

St David's Church in Wales Primary School, Vale of Glamorgan

Transport Assessment

Vale of Glamorgan Council

Project number: 60607805

May 2020

Quality information

Prepared by



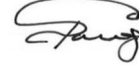
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1. Introduction

1.1 Introduction

- 1.1.1 AECOM has been commissioned by the Vale of Glamorgan (VoG) education department to provide transport planning and highways advice to inform a planning application for the proposed development of St David's Church in Wales (CiW) Primary School.
- 1.1.2 AECOM has been appointed transport consultant for the redevelopment of the school project as the scheme approaches RIBA Stage 3. The current work has included scoping discussions and baseline desk studies, with an assessment of the current highway network being undertaken, along with the commissioning of traffic surveys across the network.
- 1.1.3 AECOM have liaised with the VoG in their role as the Local Highway Authority (LHA), in the preparation of this Transport Assessment (TA). A scoping note has been prepared and sent to the LHA to gain an understanding of the level of assessment required for the TA. Communication will continue between AECOM and the LHA so that further additions, changes and recommendations can be made where necessary. A copy of the scoping report is in **Appendix 1-1** of this document.
- 1.1.4 This TA addresses the transport planning inputs required to inform the planning application and its level of assessment has been agreed through meetings and discussions with the Local Education Authority (LEA). Although the LHA have not responded directly to the scoping note, the LEA have consulted with the LHA and fed back comments to the project team, which have then been incorporated into the TA.
- 1.1.5 The content of this TA has been informed by a site visit to the existing school site. This was undertaken on 26th September 2019 between 14:30 and 15:45 in order to understand prevailing highway conditions.

1.2 Site Location and Existing Usage

- 1.2.1 The site is located in Colwinston, a rural village in the VoG which lies between Cowbridge, located 5.4km to the east, and Bridgend, located 5.1km to the north-west. The A48 'Crack Hill' runs east-west approximately 1km to the north of the village, with the village accessed via several unnamed roads routing between the A48 and Colwinston. Cardiff City Centre is located approximately 25km to the east of Colwinston.
- 1.2.2 The development site is currently occupied by the existing St David's CiW Primary School building and associated facilities. The school site is accessed from an unnamed road which routes north-south along its western boundary. The existing building is proposed to be demolished and new school facility built.

1.3 Proposed Development

- 1.3.1 The development proposals are for the expansion of St David's CiW Primary School to enable an increase in pupil intake. The expansion of the school entails demolition of the existing building, and construction of a new facility on the same site.
- 1.3.2 The existing school has a permitted capacity of 140 primary school pupils and 14 Full-Time Equivalent (FTE) nursery pupils, with 130 primary school students and 14 FTE nursery pupils currently enrolled. The new school facility is proposed to accommodate 210 primary school pupils and 24 FTE nursery pupils, equating to 234 FTE pupils. The number of staff will increase from 15 FTE to 24 FTE members of staff.
- 1.3.3 The proposals include the demolition of the existing school building and for a new two-storey school building to be constructed on the same site to the south-east of the existing school building. The existing car park shall remain and a new service yard, Multi-Use Games Area (MUGA) and soft play area will be constructed. The proposals will result in a loss of the existing school sports pitch, and therefore associated activities are proposed to be relocated to the existing sports pitches located on the separate community centre site which is located to the north of the school site.

1.4 Report Structure

1.4.1 This TA examines the existing transport and highway issues relating to the proposed development; considers the expected multi-modal trip generation and the traffic impact of the proposals on the local highway network and investigates methods of limiting car-based travel to produce a sustainable development in line with national and local planning guidance.

1.4.2 The remainder of the TA is structured as follows:

- **Section 2 – Existing Situation and Site Accessibility:** Examines the local transport conditions in the vicinity of the site and the accessibility of the site to non-car modes of travel;
- **Section 3 – Development Proposals:** Provides a detailed description of the development proposals, including the proposed means of access and parking provision;
- **Section 4 – Planning Policy Review:** Considers the development in the context of relevant national and local planning and transport policies;
- **Section 5 – Trip Generation and Distribution:** Sets out the existing/forecast trip generation for all modes of travel and method of trip distribution for the proposed development;
- **Section 6 – Traffic Impact Assessment:** Examines the impact of the development proposals on the highway network during the weekday AM and PM peak hours;
- **Section 7 – Transport Implementation Strategy:** Details the key measures recommended to improve the existing conditions, along with encouraging sustainable travel; and
- **Section 8 – Conclusions:** Summarises the key findings and conclusions of the TA.

2. Existing Situation and Site Accessibility

2.1 Introduction

2.1.1 This section of the TA provides a description of the site location and its existing usage, the operation and safety of the local highway network, and the accessibility of the site to local facilities and by walking, cycling and public transport. Information relating to the existing school site is also included for reference throughout the TA.

2.2 Site Location and Existing Usage

2.2.1 The development site is located in Colwinston, a rural village in the VoG which lies between Cowbridge, located 5.4km to the east, and Bridgend, located 5.1km to the north-west. The A48 is located 1km to the north, and Cardiff City Centre is located approximately 25km to the east.

2.2.2 The site is around 58,500m² and is currently occupied by St David's CiW Primary School and its associated facilities. The western boundary of the site fronts onto an unnamed road which connects Colwinston with the A48 (shown in **Figure 2-1** as 'Unnamed Road 1'). Vehicle and pedestrian access to the site is via this road. The remainder of the site is bounded to the north and east by residential properties associated with the new development 'St David's Meadows', and to the south by residential properties accessed via Beech Park.

2.2.3 The location of the site is illustrated in **Figure 2-1** and **Figure 2-2**.

Figure 2-1: Site Location Plan

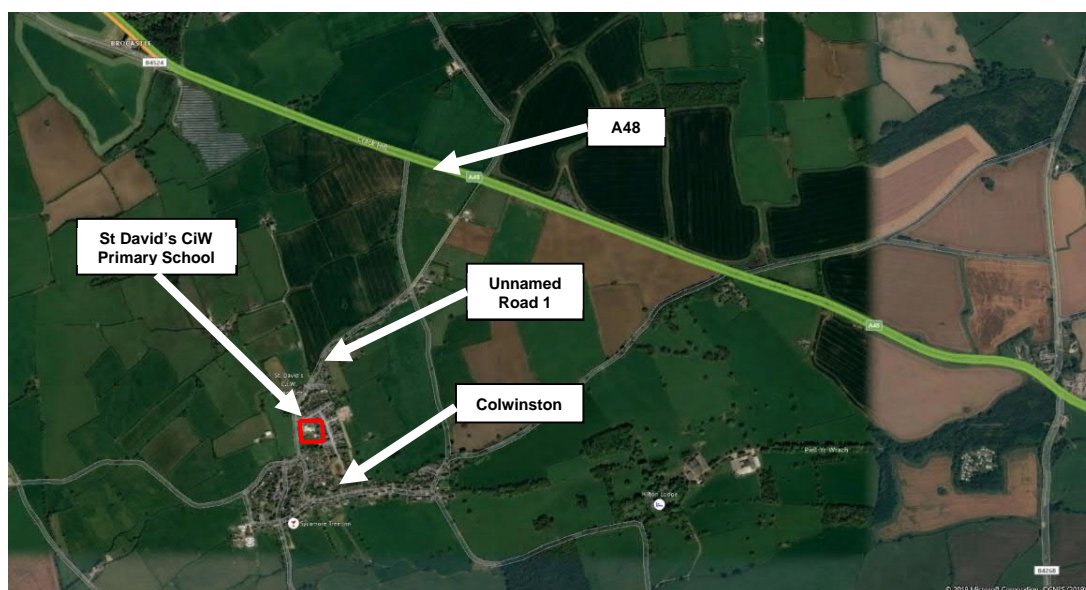
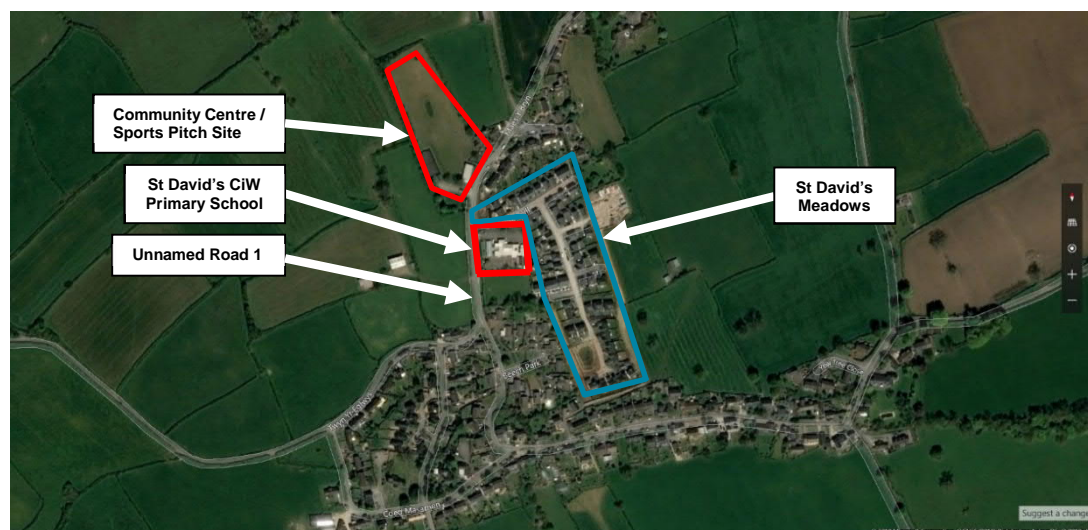


Figure 2-2: Site Location Plan (Colwinston)

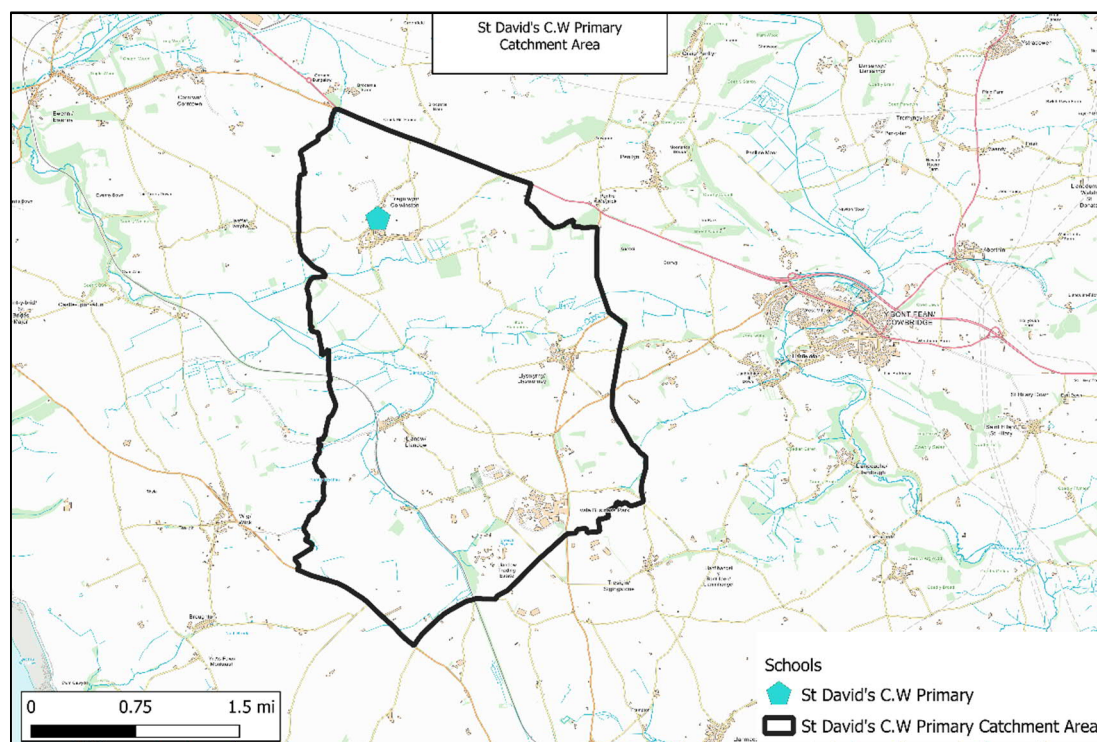


- 2.2.4 The construction of the new school facility will result in a loss of the existing sports pitch at the school site. Therefore, any school sports activities will instead make use of the existing facilities available at the nearby community centre during and following construction of the new school site. The school currently uses these facilities for annual events such as sports days and school fayres, which are proposed to continue once the new school site is constructed.
- 2.2.5 The community centre site is located on the other side of the unnamed road to the school site and approximately 50m to the north, as shown in **Figure 2-2**. The community centre is accessed via a three-arm priority junction leading to a car park with capacity for approximately 10 vehicles, although there are no marked out bays except for one disabled bay. In addition to the community centre, the site also includes a playground, MUGA and sports pitches. There is a gate provided adjacent to the vehicle access to the site.
- 2.2.6 The northern and eastern boundary of the school site is surrounded by St David's Meadows, a recently constructed residential development of 64 dwellings. Access to St David's Meadows is via a three-arm priority junction (Cae Pwll / Unnamed Road 1) located immediately north of the existing school access. The location of St David's Meadows is shown in **Figure 2-2**. Following the opening of the new school facility there is potential for the school intake to include a number of pupils who will be residing at these properties.
- 2.2.7 During construction of the St David's Meadows development, the walking and cycling facilities within the immediate vicinity of that development and the school were updated. This included new footways at the access to the development and along Unnamed Road 1, with a dropped kerb at the junction access and also located opposite the access to the community hall. These facilitate safe pedestrian movements between the school and the community facilities.

2.3 Existing School

- 2.3.1 St David's CiW Primary School caters for nursery through to Year 6 age pupils. The catchment area includes a number of rural villages situated between Cowbridge and Bridgend, including Llysworney and Llandow. The catchment of the school is shown in **Figure 2-3**.

Figure 2-3: St David's CiW Primary School Catchment Area



Source: VoG

- 2.3.2 Pupil postcode information, as supplied by the VoG, indicates that pupils also come from further afield, including from Cowbridge and Bridgend. This is typical of a faith school which tend to have wider catchments from a regional area.

Pupils and Staff

- 2.3.3 The existing school has a permitted capacity of 140 primary school pupils and 14 Full-Time Equivalent (FTE) nursery pupils, with 130 primary school students and 14 FTE nursery pupils currently enrolled.
- 2.3.4 There are 15 FTE members of staff based at the school, with 7 teaching and 8 ancillary staff.

Access and Parking

- 2.3.5 Vehicle access to the school is available via a priority junction with the unnamed road along the western boundary of the school. The access leads directly to the school car park and is the sole point of vehicle access for all on-site vehicles, including staff arrivals / departures, visitors and service vehicles. The school car park currently accommodates 26 parking spaces.
- 2.3.6 Pedestrian access to the school is achievable from the footway on Unnamed Road 1 via:
- The school gates located to the south of the vehicle access, which are the primary access for pupils and parents during school drop-off and pick-up times; and
 - A pedestrian access adjacent to the vehicle access, which is used for before and after school access (e.g. Breakfast Clubs and After School Clubs) and for the nursery.

Pupil Drop-Off / Pick-Up Arrangements

2.3.7 The school timetable is summarised in **Table 2-1**.

Table 2-1: School Timetable

Time	Activity
07:30	Simply Out of School Breakfast Club
08:00	Breakfast Club
08:50	School Gates Open / Bus arrives
08:45	Parent drop off
09:00	Registration
11:30	Morning Nursery Finish
15:20	Foundation (Nursery– Year 2) Finish
15:25	Key Stage Two (Year 3-6) Finish
15:30	Colwinston Childcare
16:15	After School Clubs Finish
17:30	Simply Out of School After School Club (Village Hall) Finish

2.3.8 Before and after school, escorting adults generally park on the verge and along the footway of Unnamed Road 1, north of the school access. Vehicles are also parked along Heol Cae Pwll, the access road to St David's Meadows. As there are no parking restrictions along these roads, parking is permissible. Some vehicles were observed to use the car park at the community centre.

2.3.9 It is understood that the school promotes a one-way system for school-related traffic (School Road Safety Travel Plan is contained in **Appendix 2-1**) to minimise the conflicts between vehicles or between vehicles and pedestrians from turning manoeuvres. However, based on on-site observations this does not seem take place. Vehicles access the school from both north and south of the site on Unnamed Road 1 which creates congestion when trying to pass each other as well as parked vehicles.

2.3.10 Based on observations during the school departure period, the play park located at the community site is well used, with a large number of pedestrians crossing the unnamed road between parked vehicles, along with parents using the car park as a pick up/drop off facility. There are existing footways and dropped kerbs / tactile paving facilities linking the school and community centre.

2.3.11 The VOG provides a bus (Service P121) between the school and Cowbridge. This fulfils its statutory responsibility to provide transport for pupils who reside beyond a two-mile walking distance from the school. It is understood that this service is currently available for any pupils residing on the route. The annual bus pass costs £300 per year. The VoG provides free transport for eligible pupils. The bus timetable information is provided at **Appendix 2-2**.

2.3.12 It is understood that a private mini-bus service operates for nursery pupils based at the school. The minibus does not require a designated parking space at the school as it is arranged under private contract and is not owned by the school. The LEA has confirmed that there is adequate capacity to accommodate the increase in nursery pupils at the school.

2.4 Local Highway Network

2.4.1 **Figure 2-4** outlines the local highway network to the development site. Unnamed / unclassified highways have been numbered for ease of reference throughout the remainder of the TA.

Figure 2-4: Local Highway Network



- 2.4.2 Unnamed Road 1 is a single-carriageway two-way road which connects Colwinston with Unnamed Road 2 to the north of the village. This road in turn provides access to the A48 to the north, or the eastern areas of Colwinston to the south. The Unnamed Road 1 / Unnamed Road 2 junction is a four-arm priority crossroad junction, located approximately 600m northeast of St David's CiW Primary School. The north-eastern arm of the junction is a farm access which provides no material highway connection. Outside of Colwinston, the carriageway width ranges from around 4.0m to 5.0m, but passing places are available. The carriageway is subject to a 30mph speed restriction within Colwinston, and the national speed limit outside of the village.
- 2.4.3 The school site, St David's Meadows and the community centre site all take access from Unnamed Road 1. In the vicinity of the school it is approximately 5.0m wide, sufficient for vehicles to pass albeit at low vehicle speeds. There are no parking restrictions on Unnamed Road 1. Vehicles parked on Unnamed Road 1 can cause obstruction to the carriageway and reduce its operation to one-way working in places. Parking associated with the school site causes one-way working during the school drop-off and pick-up periods.
- 2.4.4 Unnamed Road 3 is a rural single-carriageway road which connects the A48 with Unnamed Road 2 in the east of Colwinston. It is similar in nature to Unnamed Road 1 in that it is subject to the national speed limit reduced to a 30mph speed limit within the village. It is narrow in places with passing places provided along its length. Within the village, the carriageway operates with one-way working. There are no parking restrictions on Unnamed Road 3.
- 2.4.5 Following the occupation of the new school facility, the school will promote, monitor and, if necessary, try to enforce an informal one-way system during school opening and closing times, as part of a traffic management strategy. An indicative informal one-way system is shown in **Figure 7-2** in **Section 7**.
- 2.4.6 Unnamed Road 4 and Unnamed Road 5 are single lane tracks that both connect to Tair Croes to the south of Colwinston. They are approximately 3.0m wide.
- 2.4.7 The A48 Crack Hill is a single-carriageway road which runs east-west approximately 1km to the northeast of Colwinston. The A48 connects the major settlements of Cardiff to the east with Bridgend to the west and serves as a regional connector road. Between Bridgend and Brocastle, the A48 is subject to a 40mph speed limit. Between Brocastle and Pentir Meyrick, it is subject to the national speed and an additional lane is provided for eastbound traffic for approximately 1km.
- 2.4.8 Unnamed Road 6 is a single-carriageway track which provides a connection between the A48 with Treoes to the north, and then provides an onward connection to the A437 at Coychurch.

2.5 Existing Traffic Conditions

Traffic Surveys

- 2.5.1 Traffic surveys have been undertaken at eight locations across the area surrounding the site to understand operational conditions on the local highway network. The surveys were discussed with the LHA. The surveys included:
- Junction Turning Count (JTC) and Queue Length surveys, which were carried out between the hours of 07:00-10:00 and 14:30-18:00 on Thursday 6th June 2019, a neutral day during the school term time; and
 - Automatic Traffic Count (ATC) surveys which were also undertaken for a seven-day period between Wednesday 5th June 2019 – Tuesday 11th June 2019, which overlapped with the JTC and Queue Length surveys. ATC surveys record the speed, volume and classification of traffic by direction.
- 2.5.2 The JTC surveys and queue length surveys were carried out at following locations:
- 1) Unnamed Road 1 / Access to St David's CiW Primary School (three-arm priority T-junction);
 - 2) Unnamed Road 1 / Unnamed Road 2 (four-arm priority crossroads junction);
 - 3) A48 Crack Hill / Unnamed Road 2 (three-arm priority T-junction); and
 - 4) A48 Crack Hill / Unnamed Road 3 (three-arm priority T-junction).
- 2.5.3 The ATC surveys were carried out at the following locations:
- 5) Unnamed Road 1, north of St David's CiW Primary School;
 - 6) Unnamed Road 2, south of A48;
 - 7) A48, between Unnamed Road 2 and Unnamed Road 3; and
 - 8) Unnamed Road 3, south of A48.
- 2.5.4 The location of each survey is shown in **Figure 2-5**. A summary of the ATC survey results is included in **Table 2-2**.

Figure 2-5: Location Plan of Traffic Surveys



Table 2-2: Summary of ATC Survey Results

ATC Reference	Direction	Weekday Average Traffic Flow			
		AM Peak Hour (08:00-09:00)	School PM Peak Hour (15:15-16:15)	PM Peak Hour (17:00-18:00)	24 Hour
5 Unnamed Road 1	Northbound	62	52	39	541
	Southbound	63	73	56	557
	Two-Way	125	125	95	1,098
6 Unnamed Road 2	Northbound	83	59	40	635
	Southbound	53	77	62	612
	Two-Way	136	136	102	1,247
7 A48 Crack Hill	Eastbound	503	435	564	6,471
	Westbound	578	519	585	6,313
	Two-Way	1,081	954	1,149	12,784
8 Unnamed Road 3	Northbound	21	20	8	170
	Southbound	11	13	19	173
	Two-Way	32	33	27	343

2.5.5 The results of the ATC surveys show that there are approximately 125 two-way vehicle movements on Unnamed Road 1 in the vicinity of the school site during the AM peak hour and the School PM peak hour, equating to an average of approximately two movements per minute. There are around 1,000 two-way movements per day. This is considered to be a low level of traffic volume. The results also indicate that the average (mean) speed in the vicinity of the site is approximately 25mph.

2.5.6 On the A48, there are approximately 1,000 two-way vehicle movements per peak hour and 12,700 movements per day.

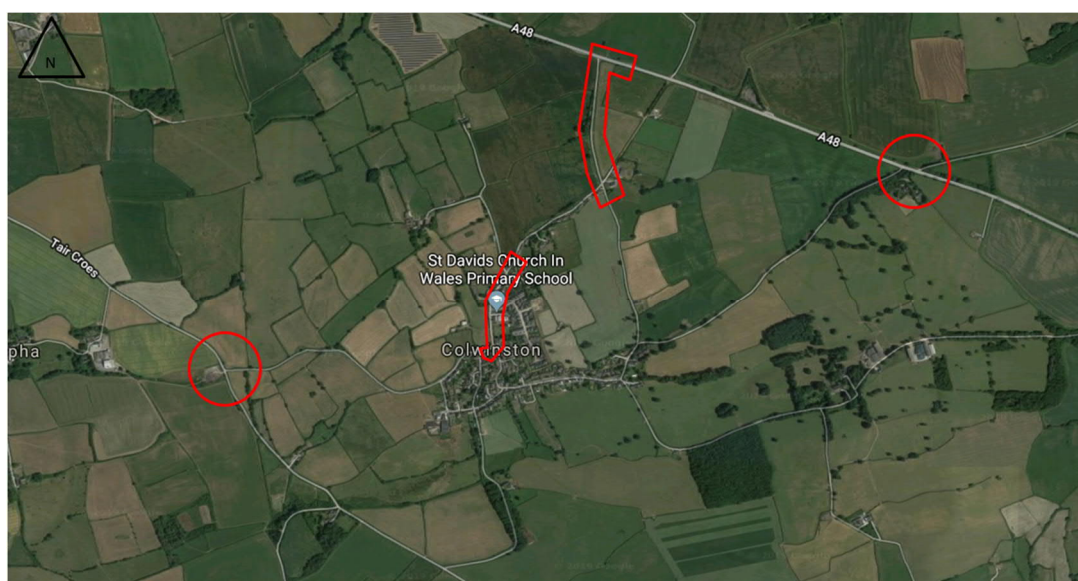
2.6 Road Safety

2.6.1 Personal Injury Collision (PIC) data has been requested from the Welsh Government (WG) to determine whether there are any locations on the highway network with a poor collision record. Data has been obtained for the most recent five-year period.

2.6.2 The study area for obtaining PIC data has been determined based on a preliminary review of recorded collisions available from the 'Crashmap' online resource for the most recent five-year period. The area for which data has been obtained is shown in **Figure 2-6**. It includes:

- Unnamed Road 1 in the vicinity of the school;
- Unnamed Road 2, between Unnamed Road 1 and the A48;
- The Unnamed Road 4 / Tair Croes junction; and
- Junction 4 from the JTC survey (between unnamed roads and the A48).

Figure 2-6: PIC Study Area



2.6.3 The PIC data is summarised in **Table 2-3**.

Table 2-3: Summary of PICs

Location	No. of PICs by Severity			
	Slight	Serious	Fatal	Total
Unnamed Road 1	0	0	0	0
Unnamed Road 2	0	0	0	0
Unnamed Road 4 / Tair Croes	1	0	0	0
JTC Survey Junction 4	2	0	0	0
Total	3	0	0	0

2.6.4 Two PICs have been recorded at the JTC survey Junction 4 to the north of Colwinston. Both collisions resulted in slight injuries and neither involved children, pedestrians or cyclists.

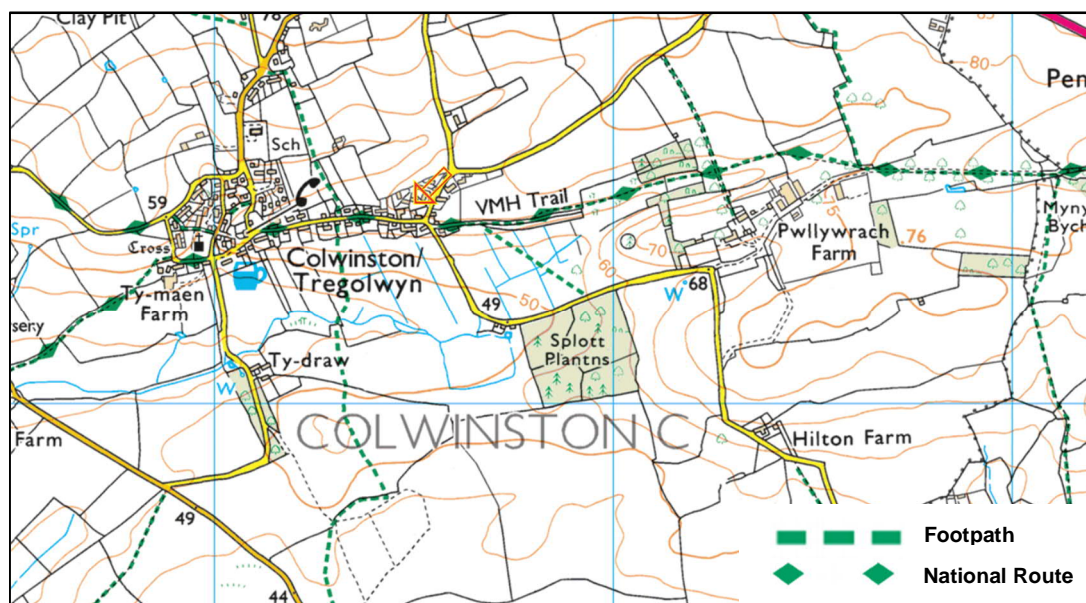
2.6.5 The first collision (ref. 1401473) occurred on 12th August 2014 at 17:24hrs during dry conditions. The police report of the collision states that a car turning right from the unnamed road (from Colwinston) entered the right-turn lane for right-turning traffic from the A48. Another car turning right (towards Colwinston direction) entered this lane and collided with the first car.

- 2.6.6 The second collision (ref. 1700956) occurred on 17th June 2017 at 17:01hrs during dry conditions. The police report states that a car has attempted to overtake a queue of traffic to the offside, using the central markings / right turn lane and has collided with another car using the right-turn lane.
- 2.6.7 Both collisions set out above were potentially caused by driver mis-use of the right-turn lane towards Colwinston, and therefore are considered to have occurred due to driver error rather than a highway design issue. These PICs are not likely to be indicative of a highway safety issues which could be exacerbated by the proposed development.
- 2.6.8 A single PIC (ref. 1601814) has been recorded at the Tair Croes / Unnamed Road 4 junction. The collision occurred on the 1st November 2016 at 13:46hrs during dry conditions. The police report of the collision states that a motorcycle collided head-on with a stationary car on Tair Croes. The motorcycle rider sustained slight injuries. This is considered to be a one-off incident and not indicative of a highway safety issue at this location.
- 2.6.9 No PICs have been recorded on Unnamed Road 1 in the vicinity of the school site or community centre site. No 'fatal' or 'serious' PICs are recorded for the study area. No PICs have involved school children or occurred during school arrival / departures times.
- 2.6.10 Overall, the nature and low occurrence of PIC records on the local highway network is not considered to be indicative of a highway safety issue.

2.7 Walking and Cycling

- 2.7.1 There is a footway on the eastern side of Unnamed Road 1 which runs along the western frontage of the school site and then extends to the north to connect to residential areas of Colwinston. Part of this footway has been implemented as part of the development of St David's Meadows and continues into that residential development site. There is no footway connection between the centre of Colwinston and the school site.
- 2.7.2 Throughout the remainder of the village, there is little to no footway provision, however this is not considered to be a significant issue or barrier to pedestrian movements considering the low traffic volumes and speeds within the village (around 1,000 vehicles per day and average speeds of 25mph). This level of footway provision is typical of a rural village setting. There are no signal controlled junctions or dedicated crossing points in Colwinston.
- 2.7.3 There are no footways along any of the highways surrounding Colwinston, including between the village and A48. The walking distances along these highways and the lack of facilities available along these routes means that pedestrian demand along these routes will be minimal. The majority of any pedestrian movements along these highways are likely to be to / from the local bus stops available at the A48.
- 2.7.4 There are a number of local and regional Public Rights of Way (PRoW) situated in and around Colwinston, as illustrated in **Figure 2-7**.

Figure 2-7: Local Public Rights of Way



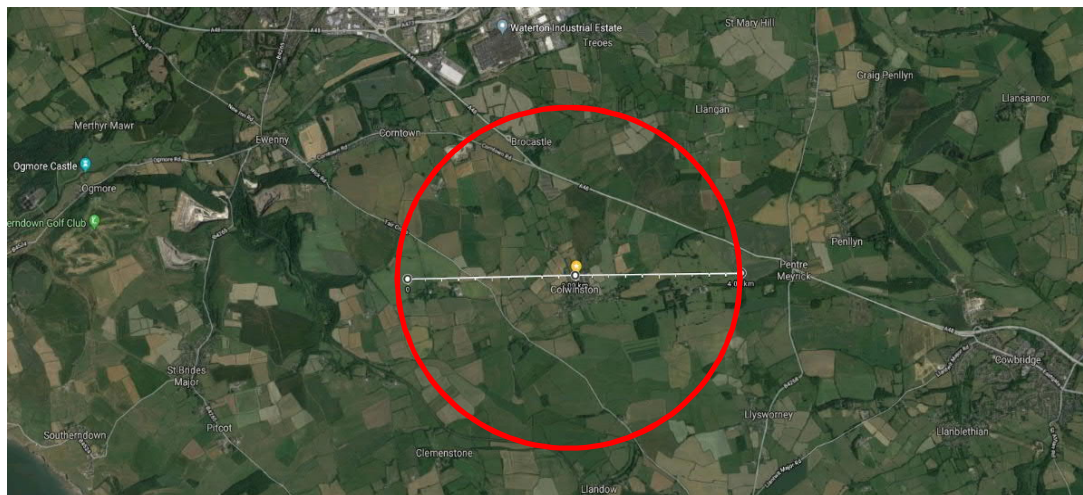
Source: www.streetmap.com

- 2.7.5 The A48 has intermittent raised footways and street lighting is provided along the highway. There are no pedestrian crossing facilities on the A48, including between the locations of the eastbound and westbound bus stops.
- 2.7.6 Cycle Route 888 routes along Tair Croes to the south of Colwinston. At this point, it is provided on-carriageway. Route 888 is not part of the National Cycle Network.
- 2.7.7 The limited level of walking and cycling infrastructure in and around the school site is typical of a rural village such as Colwinston and appropriate for the existing level of walking and cycling trips made across the local highway network. The lack of infrastructure is not considered to be a barrier for pedestrian movements considering the low traffic volumes and speeds in Colwinston. The existing footway on Unnamed Road 1 along the school frontage is beneficial to the movement of pupils in the vicinity of the school.
- 2.7.8 It is also recognised that the proposed development will increase the volume of traffic on the local highway network, and in particular Unnamed Road 1 during school arrival and departure times, accompanied by an increase in pedestrian movements in the vicinity of the school site. There will also be pedestrian movements between the school site and community centre site owing to the relocation of school sports facilities and continued use for annual events such as school fayres and sports days. The school currently manages the transportation of pupils between the school grounds and the community centre facilities, with teachers acting as a school crossing patrol, stopping vehicles for the pupils to cross. This currently works efficiently, and the school proposes to maintain this function. There are opportunities for providing improvements to pedestrian safety and these are considered in **Section 7** of this TA.

2.8 Local Facilities

- 2.8.1 The Institution for Highways and Transportation's (IHT's) *Guidelines for Providing for Journeys on Foot*, published in 2000, identifies that 2km is the preferred maximum distance that people will walk for commuting and education purposes. Cycling has been identified as having the potential to replace car trips of up to 5km. 5km equates to approximately a 20-minute journey by bicycle.
- 2.8.2 **Figure 2-8** shows an approximate 2km walking distance from the site. Existing and future pupils and staff will travel to / from the site to / from their place of residence. **Figure 2-8** shows that there is not a significant level of residential development within walking distance of the school site, with the majority located within Colwinston.

Figure 2-8: 2km Radius of the Site



2.8.3 **Table 2-4** outlines the local facilities which are located within a reasonable walking and cycling distance of the school site.

