constructed allowing walking and cycling access, with restricted vehicle access at this stage. Caregivers using the remote PUDO on Picturesque Drive can utilise Hearst Street.</p> 
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<p>AUCKLAND COUNCIL FEEDBACK</p>	
<p>Transport - General</p>	

<p>You have requested a gap-analysis of the provided information with the aim of avoiding or reducing requests for information once the Notice is lodged. I have also provided some preliminary comments on merits and potential effects that I hope may be of assistance to the Ministry.</p>	<p>Noted.</p>
<p>Transport – vehicle access</p> <p>From the Council GIS LIDAR contour information, it appears the apex of the crest curve is less than 10m south of the south end of the site’s road frontage, and it appears that sightlines from the southern end of the site frontage might extend over the crest and meet SISD requirements. That would suggest a superior location for vehicle access, respecting the current form of Murphys Road, would be at the south end of the frontage. If the sight distances from the southern end of the proposed site frontage did not meet the minimum requirements, extending the designation to the southwest (including the derelict former dwelling) should allow a fully compliant access providing for all movements. It is noted that entry movements are likely to warrant auxiliary lanes to be added to Murphys Road.</p> <p><i>The assessment of sight distances should be based on measured operating speeds, or alternately on estimated speeds 15% higher than the posted speed limit, and the grade of the road (estimated from GIS LIDAR contours to be around 7%). I recommend sight distances measured at the southern end of the road frontage be provided.</i></p> <p>The prohibition of right turn exit movements is unlikely to be fully effective and it is likely that the driveway would generate some U-turn movements to the south, potentially at the Thomas Road intersection.</p> <p><i>I recommend an assessment of the changes required to Murphys Road to support the installation of a median island, such as road widening, street lighting, changes to road markings be provided; and an assessment of the effects of the proposed median island on other users of the road, including from drivers U-turning south of the site.</i></p>	<p>AT does not support the main access to the school to occur from Murphys Road given it is an arterial road. AT confirmed this position in the meeting of 7 December. No further assessment of this option is provided.</p> <p>The level of detail provided in the ITA is sufficient for the NOR process which demonstrates sufficient visibility to the north to meet the required sight distance. There is also 70m clear sight line between the crest on Murphys Road and the proposed traffic island to ensure adequate visibility for northbound traffic to see the island on their approach.</p> <p>School traffic that wishes to head north on Murphys Road has an alternative route via Road 1 and Murphys Park Drive, which eliminates the risk to drivers using the left out only and performing a u-turn to head north.</p> <p>The ITA includes a visibility assessment using Austroads standards and provides photos showing the view from the proposed left out only access.</p> <p>The median island will be subject to an Engineering Plan Approval which will require AT approval.</p>
<p>Transport – Rat Running</p> <p>The combination of the entry from Road 3 and the exit onto Murphy Road provides for vehicles to travel through the site. That route is likely to be highly attractive to many drivers that could otherwise be subject to delay turning out of Murphys Park Drive onto Murphys Road, particularly in the a.m. peak period, and it is highly likely that “rat-run” traffic through the school site would be problematic and difficult for the school to manage.</p> <p>The ITA provides no information on the level of delay that is currently experienced at the Murphys Drive/ Murphys Drive intersection, or at any other location, to assist in estimating the potential for rat-run traffic through the school. Rat-run traffic has the potential to generate adverse outcomes for residents and other users of the proposed local roads to the north (Roads 1 to 3).</p> <p>Given these issues it is recommended the Ministry consider relocating any vehicle access on Murphys Road to the southern end of the frontage where suitable sight</p>	<p>At the meeting with AT & AC on 7 December, we discussed the possibility of ‘rat running’ through the school PUDO, which all parties seemed to be in agreement that it is not reasonable to think drivers would do this at school PUDO times, and that the Murphys Road access gate will be closed / managed at other times. Rat-running is therefore not considered a risk.</p> <p>The land east of the Murphys Park Drive / Murphys Road intersection is not yet built out, therefore the current situation of the local road network is immaterial. Once the area is built out, it is likely that the intersection will experience congestion. However, it is not considered reasonable to suggest that it would be quicker for a vehicle to travel through the school PUDO at peak school times than to wait in the queue on Murphys Park Drive. The Murphys Road access gate to the PUDO at other times will be managed/closed to ensure rat running doesn’t occur.</p> <p>As discussed above, AT does not support the main access to the school to occur from Murphys Road given it is an arterial road. AT</p>

<p>distances are available. If access is not to be relocated the ITA should explain why this location would not be feasible. It is also recommended that consideration be given to not providing a link for vehicles to pass through the site.</p> <p>Alternately, it is recommended that the Ministry consider not providing any access (vehicular or pedestrian) on Murphys Road to avoid the road safety issues associated with any access on that frontage.</p> <p><i>An assessment of the propensity for drivers to use the through-site link as a rat-run should be provided, including information on the delays experienced at the Murphys Road/ Murphys Park Road intersection in the a.m. peak period, and ways in which that may be avoided or managed.</i></p>	<p>confirmed this position in the meeting of 7 December. No further assessment of this option is provided.</p> <p>A left out access onto Murphys Road is considered a safe and effective option for the school and the arterial road network. Left in, left out accesses are often the preferred option given the left turning vehicles and turning in the same direction of the traffic flow and therefore less likely to result in death or serious injury crashes. In addition to this, provision of a left turn onto Murphys Road will take pressure off the Murphys Park Drive / Murphys Road intersection.</p>
<p>Transport – roads in 125 Murphys Road</p> <p><i>I recommended additional information be provided including the possibility that other sites fronting Road 3 may use it for vehicle access, or that Road 3 may be extended in future.</i></p> <p><i>Dimensions of the proposed median island in Road 3 and carriageway widths along with design details of Roads 1 to 3 be provided. The ITA should demonstrate that large vehicles could negotiate Roads 1 to 3 including the turns in and out of the school site.</i></p> <p><i>An assessment of the suitability of Roads 1 to 3 to provide the primary vehicular access to a school, and the effect of the additional traffic on that environment should be included.</i></p>	<p>We understand there is one JOAL access onto Road 3 from the residential development as described in Section 3.2. We understand the extension of Road 3 was not supported previously which is reflected in the EPA plans proposing a cul-de-sac at both ends.</p> <p>The EPA plans for the 125 Murphys Road development include a central island on Road 3. AT requirements suggest that a 10.3m rubbish truck will be able to negotiate these roads. MOE will consider any changes that may be needed to the central island on Road 3 for the operation of the school. This detail will be considered at OPW stage in consultation with AT.</p> <p>The carriageway on Roads 1 and 3 are wide enough (~6m plus indented parking) to allow for two-way flow. The roads are not through routes and will experience very low traffic volumes servicing the local residents only. Road 3 has one access only which services a superlot. The school pick up and drop off times are only for a short period of the day.</p>
<p>Transport – pedestrian access and PUDO</p> <p>We note Auckland Transport is of the view that a pedestrian crossing facility on Murphys Road is required. The response to that comment in the ITA states that the poor sight distance at the crest would result in queues at the crossing being hidden, precluding such a crossing. We note that a crossing provided at or near the crest is unlikely to have that problem.</p> <p>Part of the school catchment described in the ITA includes land zoned Residential- Mixed Housing Suburban. The implementation of changes to zoning rules required by central government are expected to increase the number of dwellings provided in those areas. The ITA provides an estimate of the number of dwellings likely to be provided in the catchment calculated by the Ministry, and states it is higher than the zoning anticipated, but it is not clear if the estimated number of dwellings reflects the forthcoming change to the AUP. This is relevant to the estimation of the future traffic volumes provided in the ITA.</p> <p><i>I recommend the basis for the estimated number of dwellings be clarified, including if the estimate accounts for the expected enabling of additional dwelling density.</i></p>	<p>The indicative catchment does not require pedestrians to cross Murphys Road and there is not proposed to be any pedestrian access to the school from Murphys Road.</p> <p>As per the AEE:</p> <p><i>The receiving environment is currently the existing MHU zone and Precinct. We agree that ultimately the MDRS will be implemented but the Plan Changes does not currently include this area given the Precinct. Further, the MDRS are not live and therefore do not have legal effect currently in this location.</i></p>
<p>Transport – Murphys Road</p>	