Table 2-4: Accessibility to Local Facilities

	Local Facilities	Walking Accessibility		Cycling Accessibility	
		Distance (m)	Time (Minutes)	Distance (m)	Time (Minutes)
1	The Golden Well	2100	25 mins	2100	7
2	Lidl Bridgend (Cowbridge Rd)	4200	50 mins	4200	14 mins
3	Bridgend Industrial Estate	5800	70 mins	6000	20 mins
4	Ashfield Surgery	6000	74 mins	6000	19 mins
5	Cowbridge Athletic Club	6900	83 mins	6400	21 mins
6	Cowbridge Town Centre	6900	85 mins	6500	22 mins
7	Co-op Food Cowbridge (High St)	7000	85 mins	6500	22 mins
8	Cowbridge & Vale Medical Practice	7000	85 mins	6600	22 mins
9	Cowbridge Leisure Centre	7000	85 mins	6500	22 mins
10	Cowbridge Library	7000	85 mins	6500	22 mins
11	Cowbridge Amateur Dramatics Society	7000	85 mins	6500	22 mins

Notes: 1) Distances are approximate and taken from the centre of the proposed development site
 2) Average walking speed of 1.4m/s has been assumed, based on IHT's 'Guidelines for Providing for Journeys on Foot'.
 3) Average cycling speed of 6.7m/s has been assumed, based on IHT's 'Cycle-friendly Infrastructure'

2.9 Public Transport

Bus Services

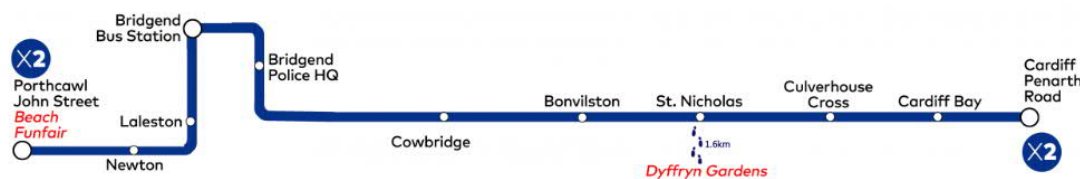
- 2.9.1 There is a bus stop provided immediately outside of the school site on Unnamed Road 1, however this is understood to be used by school related bus services such as Service P121 and coaches for school trips. No public buses currently use this stop. The school bus (service P121) operates between Cowbridge and the school.
- 2.9.2 The closest public bus stop to the school site is on the A48. There are both eastbound and westbound stops available at the A48 / Unnamed Road 2 and also at the A48 / Unnamed Road 3 junctions, the 'Crack Hill' and 'Twmpath Farm' stops respectively.
- 2.9.3 The Crack Hill stops are both defined with bus shelters, a flag and pole and dedicated bus lay-bys. These stops are located approximately 1.1km / 14 minutes walking distance from school site. The Twmpath Farm stops are defined by a flag and pole only, but also have a dedicated lay-by. These stops are approximately 2.1km / 26 minutes walking distance from the school.
- 2.9.4 The IHT's *Guidelines for Providing for Public Transport in Developments*, published in 1999, suggests 400m as the acceptable walking distance to a local bus stop. These bus stops are therefore outside of acceptable walking distances from the site. Furthermore, there is limited footway provision between Colwinston and the A48 which may reduce the number of bus journeys locally. It is therefore unlikely that public bus will be a prevalent method of transport for journeys to / from the school.
- 2.9.5 Service X2 is the only public bus that operates at these bus stops. **Table 2-5** provides a summary of the X2 service timetable. **Figure 2-9** illustrates the route of the X2 service.

Table 2-5: Bus Service Information

Service	Route	Days	Direction	First Service	Last Service	Approximate Frequency
X2	Porthcawl - Cardiff	Monday – Friday	Towards Porthcawl	08:28	23:50	15-30 minutes
			Towards Cardiff	06:30	22:30	15-30 minutes
		Saturday	Towards Porthcawl	09:50	23:50	30 minutes
			Towards Cardiff	07:40	22:30	30 minutes
		Sundays and Bank Holidays	Towards Porthcawl	10:50	23:59	Hourly
			Towards Cardiff	09:08	22:35	Hourly

Notes: 1) Information obtained from First Cymru (August 2019).
 2) Service times are arrival/departure times at/from the 'Crack Hill' bus stops on the A48.
 3) Service X2 is operated by First Cymru.

Figure 2-9: Route of Bus Service X2



Source: First Cymru.

2.9.6 The X2 service offers frequent weekday services connecting numerous residential areas and key destinations within Cardiff, Vale of Glamorgan and Bridgend. It operates approximately every 15-30 mins during the mornings and afternoons. On Sundays and bank holidays the buses run hourly services.

Rail Services

2.9.7 The nearest railway station to St David's CiW Primary School is Bridgend train station which is located approximately 6.5km to the west of Colwinston, equating to an 80-minute walk or a 22-minute cycle from the site. This is considered to be beyond reasonable walking / cycling distance from Colwinston.

2.9.8 There are frequent railways services between Bridgend and Swansea. There are also services extending further west to Carmarthen and Milford Haven, although these are less frequent. Bridgend train station also serves Cardiff Central, London Paddington, Manchester Piccadilly, and Cheltenham Spa. The railway services to / from Bridgend are summarised in **Table 2-6**.

Table 2-6: Railway Service Information

Direction	Days	First Service	Last Service	Approximate Frequency
Bridgend - Swansea	Mon-Fri	06:07	23:45	10-30 minutes
	Sat	06:10	23:30	20-30 minutes
	Sun	07:45	23:46	30-45 minutes
Swansea - Bridgend	Mon-Fri	03:54	22:32	10-30 minutes
	Sat	03:59	22:20	20-30 minutes
	Sun	07:24	23:31	30-45 minutes
Bridgend – Cardiff Central	Mon-Fri	04:27	23:15	15-30 minutes
	Sat	04:31	23:02	10-30 minutes
	Sun	07:57	22:45	20 minutes
Cardiff Central - Bridgend	Mon-Fri	05:35	23:44	10-30 minutes
	Sat	05:01	23:08	15-30 minutes
	Sun	07:10	23:58	20-30 minutes

Notes: 1) Information obtained from National Rail timetable (July 2019).

2) Services times are arrival/departure times for direct services at/from Pen-Y-Bont / Bridgend.

3) “-” means that no service is available for that day.

2.9.9 The X2 bus service operates between the Crack Hill / Twmpath Farm stops on the A48 to the north of Colwinston and Bridgend Bus Station. The bus station is a short 4-minute walk away from the railway station it may be possible to access the site via public transport for parents who commute, although it is accepted that the walking distances to bus stops are not within ideal range.

2.10 Summary

2.10.1 This section of the TA has provided a description of the site location and its existing usage, the local highway network, current safety and traffic conditions, and accessibility of the site to non-car modes of travel.

2.10.2 The development site is located in Colwinston, approximately 1km to the south of the A48, around 5km to the southeast of Bridgend and approximately 5.5km northwest of Cowbridge. The site is occupied by St David's CIW Primary School and is bounded to the north, east and south by residential properties and to the west by an unnamed road (Unnamed Road 1) which provides pedestrian and vehicle access to the school.

2.10.3 The school caters for nursery though to Year 6 age pupils, with the catchment area including a number of rural villages situated between Cowbridge and Bridgend, including Llsworney and Llandow. The school currently accommodates 140 pupils, 14 FTE nursery pupils and 15 FTE members of staff.

2.10.4 The local highway network comprises a number of unnamed roads, which are generally defined as single-carriageway roads subject to a 30mph speed restriction within Colwinston and the national speed limit outside of the village. Unnamed Road 1, Unnamed Road 2 and Unnamed Road 3 provide access between Colwinston and the A48 to the north. These are generally wide enough for two-way working, with passing places provided where the carriageway is subject to localised narrowing. The A48 is a single carriageway two-way road which connects Cowbridge with Bridgend.

2.10.5 Traffic surveys have been undertaken across the local highway network, including ATC and JTC surveys, to determine local highway operational conditions. These surveys were discussed with the LHA who provided input into the extent of the study area. The survey results for the ATC on Unnamed Road 1 in the vicinity of the school site indicate a peak hour flow of 125 two-way movements and 1,000 daily movements, a very low level of traffic. Vehicle speeds which have been recorded are observed to be travelling generally below the speed limit.

- 2.10.6 PIC data has been obtained from the WG for a study area derived using 'Crashmap'. The PIC data indicates that three collisions have occurred within the most recently available five-year period. All collisions resulted in slight injuries. No pedestrians, cyclists or children were involved in any of the collisions. The PIC data is not considered to be indicative of a highway safety issue in or around Colwinston.
- 2.10.7 There is limited dedicated / segregated walking or cycling provision on the local highway network, but this is considered to be reasonable considering the low traffic volumes and speeds in Colwinston. The existing infrastructure provision is typical of the site's setting in a rural village. A footway is provided along the site frontage to Unnamed Road 1 to residential areas to the north. There is no footway provision connecting the school with the main village to the south.
- 2.10.8 The nearest bus stops are located on the A48 to the north of the village, these are beyond the recommended walking distances considered reasonable for primary school pupils to travel to school but could still be used by those who wished to walk further. These stops are served by Bus Service X2, which provides frequent access to key destinations of Bridgend, Cardiff County and the Vale of Glamorgan. Rail services are available from Bridgend railway station. It is unlikely that regular journeys to / from the school site will be feasible via existing public transport services.

3. Development Proposals

3.1 Introduction

- 3.1.1 This section of the TA provides a description of the development proposals, including the site access strategy for vehicles, pedestrians and cyclists in addition for on-site parking arrangements for vehicles and bicycles. The construction of the proposed development is also discussed.

3.2 Overview of Proposals

- 3.2.1 The development proposals are for the expansion of St David's CiW Primary School to enable an increase in pupil intake. The expansion of the school entails demolition of the existing school building, and construction of a new facility on the same site. An illustrative masterplan of the development proposals is provided at **Appendix 3-1**.
- 3.2.2 The school currently accommodates 140 primary school pupils (130 currently in attendance) and 14 FTE nursery pupils. There are 21 members of staff based at the school, which results in 15 FTE. There are 7 FTE teaching staff and 8 FTE support / ancillary staff (FTE). The proposed expansion will accommodate 210 primary school pupils, 24 FTE nursery pupils and 33 members of staff (24 FTE), consisting of 17 teaching staff and 7 support / ancillary staff. This is an increase of 70 primary school pupils, 10 FTE nursery pupils and 12 members of staff.
- 3.2.3 The new school building will be constructed within the same site as the existing school, to the south of the existing structure. Ancillary facilities, including hard and soft play areas (separate for nursery and primary school), habitat areas, a Multi-Use Games Area (MUGA), car parking and service yard are also included in the development proposals.
- 3.2.4 The proposals will result in a loss of the existing school sports pitch. All sport activities will therefore be relocated to the community centre site, located 50m north-west of the school on Unnamed Road 1. There is a footway linking the school site with the community centre site, with dropped kerbs at the Cae Pwll access and on Unnamed Road 1. There is a basic dedicated pedestrian access to the community centre / sports pitches. There are opportunities for providing improvements to pedestrian movements and safety and these are considered in **Section 7** of this TA.

3.3 School Access Strategy

Vehicle Access

- 3.3.1 Vehicle access to the school site will be retained via the existing access junction to the school car park. The car park will also be retained in its current location at the north of the site. This will continue be the sole point of access for all on-site vehicles, including staff arrivals / departures, visitors and service vehicles.
- 3.3.2 The demolition of the existing school building will allow for the provision of a service yard, which will support the movement of delivery / service vehicles within the site.
- 3.3.3 Swept Path Analysis (SPA) has been undertaken for the proposed access and are included in **Appendix 3-2**. The SPA is undertaken with the vehicles manoeuvring into the access from the north of the site (travelling southbound along Unnamed road 1) and exiting south (continuing to travel southbound), to simulate the proposed one-way system (further details contained in **Section 7** of this TA). The SPA includes the following vehicles:
- A 7.5t box van;
 - A 10.32m refuse vehicle;
 - A 7m Dennis Sabre Fire Tender; and
 - A 6.3m minibus.

- 3.3.4 The 7.5t box van can successfully manoeuvre into the site via the existing access, without overhanging the kerb line. Tracking has been undertaken across the car park to access the LPG tank which may form part of the final development. The vehicle requiring access to the LPG tank to refill the oil tank will be the size of a 7.5m box van. To access the LPG tank, the vehicle will approach the turning circle and perform a reverse manoeuvre, exiting in a forward manoeuvre.
- 3.3.5 A 10.32m refuse vehicle can manoeuvre through the existing school access, through the car park and the turning circle successfully. The site is currently regularly accessed by refuse vehicles and there will be no change in the access junction design.
- 3.3.6 A 7m fire tender vehicle is able to access the school car park and turn near the LPG tank, to exit in a forward motion via the turning circle. The fire tender is not required to go further into the school grounds; it has been confirmed by the fire engineer that there is sufficient access from the turning loop and layby at the front of the site.
- 3.3.7 A minibus can successfully manoeuvre into the site via the existing access, without overhanging the kerb line. A coach vehicle serving the site will use the dedicated school bus stop provided on the highway outside the school, with no change to the current situation.
- 3.3.8 Typical car and van size vehicles can successfully access and safely manoeuvre within the site.
- 3.3.9 The current access junction and proposals of the school car park are considered suitable for the small intensification in use for vehicles required to access and circulate the school car park.

3.4 Pedestrian and Cycle Access

- 3.4.1 The existing pedestrian accesses will be retained with primary access for general arrivals / departures during normal school drop-off / pick up times via the pedestrian gates on Unnamed Road 1, to the south of the vehicle access. The pick and drop off which occurs outside of the school day will continue to use the pedestrian facilities and at the vehicle access.
- 3.4.2 The main school office will be available for visitors via a 'pedestrian' area linking the car park and school gates, as shown on the masterplan. This area is not part of the car park or service yard and therefore pedestrians / cyclists will be protected from vehicle movements.

3.5 Parking Provision

Car Parking

- 3.5.1 The existing school car park accommodates 26 parking spaces, including one allocated for disabled parking. This is will continue to be used for school staff, disabled visitors and for private mini-bus drop-off / pick-up for nursery pupils following the opening of the new school facility.
- 3.5.2 The VoG Parking Standards 2019 has been adopted as Supplementary Planning Guidance (SPG). The standards identify how the *CSS Wales Parking Standards 2008* will be applied across the VoG. The parking standards seek to assist developers, designers and builders in the preparation and submission of planning applications, and to achieve a common approach to the provision of vehicle parking facilities associated with new development and change of use.
- 3.5.3 The parking standards are defined according to a zoning system based on the number, range and characteristics of facilities within walking distance and the level of public transport provision. Colwinston falls within Zone D – Countryside. The relevant parking standards and resulting vehicle parking requirements for the proposed development are shown in Error! Reference source not found..

Table 3-1: Vehicle Parking Standards

Development Type	Sub-Category	Parking Type	Standard	Parking Requirement
Education	Nursery / Infants / Primary Schools	Teaching Staff	1 space per member of staff	20
		Ancillary Staff	1 space per 2 members of staff	2
		Visitors	3 spaces	3
		Operational	1 space	1
Total				26

Notes: 1) Provision calculated based on FTE staff.

3.5.4 On the basis that there will be a total of 24 FTE members of staff located at the school post-development, up to 26 spaces will be required on-site. The SPG notes that parking standards indicated are set as the maximum provision, meaning that the total car parking provision should not exceed the derived number of spaces. It also notes that:

- Parking should be calculated based on full capacity of the nursery. This has been considered within the FTE staff presented in Table 3-1;
- Where part-time staff are employed, they should be aggregated to their full-time equivalents. FTE staff have been considered in the calculation;
- A minimum of 15 car spaces will be required for most schools, but faith schools (i.e. St David's CiW Primary School) may be the exception;
- The parking area should include a facility for vehicles to turn without reversing. A service yard is provided within the site boundary;
- Appropriate provision must be provided for parental drop off/pick up of children as dictated by local circumstances and any school travel plan. Drop off areas must be located so that the safety of pupils walking or cycling to school is not jeopardised. This is provided on the local highway network currently. Arrangements for the new school facility are discussed in **Section 7** of this TA.

3.5.5 The parking standards do not specify provision for disabled blue badge holders for the education land use class but state that *"appropriate provision must be provided for use by disabled people"*. The requirement for existing employment development is set out in the SPG as 2% plus one additional space additional to the general parking outlined above. On this basis the requirement for disabled parking at the school is 1.

3.5.6 As stated above, the parking guidance is based on maximum provision. For this development it is suggested that a total of 23 parking spaces are provided on-site. with one parking space allocated for a commercial vehicle, 3 spaces allocated for visitors, 1 for disabled access, 3 for Electric Vehicles (to future proof the site), 3 spaces allocated for car sharing and the remainder for general staff use.

3.5.7 This is marginally lower than the maximum calculated using the SPG guidance, however, some spaces are allocated as car sharing space, to encourage a reduction in solo occupancy car travel of the staff.

Cycle Parking

3.5.8 VoG cycle parking standards are set out in Appendix 4 of the Parking Standards SPG. The guidance states that cycle parking should be located in a safe, secure and convenient location and for reasons of security, cycle parking facilities should be located in areas that are visible and therefore allow for informal surveillance.

3.5.9 **Table 3-2** summarises the cycle parking standards as outlined in the SPG. The number of proposed staff and pupil numbers at the school would equate to 18 cycle stands to be provided.

Table 3-2: Cycle Parking Standards – Nursery / Infants / Primary Schools

Development Type	Sub-Category	Cycle Parking Type	Standard	Allocation of Spaces
Education	Nursery / Infants / Primary Schools	Long Stay	1 stand per 5 staff and 1 stand per 20 children	16
		Short Stay	1 stand per 100 children	2
Total				18

Notes: 1) Figures are subject to rounding

- 3.5.10 The development proposes to install a total of 20 cycle parking spaces, a slight increase in the parking guidelines. The development masterplan shows that cycle parking will be provided adjacent to the new school building near the primary pedestrian / cycle access.

3.6 Construction Traffic

- 3.6.1 Managing the effects from the construction of the proposed development will form part of a Construction Traffic Management Plan (CTMP) or similar document. The management measures will be intended to protect the environment, amenity and safety of local residents, businesses, the general public and the surroundings in the vicinity of the proposed development.

- 3.6.2 As part of the CTMP, a construction vehicle routeing regime for access to the construction site will be identified and agreed with the LHA to ensure that drivers of construction related vehicles do not use inappropriate routes which are unsuitable by virtue of their width, alignment or character. The CTMP will also consider measures to discourage deliveries during peak traffic periods on the highway network. There will be ongoing monitoring of the CTMP during the construction phase to establish the effectiveness of the measures.

3.7 Summary

- 3.7.1 This section of the TA has provided a description of the development proposals, including the site access strategy. The development proposals are for a new school facility at St David's CiW Primary School to enable an increase in pupil intake.

- 3.7.2 The proposed development comprises the demolition of the existing school building, and construction of a new facility on the same site. It also includes hard and soft play areas (separate for nursery and primary school), habitat areas, a Multi-Use Games Area (MUGA), car parking and service yard. The proposals will result in a loss of the existing school sports pitches and therefore all associated activities will be relocated to the community centre located to the north along with use for annual events such as school fayres and sports days.

- 3.7.3 The proposed expansion will accommodate 210 primary school pupils, 24 FTE nursery pupils and 33 members of staff (24 FTE, an increase of 70 primary school pupils, 10 FTE nursery pupils and 12 members of staff).

- 3.7.4 The existing vehicular access to the school site will be retained. The current access is considered suitable for the vehicles required to access the school car park. Buses will continue to use the bus stop located on Unnamed Road 1.

- 3.7.5 The existing pedestrian accesses will also be retained, with primary access via the southernmost gates on Unnamed Road and nursery and before / after school pedestrian access being available via the footway adjacent to the vehicle access.

- 3.7.6 The school car park will also be retained in its current location at the north of the site. 23 parking spaces will be provided based on the proposed number of FTE staff at the proposed development and VoG parking standards as outlined in the VoG Parking Standards March 2019 SPG. 20 cycle spaces will be provided in accordance with VoG cycle parking standards. One parking space will be allocated for a commercial vehicle, with 3 spaces allocated for visitors, 1 for disabled access, 3 for Electric Vehicles (to future proof the site), with the remainder for staff use, including 3 spaces allocated for car sharing.

- 3.7.7 Construction impacts of the new school facility will be managed by a CTMP which will outline measures intended to protect the environment, amenity and safety of local residents, businesses, the general public and the surroundings in the vicinity of the proposed development.

4. Planning Policy Review

4.1 Introduction

- 4.1.1 This section of the TA provides a review of relevant planning and transport policies at a national and local level.

4.2 National Policy

Planning Policy Wales Edition 10, December 2018

- 4.2.1 Edition 10 of *Planning Policy Wales* (PPW) was published in December 2018 and sets out the land use planning policies of the Welsh Government (WG). It is supported by a number of Technical Advice Notes (TANs), which provide detailed planning advice on subjects contained within PPW. *TAN 18: Transport* is considered of particular relevance to the proposed development and is included in this policy review. An overarching theme within PPW is the commitment of the WG to sustainability.
- 4.2.2 Planning policy in Wales is plan-led, with up to date Local Development Plans (LDPs) forming a fundamental part of the system. PPW states that planning applications “*must be determined in accordance with the adopted plan unless material considerations indicate otherwise*”. This section provides a review of the VoG LDP to demonstrate that the proposed development accords with policy.
- 4.2.3 PPW outlines the vision for development of a more effective and efficient transport system, the promotion of more sustainable and healthy forms of travel, as well as minimising the need to travel. PPW indicates that this will be achieved through integration:
- *“within and between different types of transport;*
 - *between transport measures and land use planning;*
 - *between transport measures and policies to protect and improve the environment; and*
 - *between transport measures and policies for education, health, social inclusion and wealth creation.”*
- 4.2.4 Paragraph 4.1.8 states that the WG is committed to reducing reliance on the private car and supporting a modal shift to walking, cycling and public transport. Delivering this objective will make an important contribution to decarbonisation, improving air quality, increasing physical activity, improving the health of the nation and realising the goals of the *Well-being of Future Generations (Wales) Act 2015*.
- 4.2.5 The WG outlines a transport hierarchy in relation to the accessibility of new development, which prioritises walking and cycling in the first instance, followed by public transport, and finally private motor vehicles. The nature of the development site being a faith school is such that pupils travel long distances to be schooled here, therefore, active travel modes are less likely to be used. Therefore, this TA aims to improve the safety of pedestrians around the school site by encouraging the use of a one-way system during school opening and closing times. The proposed measures are set out in **Section 7** of this TA.
- 4.2.6 Paragraph 4.1.10 of PPW states:
- “Development proposals must seek to maximise accessibility by walking, cycling and public transport, by prioritising the provision of appropriate on-site infrastructure and, where necessary, mitigating transport impacts through the provision of off-site measures, such as the development of active travel routes, bus priority infrastructure and financial support for public transport services.”*
- 4.2.7 Paragraph 4.1.50 states that car parking provision has a major influence on both mode choice and development patterns, and that “*minimum parking standards are no longer appropriate*”.
- 4.2.8 Paragraphs 4.1.56 to 4.1.57 identify the requirements for development proposals to be accompanied by a TA. It directs professionals to the TAN 18 for guidance on the preparation and content of TAs.

Technical Advice Note (TAN) 18: Transport (2007)

- 4.2.9 TAN 18 describes how to integrate land use and transport planning and explains how transport impacts should be assessed and mitigated. It supports, and should be read in conjunction with, PPW.
- 4.2.10 The integration of land use and transport planning forms part of an overall sustainable development approach by the WG towards strategy and policy objectives. This is predominantly through maximising the accessibility of developments by sustainable modes of transport. This also includes reducing the need to travel and encouraging multi-purpose trips. Accessibility is defined in TAN 18 as *“the relative ability to take up services, markets or facilities”* (p.8).
- 4.2.11 The proposed development demonstrates a clear link between land use and transport planning, and is accessible by sustainable transport modes, notably walking from within Colwinston and school bus provision.
- 4.2.12 Paragraph 4.6 states that parking standards for new development should be determined on an evidence basis which includes accessibility to other modes of transport. The proposed development provides car and cycle parking in accordance with the VoG Parking Standards SPG (March 2019), as discussed in **Section 3** of this TA.
- 4.2.13 Section 5 requires all new development to be designed in a way that is inclusive for all. The design of the development also plays an important role in providing genuine alternatives to car travel. This includes sufficient cycle parking in close proximity to the school access, for those pupils able to cycle to school, and ensuring suitable accessibility within the site for all pupils and staff.
- 4.2.14 Section 7 considers the role that public transport can play in offering an alternative to car travel, giving emphasis to the provision of new services and facilities, as well as facilitating interchange, as methods of encouraging uptake. The school bus has capacity should there be new pupils who are eligible for free transport provision.

The Wales Transport Strategy (2008)

- 4.2.15 The *Wales Transport Strategy* (WTS) sets out the WG's main aims in improving transport:
- *“Reducing greenhouse gas emissions and other environmental impacts;*
 - *Improving public transport and better integration between modes;*
 - *Improving links and access between key settlements and sites across Wales and strategically important all-Wales links; and*
 - *Increasing safety and security.”*
- 4.2.16 As discussed in previous sections, the proposed development is faith school which generally caters for a wider catchment with pupils travelling typically longer distances to be schooled, therefore there will naturally be a larger percentage of car-based trips than that associated with state primary schools. The proposed development will aim to improve integration between modes, facilitate the use of existing school transport availability, and improve connectivity. It is therefore considered to be aligned with the WTS.

National Transport Finance Plan (2015)

- 4.2.17 The purpose of the *National Transport Finance Plan* (NTFP) is to:
- Provide the timescale for financing schemes undertaken by the WG;
 - Provide the timescale for delivering these schemes and detail the estimated expenditure required to deliver the scheme; and
 - Identify the likely source of financing to allow delivery to take place.
- 4.2.18 The NTFP is not a policy document nor does it seek to prioritise schemes to be taken forward. It brings together projects already being delivered. Some of these are already under construction. Others are already under development but are not yet being built.

Active Travel (Wales) Act 2013

- 4.2.19 The *Active Travel (Wales) Act* became law in Wales in November 2013. The Act makes it a legal requirement for local authorities in Wales to map and plan for suitable routes for active travel, and to build and improve their infrastructure for walking and cycling every year. It also requires both the WG and local authorities to promote walking and cycling as a mode of transport.
- 4.2.20 The purpose of this Act is to require local authorities to continuously improve facilities and routes for pedestrians and cyclists and to prepare maps identifying current and potential future routes for their use. The Act also requires new road schemes (including road improvement schemes) to consider the needs of pedestrians and cyclists at design stage.
- 4.2.21 The Act is accompanied by a statutory design guidance document, published in December 2014, which provides advice on the planning, design, construction and maintenance of active travel networks and infrastructure, and is to be used at all stages of the process. Reference will be made to this guidance in the planning and design of the proposed development.

Well-being and Future Generations (Wales) Act 2015

- 4.2.22 The *Wellbeing of Future Generations (Wales) Act 2015* has resulted in the WG outlining seven goals in a 'wellbeing statement' (published in 2017) that contribute to sustainable development and details the aims to improve economic, social, environmental and cultural wellbeing of Wales for future generations. The Act places a duty on Local Authorities to set wellbeing objectives and contribute to achieving the seven well-being goals, which are:
- A prosperous Wales;
 - A resilient Wales;
 - A healthier Wales;
 - A more equal Wales;
 - A Wales of cohesive communities;
 - A Wales of vibrant culture and thriving Welsh language; and
 - A globally responsible Wales.
- 4.2.23 The seven goals form the basis for twelve objectives, also detailed in the wellbeing statement. Several of these are directly relevant to this proposed scheme:
- Drive sustainable growth and combat climate change;
 - Promote good health and well-being for everyone;
 - Build healthier communities and better environments; and
 - Deliver modern and connected infrastructure.
- 4.2.24 By improving pedestrian safety in the vicinity of the school with the introduction of an informal one-way system for cars a mode shift away from car to walking, cycling and bus use will be encouraged. By creating an area that supports active travel that communities use, the area will be healthier and have an improved environment to live and work and be educated in.

4.3 Local Policy

- 4.3.1 Planning legislation states that applications must be determined in accordance with the LDP unless material considerations indicate otherwise.

The Vale of Glamorgan Local Development Plan

- 4.3.2 The VoG LDP was updated in June 2017 and covers the period 2011-2026. The vision for the VoG is for a place:

- *“That is safe, clean and attractive, where individuals and communities have sustainable opportunities to improve their health, learning and skills, prosperity and wellbeing; and*
- *Where there is a strong sense of community in which local groups and individuals have the capacity and incentive to make an effective contribution to the future sustainability of the area.”*

- 4.3.3 In support of the social, economic and sustainable themes intrinsic to the LDP and Community Strategy Vision, ten key strategic objectives have been developed that set the context of the LDP Strategy. The strategic objective most appropriate to this scheme is:

- Objective 3: To reduce the need for VoG residents to travel to meet their daily needs and enabling them greater access to sustainable forms of transport.

- 4.3.4 The LDP further develops ‘Strategic Policies’ to underpin the LDP Strategy and further develops policies specifically relating to ‘Managing Growth’ and ‘Managing Development’ in the VoG.

- 4.3.5 Strategic Policy SP7 (Transportation) states:

“Sustainable transport improvements that serve the economic, social and environmental needs of the Vale of Glamorgan and promote the objectives of the South East Wales Regional Transport Plan and the Local Transport Plan will be favoured”; and

“Priority will be given to schemes that improve highway safety and accessibility, public transport, walking and cycling. All new developments that have a direct impact on the strategic transportation infrastructure will be required to deliver appropriate improvements to the network”.

- 4.3.6 The provision of bus priority and cycle routes for the A48 from Culverhouse Cross to Bridgend via Cowbridge is included under *“key priorities for the delivery of strategic transportation infrastructure.”* The provision of this route would be to the benefit of cycle journeys to / from Colwinston.

- 4.3.7 The proposed development will include features to improve pedestrian safety within the site, such as dropped kerb and tactile paving crossings at the junctions with internal roads.

- 4.3.8 Policy MG6 (provision of Education Facilities) provides details of land allocations for specific school sites, however, it goes onto state that *“existing schools will be extended or improved to meet demand for school places during the plan period.”*

- 4.3.9 Policy MG16 (Transport Proposals) has been designed to safeguard a number of transport schemes, including walking / cycling and bus proposals for the A48 between Culverhouse Cross and Bridgend.

- 4.3.10 Policy MD2 (Design of New Development) states, in relation to transport and highways, that development proposals should:

- *“Provide a safe and accessible environment for all users, giving priority to pedestrians, cyclists and public transport users”;* and
- *“Have no unacceptable impact on highway safety nor cause or exacerbate existing traffic congestion to an unacceptable degree”.*

4.3.11 In respect to this, the LDP states:

“All new development should be highly accessible. Walking and cycling have an important role to play in the management of movement across the area, particularly reducing the number of short trips taken by car. Developers will be required to ensure that new developments encourage walking and cycling by giving careful consideration to location, design, access arrangements, travel ‘desire lines’ through a development, and integration with existing and potential off-site links. Providing safe and convenient walking and cycling environments will help tackle health problems associated with physical inactivity and social exclusion factors arising from car dependency, poor access to services and public transport facilities.”

4.3.12 The proposed development seeks to provide a safe and accessible environment particularly for pedestrians by encouraging measures such as a one-way system for vehicles accessing the school during school peak hours, with more information provided in **Section 7** of this TA.

The Vale of Glamorgan Local Transport Plan 2015-2030

4.3.13 The Local Transport Plan (LTP) seeks to identify the sustainable transport measures required to ensure the VoG adheres to current requirements and good practices to allow for a sustainable transport environment for the period 2015 to 2020 as well as looking forward to 2030. It therefore seeks ways to secure better conditions for pedestrians, cyclists and public transport users and to encourage a change in travel choices away from the single occupancy car.

4.3.14 As most journeys by car, particularly for shopping and school travel, are relatively short, better conditions for pedestrians and cyclists can lead to a reduction in car use. A reduction in car use can promote good health and well-being, reduce the negative impacts on the environment that car travel can bring, offer better access to services and facilities, which in turn can offer improved economic opportunities and reduce the potential for traffic accidents. Sustainable transport infrastructure and services are therefore an important feature of modern-day life.

The Vale of Glamorgan Parking Standards

4.3.15 The VoG parking standards are set out in SPG to the LDP; the SPG was adopted in March 2019.

4.3.16 The SPG sets out the VoG's parking standards and explains the planning policy for parking requirements for new developments or changes of use. The parking standards seek to promote and ensure transparent and consistent approaches to the provision of parking. In addition to this, it helps to inform developers and designers what is expected of them in terms of sustainability considerations and travel planning.

4.3.17 The proposed development provides parking in accordance with the SPG, as discussed at **Section 3** of this TA.

4.4 Summary

4.4.1 This section of the report has provided a review of existing planning and transport policies at a national and local level that are considered relevant to the proposed development.

4.4.2 Planning law requires that applications for planning permission must be determined in accordance with the adopted LDP. The proposed development is considered to align with the objectives of the LDP.

4.4.3 The proposed development will facilitate opportunities for sustainable travel through the implementation of a TP, which is a requirement of the national and local policy. This will not form part of the planning application submission; however, it will be secured as a condition, through the planning process.

4.4.4 The proposed development will comply with the national and local policy and guidance, with access to the site being safe and suitable for all users. The site is accessible via a range of sustainable modes which will be further encouraged via a number of improvements, further detailed in **Section 7** of this TA. In summary, the proposals comply with national and local policies.

5. Trip Generation and Distribution

5.1 Introduction

5.1.1 This section of the TA outlines the method for calculating multi-modal trip generation and traffic distribution / assignment for the existing and new school. The increase in traffic flow across the local highway network as a result of the development proposals have also been derived to inform the traffic impact assessment contained later in this TA.

5.2 Existing School

5.2.1 The existing school accommodates 140 FTE primary school pupils, 14 FTE nursery pupils and 15 FTE members of staff. The existing mode share and traffic generation for both pupil and staff trips to / from the school site have been derived in order to understand the likely travel patterns for the new school. Neither the school nor the VoG hold any data on the existing trip generation or mode choice for the pupil or staff population. Therefore, a first principles methodology has been developed.

5.2.2 St David's CiW Primary School has developed a School Travel Plan (TP) to inform the proposed new school. This provides some information on existing behaviours for travelling to / from the school site, including information on local walking, cycling and public transport trips. Although it does not include a travel survey, relevant information from the TP has been used to inform mode share and trip generation assumptions.

Pupil Trip Generation, Distribution and Assignment

5.2.3 Pupil trip generation has been derived using a first principles approach based on pupil home postcode data as supplied by the VoG. The postcode data has been analysed to understand where pupils are travelling to / from school and the likely transport modes used to complete the journey.

5.2.4 VoG have also supplied the postcodes of pupils who have a bus pass for the VoG school bus service (P121). VoG and the School TP both confirm that the service is used regularly by 20 pupils. This level of occupancy has been apportioned equally across the postcodes of bus-users, which have then been removed from the rest of the analysis.

5.2.5 For the remaining postcodes, the mode share for trips within two miles of the school has been derived from the National Travel Survey (NTS), Table NTS0614 (2018). As there are no public bus services which stop within acceptable walking distance from the school, the bus mode share from the NTS has been assigned proportionately to the car, walking and cycling modes. For trips of two miles or greater, it has been assumed that pupils travel as a car passenger.

5.2.6 **Table 5-1** shows the existing number of pupils travelling to school by distance (based on walking distance) and mode.

Table 5-1: Number of Pupils by Distance and Mode – Existing School

Walking Distance	Mode				Total
	Car Passenger	Walk	Cycle	Bus	
Under 1 mile	9	37	1	0	46
1 to under 2 miles	7	2	0	6	16
2 to under 5 miles	46	0	0	13	59
Over 5 miles	22	0	0	1	22
Total	84	39	1	20	144
Mode Share	58%	27%	1%	14%	100%

Note: 1) Summation errors due to rounding

2) 144 pupils are based at the school including nursery and primary school pupils.

5.2.7 The nursery mini-bus service has not been considered in this analysis, and therefore nursery pupils are assumed to travel by car, walking, cycling or bus (Service P121) modes as shown in **Table 5-1**.