<p>As noted above, it is likely that some children will be dropped off and picked up on Murphys Road as the school has an access point on that frontage. If there is a pedestrian connection between Murphys Road and Road 3 that behaviour could occur regardless of the school having an access on Murphys Road. It is recommended that this behaviour be provided for rather than attempting to dissuade it from occurring.</p>	<p>It is not safe to drop off on Murphys Road in its current state and it is not expected that caregivers would take this risk. The left out vehicle access onto Murphys Road will not include pedestrian access. The Travel Plan will include an education campaign which will provide safe options for pick up and drop off.</p>
<p>Transport – Picturesque Drive Remote PUDO</p> <p>The proposed is stated to be a 450m walk from the school and attract 25% of all vehicle traffic. The ITA explains that a school travel plan would ensure a high uptake of remote PUDO use and the provision of a Walking School Bus (WSB).</p> <p>The ITA assumes there would be little demand for the parking bays on the western side of Picturesque Drive, however, in similar residential areas the demand for on-street parking can be very high. Insufficient information is provided to support the ITA assertion in relation to parking demand.</p> <p>Based on the information supplied, the assumed level of use of this remote facility is not credible. I understand some schools can struggle to recruit sufficient volunteers to maintain a WSB at all times. A WSB would presumably wait at the remote PUDO and then leave for the school at a set time. Children that arrive late at the remote PUDO are likely to then walk to school unsupervised or to be driven to the main PUDO.</p> <p><i>I recommend data supporting the assumed low demand for on-street parking in the area be provided and data to support the assumed proportion of children that would use this PUDO in preference to another location in the area such as the on-site PUDO or Road 2. I recommend sensitivity testing with lower use of the remote PUDO be included.</i></p>	<p>Section 6.3 provides a sensitivity test assuming only 14% use the remote PUDO (and other Park & Walk locations) – 14% is the TravelWise data average for Park & Walk mode share at Auckland schools. The sensitivity test shows that the left turn out onto Murphys Road and the Road 2 /Murphys Park Drive intersection can still operate at a satisfactory level.</p> <p>There are no existing parking bays on the south western side of Picturesque Drive and unlikely to be any proposed due to there being no opportunity for additional development on the western side. The MOE proposed parking bays will have restricted parking at school start and finish times with unrestricted parking at all other times. This will be additional to the current on-street parking and therefore a benefit to the community.</p> <p>It should be noted that Park & Walk locations can occur at any point >400m from the school. The majority of the 14% average Park & Walk mode taken from the TravelWise data will be informal locations on the road network where caregivers drop off at a location where the remaining journey is safe for the child to walk. For example, at the end of the school road where there are no further roads to cross. The 25% Park & Walk modal share for Flat Bush School is expected to be made up of students using the remote PUDO and other locations such as walking from the walking / cycling connection at the Hodges Road / Picturesque Drive intersection.</p> <p>The Travel Plan will ensure the walking school bus for the remote PUDO is a priority for the school.</p>
<p>Transport – other</p> <p>The walking distance between the school and the neighbourhoods to the east, including the remote PUDO, could be significantly reduced by providing an active mode crossing of the watercourse east of the school. That would support the use of non-car transport modes and reduce car dependency.</p> <p>The on-site PUDO facility is proposed to have 16 spaces. No information is given about the adequacy of that number of spaces to serve the expected demand, or the likely queuing and delay that may be experienced within the site and the local streets to the north. The number of parking spaces proposed to be provided in Picturesque Drive is not stated. It is known that PUDO areas experience higher parking demand in the after-school period and the adequacy of the PUDO areas to accommodate that demand, the possible extent of any PUDO over-spill parking, and any potential effects generated by the parking (and/ or queuing) have not been included.</p> <p><i>Data should be provided to demonstrate the likely performance of the PUDO areas in the after-school period, and the effects of over-spill parking and traffic</i></p>	<p>A response to the suggested necessity of a stream crossing has been provided above.</p> <p>The level of detail provided is appropriate for a NOR, with a more detailed parking demand assessment provided at OPW stage for both on-site and the parking on Picturesque Drive.</p> <p>The Travel Plan will best manage the after school pick up to ensure it operates well with minimal overspill. Some overspill onto residential streets is expected at any school but is considered acceptable given is a very short window of the day and does not coincide with the commuter peak. As seen in Figure 16, there is a</p>