- 5.2.8 The pupil trips under 'car passenger trips' will be accompanied by 'escorting adult' trips, accounting for a parent driving to / from the school to drop-off and pick-up pupils. It is therefore assumed that there is one vehicle trip to the school and one trip from the school during the AM peak hour (08:00-09:00hrs), and during the School PM peak hour (15:15-16:15hrs), as the trips to / from the school to pick-up pupils are between the hours of 15:25 and 15:30hrs, as per the existing school timetable. It is assumed that there will be no pupil trips during the network PM peak hour (17:00-18:00hrs).
- 5.2.9 Some vehicle trips will transport more than one pupil, for example when siblings or friends travel together in the same vehicle. To account for this, a factor of 1.4 pupils per vehicle, based on analysis undertaken by the industry standard software, TRICS, has been applied to the 'car passenger' mode share shown in **Table 5-1**. On-site observations of car occupancy indicate that in practice more pupils are transported to / from school in a single car, however the factor of 1.4 pupils has been retained to provide a robust forecast.
- 5.2.10 The traffic generation for the existing primary school has been assigned onto the study network, based on the most desirable routes between the pupil home postcode and the existing school site. The routes have been determined using the 'Google Maps' online route planning application which determines the quickest route between pupils' postcodes and the school.
- 5.2.11 However, this approach has resulted in a route choice bias for all traffic travelling to / from the A48 east, with all traffic assigned via the westernmost road to / from Colwinston (via JTC survey Junction 3) over the easternmost route (Junction JTC survey 4). There are no obvious journey time savings or constraints on the local highway network to account for this behaviour, and therefore it is considered to be an unrealistic scenario which does not accurately reflect traffic conditions. On-site observations during the School PM peak hour did not indicate a route preference between the A48 approach options and the school.
- 5.2.12 Therefore, traffic travelling to / from the A48 east has been assigned in accordance with turning proportions determined from the 2019 JTC surveys (detailed in **Section 2**). These still assign most traffic via Junction 3, but not every vehicle and therefore is considered to be a more realistic assumption of traffic conditions and consistent with observations.
- 5.2.13 **Table 5-2** shows the assignment routes and the number of vehicles which use these routes during each peak hour. The routes with an 'Option' represent traffic travelling to / from the same network entry / exit point, but travels using alternative routes from the A48 to the school. Assignment routes are illustrated on **Figure 5-1** for reference.

Table 5-2: Pupil Traffic Assignment – Existing School

Route	Weekday AM Peak Hour (08:00-09:00)		Weekday School PM Peak Hour (15:15-16:15)	
	Arrivals	Departures	Arrivals	Departures
Route 1 - A48 Crack Hill (West) Option 1	19	19	19	19
Route 2 - A48 Crack Hill (West) Option 2	0	0	0	0
Route 3 - A48 Crack Hill (East) Option 1	3	6	5	3
Route 4 - A48 Crack Hill (East) Option 2	9	6	7	9
Route 5 - Unnamed Road via Treoes (North)	5	5	5	5
Route 6 - Tair Croes (West)	4	4	4	4
Route 7 - Tair Croes (East)	10	10	10	10
Route 8 - East of Colwinston	3	3	3	3
Route 9 - Colwinston (North of School)	4	4	4	4
Route 10 - Colwinston (South of School)	2	2	2	2
Total	60	60	60	60

Notes: 1) Includes re-assignment to account for route planning bias.

2) Summation errors are due to rounding.

- 5.2.14 Pupil traffic has been assigned to / from the community centre car park as a proxy for parking on Unnamed Road 1, St David's Meadows and the community centre as per observed on-site conditions.

- 5.2.15 This assignment does not account for any 'trip chaining' that may occur for the escorting adult trips, for example onward car journeys to / from place of work. This information is not available and for the purposes of this assessment a return journey to each pupil home postcode has been assumed.

Staff Trip Generation, Distribution and Assignment

- 5.2.16 Staff trip generation at the existing primary school is based on the existing staff population (15 FTE). It has been assumed that all staff journeys to / from the school will be completed via a single-occupancy vehicle regardless of home location.
- 5.2.17 The distribution and route assignment of existing staff has been derived using staff postcode data as supplied by the VoG. Traffic has been assigned to the study area network using the same method as pupil 'car passenger' trips, including the re-assignment of traffic according to JTC surveys for traffic travelling to / from the east of Colwinston on the A48. It is assumed that all staff arrivals will occur during the AM peak hour and all departures will be during the PM peak hour.
- 5.2.18 **Table 5-3** shows the assignment routes and the number of staff vehicles which use these routes during each peak hour.

Table 5-3: Staff Traffic Assignment – Existing School

Route	Weekday AM Peak Hour (08:00-09:00)		Weekday PM Peak Hour (17:00-18:00)	
	Arrivals	Departures	Arrivals	Departures
Route 1 - A48 Crack Hill (West) Option 1	4	0	0	4
Route 2 - A48 Crack Hill (West) Option 2	0	0	0	0
Route 3 - A48 Crack Hill (East) Option 1	0	0	0	0
Route 4 - A48 Crack Hill (East) Option 2	6	0	0	6
Route 5 - Unnamed Road via Treoes (North)	2	0	0	2
Route 6 - Tair Croes (West)	0	0	0	0
Route 7 - Tair Croes (East)	2	0	0	2
Route 8 - East of Colwinston	0	0	0	0
Route 9 - Colwinston (North of School)	0	0	0	0
Route 10 - Colwinston (South of School)	1	0	0	1
Total	15	0	0	15

Notes: 1) Includes re-assignment to account for route planning bias.
2) Summation errors are due to rounding.

5.3 Proposed School

- 5.3.1 The proposed new development will include the expansion of the school and will increase the number of pupils and staff travelling to / from the school site each weekday. A total of 210 FTE primary school pupils, 24 FTE nursery pupils and 24 FTE staff will be based at the school site. The development is expected to be completed and operational by 2021.
- 5.3.2 For the purposes of this assessment, the existing school distribution of pupils and staff has been retained as it is considered to be reflective of the school catchment. Whilst it is recognised that there may be year-on-year variation in specific pupil / staff postcodes, this cannot be quantified for the purposes of this assessment. The catchment of the new school will remain as per the existing.

Pupil Trip Generation, Distribution and Assignment

- 5.3.3 **Table 5-4** shows the number of pupils travelling to school by distance (based on walking distance) and mode. This is the total number of pupils (existing and new) following the expansion of the school.

Table 5-4: Number of Pupils by Distance and Mode – Proposed School

Distance Band	Mode				Total
	Car Passenger	Walk	Cycle	Bus	
Under 1 mile	14	60	2	0	76
1 to under 2 miles	12	3	0	11	26
2 to under 5 miles	74	0	0	21	95
Over 5 miles	36	0	0	1	36
Total	136	63	2	33	234
<i>Mode Share</i>	<i>58%</i>	<i>27%</i>	<i>1%</i>	<i>14%</i>	<i>100%</i>

5.3.4 Based on the information provided in the School TP, the P121 school bus is currently operating at 33% capacity (20 / 60 seat occupancy). It is therefore assumed that the increase in bus mode share following expansion of the school can be accommodated.

5.3.5 The pupil mode share does not account for any measures to be implemented to increase the update of active and sustainable travel for journeys to / from the school and can therefore be considered a robust assumption of future traffic generation. These measures are discussed in **Section 7**.

5.3.6 **Table 5-5** shows the number of pupil vehicles expected to use each assignment routes following the expansion. As per the existing school, it is assumed that pupil 'car passenger' trips will be accompanied by 'escorting adult' trips resulting in a vehicle arrival and departure during each peak hour.

Table 5-5: Pupil Traffic Assignment – Proposed School

Route	Weekday AM Peak Hour (08:00-09:00)		Weekday School PM Peak Hour (15:15-16:15)	
	Arrivals	Departures	Arrivals	Departures
Route 1 - A48 Crack Hill (West) Option 1	31	31	31	31
Route 2 - A48 Crack Hill (West) Option 2	0	0	0	0
Route 3 - A48 Crack Hill (East) Option 1	6	10	9	6
Route 4 - A48 Crack Hill (East) Option 2	15	10	12	15
Route 5 - Unnamed Road via Treoes (North)	8	8	8	8
Route 6 - Tair Croes (West)	7	7	7	7
Route 7 - Tair Croes (East)	15	15	15	15
Route 8 - East of Colwinston	5	5	5	5
Route 9 - Colwinston (North of School)	6	6	6	6
Route 10 - Colwinston (South of School)	4	4	4	4
Total	97	97	97	97

5.3.7 **Table 5-6** shows the increase in the number of vehicles on the local highway network as a result of the pupil expansion for the weekday AM peak hour (08:00-09:00) and school PM peak hour (15:15-16:15). The vehicle trip increase across the study area network is shown for the weekday AM peak hour and school PM peak hour on **Figure 5-2** and **Figure 5-3**.

Table 5-6: Pupil Traffic Assignment Route Increase

Route	Weekday AM Peak Hour (08:00-09:00)		Weekday School PM Peak Hour (15:15-16:15)	
	Arrivals	Departures	Arrivals	Departures
Route 1 - A48 Crack Hill (West) Option 1	12	12	12	12
Route 2 - A48 Crack Hill (West) Option 2	0	0	0	0
Route 3 - A48 Crack Hill (East) Option 1	2	4	3	2
Route 4 - A48 Crack Hill (East) Option 2	6	4	5	6
Route 5 - Unnamed Road via Treoes (North)	3	3	3	3
Route 6 - Tair Croes (West)	3	3	3	3
Route 7 - Tair Croes (East)	6	6	6	6
Route 8 - East of Colwinston	2	2	2	2
Route 9 - Colwinston (North of School)	2	2	2	2
Route 10 - Colwinston (South of School)	2	2	2	2
Total	37	37	37	37

5.3.8 It is anticipated that the expansion of the school will result in 74 additional two-way vehicle movements across the local highway network during each peak hour. This increase has been assessed (along with the increase in staff vehicles) for the traffic impact assessment.

Staff Trip Generation, Distribution and Assignment

5.3.9 **Table 5-7** shows the number of staff vehicles expected to use each assignment route following the completion of the new school facility.

Table 5-7: Staff Traffic Assignment – Proposed School

Route	Weekday AM Peak Hour (08:00-09:00)		Weekday PM Peak Hour (17:00-18:00)	
	Arrivals	Departures	Arrivals	Departures
Route 1 - A48 Crack Hill (West) Option 1	7	0	0	7
Route 2 - A48 Crack Hill (West) Option 2	0	0	0	0
Route 3 - A48 Crack Hill (East) Option 1	3	0	0	4
Route 4 - A48 Crack Hill (East) Option 2	7	0	0	6
Route 5 - Unnamed Road via Treoes (North)	3	0	0	3
Route 6 - Tair Croes (West)	0	0	0	0
Route 7 - Tair Croes (East)	3	0	0	3
Route 8 - East of Colwinston	0	0	0	0
Route 9 - Colwinston (North of School)	0	0	0	0
Route 10 - Colwinston (South of School)	1	0	0	1
Total	24	0	0	24

5.3.10 **Table 5-8** shows the increase in the number of vehicles on the local highway network as a result of the staff population increase for the weekday AM peak hour (08:00-09:00) and PM peak hour (17:00-18:00). The increase staff vehicle trips on the study area network are shown for the weekday AM and PM peak hours on **Figure 5-4** and **Figure 5-5**.

Table 5-8: Staff Traffic Assignment Increase.

Route	Weekday AM Peak Hour (08:00-09:00)		Weekday PM Peak Hour (17:00-18:00)	
	Arrivals	Departures	Arrivals	Departures
Route 1 - A48 Crack Hill (West) Option 1	2	0	0	2
Route 2 - A48 Crack Hill (West) Option 2	0	0	0	0
Route 3 - A48 Crack Hill (East) Option 1	1	0	0	1
Route 4 - A48 Crack Hill (East) Option 2	3	0	0	2
Route 5 - Unnamed Road via Treoes (North)	1	0	0	1
Route 6 - Tair Croes (West)	0	0	0	0
Route 7 - Tair Croes (East)	1	0	0	1
Route 8 - East of Colwinston	0	0	0	0
Route 9 - Colwinston (North of School)	0	0	0	0
Route 10 - Colwinston (South of School)	0	0	0	0
Total	9	0	0	9

- 5.3.11 It is anticipated that the expansion of the school will result in nine additional two-way vehicle movements across the local highway network during each peak hour period. This increase has been assessed (along with the increase in pupil vehicles) for the traffic impact assessment.

6. Traffic Impact Assessment

6.1 Introduction

6.1.1 This section of the TA outlines the assessment method and results of the traffic impact assessment for the proposed development, including the derived assessment scenarios and traffic growth forecast.

6.2 Assessment Scenarios

6.2.1 A spreadsheet model has been prepared to derive the traffic flows for each assessment scenario, which have then been used for traffic impact assessment purposes. The spreadsheet model provides network flow diagrams for each scenario which have been included at **Appendix 6-1**.

Assessment Peak Hours

6.2.2 The traffic impact assessment uses the following peak hours to account for all movements to / from the school throughout a typical weekday:

- AM Peak Hour – 08:00-09:00;
- School PM Peak Hour / Inter-Peak – 15:15-16:15; and
- PM Peak Hour – 17:00-18:00

6.2.3 The AM peak hour and School PM peak hour have been determined based on the peak traffic at the school, as determined by the JTC survey conducted for the Unnamed Road 1 / School Access junction. Owing to the rural setting of the school and the size of Colwinston, it is likely that the school is the major trip generator within the village during peak periods, therefore the peak traffic flow in the vicinity of the school access is the traffic peak of the village as a whole. This is particularly the case during the School PM peak hour which falls outside of conventional network peak periods. The PM peak hour has been determined based on the peak traffic as surveyed on the A48.

2019 Observed Scenario

6.2.4 The '2019 Observed' scenario comprises surveyed traffic flows, which include traffic associated with the existing school which has not been removed for the purposes of this assessment (the traffic impact assessment assesses the increase or 'new' traffic from the proposed development, i.e. derived new school traffic minus derived existing school traffic).

2021 Base

6.2.5 2021 will be the opening year of the new school site and is considered to be the point at which the school reaches maximum capacity in terms of pupil and staff population.

6.2.6 The surveyed traffic flows have been 'growthed' to 2021 using growth factors derived from TEMPro (NTEM Dataset 7.2), as per industry standard methodology. The TEMPro program is based on the National Trip End Model (NTEM) and considers changes in car ownership and local planning forecasts regarding housing and employment to provide growth factors.

6.2.7 The NTEM forecast has been based on 'rural – all' road types for the 'Vale of Glamorgan 001' Middle Super Output Area (MSOA). The growth factors for each peak hour are set out in **Table 6-1**.

Table 6-1: Growth Factors (2019 – 2021)

Peak Hour	Growth Factor
Weekday AM Peak (07:00-10:00)	1.0214
Weekday Inter-Peak (10:00-16:00)	1.0252
Weekday PM Peak (16:19:00)	1.0214

6.2.8 The TEMPro growth factors account for local committed growth in residential and employment development within the NTEM assumptions. The growth forecast has not included any manually assigned committed development growth to the highway network.

2021 Base + Development

6.2.9 The '2021 Base + Development' scenario has been derived by applying the increase in pupil and staff traffic to the 2021 Base traffic flows. The increase in pupil and staff traffic on the assignment routes to / from the school are shown in **Table 5-6** and **Table 5-8**.

6.3 Traffic Impact Assessment

6.3.1 To understand the impact of the proposed development on the operation of the highway network, a traffic impact assessment has been completed. This comprises:

- A percentage impact assessment, which considers development impacts on Unnamed Road 1 in the vicinity of the school;
- A percentage impact assessment, which considers development impacts at the junctions on the local highway network; and
- Junction capacity assessments where the percentage impact on junction is shown to be material.

6.3.2 The assessments express the increase in school traffic against the 2021 Base scenario.

Unnamed Road 1 – Percentage Impact Assessment

6.3.3 The traffic flow in each scenario and percentage impact on Unnamed Road 1 in the vicinity of the school and community centre is provided in **Table 6-2**.

Table 6-2: Unnamed Road 1 – Percentage Impact Assessment

Link	Direction	2021 Base			Increase in School Traffic			2021 Base + Development			% Impact (2021)		
		AM	IP	PM	AM	IP	PM	AM	IP	PM	AM	IP	PM
North of Community Centre Access	Northbound	31	29	28	23	25	6	54	54	33	76%	88%	21%
	Southbound	42	54	28	32	24	0	73	78	28	75%	44%	0%
	Two-way	73	83	55	55	49	6	128	132	61	76%	59%	11%
Between Community Centre and School Accesses	Northbound	31	29	28	12	13	6	43	42	33	40%	47%	21%
	Southbound	42	54	28	20	12	0	62	67	28	49%	23%	0%
	Two-way	72	83	55	33	26	6	105	109	61	45%	31%	11%
South of School Access	Northbound	34	24	25	15	13	0	49	37	25	44%	57%	0%
	Southbound	32	55	28	14	12	3	46	68	31	44%	22%	11%
	Two-way	65	79	52	29	26	3	94	105	55	44%	33%	6%

Notes: 1) "IP" refers to the school PM peak hour (15:15-16:15)

6.3.4 The assessment shows that the impact of the school expansion on Unnamed Road 1 will be material, resulting in percentage increases of around 76% north of the community centre during the AM peak hour, and 59% during the School PM peak hour, based on two-way movements. South of the community centre, there are forecast to be increases of over 44% during the AM and 33% School PM peak hour, based on two-way movements.

6.3.5 The increase in pupil traffic has been assigned to / from the community centre car park to represent parking on Unnamed Road 1, St David's Meadows and the community centre. Therefore, the impacts north of the community centre are those from traffic assigned to / from the north of Colwinston (A48) and the impact to the south of the community centre are those assigned to / from the south of Colwinston.

- 6.3.6 The high percentage increases shown along Unnamed Road are due to the low baseline of traffic in the vicinity of the school, and the comparatively high increase in traffic forecast as a result of the development proposals. The actual increases in traffic are not significant in real terms. For example, in the '2021 Base' scenario there is forecast to be no more than 83 two-way vehicle movements during a peak hour, which is set against a maximum increase of around 54 two-way movements. This increase equates to an average increase of less than one vehicle movement per minute within a peak hour, or around 14 movements per average 15-minute period. This is not considered to be a significant increase in traffic.
- 6.3.7 Furthermore, this assessment is robust as it does not account for pupils that will arrive / depart outside the assessed peak hours (for example to attend before / after school clubs), or for the nursery 'half day' timetable which would effectively half the number of nursery trips occurring during the assessed periods. This assessment also doesn't account for an increase in the number of pupils attending from within a two-mile catchment of the school (e.g. from local housing developments) which are likely to result in an increase in walking and cycling mode share rather than vehicle trips.
- 6.3.8 During the PM peak hour, impacts are significantly lower, reaching a maximum of 9%. This is not considered to be a material impact during this period.
- 6.3.9 It is noted, however, that there are likely to be some negative impacts on Unnamed Road 1 from the development proposals, particularly if vehicles undertake a turning manoeuvre in the road to exit via the same direction in which they arrived. This would further intensify congestion and delay from one-way carriageway working arising from parked vehicles, and potential adverse highway safety for pedestrians. The opportunities to manage the increase in school traffic locally are discussed in **Section 7** of this TA.

Junction Impact Assessment (Percentage Impact)

- 6.3.10 **Table 6-3, Table 6-4** and **Table 6-5** present the percentage impact for junctions on the local highway network. The assessment is based on the traffic approaching the junction on each arm. The junctions are referenced in relation to their labelling from the JTC surveys, with their locations shown in **Figure 2-5**.

Table 6-3: Junction 2 – Unnamed Road Crossroads Percentage Impact

Approach Arm	2021 Base			Increase in School Traffic			2021 Base + Development			% Impact (2021)		
	AM	IP	PM	AM	IP	PM	AM	IP	PM	AM	IP	PM
Unnamed Road 2 (North)	59	69	65	27	20	0	87	89	65	46%	29%	0%
Unnamed Road (East)	1	1	2	0	0	0	1	1	2	0%	0%	0%
Unnamed Road 3 (South)	11	8	4	2	2	0	13	10	4	15%	21%	0%
Unnamed Road 1 (West)	62	63	36	21	23	6	83	85	42	34%	37%	16%
Total / Average Impact	134	140	107	50	45	6	184	185	113	38%	32%	5%

Notes: 1) "IP" refers to the school PM peak hour (15:15-16:15)

- 6.3.11 The assessment for this junction shows that there will be a material increase in vehicle movements across the junction of around 45-50 movements. The maximum increase in traffic demand is forecast to occur on the northern arm of the junction, equating to around 20-27 movements during the AM peak hour and School PM peak hour. The average percentage impact for the junction as a whole during these periods is 38% and 32% which is considered to be significant.
- 6.3.12 The average junction impact during the PM peak hour is 5% with a total increase in demand of six vehicles over the hour period. This is not considered a severe impact
- 6.3.13 As a result of the percentage impact on the junction during the AM and IP, a junction capacity assessment has been undertaken. This is to gain an understand on whether the material impact shown in percentage terms results in a severe impact on the operation of this junction. The junction capacity assessment is outlined in the following section.

Table 6-4: Junction 3 – A48 Crack Hill / Unnamed Road T-Junction (West) Percentage Impact

Approach Arm	2021 Base			Increase in School Traffic			2021 Base + Development			% Impact (2021)		
	AM	IP	PM	AM	IP	PM	AM	IP	PM	AM	IP	PM
A48 Crack Hill East	543	528	570	13	8	0	556	536	570	2%	1%	0%
Unnamed Road 2 South	77	72	41	19	21	6	96	93	47	25%	29%	14%
A48 Crack Hill West	499	473	593	15	12	0	514	485	593	3%	3%	0%
Total / Average Impact	1,119	1,072	1,204	47	41	6	1,166	1,113	1,210	4%	4%	0%

Notes: 1) "IP" refers to the school PM peak hour (15:15-16:15)

- 6.3.14 The results of the assessment for this junction show that there will be a total increase of around 41 to 47 two-way vehicle movements across the junction during the AM peak hour and School PM peak hour as a result of the proposed development. The average percentage impact at the junction during these periods is less than 5% which is not considered to be a material or severe impact. The impact on Unnamed Road 2 is around 25% - 30% during the AM and PM peak hour, which may result in some queuing during peak hours, but this would not be expected to impact the operation or safety of the A48.
- 6.3.15 The average impact during the PM peak hour is 0%, with a maximum impact of 14% occurring on Unnamed Road. This is not considered to be severe.
- 6.3.16 As the impact at this junction is not considered to be material, it has not been subject to junction capacity assessment.

Table 6-5: Junction 4 – A48 Crack Hill / Unnamed Road T-Junction (East) Percentage Impact

Approach Arm	2021 Base			Increase in School Traffic			2021 Base + Development			% Impact (2021)		
	AM	IP	PM	AM	IP	PM	AM	IP	PM	AM	IP	PM
A48 Crack Hill East	611	594	661	12	8	0	622	602	661	2%	1%	0%
Unnamed Road South	22	15	12	4	2	1	26	18	14	18%	14%	12%
A48 Crack Hill West	523	483	605	4	6	2	527	489	607	1%	1%	0%
Total / Average Impact	1,156	1,092	1,278	20	16	4	1,176	1,108	1,281	2%	1%	0%

Notes: 1) "IP" refers to the school PM peak hour (15:15-16:15)

- 6.3.17 The results of the assessment for this junction show that there will be a total increase of around 16 - 20 two-way vehicle movements across the junction during the AM peak hour and School PM peak hour as a result of the proposed development. This is not considered to be a material increase in traffic.
- 6.3.18 The average percentage impact at the junction is 2% or less for all peak hour periods, although the impact on the minor arm (Unnamed Road) is between 14% and 18% which may result in some minor queuing on Unnamed Road during peak hours. This would not impact the operation or safety of the A48 and therefore, this is not considered a severe impact.
- 6.3.19 As the impact at this junction is not considered to be material, it has not been subject to junction capacity assessment.

Junction Capacity Assessment

- 6.3.20 A junction capacity assessment has been undertaken for Junction 2 (Unnamed Road Crossroads) in order to further understand the impact of the proposed development on junction performance. The modelling has been completed using industry-standard junction modelling software 'Junctions 9'. The junction model has been constructed and calibrated using desk-based measurements. The models have been validated to traffic conditions as observed during the site visit.
- 6.3.21 Vehicle flows have been inputted to the model for each assessment scenario as derived from the spreadsheet model. Junctions 9 requires information on the classification of vehicles using the junction. For this assessment, the proportion of HGVs for all scenarios is consistent with surveyed HGVs (i.e. OGV1, OGV2 and PSV classifications) from 2019. This means that the 'real' number of HGVs being assessed through the model increases with total traffic, which is considered to be a reasonable and robust approach.
- 6.3.22 The results of the modelling are presented as 'Ratio Flow to Capacity' (RFC) 'Queue Length' in PCUs (rounded up to next whole PCU). Movements with an RFC above 0.85 are considered to exceed "practical capacity", as this is the point above which 'Random Oversaturation Delay' can occur. An RFC of 1.00 denotes the "absolute capacity" of the junction. The results for Junctions 9 analyses are presented as a summary only, for ease of reference, and represent the maximum values experienced by each stream across the AM, School PM and PM peak hours.
- 6.3.23 The results of the junction capacity modelling are presented in **Table 6-6**. The Junctions 9 output report which provides the full parameters, traffic flow entry and results, has been included at **Appendix 6-2**.

Table 6-6: Junction 2 – Unnamed Crossroads – Summary of Junction Capacity

Assessment Scenario	Stream / Movement	AM Peak Hour (08:00-09:00)		School PM Peak Hour (15:15-16:15)		PM Peak Hour (17:00-18:00)	
		Queue (PCU)	RFC	Queue (PCU)	RFC	Queue (PCU)	RFC
2019 Observed	Stream B-ACD	0	0.00	0	0.00	0	0.00
	Stream A-BCD	1	0.11	1	0.10	1	0.10
	Stream D-ABC	1	0.11	1	0.11	1	0.06
	Stream C-ABD	0	0.00	0	0.00	0	0.00
2021 Base	Stream B-ACD	0	0.00	0	0.00	0	0.00
	Stream A-BCD	1	0.11	1	0.10	1	0.10
	Stream D-ABC	1	0.11	1	0.11	1	0.07
	Stream C-ABD	0	0.00	0	0.00	0	0.00
2021 Base + Development	Stream B-ACD	0	0.00	0	0.00	0	0.00
	Stream A-BCD	1	0.15	1	0.13	1	0.10
	Stream D-ABC	1	0.15	1	0.15	1	0.08
	Stream C-ABD	0	0.00	0	0.00	0	0.00

Notes: 1) Arm A = North, Arm B = East, Arm C = South, Arm D = West.

2) Queue lengths have been rounded up to the nearest 1 PCU.

- 6.3.24 The results of the junction capacity modelling show that the junction is forecast to operate well within practical capacity in all assessment scenarios, including the 2021 Base + Development scenario, and across all assessed peak hours.

- 6.3.25 The impact of the proposed development on the performance of this junction is immaterial, with the introduction of development traffic forecast to result in a maximum increase in an RFC of 0.04 during the AM peak hour (from 0.11 to 0.15), 0.04 during the School PM peak hour (0.11 to 0.15) and 0.01 during the PM peak hour (from 0.07 to 0.08). There are no material increases in queue lengths. Therefore, although there is forecast to be a material impact at this junction in percentage terms, this is not forecast to result in a significant impact in junction capacity or queuing.
- 6.3.26 The junction operates well within capacity limits, with a negligible impact from the proposed development and therefore cannot be considered severe.

6.4 Summary

- 6.4.1 This section of the TA has set out the methodology and results of the traffic impact assessment for the development proposals.
- 6.4.2 A spreadsheet model has been used to determine traffic flows across the network for three assessment scenarios. The '2019 Observed' scenario traffic flows have been taken directly from the JTC surveys completed across the local highway network. The '2021 Base' scenario has been derived through the application of TEMPro-derived growth factors to the 2019 flows. The '2021 Base + Development' scenario has been derived through the application of the increase in school traffic as derived in **Section 5** of this TA and outlined in **Table 5-6** and **Table 5-8**.
- 6.4.3 The traffic impact assessment uses peak hours as defined by the traffic surveys for the local highway network. The AM peak hour is 08:00-09:00hrs and the School PM peak hour / IP hour is 15:15-16:15hrs, as defined by the JTC conducted at the school access. The PM peak hour is 17:00-18:00hrs as defined by the ATC on the A48.
- 6.4.4 The traffic impact assessment has been based on a percentage impact assessment for Unnamed Road 1 in the vicinity of the school site and for three junctions on the local highway network.
- 6.4.5 The results of the assessment for Unnamed Road 1 indicate a significant impact as a result of the proposed development, equating to a maximum of 55 two-way movements during the AM and School PM peak hours. This equates to around one movement per minute during each peak hour, which is not considered to be a 'severe' impact. Nevertheless, measures to improve the existing traffic issues and manage the forecasted increase in school traffic on Unnamed Road 1 are discussed in **Section 7** of this TA.
- 6.4.6 The results of the junction assessments indicate an immaterial impact at the junctions with the A48 to the north of Colwinston. There is forecast to be a material impact in percentage terms at the Unnamed Road crossroads, however junction capacity modelling has shown that in real terms the expected increase in traffic demand will have a negligible impact and therefore the development impact is not severe.
- 6.4.7 Overall, the impact of the proposed development is not considered to be severe, but in any case, measures to reduce potential impacts from the increase in development traffic are discussed in **Section 7**.

7. Transport Implementation Strategy

7.1 Introduction

7.1.1 TAN 18 requires any TA document to provide the information necessary to assess the suitability of an application in travel demand and traffic impact terms. It recommends that a Transport Implementation Strategy (TIS) should be included within the TA. The TIS is intended to set objectives and targets in managing travel demand, whilst detailing the infrastructure and measures necessary to achieve them. The TIS should also set up a framework for monitoring the targets including modal travel choice.

7.1.2 A TIS shares many of the same goals as a TP; therefore, the modal information, targets and measures set out in this section will inform the School TP which will be conditioned as part of the planning application. Whilst there is an existing School TP, this does not provide sufficient information and will therefore be updated or superseded as part of the conditions for the planning application.

7.2 Mode Share and Targets

7.2.1 Mode share targets are used to evaluate the success of the TIS and to identify areas on which further measures should be focused in order to help to drive travel behaviour change. To enable the setting of valid and realistic targets, a valid baseline first needs to be established.

7.2.2 **Section 5** of this TA sets out the forecast mode share of the school with the development proposals. The staff and pupil mode share which has been calculated as part of the assessments is summarised in

7.2.3 Table 7-1 for 2021.

Table 7-1: Forecast Mode Share for 2021

Mode	Pupils		Staff	
	AM	PM	AM	PM
Walk	27%	27%	0%	0%
Cycle	1%	1%	0%	0%
School Bus	14%	14%	0%	0%
Car	58%	58%	100%	100%
Total	100%	100%	100%	100%

7.2.4 This mode share does not consider measures to reduce journey to / from the school via car modes, and it should also be noted that for the purposes of this TA all staff are assumed to travel to / from the school using a single-occupancy vehicle following the opening of the new school facility.

7.2.5 As the TP will be secured as a planning condition and will be required to be in place when the school is fully operational, it is appropriate to set targets based on the forecast mode share for that time. The target will be to reduce the 'car' mode share by 6% for pupils and for staff over five years, consistent with Smarter Choices' report *Changing the way we travel* (2004). Following a baseline travel survey these targets can be confirmed or adjusted as appropriate, during the drafting of the TP and following discussions between the VoG and the Travel Plan Coordinator (TPC).

7.3 Monitoring and Evaluation

7.3.1 The point at which baseline travel surveys are required will be subject to agreement with the VoG as the LHA. A minimum response rate to the travel surveys will be required to be set and agreed to ensure that the data is representative.

- 7.3.2 The format of the baseline and monitoring surveys will also need to be agreed with the VoG. In general, these will seek to establish the actual travel patterns, the reasons for travel choice and potential measures to encourage consideration of alternatives. For staff, it is envisaged that the surveys will be primarily online-based, but paper copies will also be made available to staff should they prefer. For pupils and staff at the schools, a combination of survey methods could be utilised, and is likely to include the following:
- Hands-up surveys of pupils;
 - Manual counts at school drop-off/pick-up periods; and
 - Pupil/parent and staff questionnaires.
- 7.3.3 The results of the baseline travel surveys will be analysed and the factors influencing travel behaviour will be investigated. It will then be necessary for the TPC to review and update the respective TP to include additional details and the need for any other measures not already included that require further investigation. Specific objectives and targets will need to be identified, separated into short/medium/long term targets, and will need to be SMART (Specific, Measurable, Achievable, Realistic, and Timed). Specific actions and measures to encourage sustainable modes of travel will be identified. For the on-going management of the TP to be successful and to deliver the desired outcomes, it is important that the parties involved in the delivery of the TP, which means the TPC, and the VoG, work effectively in partnership to achieve the desired results.
- 7.3.4 Monitoring of the TP will be required for a five-year period from the date of the baseline travel surveys. They will be undertaken at intervals of one, three and five years after the date (or close to the date) of the baseline travel surveys. The TPC will aim to coordinate the baseline travel surveys and subsequent monitoring surveys to ensure consistency between the collection of data for the TP. Surveys will avoid sustained periods of inclement weather or when there is significant disruption to the local road or public transport network.
- 7.3.5 A monitoring report will be prepared by the TPC for each monitoring survey. These will identify the results of the surveys and success of the measures implemented in achieving the targets. The reports will be submitted to the VoG for comment. If the targets are not met, then it will be necessary to review what remedial measures need to be implemented to mitigate the impact of any under achievement.

7.4 TP Measures and Interventions

- 7.4.1 In order to achieve the reduction in single occupancy car use and encourage a modal shift to more sustainable forms of travel, a number of TP measures will be implemented.
- 7.4.2 A TP will be secured as a planning condition and will be produced ready for full occupancy of the new school development. A TPC will be appointed who will be responsible in ensuring the success of the TP and its targets and objectives. The TP will contain a range of measures additional to those that will be provided as part of the development to enhance the attractiveness of sustainable travel and to encourage the use of the walking, cycling and public transport infrastructure. Additional measures include:
- Newsletters;
 - Noticeboards advertising sustainable transport information; and
 - Promotion of national sustainable transport initiatives such as national walk to school day and bike to school week, etc.

7.5 Physical Measures and Interventions

- 7.5.1 Physical measures will be implemented to encourage journeys to / from the school site using sustainable transport modes and to ensure that safe and secure access can be provided for non-motorised users. These measures are summarised in the following sub-sections.