<p><i>movements, including U-turn movements to access parking.</i></p>	<p>well-connected road network which should support the remote PUDO to operate well with no need for U-turning.</p>
<p>Transport – Assessment review <i>Recent actual traffic volumes on Murphys Road and Murphys Park Drive in the before-school and after-school hours should be provided.</i></p>	<p>As discussed above, the land east of the Murphys Park Drive / Murphys Road intersection is not yet built out, therefore the current situation of the local road network is immaterial.</p>
<p><i>Data to support the assumed trip rate, or modified analysis using a higher trip rate, and sensitivity testing of assumptions such as trip distribution, or alternative data such as output from regional transport models to inform the expected future traffic volumes should be provided.</i></p>	<p>The SIDRA models have used the appropriate trip rate for the housing typology. We consider our models to be conservative given we have not assumed any shared trips i.e. all school trips are in addition to residential trips.</p> <p>All regional models available had assumed the Mill Rd corridor upgrade completion. This was confirmed by AT who have stated that no modelling without the Mill Road corridor upgrade is available.</p>
<p><i>I recommend data be provided to support the assumed car mode share values and the trip generation rates.</i></p>	<p>As stated in the ITA, we have used the TravelWise data. We understand this is the most up-to-date data available for schools. A comment on the trip generation rates is provided in the item above.</p>
<p><i>I recommend the results of sensitivity testing of the assumptions used, and some analysis of the after-school period be provided.</i></p>	<p>As per the AEE: <i>The ITA only provided the model for the morning period because traffic on network will be less in the afternoon as the school and commuter traffic peaks do not coincide. Morning peak therefore the worst-case. The travel plan designation condition is expected to manage the after school PUDO period.</i></p>

Appendix B.
SIDRA Model Outputs



Model (1) SIDRA Results for School Access (Left out Exit only) on Murphys Road

MOVEMENT SUMMARY

Site: 101 [School Exit / Murphys Rd (Site Folder: General)]

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

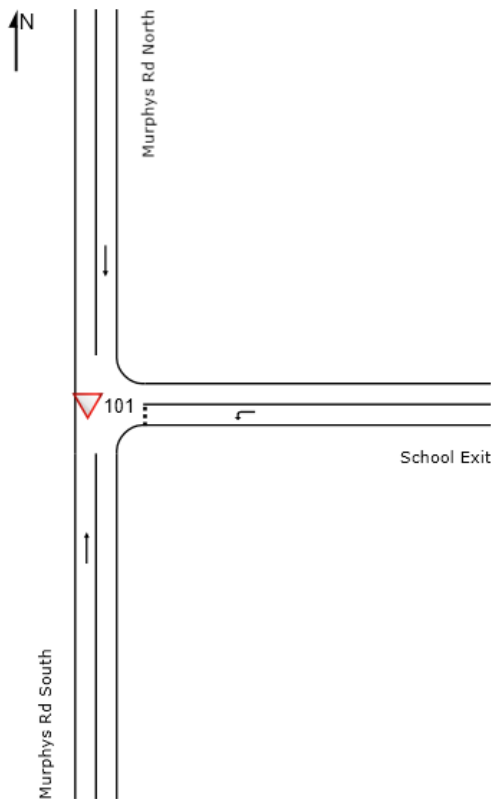
Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn w/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
		[Total veh/h]	[HV %]	[Total veh/h]	[HV %]				[Veh. veh]	[Dist m]				
South: Murphys Rd South														
2	T1	671	0.0	706	0.0	0.362	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	49.8
Approach		671	0.0	706	0.0	0.362	0.1	NA	0.0	0.0	0.00	0.00	0.00	49.8
East: School Exit														
4	L2	250	0.0	500	0.0	0.787	17.4	LOS C	6.9	48.5	0.88	1.40	2.22	38.2
Approach		250	0.0	500	0.0	0.787	17.4	LOS C	6.9	48.5	0.88	1.40	2.22	38.2
North: Murphys Rd North														
8	T1	773	0.0	814	0.0	0.417	0.2	LOS A	0.0	0.0	0.00	0.00	0.00	49.8
Approach		773	0.0	814	0.0	0.417	0.2	NA	0.0	0.0	0.00	0.00	0.00	49.8
All Vehicles		1694	0.0	2020	0.0	0.787	4.4	NA	6.9	48.5	0.22	0.35	0.55	46.8

SITE LAYOUT

Site: 101 [School Exit / Murphys Rd (Site Folder: General)]

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

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



Model (2) SIDRA Results for Road 2 / Murphys Park Drive intersection

MOVEMENT SUMMARY

▼ Site: 101 [MPD/Rd2 Base+ALL School thru one int (Site Folder: General)]