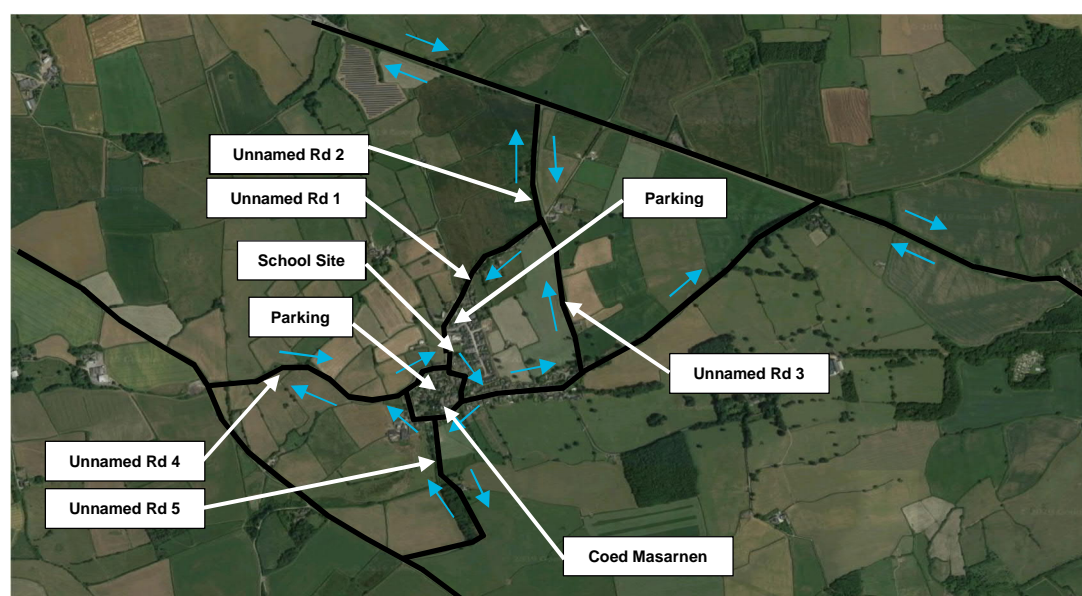
On-Site Measures

- 7.5.2 It is proposed that people of all abilities shall be able to easily enter into and move through the landscape and each space within it via level or ramped entry points where necessary. Existing footpaths may be re-aligned to suit new desire lines and entry points and internal access roads which require crossing will include dropped kerbs and tactile paving.
- 7.5.3 Primary pedestrian and cycle access will be retained via the existing gates on Unnamed Road 1. These will provide safe and secure access to the curtilage of the new school building, from which specific class arrangements for pupil drop-off and pick-up can be made. No other pedestrian accesses are to be provided so as to create a secure boundary around the school site.
- 7.5.4 A total of 20 cycle parking spaces are proposed, in accordance with parking standards, to be distributed at key locations near pedestrian entrances. These will be for both staff and pupil use.

One-Way System

- 7.5.5 Following the occupation of the new school facility, the school will promote, monitor and, if necessary, try to enforce a one-way system as part of a traffic management strategy, for vehicle trips to from the school site during school opening and closing times. An indicative one-way system is shown in **Figure 7-2** and is summarised as follows:
- Traffic to / from the A48 – will route via the A48 / Unnamed Road 2 junction towards the crossroad junctions, and then route south via Unnamed Road 1 towards the school. Once pupils have been dropped-off / picked-up traffic will continue their route south on Unnamed Road 1 towards Colwinston and then route via Unnamed Road 3 to access the A48 at the A48 / Unnamed Road 3 junction or the A48 / Unnamed Road 2 junction.
 - Traffic to / from the south of Colwinston – will route via Unnamed Road 4 or Unnamed Road 5 to park in Colwinston. Adults will then be required to escort pupils from the residential areas of Colwinston to the school, to then depart via Coed Masarnen back to the south.

Figure 7-2: Indicative One-Way System



- 7.5.6 The one-way system shown is indicative and can be revised by the school to meet emerging needs following construction of the proposed development. The school will promote the one-way system to parents / guardians of pupils and will regularly observe traffic behaviours to identify whether the system is effective and adhered to. This system is not consistent with existing travel behaviours observed at the school site, and therefore substantial promotion will be required from the outset to introduce new travel behaviours.

7.5.7 The benefits of implementing a one-way system are as follows:

- Removal of two-way traffic conflicts on the narrow highway past the school. This will also benefit pedestrian / cycle movements as traffic movements will be more predictable with a single prevailing direction of travel.
- Removal of vehicles turning in the road, including use of side roads and residential driveways. This will significantly reduce the potential for vehicles to collide with pedestrians / cyclists during manoeuvres.
- Additional parking supply available within Colwinston which will reduce parking pressure on northern sections of Unnamed Road 1. Only 25% of existing pupils routes to / from the south of Colwinston. This is expected to be consistent following the opening of the proposed development, and therefore unlikely to have a significant impact on parking in Colwinston. All parking will be for the short-term only.

7.5.8 It is recognised that local residents cannot be expected to use the one-way system for traffic movements during the AM and School PM peak hours, however it is considered that many will likely choose to follow as this would be an easier option compared to travelling against the prevailing flow.

7.5.9 The one-way system will be managed by the school and the TP co-ordinator. Marketing material will be produced and provided to all pupils, parents / carers and local residents to ensure they are aware and encourage use of the one-way system operation during the school AM and PM Peaks.

7.6 Summary

7.6.1 Targets have been set for the reduction of private car use and a commitment to a TP and monitoring programme has been made. The measures that will be implemented as part of the development proposals have been outlined to help to achieve the targets and objectives set. These include the implementation of an informal one-way system for school traffic which will reduce the conflicts between traffic and between traffic and pedestrians, car sharing spaces in the staff car park and cycle parking in close proximity to the school access.

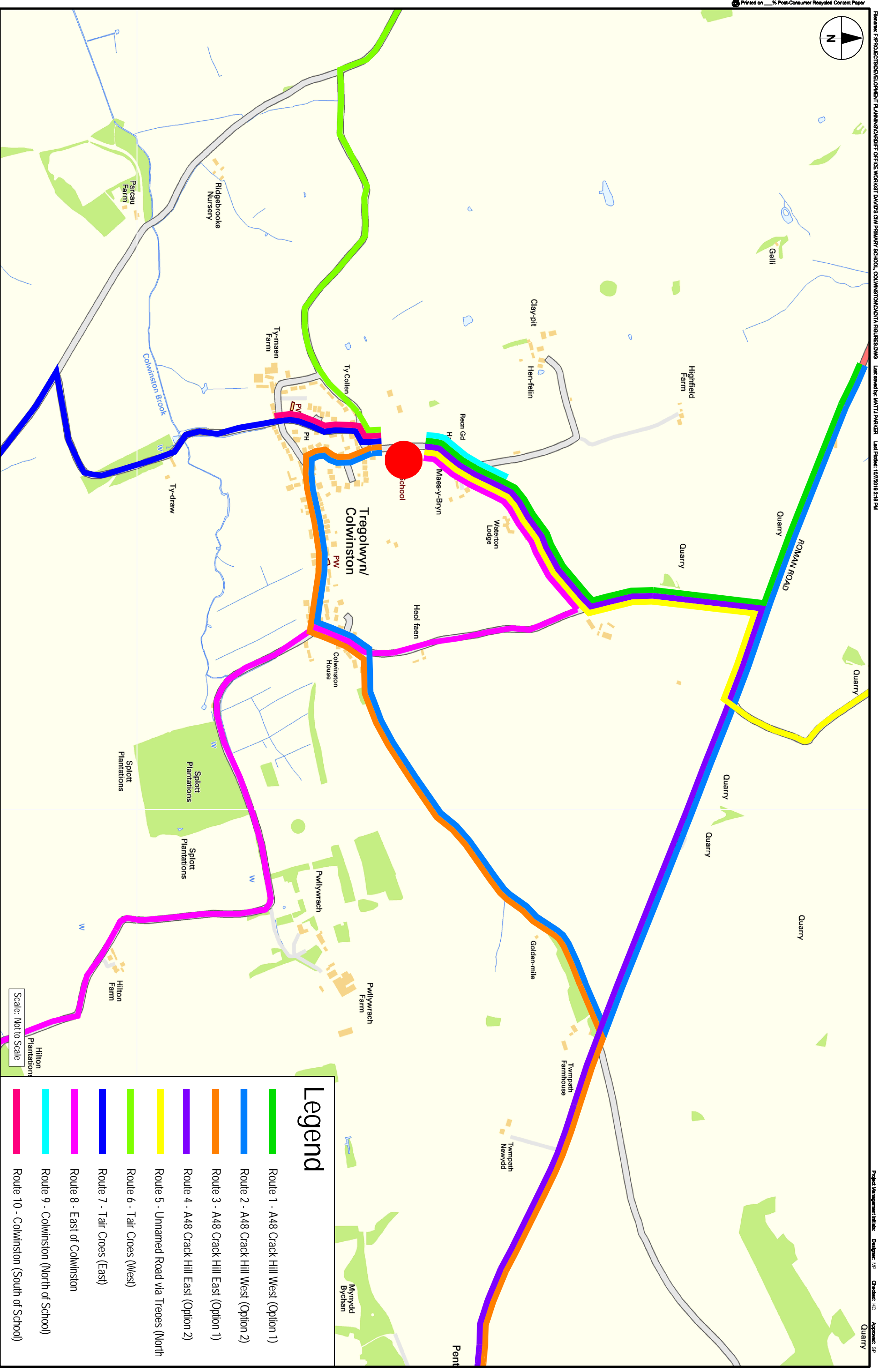
7.6.2 TP measures will add another layer of interventions once the TP is established. This will continue to promote and encourage the range of facilities available and improve awareness or provision wherever possible.

8. Conclusions

- 8.1.1 AECOM has been commissioned by the Vale of Glamorgan (VoG) education department to provide transport planning and highways advice to inform a planning application for the proposed new development of St David's Church in Wales (CiW) Primary School. The TA has been prepared with regard to pre-application discussions with the VoG, in its role as LHA and has been informed by a site visit undertaken on 26th September 2019.
- 8.1.2 The existing school site is located in Colwinston, a rural village in the VoG. The existing school has a capacity of 140 pupils (with 130 currently enrolled) and 15 Full Time Equivalent (FTE) members of staff. The school catchment includes local rural villages situated between Cowbridge and Bridgend, including Llysworney and Llandow.
- 8.1.3 The development proposals are for a new school of St David's CIW Primary School to enable an increase in pupil intake. The expansion of the school entails demolition of the existing school building, and construction of a new facility on the same site.
- 8.1.4 Ancillary facilities including hard and soft play areas (separate for nursery and primary school), habitat areas, a Multi-Use Games Area (MUGA), car park and a service yard proposed. The proposed capacity of the new school will be 210 primary school pupils, with an additional 24 Full-Time Equivalent (FTE) pupils in a new nursery facility, totalling 234 pupils. The number of staff will increase from 15 FTE to 24 FTE members of staff.
- 8.1.5 Vehicular access to the school site will be retained at its existing location via the unnamed road (Unnamed Road 1) which runs north-south along the western boundary of the school site. This will be the sole point of access for all on-site vehicles, including staff arrivals / departures and service vehicles. Primary pedestrian and cycle access will be retained via the existing gates.
- 8.1.6 A total of 25 vehicle parking spaces will be provided in the school car park, of which 1 will be allocated as a disabled bay, 3 will be allocated for visitors, 3 Electric Vehicle spaces and 3 car sharing spaces. One space will be suitable for a commercial vehicle. 20 bicycle spaces will be provided. Parking is proposed in accordance with VoG Parking Standards 2019 (SPG).
- 8.1.7 The development proposals align with existing and emerging planning and transport policy at both a national and local level. The proposals will facilitate sustainable travel through a number of measures including the implementation of a TP, which will be conditioned as part of the planning application submission. The local highway network comprises a number of unnamed roads, which are generally defined as single-carriageway roads subject to a 30mph speed restriction within Colwinston and the national speed limit outside of the village. These are generally wide enough for two-way working, with passing places provided where the carriageway is subject to localised narrowing. The A48 is a single carriageway two-way road which connects Cowbridge with Bridgend.
- 8.1.8 Traffic surveys have been undertaken across the local highway network, including ATC and JTC surveys, to determine local highway operational conditions. These were discussed and informed by the Highway Authority. The survey results for the ATC on Unnamed Road 1 in the vicinity of the school site indicate a peak hour flow of 125 two-way movements and 1,000 daily movements, a very low level of traffic. Vehicle speeds are generally below the speed limit.
- 8.1.9 PIC data has been obtained from the WG for a study area derived using 'Crashmap'. The PIC data indicates that three collisions have occurred within the most recently available five-year period. All collisions resulted in slight injuries. No pedestrians, cyclists or children were involved in any of the collisions. The PIC data is not considered to be indicative of a highway safety issue in or around Colwinston.
- 8.1.10 There is limited dedicated / segregated walking or cycling provision on the local highway network, but this is considered to be reasonable considering the low traffic volumes and speeds in Colwinston. The existing provision is typical of the site's setting in a rural village. A footway is provided along the site frontage to the unnamed road (Unnamed Road 1) to residential areas to the north. There is no footway provision connecting the school with the main village to the south.

- 8.1.11 The nearest bus stops are located on the A48 to the north of the village, these are beyond the recommended walking distances considered reasonable for primary school pupils to travel to school. These stops are served by Bus Service X2, which provides frequent access to key destinations of Bridgend, Cardiff County and the Vale of Glamorgan. Rail services are available from Bridgend railway station. It is unlikely that regular journeys to / from the school site will be feasible via existing public transport services. However, school bus services are in operation between the school and Cowbridge.
- 8.1.12 The TA has utilised a combination of data sources to establish the existing mode share of the pupil and staff population and the forecast mode share of the proposed development. This will also be used to inform initial mode share targets in the TP. The mode share calculations have considered the school bus.
- 8.1.13 The additional school pupil population will generate an additional 74 vehicle movements during the AM peak hour (07:00-08:00) and the School PM peak hour (15:15-16:15) accounting for escorting adult arrivals and departures. The additional school staff population will generate an additional seven movements during the AM peak hour and PM peak hour (17:00-18:00). Traffic has been assigned onto the highway network based on pupils and staff home postcode information.
- 8.1.14 A spreadsheet model has been used to determine traffic flows across the network for three assessment scenarios. The '2019 Observed' scenario traffic flows have been taken directly from the JTC surveys completed across the local highway network. The '2021 Base' scenario has been derived through the application of TEMPro-derived growth factors to the 2019 flows. The '2021 Base + Development' scenario has been derived through the application of the increase in school traffic (pupils and staff).
- 8.1.15 The results of the assessment for the unnamed road adjacent to the school indicates a material impact as a result of the proposed development, equating to a maximum increase of 55 vehicles during the AM and School PM peak hours. This equates to around one vehicle movement per minute during each peak hour, which is not considered to be a 'severe' impact in percentage terms. Measures to reduce the impact of traffic on Unnamed Road 1 are outlined in the Transport Implementation Strategy (TIS) in **Section 7** of this TA.
- 8.1.16 The results of the junction assessments indicate an immaterial impact at the junctions with the A48 to the north of Colwinston. There is forecast to be a material impact in percentage terms at the Unnamed Road crossroads, however junction capacity modelling has shown that in real terms the expected increase in traffic demand will have a negligible impact and therefore the development impact is not severe.
- 8.1.17 The TIS sets out the targets for the reduction of private car use and a commitment to a TP and monitoring programme has been made. The measures that will be implemented as part of the development proposals have been outlined to help to achieve the targets and objectives set. These include the implementation of a one-way system for school traffic which will reduce the conflicts between traffic and between traffic and pedestrians, car sharing spaces in the staff car park and cycle parking in close proximity to the school access.
- 8.1.18 TP measures will add another layer of interventions once the TP is established. This will continue to promote and encourage the range of facilities available and improve awareness or provision wherever possible.
- 8.1.19 Further to the findings of this TA, it can be concluded that there are no transport planning reasons why the proposed development should not be granted planning permission.

Figures



Scale: Not to Scale

Legend

- █ Route 1 - A48 Crack Hill West (Option 1)
- █ Route 2 - A48 Crack Hill West (Option 2)
- █ Route 3 - A48 Crack Hill East (Option 1)
- █ Route 4 - A48 Crack Hill East (Option 2)
- █ Route 5 - Unnamed Road via Treoes (North)
- █ Route 6 - Tair Croes (West)
- █ Route 7 - Tair Croes (East)
- █ Route 8 - East of Colwinston
- █ Route 9 - Colwinston (North of School)
- █ Route 10 - Colwinston (South of School)

Figure 5-1: Traffic Assignment Routes

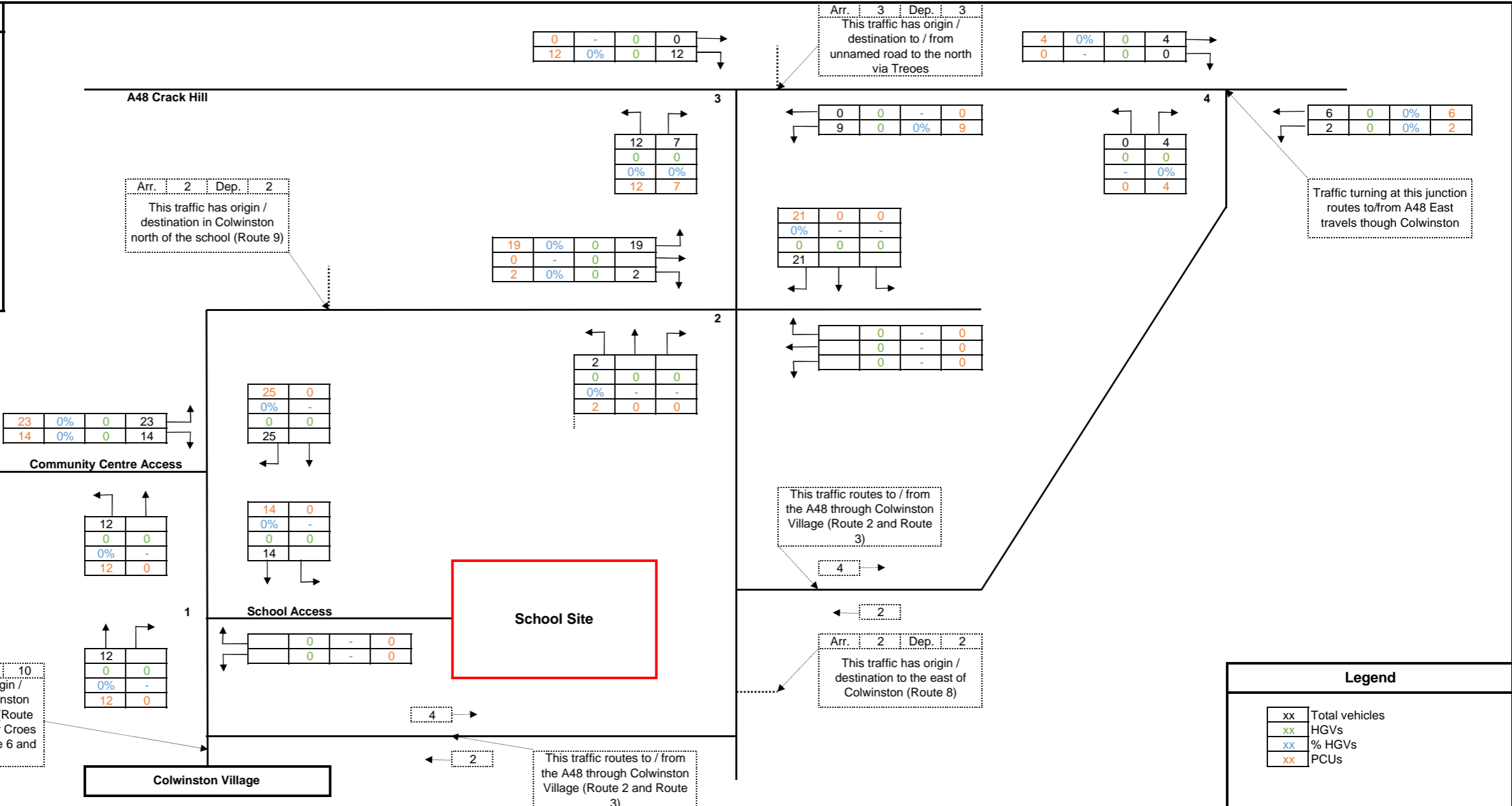
St David's CIW Primary School, Vale of Glamorgan
 Transport Assessment



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Notes

- 1 Diagram not to scale.
- 2 Traffic flows show the increase in pupil traffic generation, i.e. escort-education trips. Traffic arrives and departs during peak hour.
- 3 Traffic assigned to/from Community Centre / Playground site.
- 4 All traffic flows are in vehicles. No HGVs are generated by the proposed development.
- 5 Boxes with dashed lines indicate where traffic leaves the network for its origin/ destination.



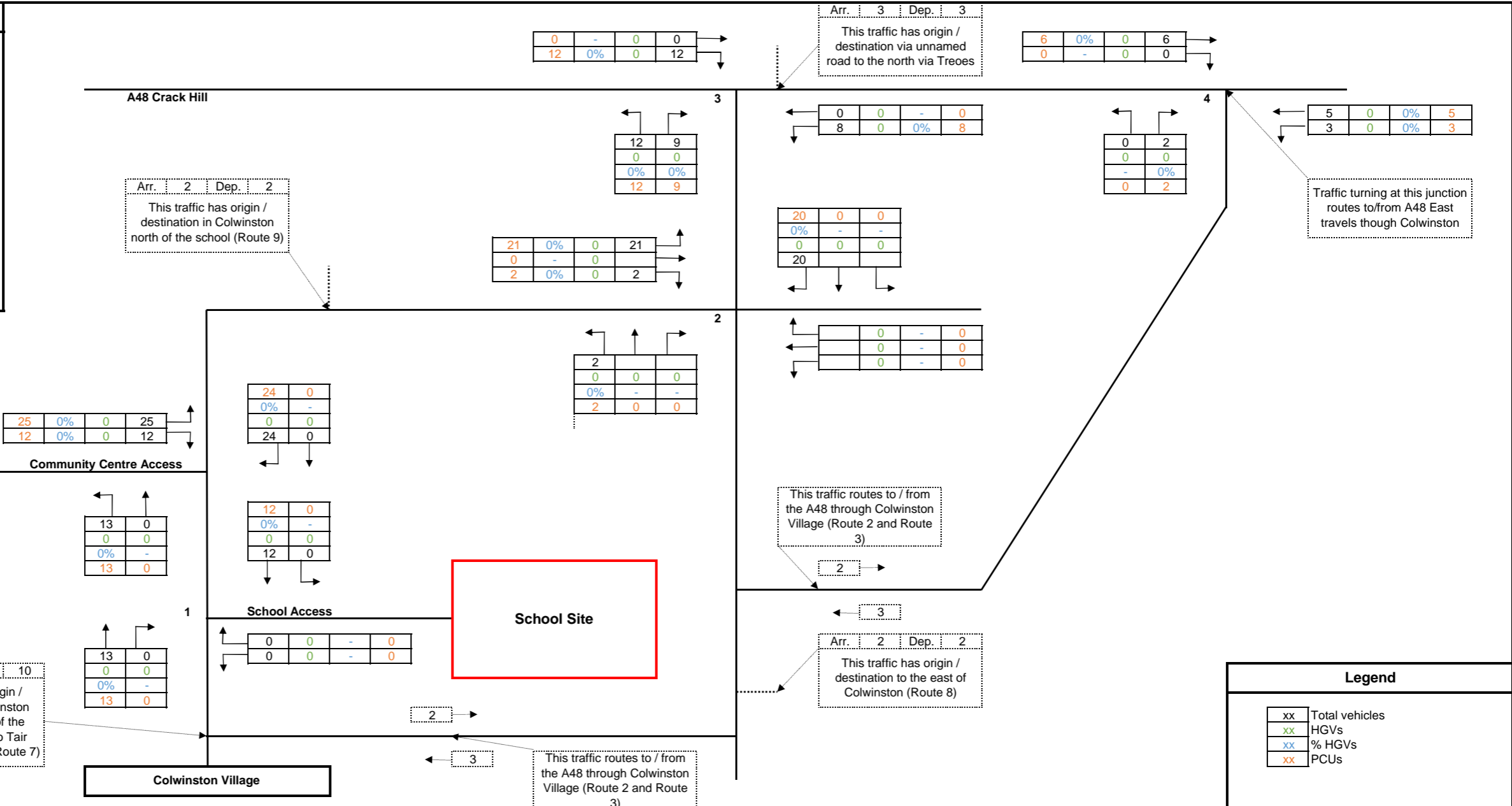
AECOM
 1 Callaghan Square
 Cardiff
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Title:	Traffic Generation - Expanded School Pupils: AM Peak Hour (08:00-09:00)
Figure:	Figure 5-2
Project:	St David's Church in Wales Primary School, Colwinston, Vale of Glamorgan
Client:	Vale of Glamorgan

Drawn:	MP
Checked:	MD
Approved:	KC
Date:	27/02/2020

Notes

- 1 Diagram not to scale.
- 2 Traffic flows show the increase in pupil traffic generation, i.e. escort-education trips. Traffic arrives and departs during peak hour.
- 3 Traffic assigned to/from Community Centre / Playground site.
- 4 All traffic flows are in vehicles. No HGVs are generated by the proposed development.
- 5 Boxes with dashed lines indicate where traffic leaves the network for its origin/ destination.



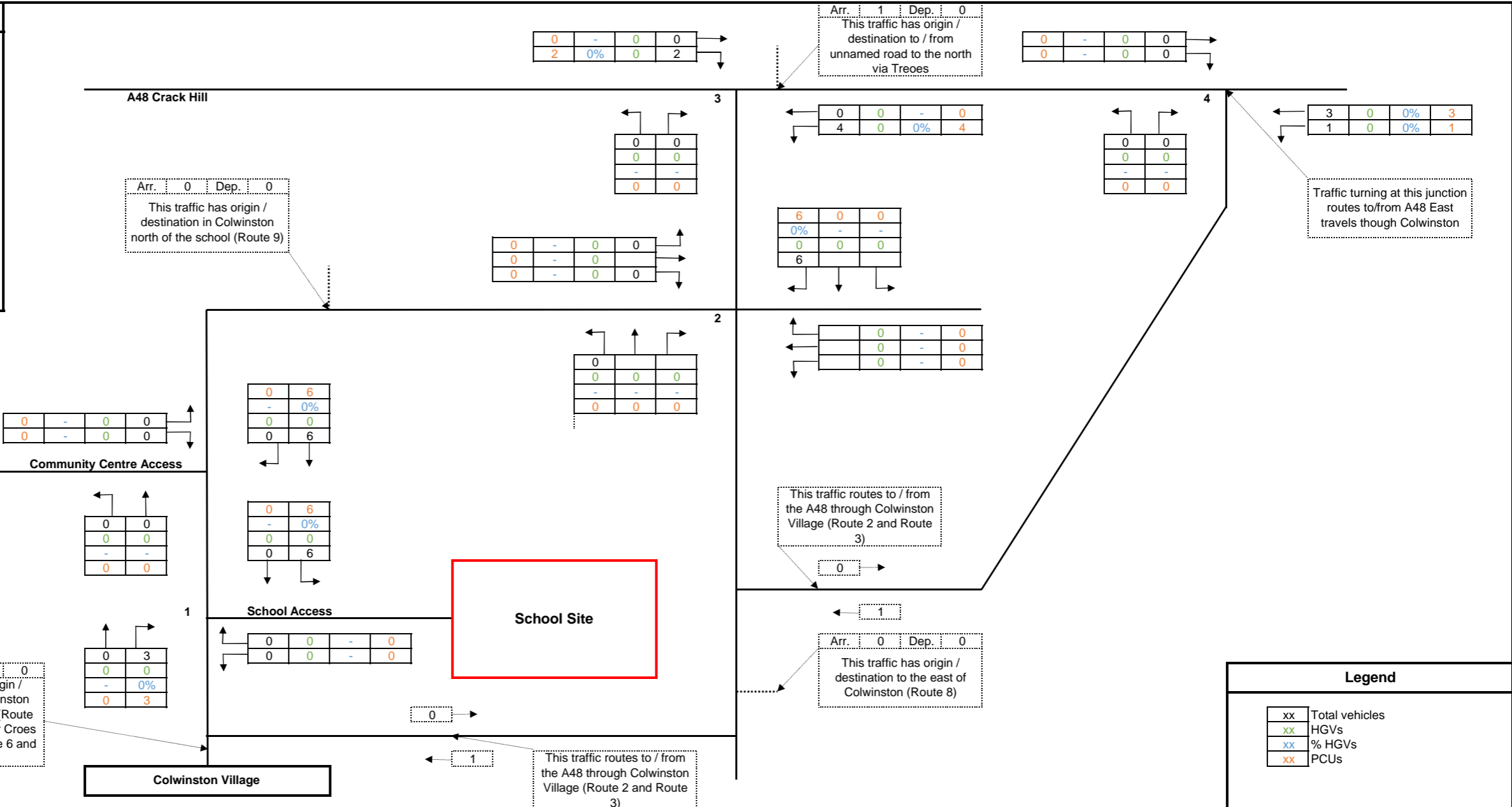
AECOM
 1 Callaghan Square
 Cardiff
 CF10 5BT
 029 2067 4600
www.aecom.com

Title:	Traffic Generation - Expanded School Pupils: School PM Peak Hour (15:15-16:15)
Figure:	Figure 5-3
Project:	St David's Church in Wales Primary School, Colwinston, Vale of Glamorgan
Client:	Vale of Glamorgan

Drawn:	MP
Checked:	MD
Approved:	KC
Date:	27/02/2020

Notes

- 1 Diagram not to scale.
- 2 Traffic flows show the additional staff trips for the expanded school. All staff assumed to arrive during AM peak hour and depart during the PM peak hour.
- 3 Traffic assigned to/from School Site access.
- 4 All traffic flows are in vehicles. No HGVs are generated by the proposed development.
- 5 Boxes with dashed lines indicate where traffic leaves the network for its origin/ destination.



Legend	
xx	Total vehicles
xx	HGVs
xx	% HGVs
xx	PCUs

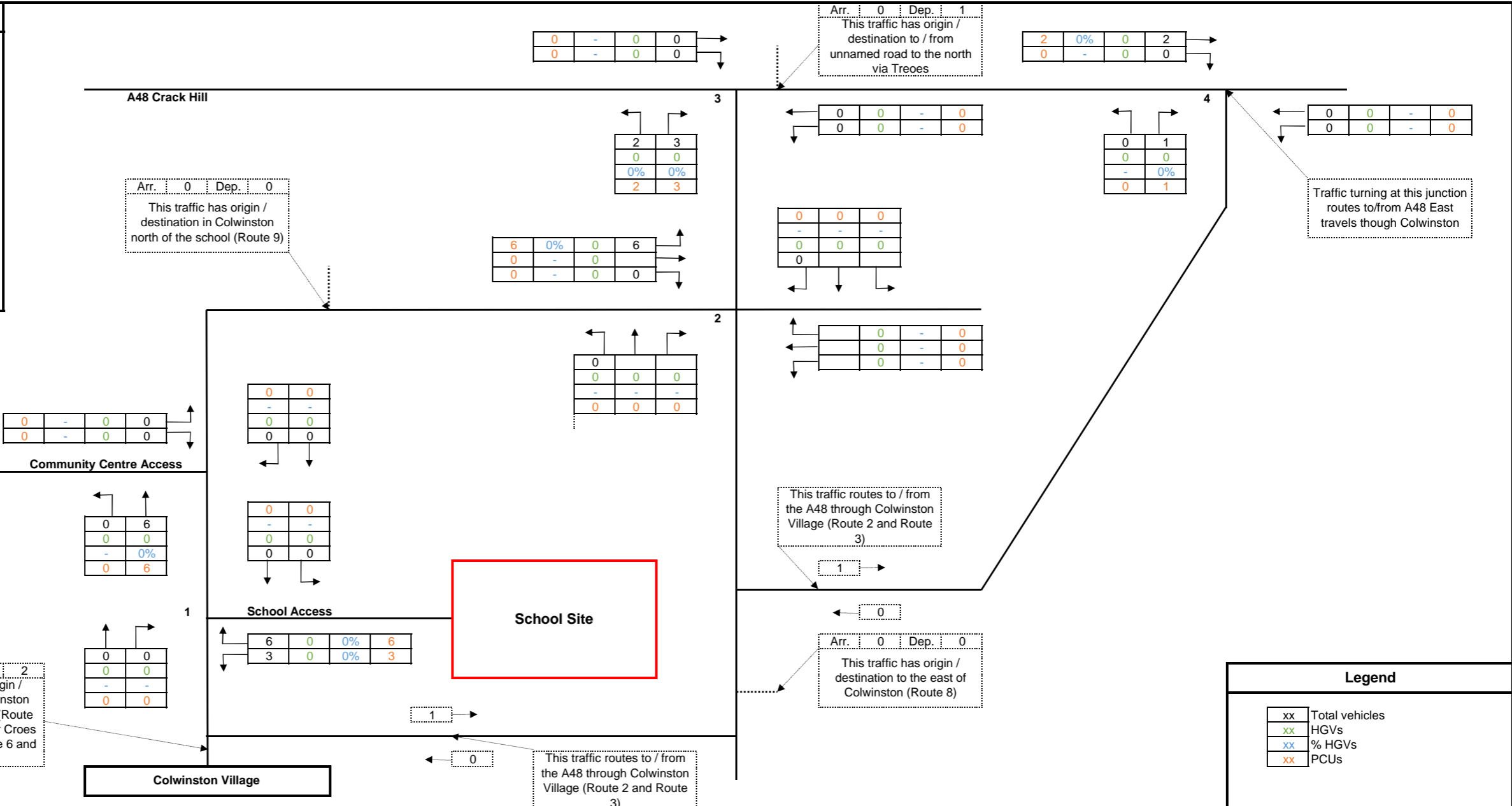
AECOM
 1 Callaghan Square
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 029 2067 4600
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Title:	Traffic Generation - Expanded School Staff: AM Peak Hour (08:00-09:00)
Figure:	Figure 5-4
Project:	St David's Church in Wales Primary School, Colwinston, Vale of Glamorgan
Client:	Vale of Glamorgan

Drawn:	MP
Checked:	MD
Approved:	KC
Date:	27/02/2020

Notes

- 1 Diagram not to scale.
- 2 Traffic flows show the additional staff trips for the expanded school. All staff assumed to arrive during AM peak hour and depart during the PM peak hour.
- 3 Traffic assigned to/from School Site access.
- 4 All traffic flows are in vehicles. No HGVs are generated by the proposed development.
- 5 Boxes with dashed lines indicate where traffic leaves the network for its origin/ destination.



Legend	
xx	Total vehicles
xx	HGVs
xx	% HGVs
xx	PCUs

AECOM
 1 Callaghan Square
 Cardiff
 CF10 5BT
 029 2067 4600
www.aecom.com

Title:	Traffic Generation - Expanded School Staff: PM Peak Hour (17:00-18:00)
Figure:	Figure 5-5
Project:	St David's Church in Wales Primary School, Colwinston, Vale of Glamorgan
Client:	Vale of Glamorgan

Drawn:	MP
Checked:	MD
Approved:	KC
Date:	27/02/2020

Appendix 1-1: Transport Assessment Scoping Note

Project:	St David’s Church in Wales Primary School, Colwinston	Job No:	60607805
Subject:	Transport Assessment Scoping Note		
Prepared by:	Kirsty Cox (Principal Consultant)	Date:	29/08/2019
Checked by:	Matt Davies (Senior Consultant)	Date:	02/09/2019
Approved by:	Spiro Panagi (Associate Director)	Date:	03/09/2019

The following table sets out the proposed scope of a Transport Assessment (TA) in respect of the proposed redevelopment of a new school building for St David’s Church in Wales (CIW) Primary School in Colwinston, Vale of Glamorgan (VoG), Wales. It is submitted to the VoG, in its role as Local Highway Authority (LHA), for agreement and approval.

1	Site Location and Existing Land Use	<p>St David’s Church in Wales (CIW) Primary School is seeking planning permission for redevelopment of the school site in the VoG. A plan indicating the location of the school is attached in Appendix A.</p> <p>The existing school is a co-educational primary school, located on an unnamed road in Colwinston which can be accessed via the A48 between Cowbridge and Bridgend. The A48 travels east-west from Cardiff City Centre to Bridgend and continues further west. The site is approximately 15 miles from Cardiff City Centre.</p> <p>The existing capacity of the school is 140 primary school pupils with an additional 14 nursery pupils, thus a total capacity of 154 pupils. There are currently 130 pupils actively enrolled in the primary school, and 28 part-time nursery pupils.</p>
2	Planning History	<p>The development site is located in the VoG. It will involve the redevelopment of the existing school site for a new facility.</p> <p>AECOM have been appointed transport consultant as this scheme approaches RIBA Stage 3. The current work has included scoping discussions and baseline desk studies. We have assessed the current highway network and have also commissioned traffic surveys across the local road network in close proximity to the school. The traffic survey scoping was carried out and agreed upon with the LHA (see below Data Collection).</p>
3	Development Proposal	<p>The new school is proposed to enrol a total capacity of 210 pupils in the primary school and 24 nursery pupils, totalling 234 pupils on the site. The proposed staff numbers will include 23 Full Time Equivalentents (FTE).</p> <p>Proposals include the following:</p> <p><u>Existing school site location</u></p> <ul style="list-style-type: none"> ▪ A new two-storey school building located to the south of the existing school buildings;

		<ul style="list-style-type: none"> ▪ Both hard and soft play areas to the east of the proposed new school building; ▪ A car park and service yard constructed to the north of the proposed school buildings; and ▪ Multi Use Games Areas (MUGAs) will be built where the existing school building is located (near the entrance to the school site). <p><u>Land adjacent to unnamed access road</u></p> <p>This additional site has an existing MUGA which will remain, sports pitches, as well as an existing community hall, playground, and car park. This site is not currently used by the school, however, as part of the development proposals, the currently sports pitches on the school site will be demolished, therefore the community sports pitches will be used for annual activities such as sports day etc.</p> <p>The TA will include the following:</p> <ul style="list-style-type: none"> ▪ Details of the access arrangements and connections between the school and the land accommodating the community sports facilities; ▪ Internal transport layout for the site, including cycle and car parking provision (staff and visitor) and circulation along with pedestrian circulation; ▪ Consideration of the potential for bus stops, layovers and parent drop-off points; and ▪ Swept Path Analysis (SPA) to demonstrate that larger vehicles (school buses, refuse, delivery and emergency) can be accommodated.
4	Planning Policy Review	<p>The context of the development proposals will be considered in relation to the following policy and guidance:</p> <ul style="list-style-type: none"> ▪ Planning Policy Wales (PPW) 10; ▪ Technical Advice Note (TAN) 18: Transport, published in March 2007; ▪ The Wales Transport Strategy, published in April 2008; ▪ National Transport Finance Plan, published in September 2015; ▪ Active Travel (Wales) Act 2013; ▪ Wellbeing of Future Generations (Wales) Act 2015; ▪ Vale of Glamorgan Local Development Plan (LDP) 2011-2026 [adopted June 2017]; ▪ Vale of Glamorgan Local Transport Plan (LTP) 2015-2030; and ▪ Supplementary Planning Guidance (SPG) to the LDP, including Parking Standards (March 2019). <p>The TA will clearly demonstrate the development’s compliance to the above policies and corresponding objectives. This will be demonstrated within the policy chapter (following the setting out of the development proposals), linking specific development proposals to the policies and their objectives. A summary will be provided within the TA conclusions.</p>
5	Existing Situation and Site Accessibility	<p>The TA will include the following:</p> <ul style="list-style-type: none"> ▪ Description of the site location and existing usage; ▪ Description of the local highway network, including carriageway widths, speed limits, street lighting, etc;

		<ul style="list-style-type: none"> ▪ Description of the existing highway operational conditions with reference to traffic survey data, along with queuing conditions at key junctions; ▪ Analysis of Personal Injury Collision (PIC) data; ▪ Description of existing walking/cycling facilities; ▪ Description of public transport services; and ▪ Identification of key local facilities and their accessibility by sustainable modes.
6	Data Collection	<p>Traffic surveys have been undertaken on the local highway network surrounding the development to identify the existing traffic generation of the school and highway operational conditions. At the time of the traffic surveys the school had 130 pupils enrolled and therefore, for the purposes of the TA, this will form the base scenario (existing situation). The traffic surveys were carried out following discussion and agreement upon with LHA on the extent of the study area, prior to commissioning.</p> <p>Traffic surveys included Junction Turning Counts (JTC), Queue Length surveys and Automatic Traffic Counts (ATCs). The locations of the surveys are shown on the plan at Appendix B, which contains the Survey Brief and Specification that was given to the appointed survey specialist. These locations are specifically:</p> <p><u>Junction Turning Counts (JTC) and Queue Length Surveys:</u></p> <ol style="list-style-type: none"> 1. Unnamed Road/Access to St David's CiW Primary School (three-arm priority T-junction); 2. Crossroads of Unnamed Roads (four-arm priority crossroads junction); 3. A48/Unnamed Road (three-arm priority T-junction); 4. A48/ Unnamed Road (three-arm priority T-Junction); <p><u>Automatic Traffic Count (ATC) Surveys:</u></p> <ol style="list-style-type: none"> 5. Unnamed Road 6. Unnamed Road; 7. A48 Crack Hill; and 8. Unnamed Road. <p>The JTC and Queue Length surveys were undertaken on Thursday 6th June 2019, which was within school term time and therefore reflective of 'normal' conditions. The data was recorded between the hours of 07:00-10:00 and 14:30-18:00 to ensure that the data recorded included both the morning and afternoon traffic peaks.</p> <p>The ATC surveys were carried out over a 7-day period from 5th June 2019 – 11th June 2019 (also within school term time) and covered the same period as the JTC and Queue Length surveys.</p> <p>The data has been received and AECOM has performed checks to ensure that the data is complete and with no obvious errors. The junction traffic data has been used to develop a network study area; this will be used to assess and forecast traffic impact of the proposals and to inform junction capacity assessments.</p> <p>PIC data will be obtained from the Welsh Government for the most recent 5-year period, covering an appropriate study area. This study area will include the site along with the assessed junctions and will be analysed and reported</p>

		upon within the TA. Should the data not be returned in good time for the TA to be completed, a preliminary assessment will be carried out using an online resource such as Crashmap. This will be followed by a more detailed assessment of the PIC data from Welsh Government as an updated TA or Addendum, as appropriate.
7	Trip Generation	<p>Should the school have data on the mode share of pupils and staff such as from an existing Travel Plan (TP), this will be used to inform the trip generation forecasts for the growth in pupil and staff population.</p> <p>Should existing mode share data not be available, then the trip generation of the growth in pupil population will be forecast based on travel distances (based on analysis of postcodes of the existing pupil population) and mode by distance information (from the National Travel Survey). For growth in staff, it will be assumed that these will travel by car.</p>
8	Trip Distribution	The distribution of pupil trips will be based on analysis of postcodes of the existing pupil population, with consideration to growth areas in regard to pupil catchment. The distribution of staff trips will be based on analysis of existing staff postcodes (if available), or, if this is not available, analysis of the 2011 Census 'Location of usual residence and place of work' dataset.
9	Traffic Impact Assessment	<p>Assessment Scenarios:</p> <ul style="list-style-type: none"> ▪ The TA will assess the impact of the development proposals for the school opening year, (2021) both without and with the development proposals. ▪ The 'without development' scenario will include traffic growth (based on growth factors derived from TEMPro) and the existing school situation with associated traffic patterns. This is considered the future baseline. We have undertaken some basic checks and are not aware of any committed development in the surrounding area, therefore we will not be including any committed development into our future baseline. ▪ The 'with development' scenario will be as the 'without development', but with the additional traffic generated by the growth in pupil and staff population as a result of the proposed development ▪ The morning and evening weekday drop-off/pick-up hours will be considered. The peak hours for development traffic generation will be consistent with the peak hours selected for assessment. ▪ Traffic growth factors derived from TEMPro (Version 7.2) will be applied to the traffic data to establish traffic flows in the opening and forecast years. <p>Impact Assessment:</p> <ul style="list-style-type: none"> ▪ The assessment will identify the percentage impact of the proposed development in terms of traffic flows at the principal access junctions identified in Section 6. ▪ Should the increase in traffic at these junctions be considered to warrant capacity assessment, this will be undertaken using the industry-standard TRL software program 'Junctions 9' (for priority and roundabout junctions).

10	Transport Implementation Strategy (TIS)	<p>The TA will include a TIS, which will consider potential measures, and appraise those already being implemented by the wider site, to increase the mode share of sustainable travel modes by staff and pupils at the school. In particular, the following will be considered:</p> <ul style="list-style-type: none"> ▪ Feasibility of walking and cycling routes in the surrounding areas including consideration for potential improvements; ▪ Cycle parking within the school grounds; ▪ Pedestrian and cycle access and circulation within the site; and ▪ Bus/parent drop-off points. <p>Determine if a Travel Plan (TP) exists for the current site, the outcome of this will be considered in the production of the TIS, with appropriate recommendations and actions. A new TP for the site will be secured as part of a planning condition.</p>
11	Construction Traffic	<p>The TA will include discussion of potential routeing arrangements and estimates of construction traffic.</p>

Appendix A

Location Plan - St David's Church in Wales Primary School



Appendix B

Colwinston, Vale of Glamorgan – Traffic Surveys Location Plan



Junction Turning Count (JTC) and Queue Length Surveys – Survey Specification

Locations:

1. Unnamed Road/Access to St David's CIW Primary School (three-arm priority T-junction).
2. Crossroads of Unnamed Roads (four-arm priority crossroads junction).
3. A48/Unnamed Road (three-arm priority T-junction).
4. A48/Unnamed Road (three-arm priority T-junction).

Date: The survey needs to be undertaken on a weekday (preferably Tuesday, Wednesday or Thursday) during term time (i.e. outside school holidays), specifically w/c 3rd June 2019.

Duration: 07:00–10:00 and 14:30–18:00.

Data to be recorded:

- Classified turning counts, with data split into 15 minute intervals (including a breakdown for vehicle types) – all locations.
- Queue lengths, recorded during 5 minute intervals (the maximum queue on each arm during each interval) – to be undertaken at Locations 3 and 4 only.

Automatic Traffic Count (ATC) Surveys – Survey Specification

Locations:

5. Unnamed Road (location to be confirmed).
6. Unnamed Road (location to be confirmed).
7. A48 Crack Hill (location to be confirmed).
8. Unnamed Road (location to be confirmed).

Date: The survey needs to be undertaken over a 7-day period during term time (i.e. outside school holidays), at the same time as the JTC/Queue Length surveys.

Duration: 7-day period.

Data to be recorded: Speed, volume and classification by direction.

Please note that it is the responsibility of the survey company to obtain any licences required to undertake the surveys.

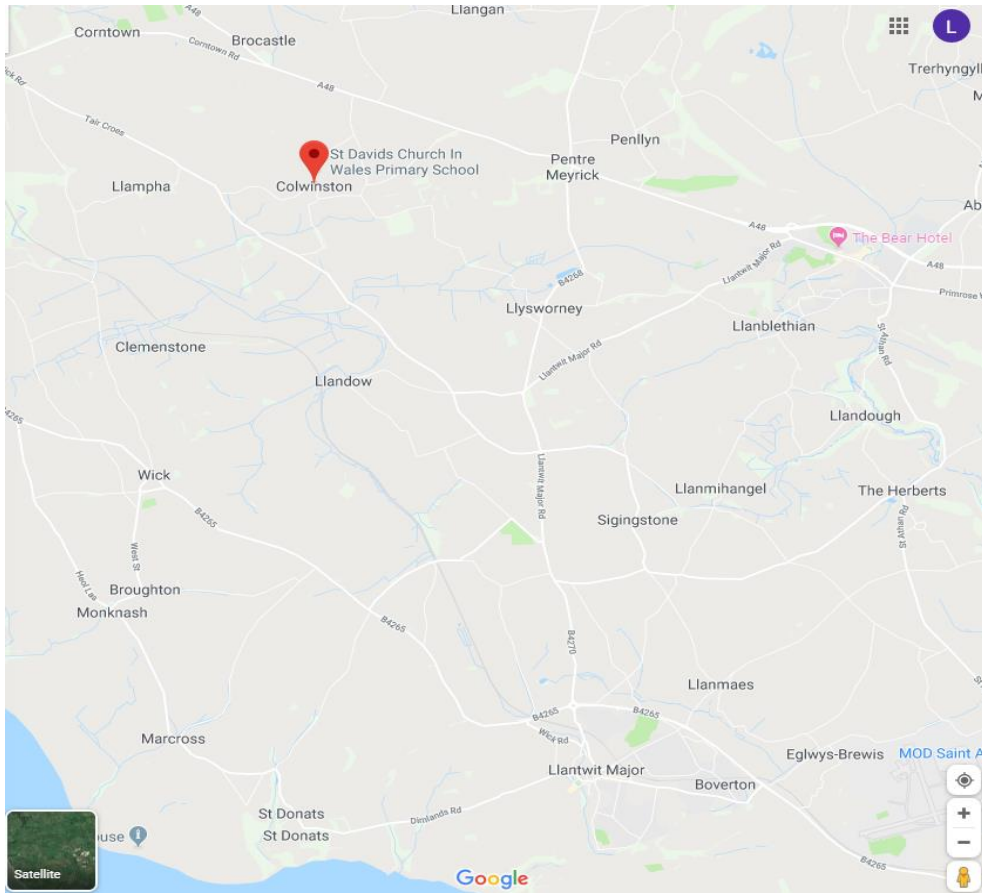
Appendix 2-1: St David's CiW School Road Safety Travel Plan

ST DAVID'S CIW VA PRIMARY SCHOOL



TRAVEL PLAN 2019

St David's CIW VA Primary School Travel Plan



Location of the school

St David's CIW VA Primary School is a rural school, located in Colwinston Village in the Vale of Glamorgan. The village is just off the A48 between Cowbridge and Bridgend. The school is situated adjacent to Heol Cae Pwll (the St David's Meadows Housing Development).

School number: 673/3367

The age range of pupils attending the school is 3 years to 11 years old.

Currently there are 166 pupils and 21 staff. (28 pupils and 12 staff are part time).

The school start times:

Simply Out of School Breakfast Club **0730**

School WAG Free Breakfast Club **0800**

The yard gate opens for all other pupils at **08.50** for registration at 0900.

School end times:

Morning Nursery: **1130**

Foundation Phase: **1520**

Key Stage 2: **1525**

Colwinston Childcare: **1530**

School Based After School Clubs: **1615**

Simply Out of School after school club: **1730** (Provided at the Village Hall)

Reason for the Travel Plan

The school expansion to 210 will accommodate approximately an additional 50 pupils, and this therefore represents an opportune milestone in the schools development to influence the travel habits and behaviour of both the staff and pupils.

School Travel Plan Co-ordinator

The school Travel Plan coordinator (TPC) will be: Karen Anthony, Deputy Headteacher

St David's CIW VA Primary School, Colwinston, Vale of Glamorgan, CF71 7NL

01656 656447

Travel Plan Working Group

The Travel Plan working group (TPWG) will consist of the school TPC, Year 6 Junior Road Safety Officers (JRSOs) and representatives from parents, local community council and governors.

Travel Plan Aims and Objectives

Overview

A school Travel Plan is a long-term strategy and a management tool aiming to encourage pupils, parents and staff to use more sustainable modes of transport and reduce the reliance on the private car. This involves looking at the current travel patterns associated with the school and introducing measures aimed at promoting more sustainable modes of transport. A Travel Plan should be reviewed on a regular basis.

School vision and aims

Hand in hand, together we can....

.....*Law yn llaw, fe allwn gyda'n gilydd.*

1. Grow, with everyone achieving their full potential, through opportunity and challenge
2. Develop the whole person and celebrate each individual as unique
- 3. Provide a safe, nurturing and happy environment, welcoming the links with parents and the wider community**
4. Learn to value ourselves and others as Jesus did
5. Foster a love of learning through a fun, broad and balanced curriculum
- 6. Support sustainability and healthy lifestyles**
7. Celebrate our Welsh culture and our place within the global community
8. Demonstrate and promote equality, tolerance and forgiveness for all
9. Build life skills for an ever-changing world

Travel Plan Aims

To achieve sustainable travel this plan will have the following headline aims and ensure that these objectives are widely shared:

- Reduce peak time congestion
- Bring about local environmental improvements from reduced air pollution and noise
- Reduce CO2 emissions that contribute to environmental pollution and global warming
- Help to reduce road casualties
- Increase overall fitness through healthier lifestyles
- Encourage more sustainable modes of travel to and from school (increase use of the School Transport Bus/walking and cycling);
- Reduce the number of pupil pick-up/ drop-off trips made by private car;
- Reduce the overall number of single car occupancy journeys to and from school;
- Increase the awareness of the importance of safe travel to school, consistent with the Active Travel (Wales) Act 2013 and Wellbeing of Future Generations (Wales) Act 2015 sustainable development principles
- Reduce congestion through the narrow village lanes, by encouraging adherence to the historic voluntary one-way system ;
- Promote sustainable travel for staff (to ensure the most efficient use of car travel to and from schools staff will encouraged to car share wherever possible.)

- Provide better access / incentives to more sustainable modes of transport.
- Reduce the cost of commuting or even remove the need to own a car.
- Reduce journey times to work, leisure facilities and other destinations.
- Improve physical and mental health by providing the opportunity to build exercise and stress relief into daily life.
- Free up parking for those people that actually require the use of a vehicle.
- Provide an improved work-life balance.
- Provide benefits to people by shifting travel perks based on seniority to incentives for sustainable travel

Travel Plan Objectives

To achieve these aims, the specific supporting objectives for this Travel Plan are to:

- Promote a healthy sustainable lifestyle for pupils, parents and staff;
- Minimise the impact and frequency of private car trips on the local community;
- Promote sustainable transport options, such as walking, cycling, School Bus and car sharing as the primary modes of travel for pupils, parents and staff;
- Educate pupils in safety on the school journey;
- Maintain direction and progress in travel planning through continued management and review.

The above objectives will be achieved by introducing an action plan that will focus on promoting access to school using sustainable modes of transport as an alternative to the private car. The action plan will encourage pupils, parents and staff to consider sustainable travel instead of single parent/ pupil car trips and other single occupancy vehicle trips to and from the site.

Location accessibility assessment

Guidance provided by the Chartered Institution of Highways and Transportation (CIHT) in their publication 'Guidelines for Providing for Journeys on Foot' (2000) suggests that in terms of commuting, walking to school and recreational journeys; walk distances of up to 2km can be considered with the desirable and acceptable distances being 500m and 1km respectively.

The existing transport links and transport options available to employees, visitors and residents include:

- Walking, but with limited footpaths, (Only the few families who live in Colwinston village choose to walk)
- Cycling, but with narrow winding lanes, without cycle paths, (a few families cycle to school- nearly all staff do not live within easy cycling distance),
- public transport (X2 bus service Porthcawl to Cardiff only as far as the A48/nearest railway stations Llantwit Major & Bridgend but no linking bus service);
- P121 School Bus from Cowbridge to Colwinston for eligible pupils (Currently only 20/60 places are taken up). The bus stop is directly outside the school onto a paved footpath.
- car borne journeys

Proximity to local facilities and services:

- walking distance to Colwinston Village Hall & MUGA, a village shop/café, post box and a local public house
- transport required to Cowbridge town for banks/post office, library, shops and supermarkets; Bridgend, Llantwit Major or Barry for leisure centres

Car parking: school car park 26 spaces for staff, disabled visitors (1 marked space), drop off of wrap around private nursery minibuses (this is sufficient for demand, with some spare capacity); Village Hall approximately 10 spaces (not demarked)- often used by parents at drop off/pick up time

Cycle parking and facilities for cyclists: 6 space fixed bike rack in school, no lockers or changing areas; (cycle rack is sufficient for current demand). Annually, all Year 6 pupils undertake a week of cycling proficiency training.

Other factors: In order to avoid two way traffic along the narrow lane in front of the school gates and reduce congestion problems and highway safety concerns, a voluntary one-way system was introduced over 10 years ago, during school drop off and collection times. The whole school community are regularly reminded to support this initiative.

Travel Plan Policy Review

The TPC and JRSO are responsible for reviewing policy and procedures with the wider school community.

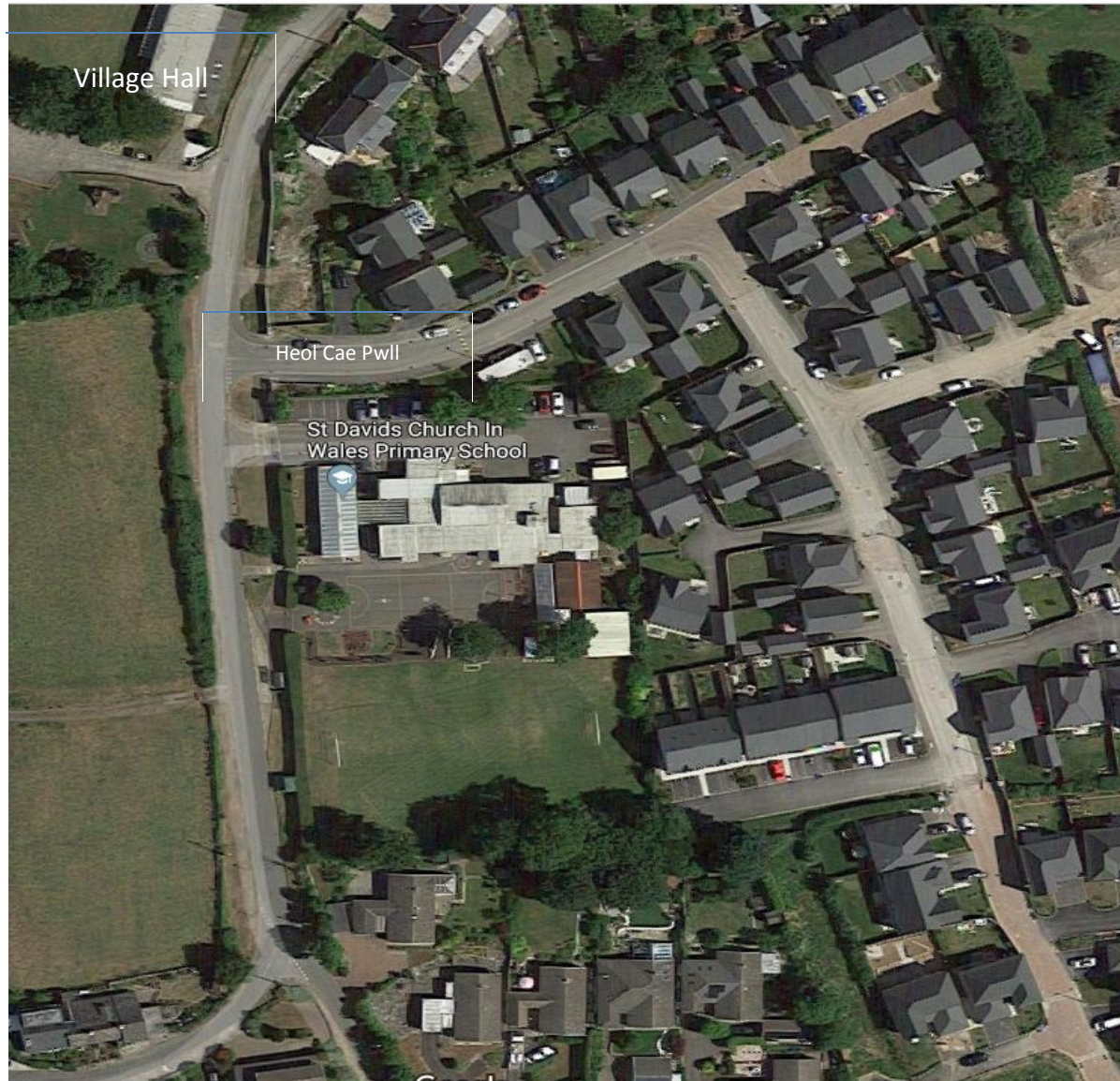
The TPC ensures that the Headteacher and Admin Officer provide regular communication with the wider community. (Website; ParentPay emails/texts; Twitter; Prospectus).

JRSOs encourage car sharing or part car- part walk initiatives to encourage sustainable travel to the site. They present pink tickets to drivers who need to be reminded

School Policies

The school lists key information and policies on its website. These all relate to the day-to-day running of the school, rather than the journey to and from the school. However, both the website and prospectus include pages dedicated to school transport, so a section could be added by the JRSOs.

School Site Location



The main entrance to the school is located off the main road through Colwinston Village.

Pedestrian Access

Pedestrian and cycle Footpaths, Footways and Pedestrian Crossing Facilities are extremely limited in the rural village. It is acknowledge that walking and cycling is not a viable option for everyone travelling to and from the school.

The roads surrounding the school experience low traffic volumes and therefore do not warrant the installation of a signalised crossing facility. There is no school crossing patrol officer, despite parents using the car park facilities in the Village Hall and needing to cross the lane.

The school has two pedestrian accesses from the main road, both segregated from vehicular access. Breakfast Club & morning nursery pick up must use the small gate leading into the school car park. Pedestrians are directed to stay on the internal pavement through the car park either to the internal yard side-gate or the main building entrance. At main drop off and pick up times (0850 and 1510), the small yard gate with the school logo is opened for pupils.



Vehicular Access

The speed limit through the village is 30MPH, but community police speed monitoring revealed this was rarely exceeded, despite perceived speeding issues. There are no flashing speed reminders, only the signs at the entrance to the village.

Vehicular access is through the wide double gates adjacent to the pavement. Parents must be reminded to check for cars before crossing in front of the school gate.

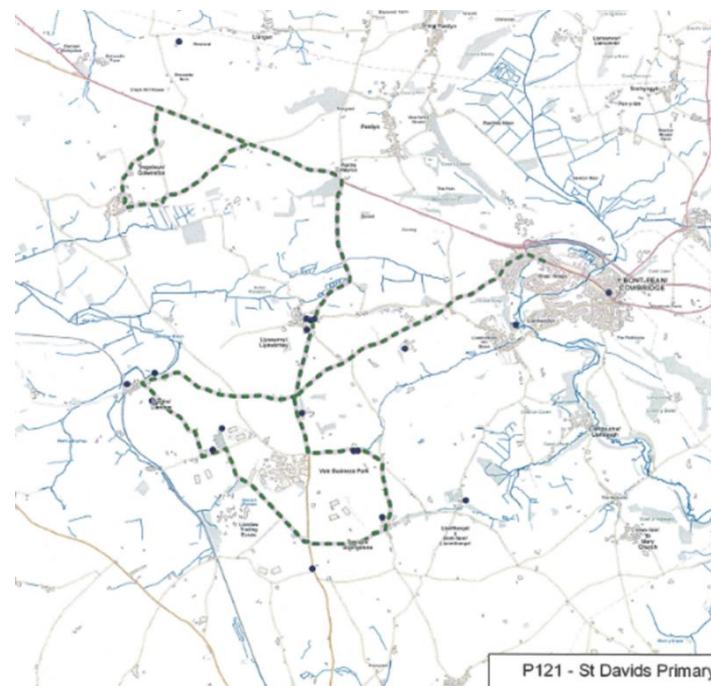
This access is mainly used by staff, with the odd visitor, disabled parents/pupils, external wrap around providers to the nursery and deliveries. Deliveries cannot be made to the school during drop off and pick up times.

Access to the back of the school can be negotiated through the locked field gate, but only when no pupils are using the yard. This is for contractors and grounds maintenance only.

Existing School Catchment Area

The existing school catchment area is illustrated on the Bus Route. This was the parishes of Colwinston Llandow and Llyswnnoy.

The post code data plots illustrate that the majority of pupils/staff live too far to commute by walking. However, since the completion of the Redrow St David's Meadow housing development, the figures do show an increasing proportion are within the 'desirable' walking distance.



Polite Parking Notice

You have been **TICKETED** by
St David's Junior Road Safety Officers

You have parked blocking the SCHOOL ENTRANCE

*The Highway Code Rule 243 Laws RTA 1988 sect 22 & CUR reg 103
DO NOT stop or park near a school entrance or **you could be subject to a
Penalty Charge Notice***

You have parked in a BUS BAY

*The Highway Code Rule 243 Laws RTA 1988 sect 22 & CUR reg 103
DO NOT stop or park in a bus stop or **you could be subject to a Penalty
Charge Notice***

**You have parked and left your car in our cone marked safety DROP
AND GO ZONE, preventing other parents from using/waiting to use
this facility**

**You have added to school traffic congestion by driving AGAINST THE
VOLUNTARY ONE-WAY SYSTEM**

**You have parked on the opposite roadside AND your children got out
on the traffic side**

*The Highway Code Rule 239 If you have to stop on the roadside it is safer for
your passengers (especially children) to get out of the vehicle on the side
next to the kerb*

We know that congestion and parking is a problem in our small
rural school.

Please help keep our children safe.

Please drive and park responsibly.

Action Plan

Targets

These targets relate to the effect of implementing the travel planning measures,
and are the following:

- Ensure that 100% of the pupils and parents are aware of the school travel within six months after the Travel Plan has been implemented.
- Reduce the numbers not using the voluntary one-way system or requiring a "Polite Parking Notice" to less than 5%
- Reduce the proportion of pupils/ parents travelling to school by 'car alone' on regular basis within five years after Travel Plan implementation. Some parents who currently drive could also consider car sharing, which involves two parents living in the same area agreeing to pick-up/ drop-off a number of children at the school in one car.
- Increase the number of pupils walking (part-walking) to school by 10%
- Increase the number of eligible pupils using the school bus by 10%
- Increase the number of pupils cycling to school by 5%.

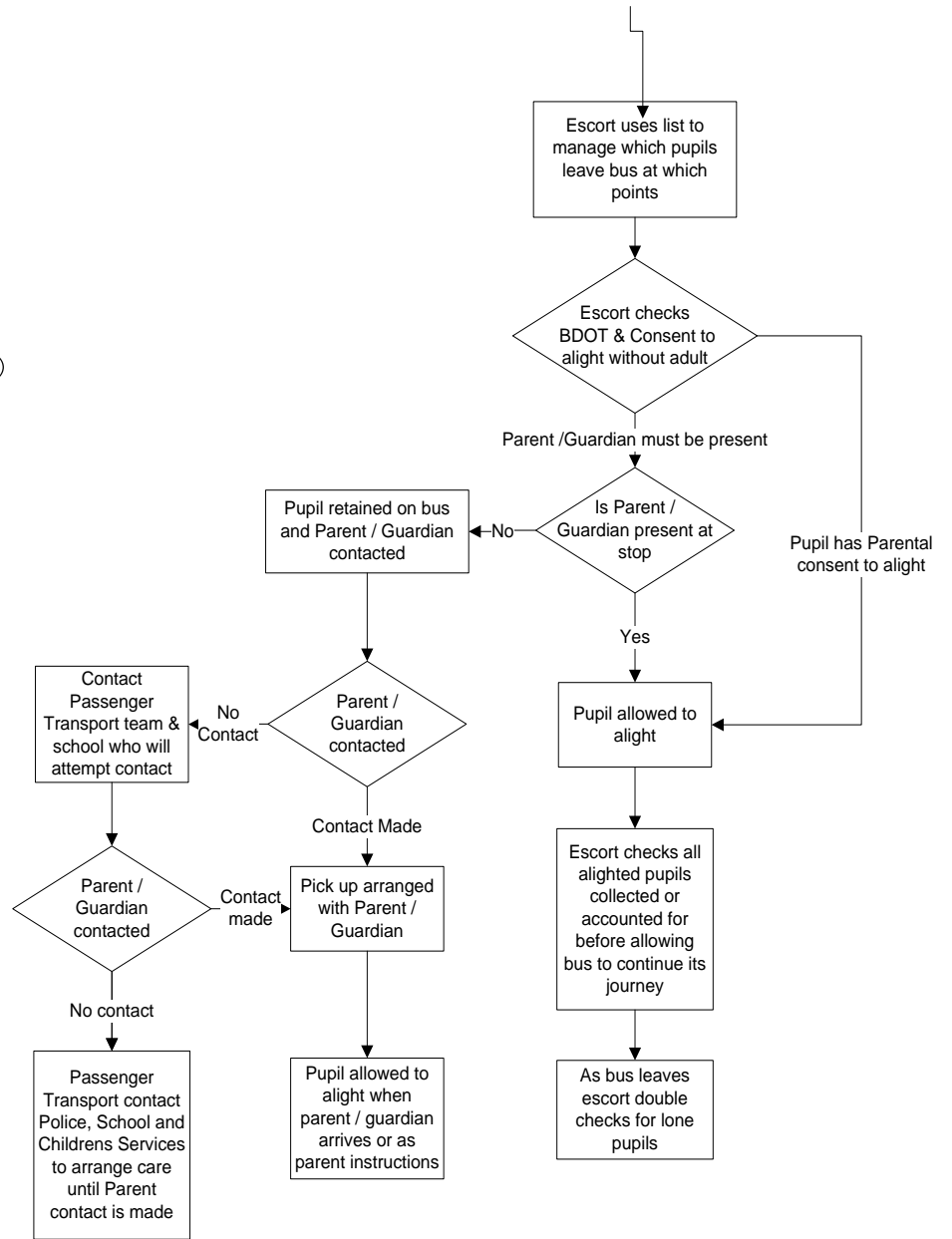
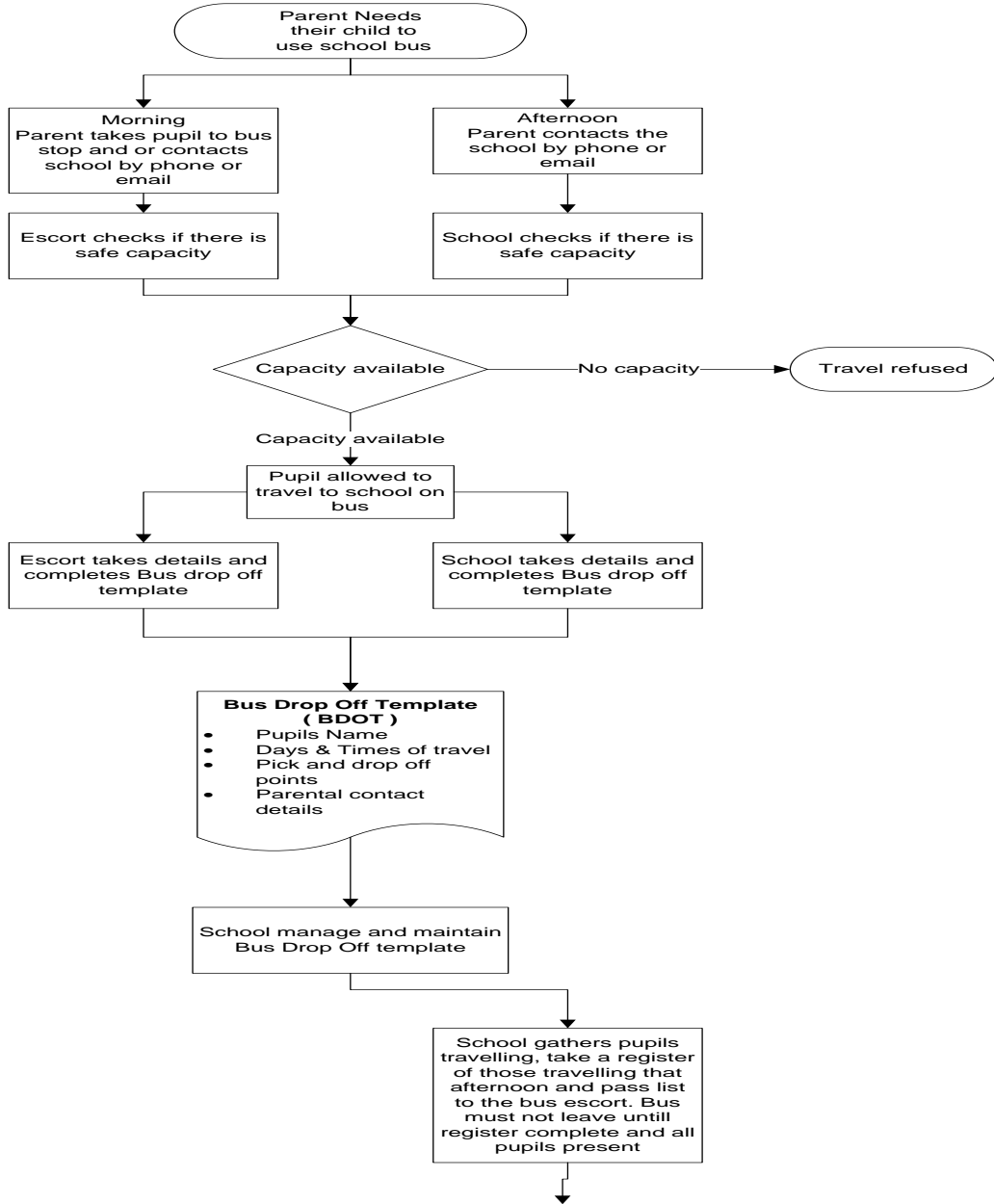
As the travel plan is a living document, it will need revising and updating regularly. Where targets are not being reached, additional measures will be evaluated.