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

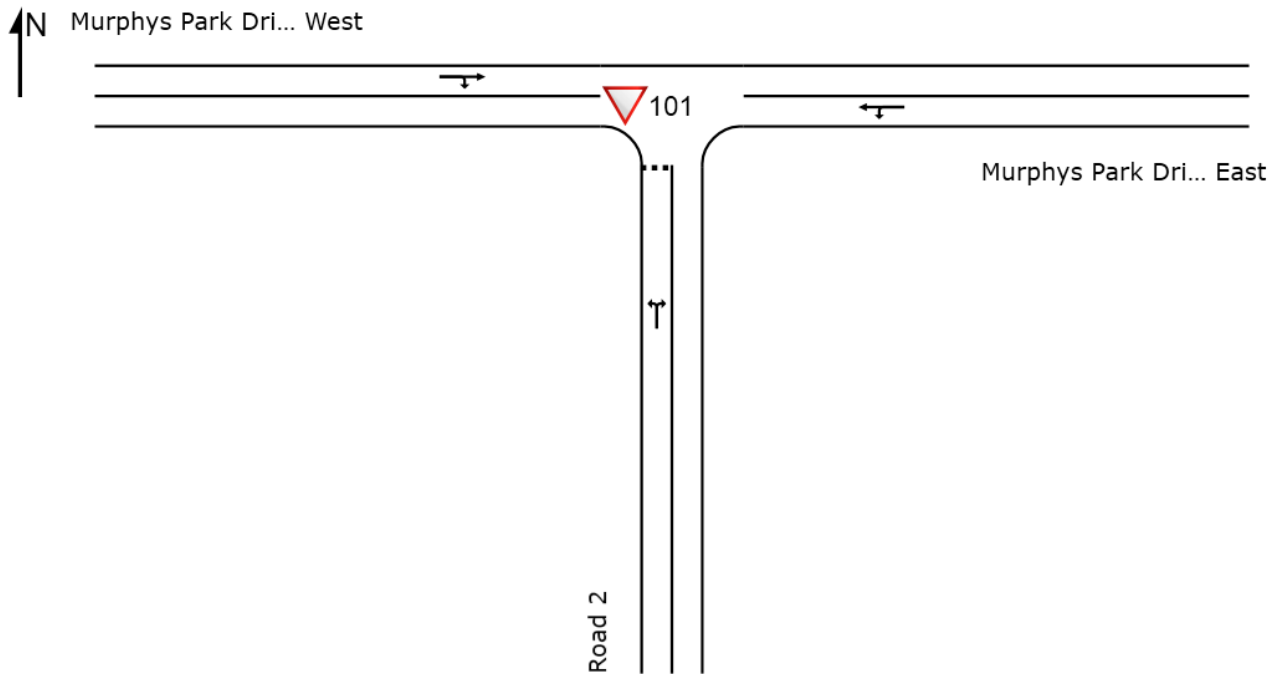
Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn w/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
		[Total veh/h	HV] %	[Total veh/h	HV] %				[Veh. veh	Dist] m				
South: Road 2														
1	L2	85	0.0	113	0.0	0.511	9.7	LOS A	2.4	16.9	0.74	1.03	1.15	41.2
3	R2	60	0.0	120	0.0	0.511	19.6	LOS C	2.4	16.9	0.74	1.03	1.15	40.9
Approach		145	0.0	233	0.0	0.511	14.8	LOS B	2.4	16.9	0.74	1.03	1.15	41.1
East: Murphys Park Drive East														
4	L2	357	0.0	714	0.0	0.653	5.0	LOS A	0.0	0.0	0.00	0.31	0.00	47.3
5	T1	498	0.0	524	0.0	0.653	0.5	LOS A	0.0	0.0	0.00	0.31	0.00	47.7
Approach		855	0.0	1238	0.0	0.653	3.1	NA	0.0	0.0	0.00	0.31	0.00	47.5
West: Murphys Park Drive West														
11	T1	233	0.0	245	0.0	0.241	7.2	LOS A	1.9	13.6	0.47	0.09	0.55	44.6
12	R2	28	0.0	29	0.0	0.241	21.9	LOS C	1.9	13.6	0.47	0.09	0.55	43.8
Approach		261	0.0	275	0.0	0.241	8.8	NA	1.9	13.6	0.47	0.09	0.55	44.5
All Vehicles		1261	0.0	1746	0.0	0.653	5.5	NA	2.4	16.9	0.17	0.37	0.24	46.0

SITE LAYOUT

▼ Site: 101 [MPD/Rd2 Base+ALL School thru one int (Site Folder: General)]

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

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



Model (3) Sensitivity Test: SIDRA Results for School Exit on Murphys Road - 14% Use of remote PUDO

MOVEMENT SUMMARY

Site: 101 [Model3 School Exit / Murphys Rd 50% traffic using school PUDO (Site Folder: General)]