Travel Plan Management

The day to day responsibility for the implementation of the schools Travel Plan will be with the designated Travel Plan Co-ordinator (TPC), in this case the schools' Deputy Headteacher. The TPC responsibility would be ancillary to their day-to-day activities, where the TPC should be accessible to pupils, parents and staff to provide necessary support and information.

The following should feed information to the TPC:

- JRSOs – surveys of mode of travel; safety feedback
- Headteacher- safety feedback
- Caretakers on gate duty – safety feedback
- All staff undertaking bus duty – bus numbers and safety feedback



MAKE EVERY JOURNEY A GOOD ONE STICK TO THE TRAVEL CODE.



THE TRAVEL CODE

Your safety is very important. You must behave responsibly and safely when travelling to and from school or college, whether you get there by bus, train, taxi, bicycle, walking or any other way. If you get a bus to school or college, you must also follow the rules in the School Bus Travel Code.

If you do not follow the Travel Code, for your own safety, local authorities, schools and colleges can take action against you. This might involve taking away your right to school transport and even excluding you from school.

Your Responsibility	Your Safety	Your Rights
<ul style="list-style-type: none"> ➤ Always respect others, including other learners, drivers and the public. ➤ Always respect vehicles and property. ➤ Always be polite. ➤ Never drop litter. ➤ Always obey the law. 	<ul style="list-style-type: none"> ➤ Always behave well throughout your journey. ➤ Always follow the driver's instructions when travelling. ➤ You must not distract drivers. ➤ Always cross the road safely and sensibly. ➤ Always travel by a safe route. 	<ul style="list-style-type: none"> ➤ To be safe when travelling. ➤ To be treated fairly and with respect. ➤ To tell someone if somebody or something is causing you problems. ➤ Not to be bullied or picked on.



TELL A TEACHER, PARENT
OR DRIVER ABOUT ANY
POOR BEHAVIOUR OR
BULLYING YOU SEE.

MAKE EVERY JOURNEY A GOOD ONE STICK TO THE TRAVEL CODE.



SCHOOL BUS TRAVEL CODE

- When at the bus stop, always wait sensibly, off the road.
- Make an agreement with your parents what to do if the bus does not arrive or if you miss it.
- When the bus arrives wait for it to stop. Never push or rush for the door.
- Show your bus pass (if you have been given one) when you get on the bus.
- On a school bus stay in your seat for the whole journey.
- On a public bus find a seat if one is available.
- Never block the aisle with your bag or other belongings.
- Always wear a seatbelt if one is provided.
- You must not distract the driver when he or she is driving.
- Never eat or drink on the bus.
- Never throw anything in or from the bus.
- Never damage or vandalise any part of the bus.
- Never operate the bus doors or exits, except in an emergency.
- Always follow the instructions of the driver or passenger assistant at all times.
- If there is an accident, stay on the bus until you are told to leave. If it is unsafe to stay on the bus then leave via the safest exit.
- Never try and get on or off the bus until it has stopped.
- Always get off the bus sensibly, taking all belongings with you.
- Never cross the road in front of or close behind the bus.



TELL A TEACHER, PARENT
OR DRIVER ABOUT ANY
POOR BEHAVIOUR OR
BULLYING YOU SEE.

Appendix 2-2: School Bus Information

Service Number/Rhif Gwasanaeth: P121

Cowbridge & Llandow to St David's Church in Wales Primary School

Morning / Y Bore

0810	Cowbridge Police Station	<i>Route/Llwybr:</i>
0825	Sigingstone	High Street, Westgate, Llantwit Major
0840	Llandow Village	Road, lane to Sigingstone, lane to
0848	Llysworney	Llandow, B4268 to Llysworney, A48, lane
0855	St David's Church in Wales Primary	to Colwinston

Afternoon / Y Prynawn

1530	St David's Church in Wales Primary	<i>Route/Llwybr:</i>
1538	Llysworney	Lane to A48, B4268 to Llysworney, lane to
1550	Llandow Village	Llandow, Sigingstone, Llantwit Major
1553	Sigingstone	Road, Westgate, High Street
1615	Cowbridge Police Station	

Please note:

This bus can only be used by holders of a valid Vale of Glamorgan Council School Bus pass bearing the bus service number above. **Anyone not holding a valid pass for this service will be refused travel.** Please ensure that pupils are at the pick-up point at least 5 minutes before the times quoted.

Cofiwch:

Dim ond deiliaid tocyn Bws Ysgol Cyngor Bro Morgannwg dilys gyda'r rhif gwasanaeth bws uchod all ddefnyddio'r bws hwn. **Bydd unrhyw un heb docyn dilys ar gyfer y gwasanaeth hwn yn cael ei wrthod.** Sicrhewch fod y disgyblion ar y pwynt codi o leiaf 5 munud cyn yr amser a nodir.



Contact details / Manylion Cyswllt

Vale of Glamorgan Council – 01446 700111

St David's C/W Primary– 01656 656447

Operator/Gweithredwr – Peyton Travel 01656 661221

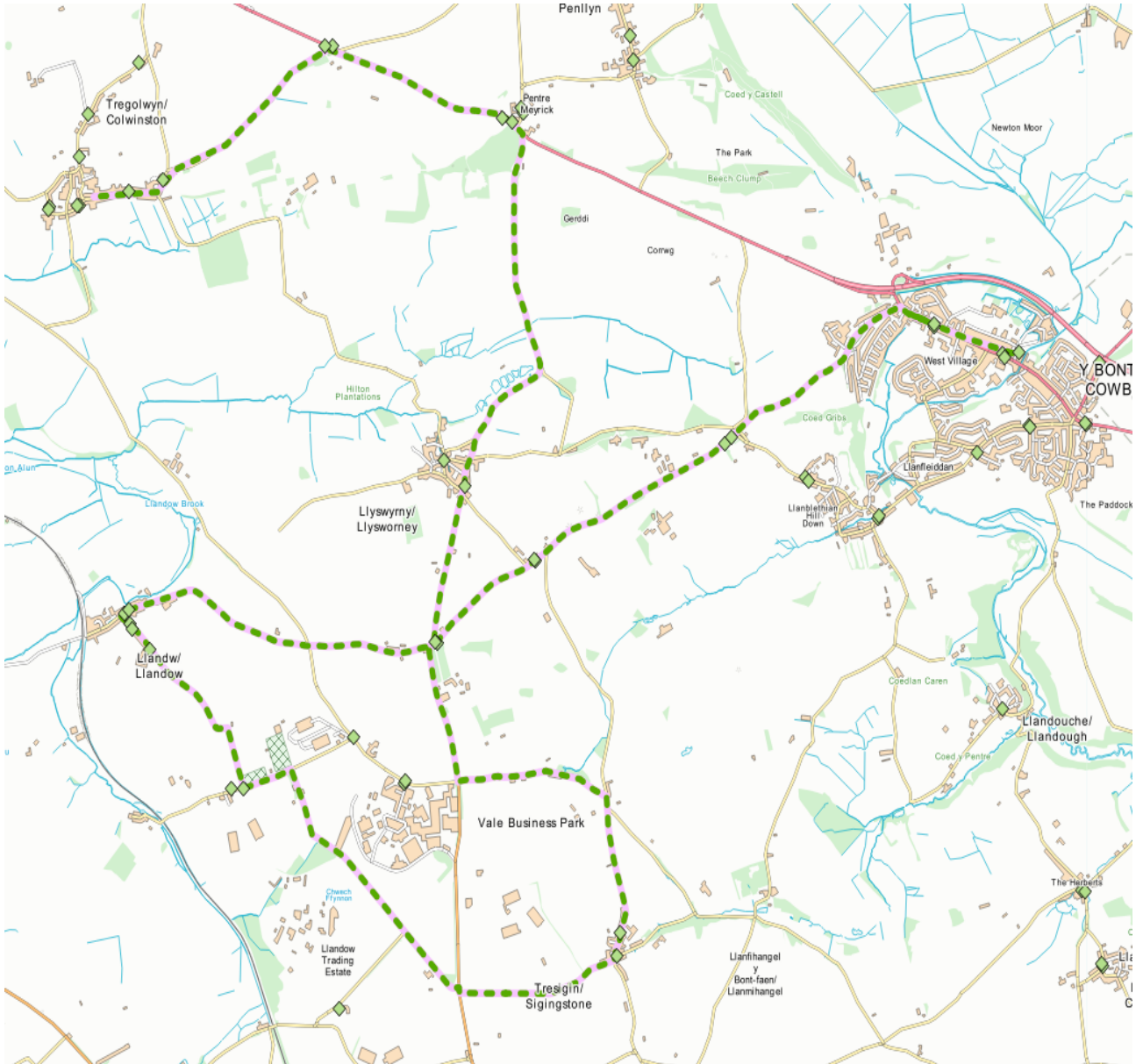
Twitter - @PeytonLtd



You can ask us any questions on school or public transport via email - schooltransport@valeofglamorgan.gov.uk

Gallwch ofyn unrhyw gwestiynau ar drafnidiaeth ysgol neu gyhoedus drwy e-bost - schooltransport@valeofglamorgan.gov.uk

valid from/yn ddilys o 02/09/2019



Appendix 3-1: Illustrative Masterplan



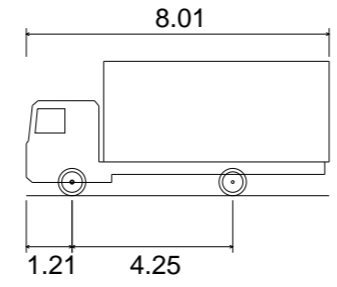
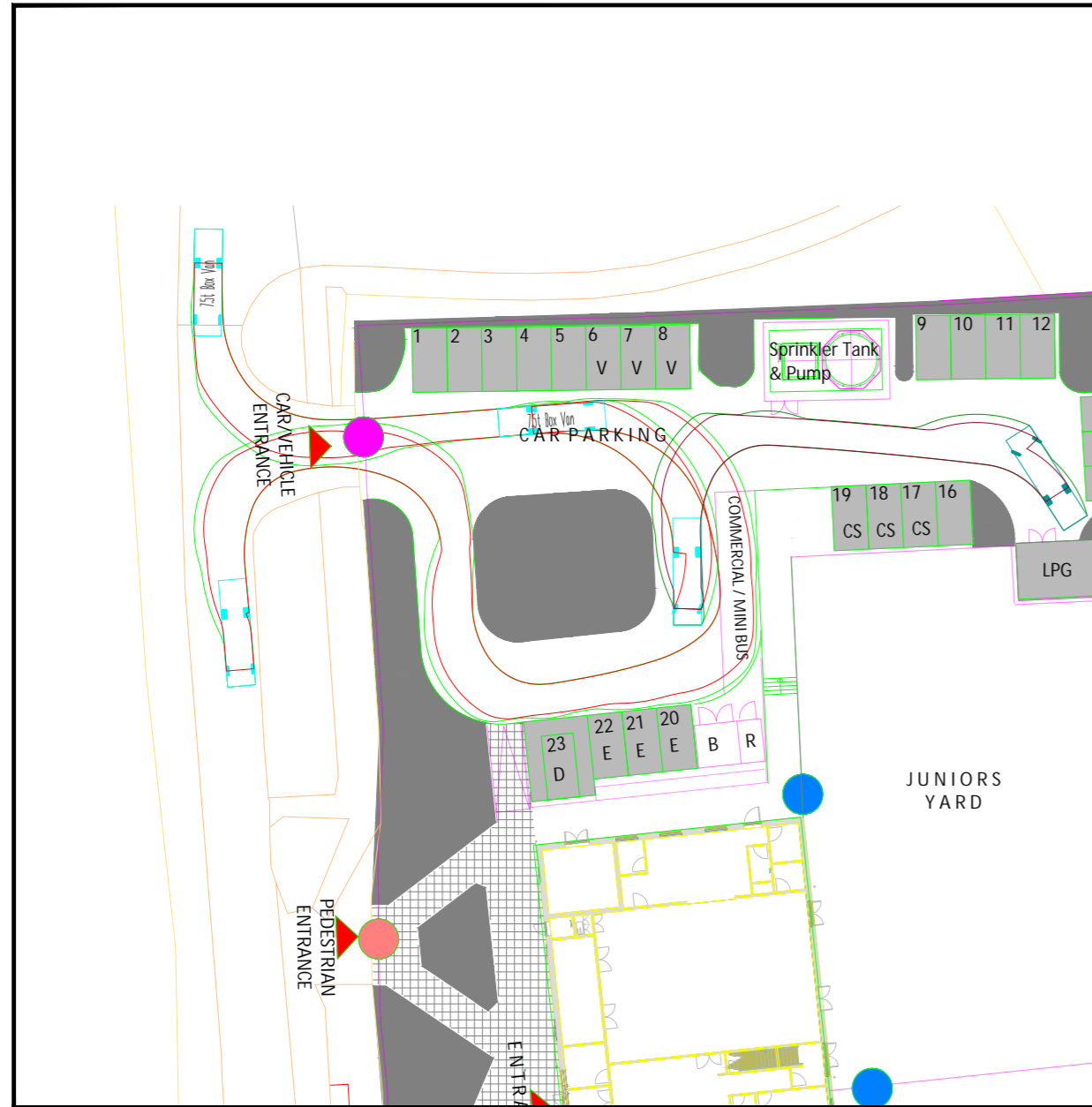
STATUS	REV	DATE	DESCRIPTION
PL	PL01	21/02/20	First Issue - Draft issue for PAC
PL	PL02	25/02/20	Updated notations following TA meeting. Bin stores relocated due to levels.
PL	PL03	26/02/20	Issue to transport consultant.
PL	PL04	27/02/20	Pre application consultation issue.

- KEY**
- Site Red Line Boundary
 - - - Fence - Specification to be confirmed
 - - - Retaining wall
- Gates**
- Pedestrian single gate
 - Pedestrian and maintenance vehicle access gate
 - Site entrance vehicle gates
- CS** Car share parking space
E Electric Charging parking space
D Disabled parking space
V Visitor parking space
R Recycling Bins
B General Waste Bins

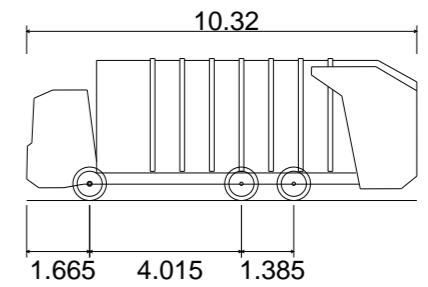
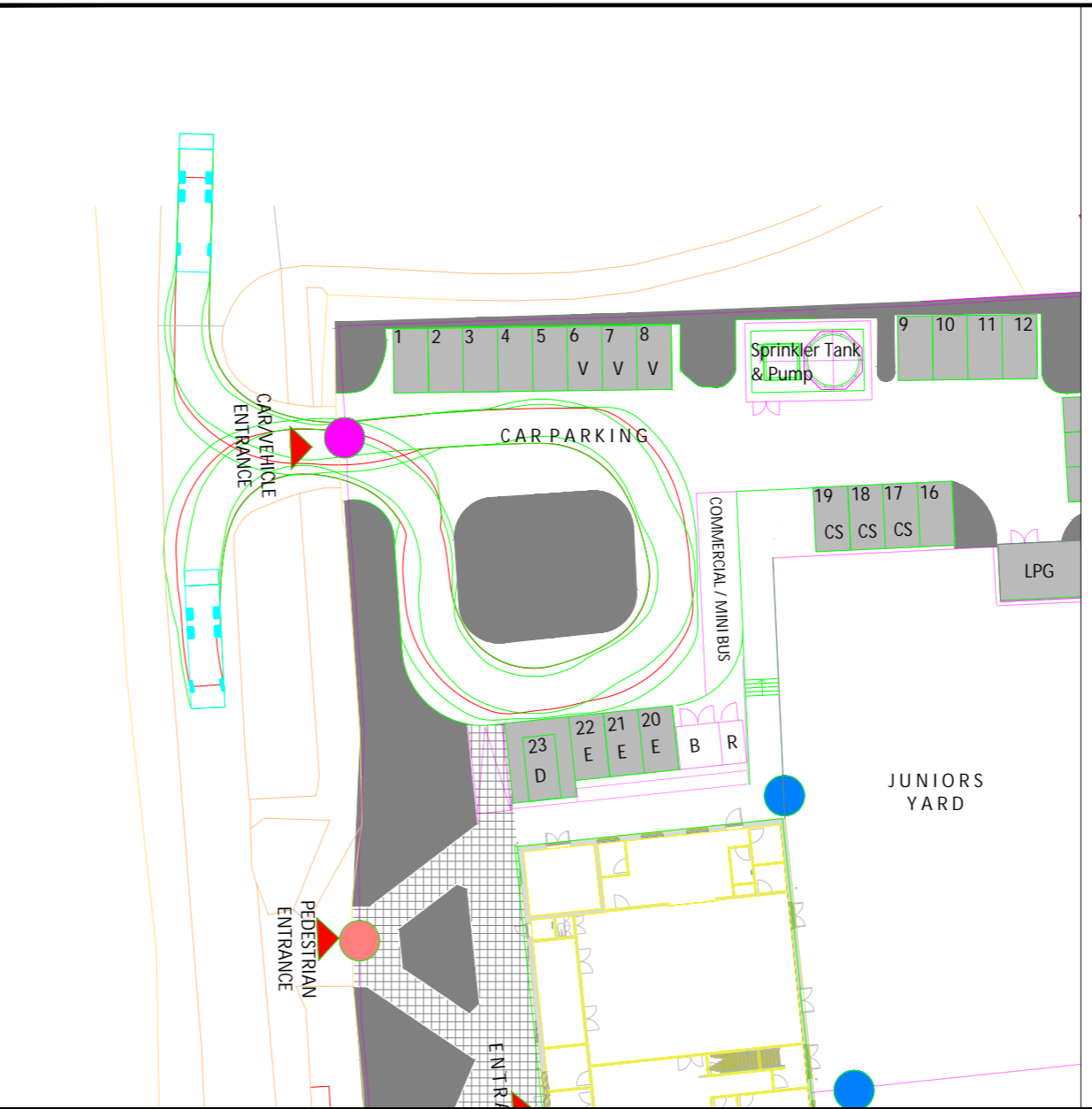


Proposed Site Plan
1 : 500

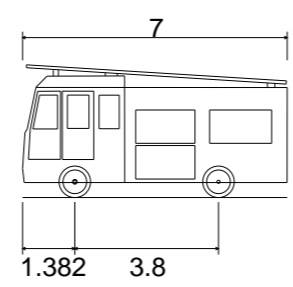
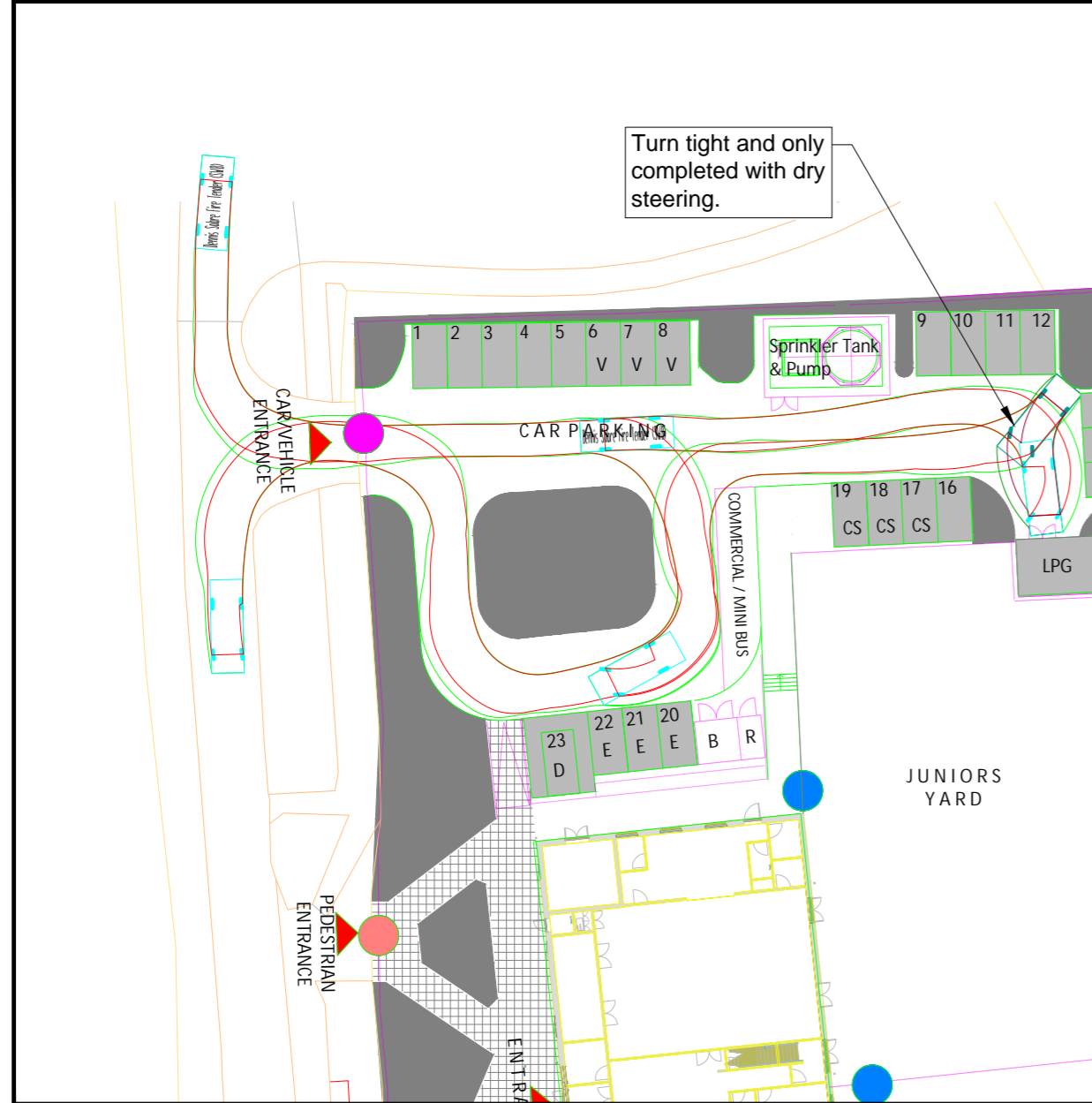
Appendix 3-2: Swept Path Analysis



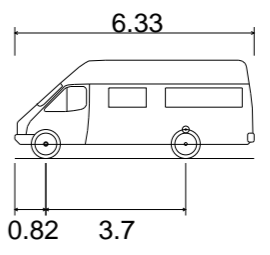
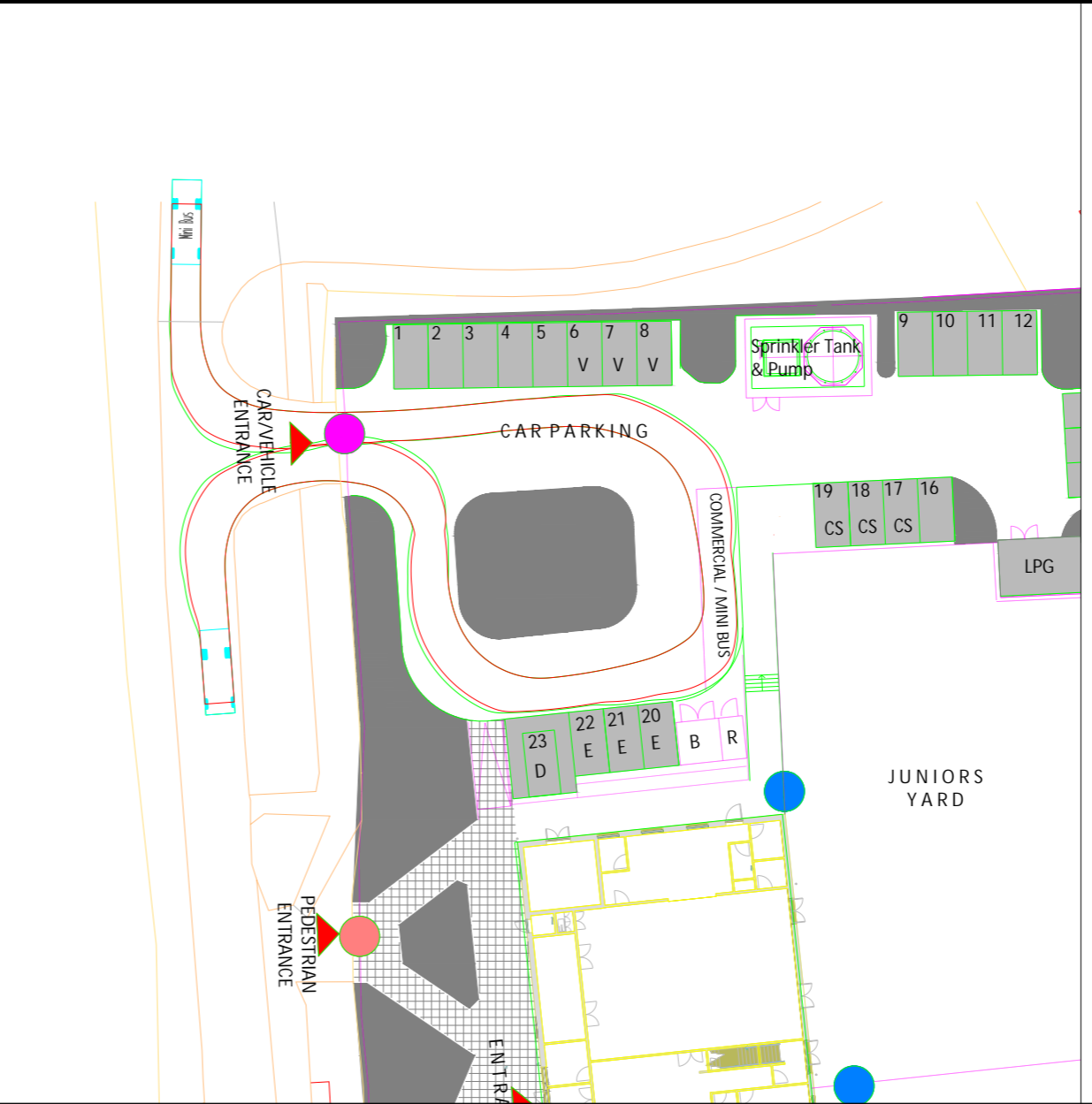
7.5t Box Van
 Overall Length 8.010m
 Overall Width 2.100m
 Overall Body Height 3.556m
 Min Body Ground Clearance 0.351m
 Track Width 2.064m
 Lock to lock time 4.00s
 Kerb to Kerb Turning Radius 7.400m



Phoenix 2 Duo Recycler
 (P2-12W with Elite 6x4 chassis)
 Overall Length 10.320m
 Overall Width 2.530m
 Overall Body Height 3.756m
 Min Body Ground Clearance 0.309m
 Track Width 2.530m
 Lock to lock time 4.00s
 Kerb to Kerb Turning Radius 9.450m



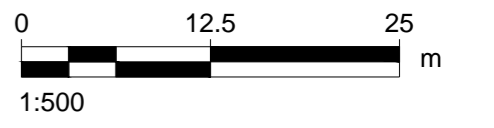
Dennis Sabre Fire Tender (SWB)
 Overall Length 7.000m
 Overall Width 2.430m
 Overall Body Height 3.512m
 Min Body Ground Clearance 0.397m
 Track Width 2.380m
 Lock to lock time 5.00s
 Kerb to Kerb Turning Radius 6.835m



Mini Bus
 Overall Length 6.330m
 Overall Width 2.192m
 Overall Body Height 2.601m
 Min Body Ground Clearance 0.374m
 Track Width 2.192m
 Lock to lock time 4.00s
 Kerb to Kerb Turning Radius 6.450m

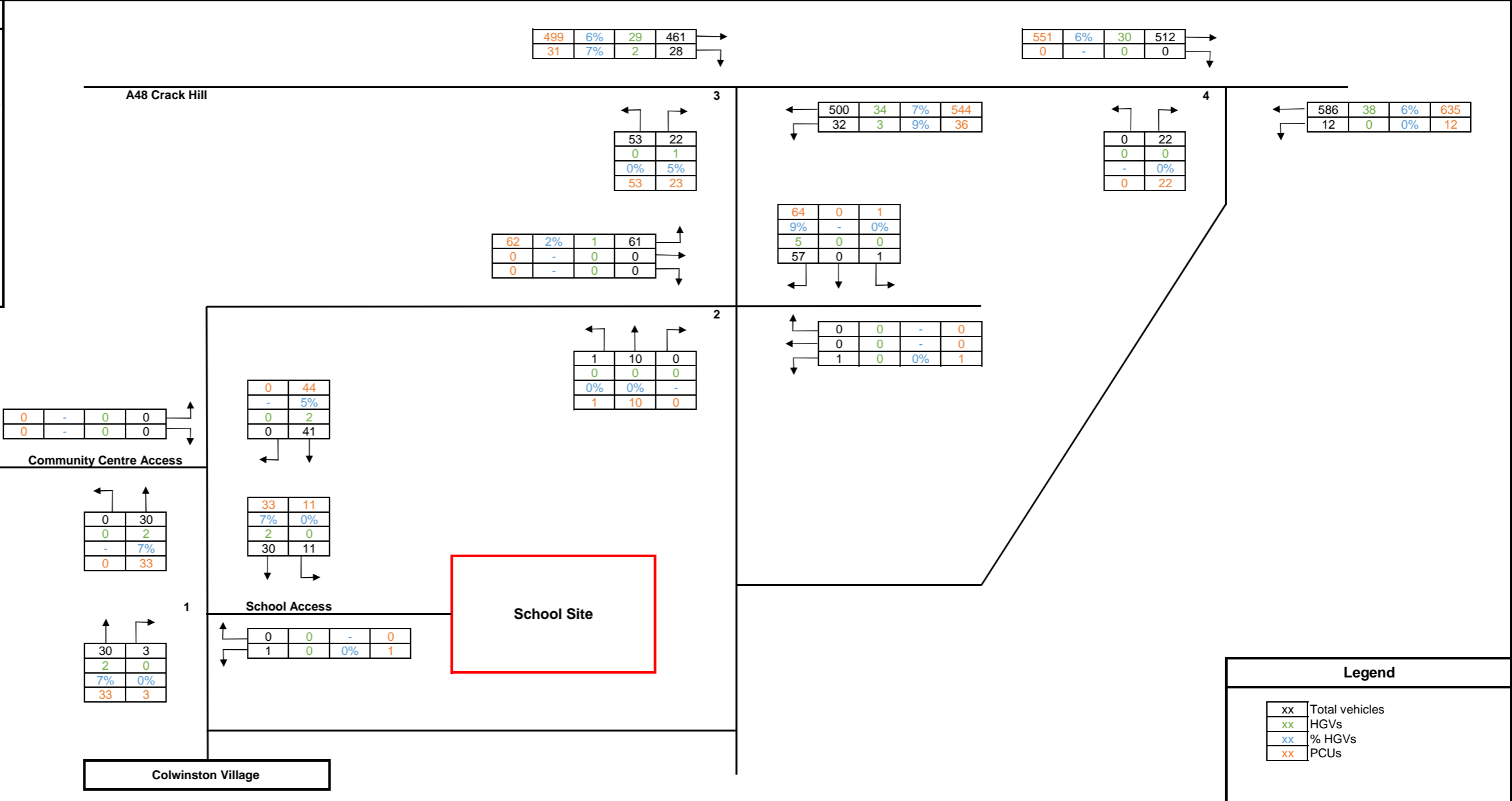
Tracking Based on Drawing:
 SDPS-STL-XX-ZZ-DR-A-0003-PL04-Proposed Site Plan

FOR INFORMATION ONLY



Appendix 6-1: Traffic Flow Diagrams

- Notes**
- 1 Diagram not to scale.
 - 2 Traffic flow taken from JTC surveys completed 06/06/19.
 - 3 "HGV" flows are taken as OGV1, OGV2 and PSV flows from JTC surveys.
 - 4 PCU flows derived by applying factor of 2.3 to HGV flows.
 - 5 Peak hour has been derived based on the peak traffic demand at the school access JTC survey.
 - 6 Community centre access flows derived from the arrivals to / departures from the school access.



Legend

xx	Total vehicles
xx	HGVs
xx	% HGVs
xx	PCUs

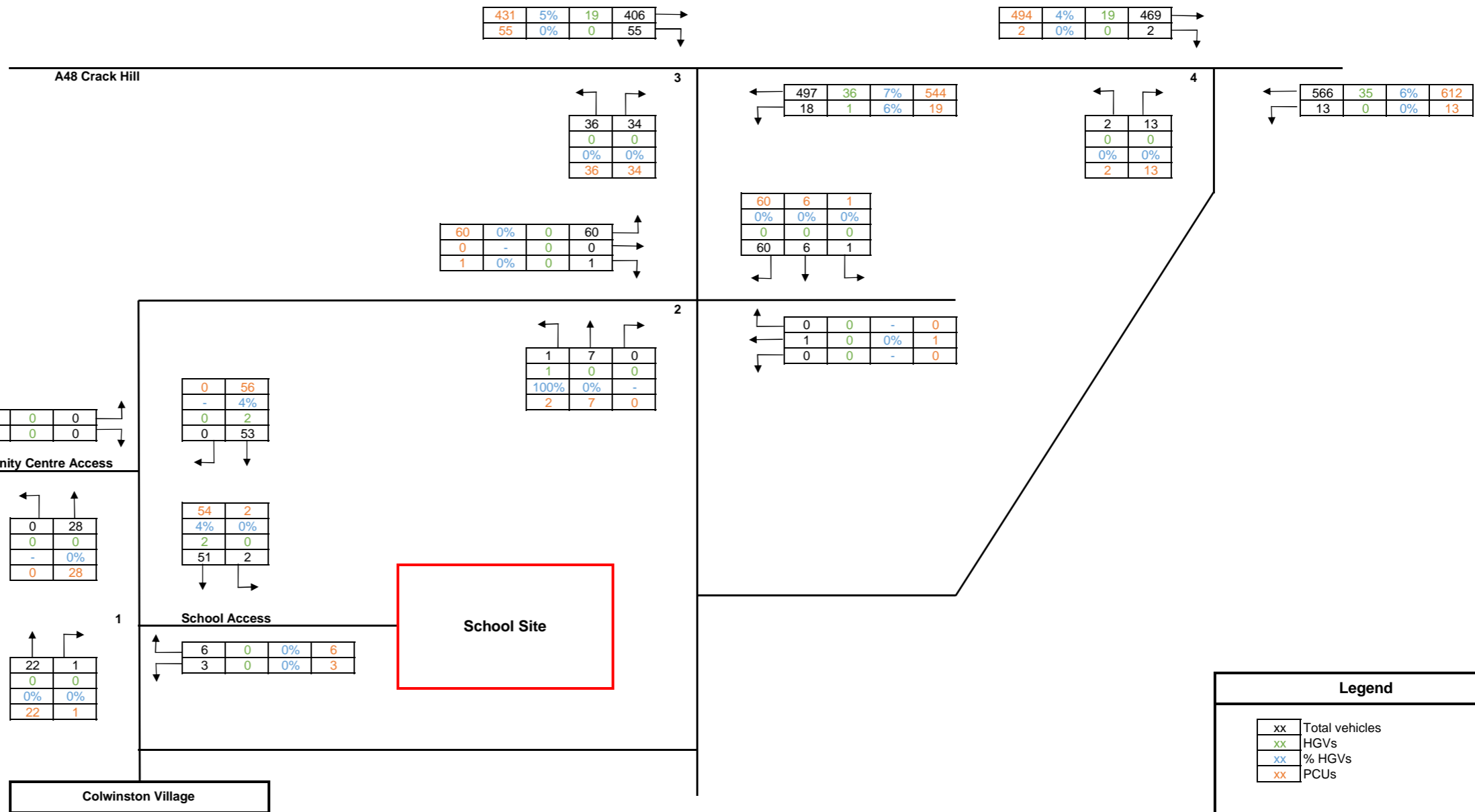
AECOM
 1 Callaghan Square
 Cardiff
 CF10 5BT
 029 2067 4600
www.aecom.com

Title:	2019 Observed Traffic Flows: AM Peak Hour (08:00-09:00)
Figure:	-
Project:	St David's Church in Wales Primary School, Colwinston, Vale of Glamorgan
Client:	Vale of Glamorgan

Drawn:	MP
Checked:	MD
Approved:	KC
Date:	27/02/2020

Notes

- 1 Diagram not to scale.
- 2 Traffic flow taken from JTC surveys completed 06/06/19.
- 3 "HGV" flows are taken as OGV1, OGV2 and PSV flows from JTC surveys.
- 4 PCU flows derived by applying factor of 2.3 to HGV flows.
- 5 School peak hour has been derived based on the peak traffic demand at the school access JTC survey.
- 6 Community centre access flows derived from the arrivals to / departures from the school access.



Legend	
xx	Total vehicles
xx	HGVs
xx	% HGVs
xx	PCUs

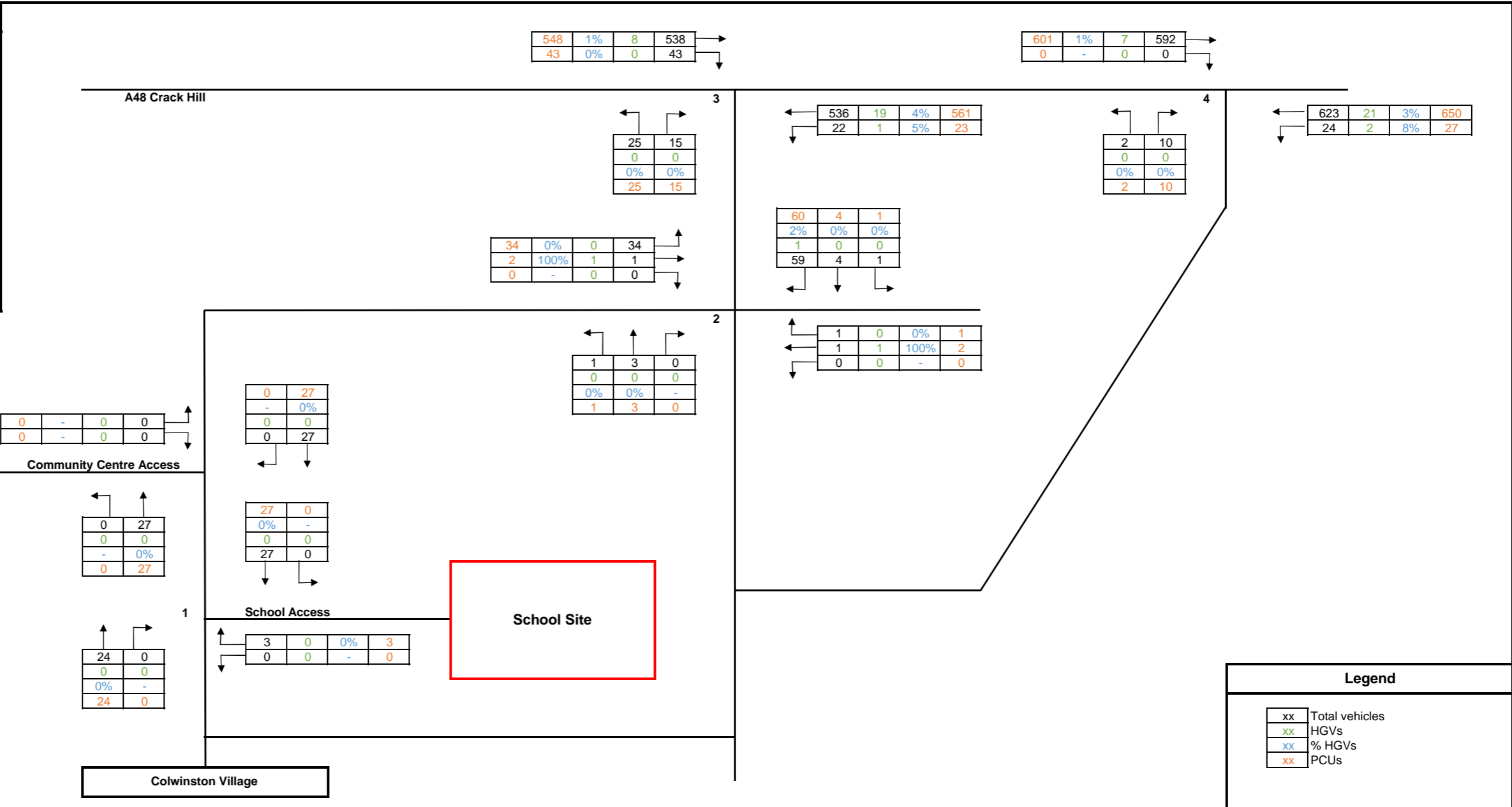
AECOM
 1 Callaghan Square
 Cardiff
 CF10 5BT
 029 2067 4600
www.aecom.com

Title:	2019 Observed Traffic Flows: School PM Peak Hour (15:15-16:15)
Figure:	-
Project:	St David's Church in Wales Primary School, Colwinston, Vale of Glamorgan
Client:	Vale of Glamorgan

Drawn:	MP
Checked:	MD
Approved:	KC
Date:	27/02/2020

Notes

- 1 Diagram not to scale.
- 2 Traffic flow taken from JTC surveys completed 06/06/19.
- 3 "HGV" flows are taken as OGV1, OGV2 and PSV flows from JTC surveys.
- 4 PCU flows derived by applying factor of 2.3 to HGV flows.
- 5 Peak hour has been derived based on the ATC Survey on the A48.
- 6 Community centre access flows derived from the arrivals to / departures from the school access.



Legend

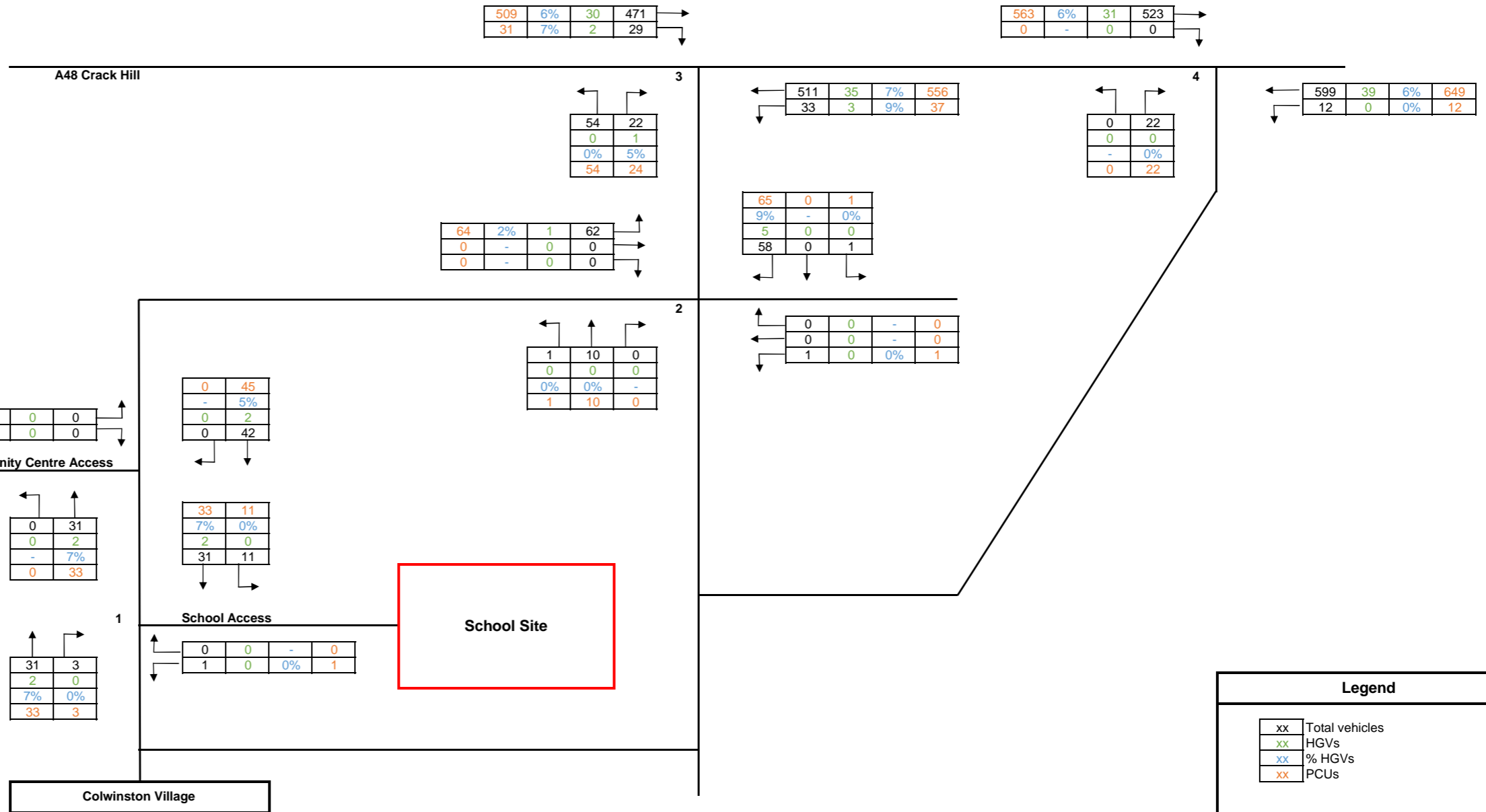
xx	Total vehicles
xx	HGVs
xx	% HGVs
xx	PCUs

AECOM
 1 Callaghan Square
 Cardiff
 CF10 5BT
 029 2067 4600
www.aecom.com

Title:	2019 Observed Traffic Flows: PM Peak Hour (17:00-18:00)	Drawn:	MP
Figure:	-	Checked:	MD
Project:	St David's Church in Wales Primary School, Colwinston, Vale of Glamorgan	Approved:	KC
Client:	Vale of Glamorgan	Date:	27/02/2020

Notes

- 1 Diagram not to scale.
- 2 Growth to 2021 via application of growth factor derived from TEMPro (Version 7.2).
- 3 Growth factor has been applied to 'total vehicle' and 'HGV' flows.
- 4 Growth factor has not been applied to movements to / from site accesses or cul-de-sacs.



Legend

xx	Total vehicles
xx	HGVs
xx	% HGVs
xx	PCUs

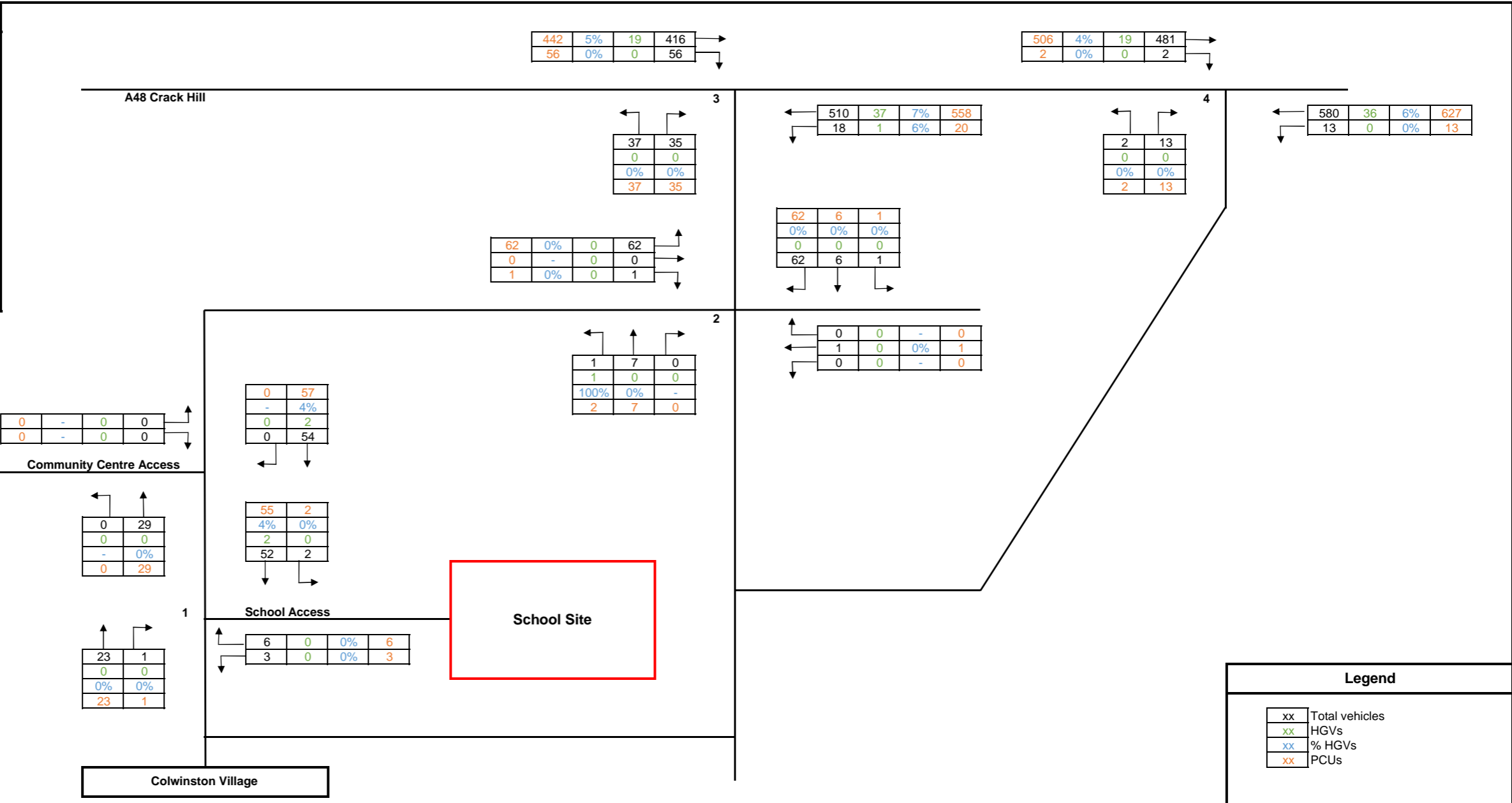
AECOM
 1 Callaghan Square
 Cardiff
 CF10 5BT
 029 2067 4600
www.aecom.com

Title:	2021 Base Traffic Flows: AM Peak Hour (08:00-09:00)
Figure:	-
Project:	St David's Church in Wales Primary School, Colwinston, Vale of Glamorgan
Client:	Vale of Glamorgan

Drawn:	MP
Checked:	MD
Approved:	KC
Date:	27/02/2020

Notes

- 1 Diagram not to scale.
- 2 Growth to 2021 via application of growth factor derived from TEMPro (Version 7.2).
- 3 Growth factor has been applied to 'total vehicle' and 'HGV' flows.
- 4 Growth factor has not been applied to movements to / from site accesses or cul-de-sacs.



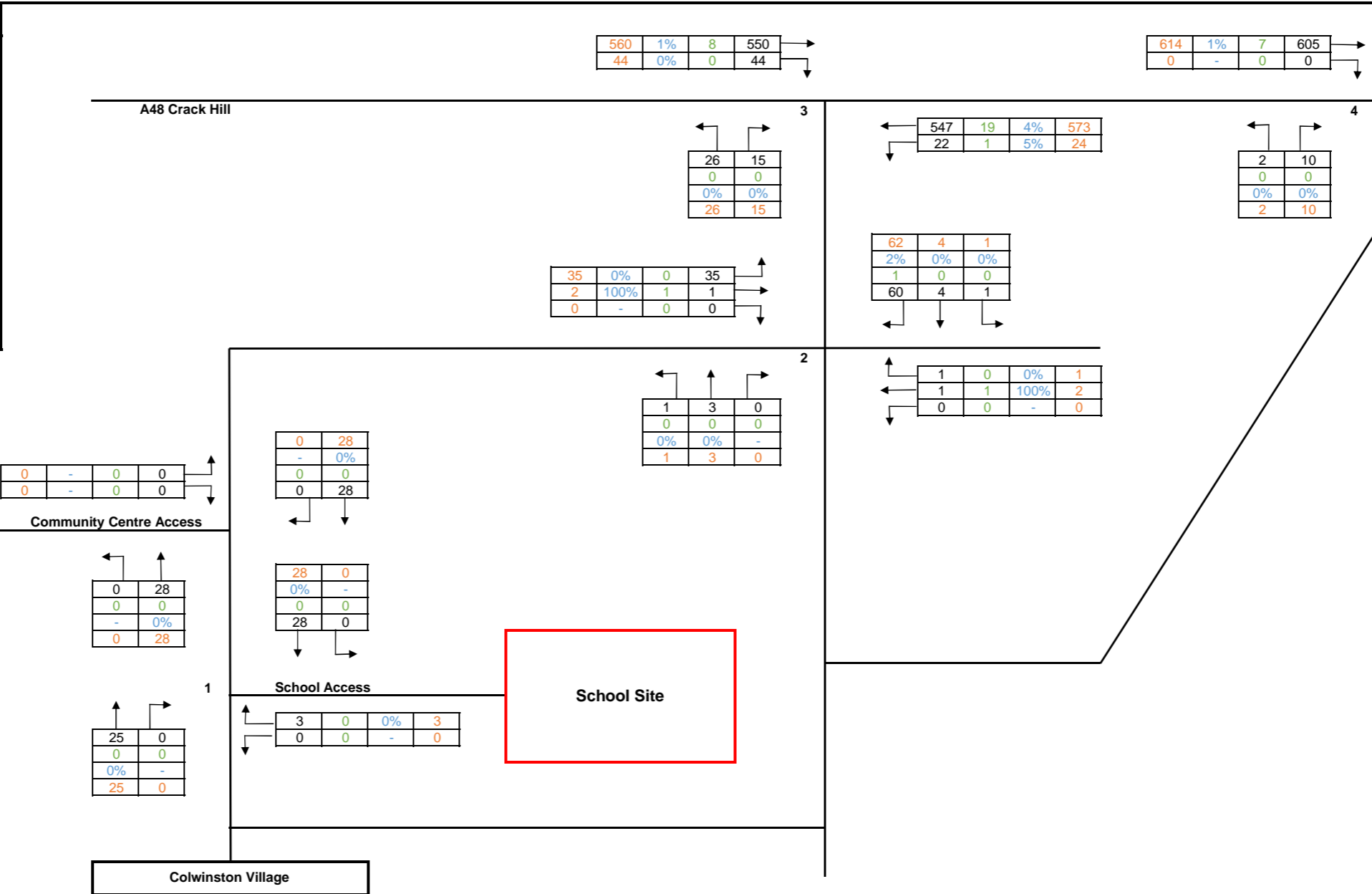
AECOM
 1 Callaghan Square
 Cardiff
 CF10 5BT
 029 2067 4600
www.aecom.com

Title:	2021 Base Traffic Flows: School PM Peak Hour (15:15-16:15)
Figure:	-
Project:	St David's Church in Wales Primary School, Colwinston, Vale of Glamorgan
Client:	Vale of Glamorgan

Drawn:	MP
Checked:	MD
Approved:	KC
Date:	27/02/2020

Notes

- 1 Diagram not to scale.
- 2 Growth to 2021 via application of growth factor derived from TEMPro (Version 7.2).
- 3 Growth factor has been applied to 'total vehicle' and 'HGV' flows.
- 4 Growth factor has not been applied to movements to / from site accesses or cul-de-sacs.



Legend

xx	Total vehicles
xx	HGVs
xx	% HGVs
xx	PCUs

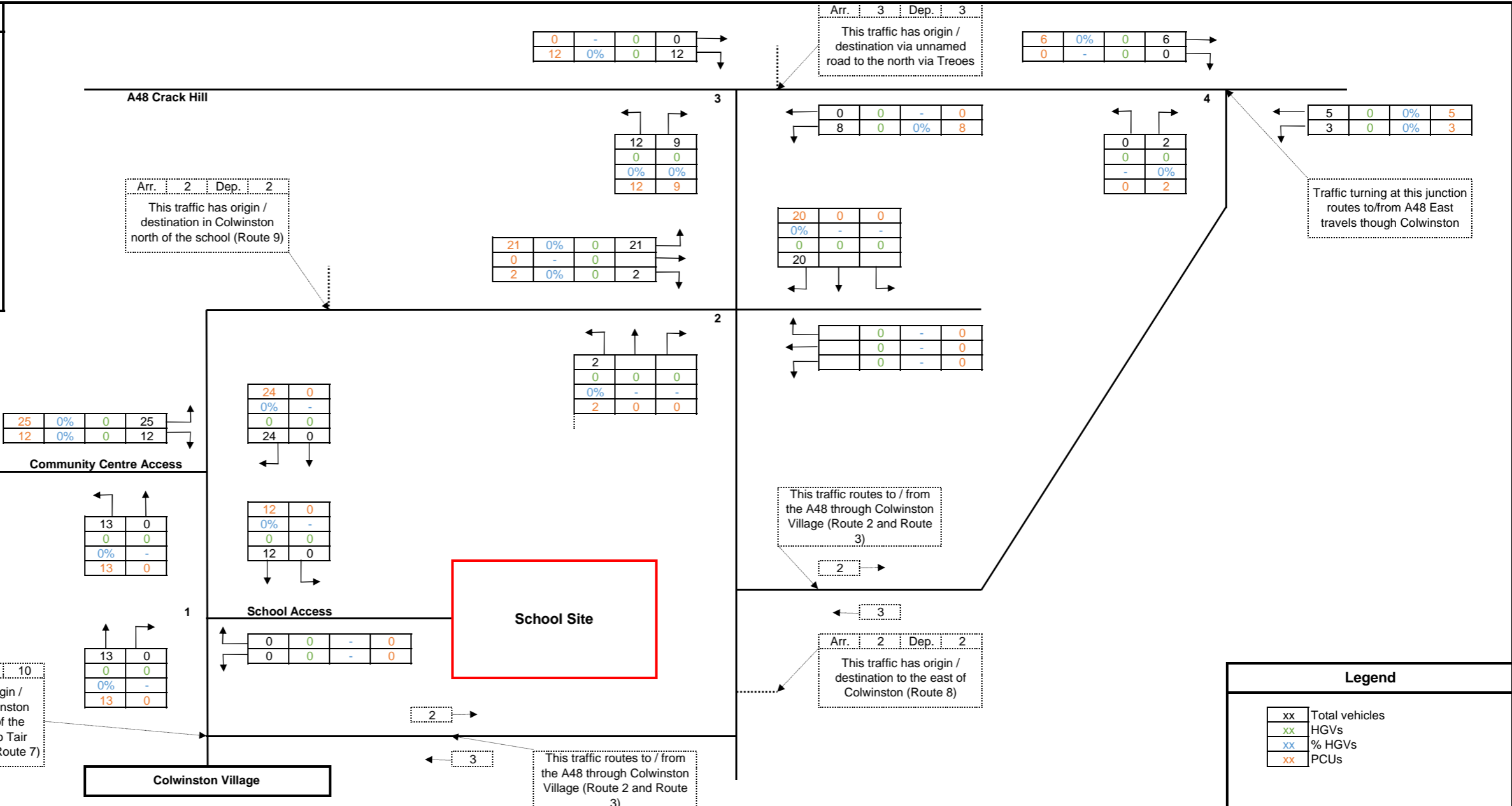
AECOM
 1 Callaghan Square
 Cardiff
 CF10 5BT
 029 2067 4600
www.aecom.com

Title:	2021 Base Traffic Flows: PM Peak Hour (17:00-18:00)
Figure:	-
Project:	St David's Church in Wales Primary School, Colwinston, Vale of Glamorgan
Client:	Vale of Glamorgan

Drawn:	MP
Checked:	MD
Approved:	KC
Date:	27/02/2020

Notes

- 1 Diagram not to scale.
- 2 Traffic flows show the increase in pupil traffic generation, i.e. escort-education trips. Traffic arrives and departs during peak hour.
- 3 Traffic assigned to/from Community Centre / Playground site.
- 4 All traffic flows are in vehicles. No HGVs are generated by the proposed development.
- 5 Boxes with dashed lines indicate where traffic leaves the network for its origin/ destination.



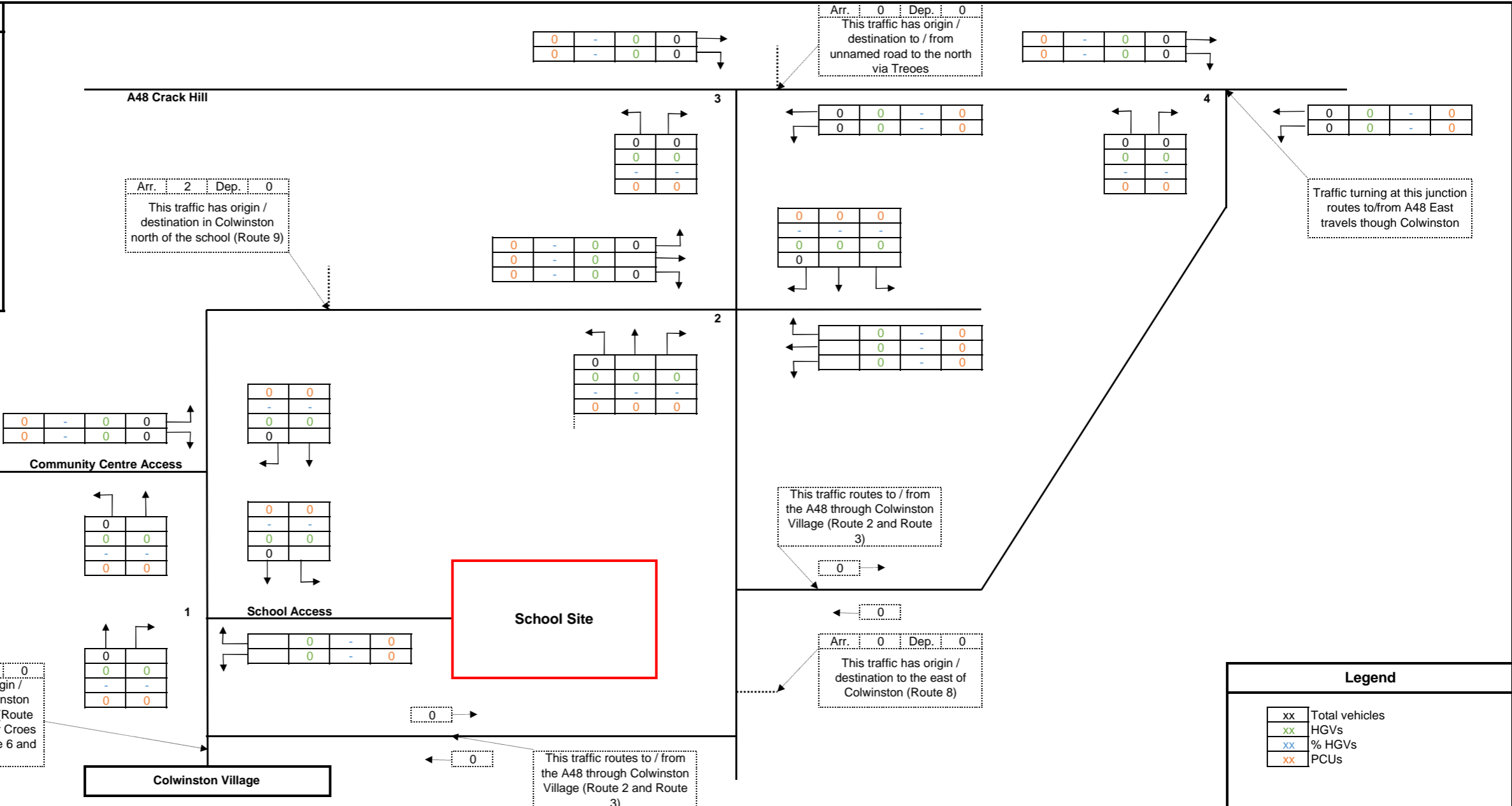
AECOM
 1 Callaghan Square
 Cardiff
 CF10 5BT
 029 2067 4600
www.aecom.com

Title:	Traffic Generation - Expanded School Pupils: School PM Peak Hour (15:15-16:15)
Figure:	Figure 5-3
Project:	St David's Church in Wales Primary School, Colwinston, Vale of Glamorgan
Client:	Vale of Glamorgan

Drawn:	MP
Checked:	MD
Approved:	KC
Date:	27/02/2020

Notes

- 1 Diagram not to scale.
- 2 Traffic flows show the increase in pupil traffic generation, i.e. escort-education trips. Traffic arrives and departs during peak hour.
- 3 Traffic assigned to/from Community Centre / Playground site.
- 4 All traffic flows are in vehicles. No HGVs are generated by the proposed development.
- 5 Boxes with dashed lines indicate where traffic leaves the network for its origin/ destination.



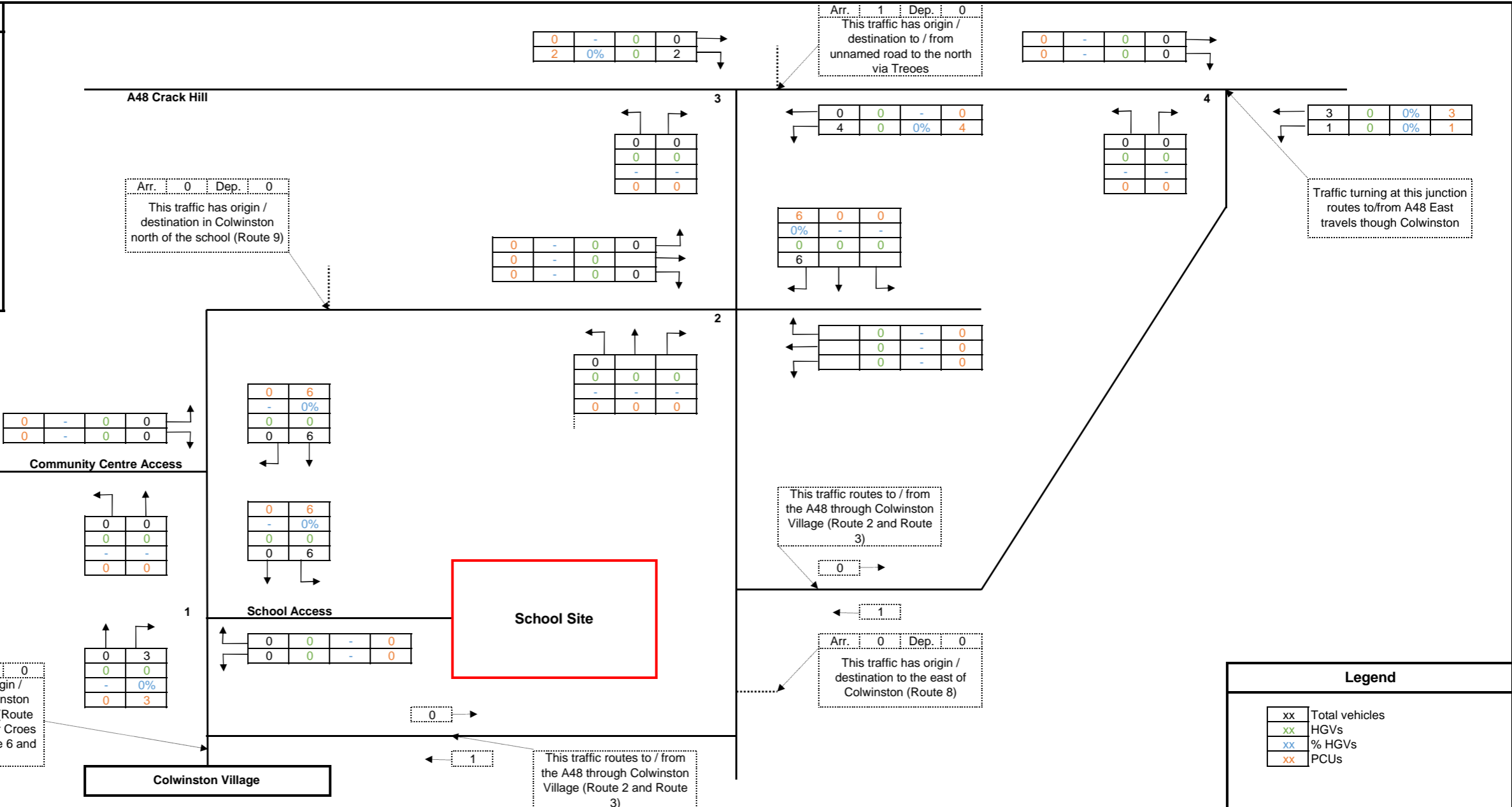
AECOM
 1 Callaghan Square
 Cardiff
 CF10 5BT
 029 2067 4600
www.aecom.com

Title:	Traffic Generation - Expanded School Pupils: PM Peak Hour (17:00-18:00)
Figure:	-
Project:	St David's Church in Wales Primary School, Colwinston, Vale of Glamorgan
Client:	Vale of Glamorgan

Drawn:	MP
Checked:	MD
Approved:	KC
Date:	27/02/2020

Notes

- 1 Diagram not to scale.
- 2 Traffic flows show the additional staff trips for the expanded school. All staff assumed to arrive during AM peak hour and depart during the PM peak hour.
- 3 Traffic assigned to/from School Site access.
- 4 All traffic flows are in vehicles. No HGVs are generated by the proposed development.
- 5 Boxes with dashed lines indicate where traffic leaves the network for its origin/ destination.