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

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] %	[Total veh/h	HV] %	v/c	sec		[Veh. veh	Dist] m				km/h
South: Murphys Rd South														
2	T1	671	0.0	706	0.0	0.362	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	49.8
Approach		671	0.0	706	0.0	0.362	0.1	NA	0.0	0.0	0.00	0.00	0.00	49.8
East: School Exit														
4	L2	313	0.0	626	0.0	0.985	44.0	LOS E	22.6	158.0	0.99	2.69	5.90	28.4
Approach		313	0.0	626	0.0	0.985	44.0	LOS E	22.6	158.0	0.99	2.69	5.90	28.4
North: Murphys Rd North														
8	T1	773	0.0	814	0.0	0.417	0.2	LOS A	0.0	0.0	0.00	0.00	0.00	49.8
Approach		773	0.0	814	0.0	0.417	0.2	NA	0.0	0.0	0.00	0.00	0.00	49.8
All Vehicles		1757	0.0	2146	0.0	0.985	12.9	NA	22.6	158.0	0.29	0.78	1.72	41.9

Model (4) Sensitivity Test: SIDRA Results for Road 2 / Murphys Park Drive intersection - 14% Use of remote PUDO

MOVEMENT SUMMARY

Site: 101 [Model4 MPD/Rd2 Base+School Sens test All R turn thru Road 2 (Site Folder: General)]

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

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] %	[Total veh/h	HV] %	v/c	sec		[Veh. veh	Dist] m				km/h
South: Road 2														
1	L2	157	0.0	165	0.0	0.781	17.2	LOS C	5.5	38.6	0.82	1.37	2.10	37.3
3	R2	77	0.0	154	0.0	0.781	31.3	LOS D	5.5	38.6	0.82	1.37	2.10	37.1
Approach		234	0.0	319	0.0	0.781	24.0	LOS C	5.5	38.6	0.82	1.37	2.10	37.2
East: Murphys Park Drive East														
4	L2	446	0.0	892	0.0	0.749	5.2	LOS A	0.0	0.0	0.00	0.33	0.00	46.9
5	T1	498	0.0	524	0.0	0.749	0.7	LOS A	0.0	0.0	0.00	0.33	0.00	47.2
Approach		944	0.0	1416	0.0	0.749	3.5	NA	0.0	0.0	0.00	0.33	0.00	47.0
West: Murphys Park Drive West														
11	T1	233	0.0	245	0.0	0.343	19.7	LOS C	6.7	46.7	1.00	0.11	1.19	38.5
12	R2	28	0.0	29	0.0	0.343	38.6	LOS E	6.7	46.7	1.00	0.11	1.19	37.9
Approach		261	0.0	275	0.0	0.343	21.7	NA	6.7	46.7	1.00	0.11	1.19	38.4
All Vehicles		1439	0.0	2010	0.0	0.781	9.3	NA	6.7	46.7	0.27	0.47	0.50	43.8

Model (5) Sensitivity Test: SIDRA Results for Road 2 / Murphys Park Drive intersection - No School Exit on Murphys Road

MOVEMENT SUMMARY

Site: 101 [Model5 MPD/Rd2 Base+School Sens test No Exit ON Murphys Rd (Site Folder: General)]

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

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] %	[Total veh/h	HV] %	v/c	sec		[Veh. veh	Dist] m				km/h
South: Road 2														
1	L2	293	0.0	308	0.0	0.899	22.4	LOS C	12.1	84.5	0.85	1.86	3.33	36.4
3	R2	107	0.0	214	0.0	0.899	32.2	LOS D	12.1	84.5	0.85	1.86	3.33	36.2
Approach		400	0.0	522	0.0	0.899	26.4	LOS D	12.1	84.5	0.85	1.86	3.33	36.3
East: Murphys Park Drive East														
4	L2	257	0.0	514	0.0	0.546	4.8	LOS A	0.0	0.0	0.00	0.27	0.00	47.7
5	T1	498	0.0	524	0.0	0.546	0.3	LOS A	0.0	0.0	0.00	0.27	0.00	48.1
Approach		755	0.0	1038	0.0	0.546	2.5	NA	0.0	0.0	0.00	0.27	0.00	47.9
West: Murphys Park Drive West														
11	T1	233	0.0	245	0.0	0.194	2.9	LOS A	1.0	6.7	0.34	0.08	0.35	47.3
12	R2	28	0.0	29	0.0	0.194	14.0	LOS B	1.0	6.7	0.34	0.08	0.35	46.4
Approach		261	0.0	275	0.0	0.194	4.1	NA	1.0	6.7	0.34	0.08	0.35	47.2
All Vehicles		1416	0.0	1835	0.0	0.899	9.6	NA	12.1	84.5	0.29	0.69	1.00	43.8

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