Legend	
xx	Total vehicles
xx	HGVs
xx	% HGVs
xx	PCUs

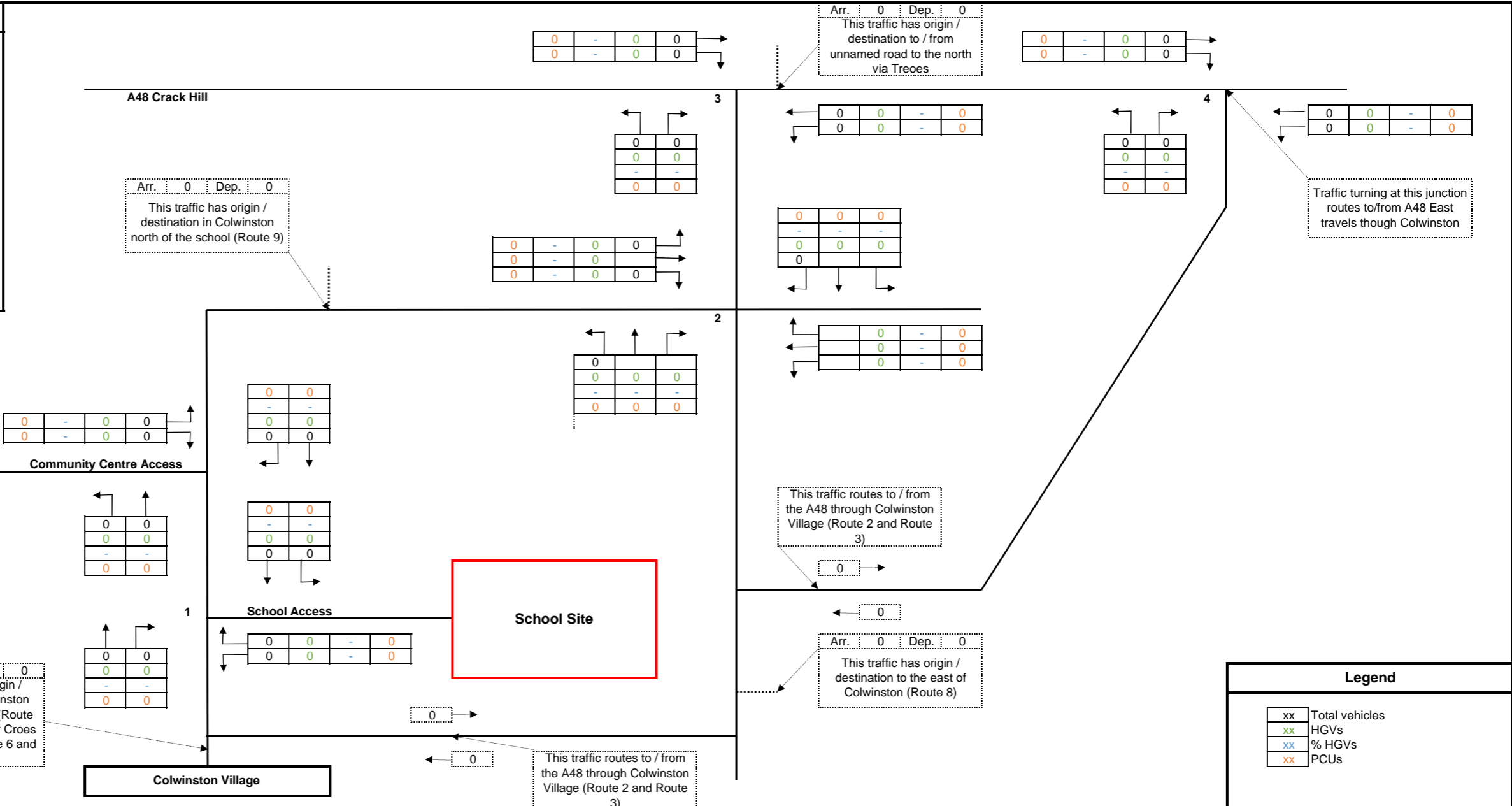
AECOM
 1 Callaghan Square
 Cardiff
 CF10 5BT
 029 2067 4600
www.aecom.com

Title:	Traffic Generation - Expanded School Staff: AM Peak Hour (08:00-09:00)
Figure:	Figure 5-4
Project:	St David's Church in Wales Primary School, Colwinston, Vale of Glamorgan
Client:	Vale of Glamorgan

Drawn:	MP
Checked:	MD
Approved:	KC
Date:	27/02/2020

Notes

- 1 Diagram not to scale.
- 2 Traffic flows show the additional staff trips for the expanded school. All staff assumed to arrive during AM peak hour and depart during the PM peak hour.
- 3 Traffic assigned to/from School Site access.
- 4 All traffic flows are in vehicles. No HGVs are generated by the proposed development.
- 5 Boxes with dashed lines indicate where traffic leaves the network for its origin/ destination.



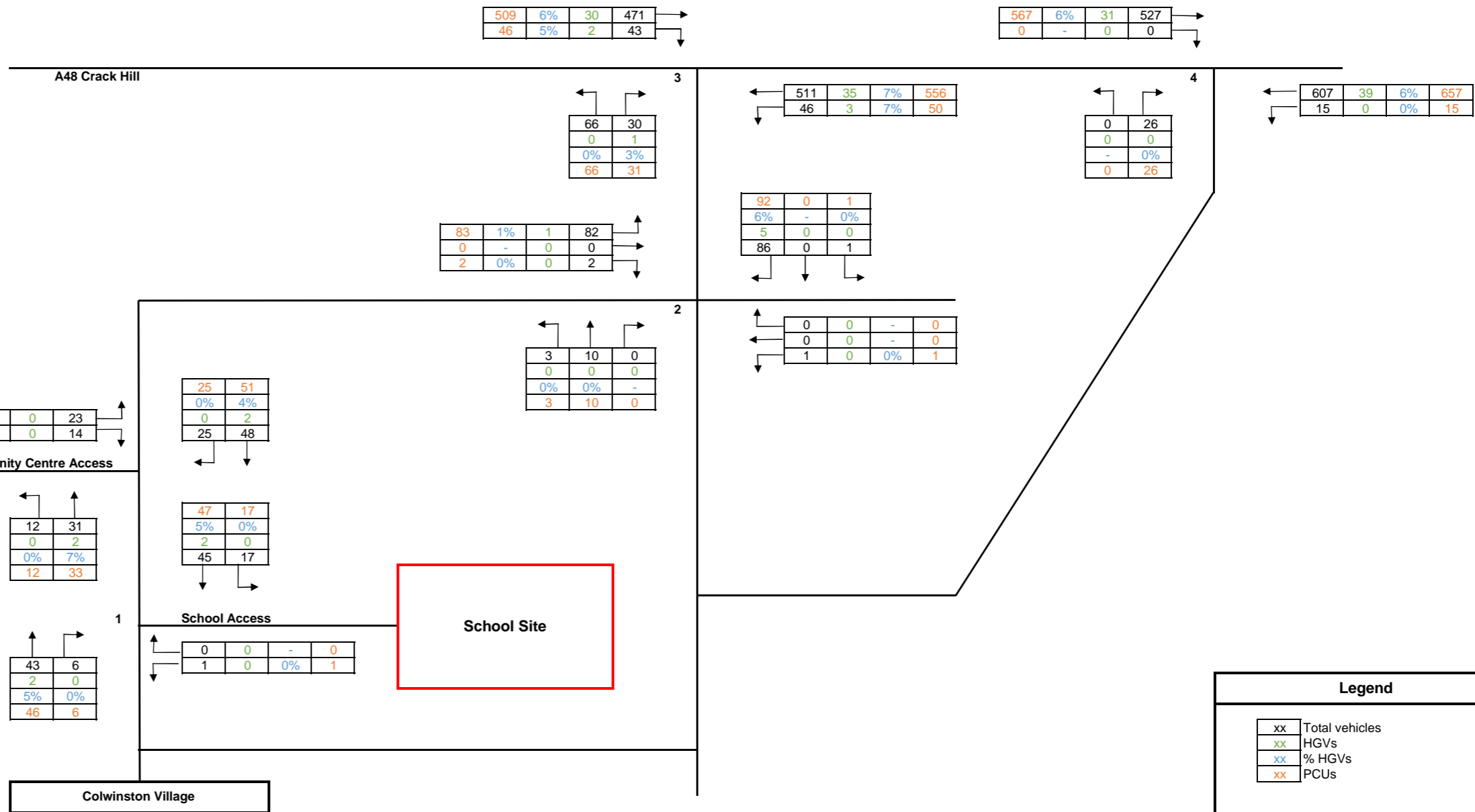
AECOM
 1 Callaghan Square
 Cardiff
 CF10 5BT
 029 2067 4600
www.aecom.com

Title:	Traffic Generation - Expanded School Staff: PM Peak Hour (15:15 - 16:15)
Figure:	-
Project:	St David's Church in Wales Primary School, Colwinston, Vale of Glamorgan
Client:	Vale of Glamorgan

Drawn:	MP
Checked:	MD
Approved:	KC
Date:	27/02/2020

Notes

- 1 Diagram not to scale.
- 2 Traffic flows are 2021 Base flows plus total school traffic following expansion.
- 3 Traffic arrivals / departures between junctions are not shown.



Legend	
xx	Total vehicles
xx	HGVs
xx	% HGVs
xx	PCUs

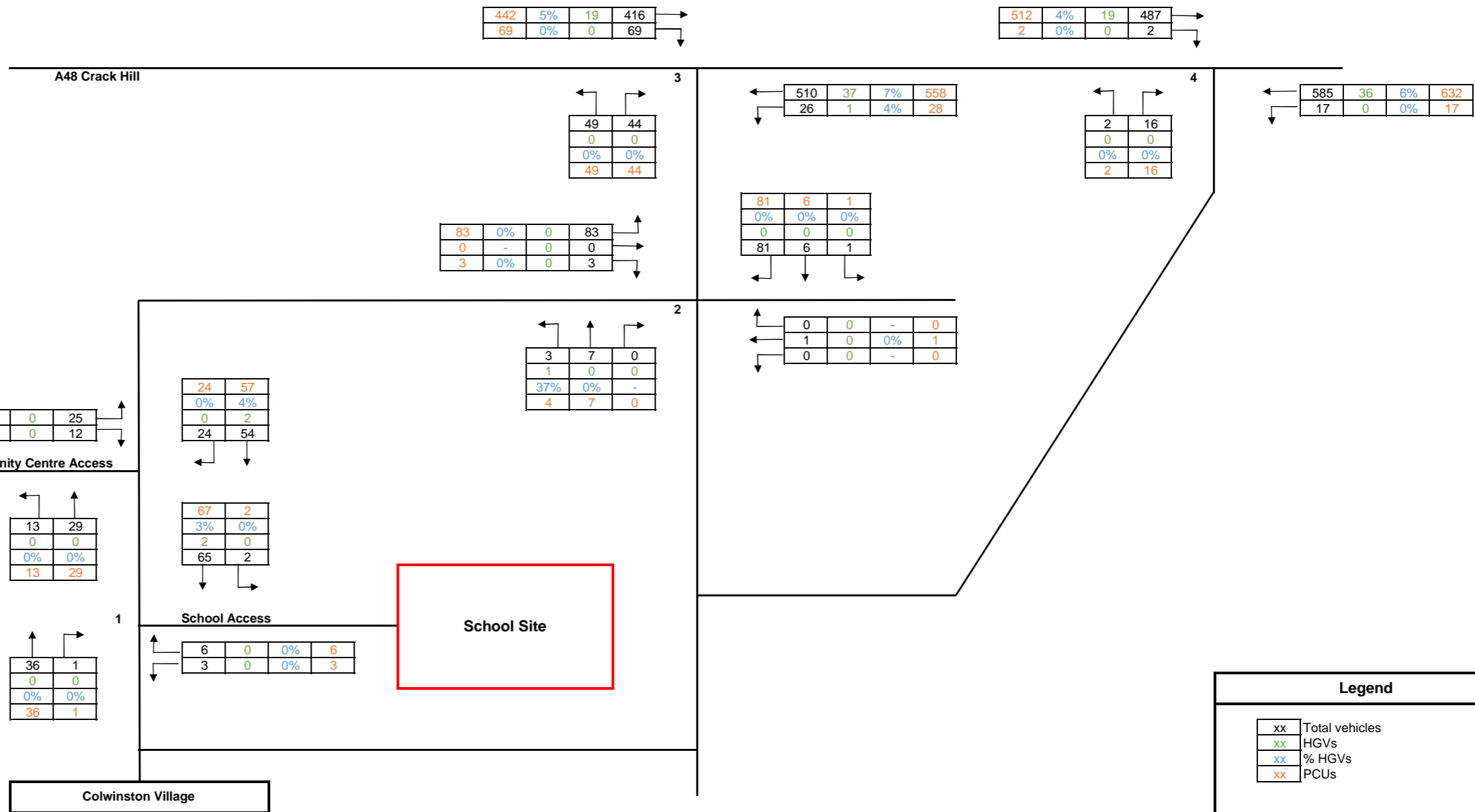
AECOM
 1 Callaghan Square
 Cardiff
 CF10 5BT
 029 2067 4600
www.aecom.com

Title:	2021 Base + Development Traffic Flows: AM Peak Hour (08:00-09:00)
Figure:	-
Project:	St David's Church in Wales Primary School, Colwinston, Vale of Glamorgan
Client:	Vale of Glamorgan

Drawn:	MP
Checked:	MD
Approved:	KC
Date:	27/02/2020

Notes

- 1 Diagram not to scale.
- 2 Traffic flows are 2021 Base flows plus total school traffic following expansion.
- 3 Traffic arrivals / departures between junctions are not shown.



Legend

xx	Total vehicles
xx	HGVs
xx	% HGVs
xx	PCUs

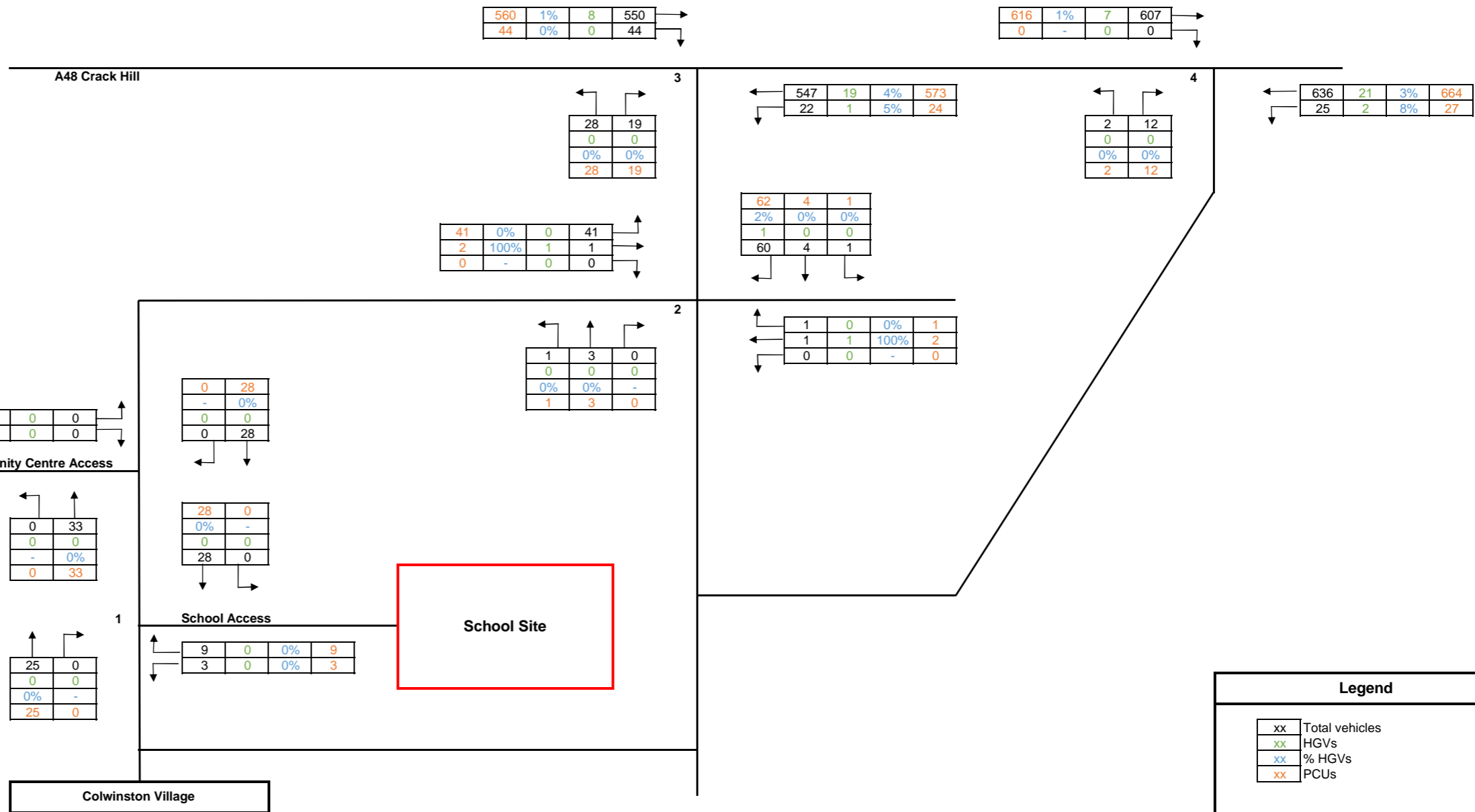
AECOM
 1 Callaghan Square
 Cardiff
 CF10 5BT
 029 2067 4600
www.aecom.com

Title:	2021 Base + Development Traffic Flows: School PM Peak Hour (15:15-16:15)
Figure:	-
Project:	St David's Church in Wales Primary School, Colwinston, Vale of Glamorgan
Client:	Vale of Glamorgan

Drawn:	MP
Checked:	MD
Approved:	KC
Date:	27/02/2020

Notes

- 1 Diagram not to scale.
- 2 Traffic flows are 2021 Base flows plus total school traffic following expansion.
- 3 Traffic arrivals / departures between junctions are not shown.



Legend

xx	Total vehicles
xx	HGVs
xx	% HGVs
xx	PCUs

AECOM
 1 Callaghan Square
 Cardiff
 CF10 5BT
 029 2067 4600
www.aecom.com

Title:	2021 Base + Development Traffic Flows: PM Peak Hour (17:00-18:00)
Figure:	-
Project:	St David's Church in Wales Primary School, Colwinston, Vale of Glamorgan
Client:	Vale of Glamorgan

Drawn:	MP
Checked:	MD
Approved:	KC
Date:	27/02/2020

Appendix 6-2: Junction Capacity Assessment Output Report

Junctions 9
PICADY 9 - Priority Intersection Module
Version: 9.5.1.7462 © Copyright TRL Limited, 2019
For sales and distribution information, program advice and maintenance, contact TRL: +44 (0)1344 379777 software@trl.co.uk www.trlsoftware.co.uk
The users of this computer program for the solution of an engineering problem are in no way relieved of their responsibility for the correctness of the solution

Filename: Junction 2 - Unnamed Road Crossroads_v0.2.j9

Path: F:\projects\Development Planning\Cardiff Office Work\St David's CIW Primary School, Colwinston\Junction Modelling

Report generation date: 27/02/2020 10:11:34

- »2019 Observed, AM
- »2019 Observed, IP
- »2019 Observed, PM
- »2021 Base, AM
- »2021 Base, IP
- »2021 Base, PM
- »2021 Base + Development, AM
- »2021 Base + Development, IP
- »2021 Base + Development, PM

Summary of junction performance

	AM					IP					PM				
	Set ID	Queue (PCU)	Delay (s)	RFC	LOS	Set ID	Queue (PCU)	Delay (s)	RFC	LOS	Set ID	Queue (PCU)	Delay (s)	RFC	LOS
2019 Observed															
Stream B-ACD	D1	0.0	0.00	0.00	A	D2	0.0	0.00	0.00	A	D3	0.0	0.00	0.00	A
Stream A-BCD		0.1	6.58	0.11	A		0.1	5.95	0.10	A		0.1	6.06	0.10	A
Stream D-ABC		0.1	6.62	0.11	A		0.1	6.51	0.11	A		0.1	6.45	0.06	A
Stream C-ABD		0.0	0.00	0.00	A		0.0	0.00	0.00	A		0.0	0.00	0.00	A
2021 Base															
Stream B-ACD	D4	0.0	0.00	0.00	A	D5	0.0	0.00	0.00	A	D6	0.0	0.00	0.00	A
Stream A-BCD		0.1	6.59	0.11	A		0.1	5.97	0.10	A		0.1	6.08	0.10	A
Stream D-ABC		0.1	6.65	0.11	A		0.1	6.54	0.11	A		0.1	6.45	0.07	A
Stream C-ABD		0.0	0.00	0.00	A		0.0	0.00	0.00	A		0.0	0.00	0.00	A
2021 Base + Development															
Stream B-ACD	D7	0.0	0.00	0.00	A	D8	0.0	0.00	0.00	A	D9	0.0	0.00	0.00	A
Stream A-BCD		0.2	6.94	0.15	A		0.2	6.20	0.13	A		0.1	6.08	0.10	A
Stream D-ABC		0.2	7.01	0.15	A		0.2	6.91	0.15	A		0.1	6.49	0.08	A
Stream C-ABD		0.0	0.00	0.00	A		0.0	0.00	0.00	A		0.0	0.00	0.00	A

There are warnings associated with one or more model runs - see the 'Data Errors and Warnings' tables for each Analysis or Demand Set.

Values shown are the highest values encountered over all time segments. Delay is the maximum value of average delay per arriving vehicle.

File summary

File Description

Title	Junction 2 - Unnamed Road Crossroads
Location	Colwinston, Vale of Glamorgan
Site number	
Date	11/10/2019
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Enumerator	EU\Matt.J.Parker
Description	

Units

Distance units	Speed units	Traffic units input	Traffic units results	Flow units	Average delay units	Total delay units	Rate of delay units
m	kph	PCU	PCU	perHour	s	-Min	perMin

Analysis Options

Vehicle length (m)	Calculate Queue Percentiles	Calculate detailed queueing delay	Calculate residual capacity	RFC Threshold	Average Delay threshold (s)	Queue threshold (PCU)
5.75				0.85	36.00	20.00

Demand Set Summary

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D1	2019 Observed	AM	ONE HOUR	07:45	09:15	15	✓
D2	2019 Observed	IP	ONE HOUR	15:00	16:30	15	✓
D3	2019 Observed	PM	ONE HOUR	16:45	18:15	15	✓
D4	2021 Base	AM	ONE HOUR	07:45	09:15	15	✓
D5	2021 Base	IP	ONE HOUR	15:00	16:30	15	✓
D6	2021 Base	PM	ONE HOUR	16:45	18:15	15	✓
D7	2021 Base + Development	AM	ONE HOUR	07:45	09:15	15	✓
D8	2021 Base + Development	IP	ONE HOUR	15:00	16:30	15	✓
D9	2021 Base + Development	PM	ONE HOUR	16:45	18:15	15	✓

Analysis Set Details

ID	Include in report	Network flow scaling factor (%)	Network capacity scaling factor (%)
A1	✓	100.000	100.000

2019 Observed, AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Major arm width	Arm A - Major arm geometry	For two-way major roads, please interpret results with caution if the total major carriageway width is less than 6m.
Warning	Major arm width	Arm C - Major arm geometry	For two-way major roads, please interpret results with caution if the total major carriageway width is less than 6m.

Junction Network

Junctions

Junction	Name	Junction type	Major road direction	Use circulating lanes	Junction Delay (s)	Junction LOS
1	untitled	Crossroads	Two-way		6.03	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Name	Description	Arm type
A	untitled		Major
B	untitled		Minor
C	untitled		Major
D	untitled		Minor

Major Arm Geometry

Arm	Width of carriageway (m)	Has kerbed central reserve	Has right turn bay	Visibility for right turn (m)	Blocks?	Blocking queue (PCU)
A	5.06			165.0	✓	0.00
C	5.06			150.0	✓	0.00

Geometries for Arm C are measured opposite Arm B. Geometries for Arm A (if relevant) are measured opposite Arm D.

Minor Arm Geometry

Arm	Minor arm type	Lane width (m)	Visibility to left (m)	Visibility to right (m)
B	One lane	2.53	22	10
D	One lane	2.90	17	13

Slope / Intercept / Capacity

Priority Intersection Slopes and Intercepts

Stream	Intercept (PCU/hr)	Slope for A-B	Slope for A-C	Slope for A-D	Slope for B-A	Slope for B-C	Slope for B-D	Slope for C-A	Slope for C-B	Slope for C-D	Slope for D-A	Slope for D-B	Slope for D-C
A-D	670	-	-	-	-	-	-	0.270	0.386	0.270	-	-	-
B-A	467	0.088	0.224	0.224	-	-	-	0.141	0.319	-	0.224	0.224	0.112
B-C	601	0.096	0.242	-	-	-	-	-	-	-	-	-	-
B-D, nearside lane	467	0.088	0.224	0.224	-	-	-	0.141	0.319	0.141	-	-	-
B-D, offside lane	467	0.088	0.224	0.224	-	-	-	0.141	0.319	0.141	-	-	-
C-B	661	0.267	0.267	0.381	-	-	-	-	-	-	-	-	-
D-A	626	-	-	-	-	-	-	0.252	-	0.100	-	-	-
D-B, nearside lane	485	0.146	0.146	0.332	-	-	-	0.232	0.232	0.092	-	-	-
D-B, offside lane	485	0.146	0.146	0.332	-	-	-	0.232	0.232	0.092	-	-	-
D-C	485	-	0.146	0.332	0.116	0.232	0.232	0.232	0.232	0.092	-	-	-

The slopes and intercepts shown above do NOT include any corrections or adjustments.

Streams may be combined, in which case capacity will be adjusted.

Values are shown for the first time segment only; they may differ for subsequent time segments.

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D1	2019 Observed	AM	ONE HOUR	07:45	09:15	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A		ONE HOUR	✓	65	100.000
B		ONE HOUR	✓	1	100.000
C		ONE HOUR	✓	11	100.000
D		ONE HOUR	✓	62	100.000

Origin-Destination Data

Demand (PCU/hr)

		To			
		A	B	C	D
From	A	0	1	0	64
	B	0	0	1	0
	C	10	0	0	1
	D	62	0	0	0

Vehicle Mix

Heavy Vehicle Percentages

		To			
		A	B	C	D
From	A	0	0	0	9
	B	0	0	0	0
	C	0	0	0	0
	D	2	0	0	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
B-ACD	0.00	0.00	0.0	A	0	0
A-BCD	0.11	6.58	0.1	A	59	88
A-B					0.83	1
A-C					0	0
D-ABC	0.11	6.62	0.1	A	57	85
C-ABD	0.00	0.00	0.0	A	0	0
C-D					0.92	1
C-A					9	14

Main Results for each time segment

07:45 - 08:00

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-ACD	0	0	481	0.000	0	0.0	0.0	0.000	A
A-BCD	48	12	668	0.072	48	0.0	0.1	6.327	A
A-B	0.70	0.17			0.70				
A-C	0	0			0				
D-ABC	47	12	624	0.075	46	0.0	0.1	6.356	A
C-ABD	0	0	642	0.000	0	0.0	0.0	0.000	A
C-D	0.75	0.19			0.75				
C-A	8	2			8				

08:00 - 08:15

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-ACD	0	0	478	0.000	0	0.0	0.0	0.000	A
A-BCD	58	14	667	0.086	58	0.1	0.1	6.433	A
A-B	0.82	0.21			0.82				
A-C	0	0			0				
D-ABC	56	14	623	0.089	56	0.1	0.1	6.467	A
C-ABD	0	0	639	0.000	0	0.0	0.0	0.000	A
C-D	0.90	0.22			0.90				
C-A	9	2			9				

08:15 - 08:30

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-ACD	0	0	475	0.000	0	0.0	0.0	0.000	A
A-BCD	71	18	667	0.106	70	0.1	0.1	6.578	A
A-B	0.98	0.25			0.98				
A-C	0	0			0				
D-ABC	68	17	623	0.110	68	0.1	0.1	6.619	A
C-ABD	0	0	634	0.000	0	0.0	0.0	0.000	A
C-D	1	0.28			1				
C-A	11	3			11				

08:30 - 08:45

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-ACD	0	0	475	0.000	0	0.0	0.0	0.000	A
A-BCD	71	18	667	0.106	71	0.1	0.1	6.578	A
A-B	0.98	0.25			0.98				
A-C	0	0			0				
D-ABC	68	17	623	0.110	68	0.1	0.1	6.619	A
C-ABD	0	0	634	0.000	0	0.0	0.0	0.000	A
C-D	1	0.28			1				
C-A	11	3			11				

08:45 - 09:00

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-ACD	0	0	478	0.000	0	0.0	0.0	0.000	A
A-BCD	58	14	667	0.086	58	0.1	0.1	6.437	A
A-B	0.82	0.21			0.82				
A-C	0	0			0				
D-ABC	56	14	623	0.089	56	0.1	0.1	6.469	A
C-ABD	0	0	638	0.000	0	0.0	0.0	0.000	A
C-D	0.90	0.22			0.90				
C-A	9	2			9				

09:00 - 09:15

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-ACD	0	0	481	0.000	0	0.0	0.0	0.000	A
A-BCD	48	12	668	0.072	48	0.1	0.1	6.334	A
A-B	0.70	0.17			0.70				
A-C	0	0			0				
D-ABC	47	12	624	0.075	47	0.1	0.1	6.365	A
C-ABD	0	0	642	0.000	0	0.0	0.0	0.000	A
C-D	0.75	0.19			0.75				
C-A	8	2			8				

2019 Observed, IP

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Major arm width	Arm A - Major arm geometry	For two-way major roads, please interpret results with caution if the total major carriageway width is less than 6m.
Warning	Major arm width	Arm C - Major arm geometry	For two-way major roads, please interpret results with caution if the total major carriageway width is less than 6m.

Junction Network

Junctions

Junction	Name	Junction type	Major road direction	Use circulating lanes	Junction Delay (s)	Junction LOS
1	untitled	Crossroads	Two-way		5.53	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D2	2019 Observed	IP	ONE HOUR	15:00	16:30	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A		ONE HOUR	✓	67	100.000
B		ONE HOUR	✓	1	100.000
C		ONE HOUR	✓	9	100.000
D		ONE HOUR	✓	61	100.000

Origin-Destination Data

Demand (PCU/hr)

		To			
		A	B	C	D
From	A	0	1	6	60
	B	0	0	0	1
	C	7	0	0	2
	D	60	0	1	0

Vehicle Mix

Heavy Vehicle Percentages

		To			
		A	B	C	D
From	A	0	0	0	0
	B	0	0	0	0
	C	0	0	0	100
	D	0	0	0	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
B-ACD	0.00	0.00	0.0	A	0	0
A-BCD	0.10	5.95	0.1	A	56	83
A-B					0.84	1
A-C					5	8
D-ABC	0.11	6.51	0.1	A	56	84
C-ABD	0.00	0.00	0.0	A	0	0
C-D					2	3
C-A					6	10

Main Results for each time segment

15:00 - 15:15

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-ACD	0	0	481	0.000	0	0.0	0.0	0.000	A
A-BCD	46	11	671	0.068	45	0.0	0.1	5.750	A
A-B	0.70	0.18			0.70				
A-C	4	1			4				
D-ABC	46	11	621	0.074	46	0.0	0.1	6.255	A
C-ABD	0	0	642	0.000	0	0.0	0.0	0.000	A
C-D	2	0.38			2				
C-A	5	1			5				

15:15 - 15:30

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-ACD	0	0	478	0.000	0	0.0	0.0	0.000	A
A-BCD	54	14	671	0.081	54	0.1	0.1	5.835	A
A-B	0.83	0.21			0.83				
A-C	5	1			5				
D-ABC	55	14	621	0.088	55	0.1	0.1	6.363	A
C-ABD	0	0	639	0.000	0	0.0	0.0	0.000	A
C-D	2	0.45			2				
C-A	6	2			6				

15:30 - 15:45

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-ACD	0	0	475	0.000	0	0.0	0.0	0.000	A
A-BCD	67	17	672	0.100	67	0.1	0.1	5.951	A
A-B	0.99	0.25			0.99				
A-C	6	1			6				
D-ABC	67	17	620	0.108	67	0.1	0.1	6.511	A
C-ABD	0	0	633	0.000	0	0.0	0.0	0.000	A
C-D	2	0.55			2				
C-A	8	2			8				

15:45 - 16:00

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-ACD	0	0	475	0.000	0	0.0	0.0	0.000	A
A-BCD	67	17	672	0.100	67	0.1	0.1	5.951	A
A-B	0.99	0.25			0.99				
A-C	6	1			6				
D-ABC	67	17	620	0.108	67	0.1	0.1	6.511	A
C-ABD	0	0	633	0.000	0	0.0	0.0	0.000	A
C-D	2	0.55			2				
C-A	8	2			8				

16:00 - 16:15

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-ACD	0	0	478	0.000	0	0.0	0.0	0.000	A
A-BCD	54	14	671	0.081	55	0.1	0.1	5.837	A
A-B	0.83	0.21			0.83				
A-C	5	1			5				
D-ABC	55	14	621	0.088	55	0.1	0.1	6.365	A
C-ABD	0	0	638	0.000	0	0.0	0.0	0.000	A
C-D	2	0.45			2				
C-A	6	2			6				

16:15 - 16:30

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-ACD	0	0	481	0.000	0	0.0	0.0	0.000	A
A-BCD	46	11	671	0.068	46	0.1	0.1	5.758	A
A-B	0.70	0.18			0.70				
A-C	4	1			4				
D-ABC	46	11	621	0.074	46	0.1	0.1	6.264	A
C-ABD	0	0	642	0.000	0	0.0	0.0	0.000	A
C-D	2	0.38			2				
C-A	5	1			5				

2019 Observed, PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Major arm width	Arm A - Major arm geometry	For two-way major roads, please interpret results with caution if the total major carriageway width is less than 6m.
Warning	Major arm width	Arm C - Major arm geometry	For two-way major roads, please interpret results with caution if the total major carriageway width is less than 6m.

Junction Network

Junctions

Junction	Name	Junction type	Major road direction	Use circulating lanes	Junction Delay (s)	Junction LOS
1	untitled	Crossroads	Two-way		5.92	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D3	2019 Observed	PM	ONE HOUR	16:45	18:15	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A		ONE HOUR	✓	65	100.000
B		ONE HOUR	✓	3	100.000
C		ONE HOUR	✓	4	100.000
D		ONE HOUR	✓	36	100.000

Origin-Destination Data

Demand (PCU/hr)

		To			
		A	B	C	D
From	A	0	1	4	60
	B	1	0	0	2
	C	3	0	0	1
	D	34	2	0	0

Vehicle Mix

Heavy Vehicle Percentages

From	To			
	A	B	C	D
A	0	0	0	2
B	0	0	0	0
C	0	0	0	0
D	0	100	0	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
B-ACD	0.00	0.00	0.0	A	0	0
A-BCD	0.10	6.06	0.1	A	55	83
A-B					0.84	1
A-C					3	5
D-ABC	0.06	6.45	0.1	A	33	50
C-ABD	0.00	0.00	0.0	A	0	0
C-D					0	0
C-A					0	0

Main Results for each time segment

16:45 - 17:00

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-ACD	0	0	483	0.000	0	0.0	0.0	0.000	A
A-BCD	45	11	672	0.068	45	0.0	0.1	5.855	A
A-B	0.70	0.18			0.70				
A-C	3	0.70			3				
D-ABC	27	7	614	0.044	27	0.0	0.0	6.301	A
C-ABD	0	0	643	0.000	0	0.0	0.0	0.000	A
C-D	0	0			0				
C-A	0	0			0				

17:00 - 17:15

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-ACD	0	0	481	0.000	0	0.0	0.0	0.000	A
A-BCD	54	14	672	0.081	54	0.1	0.1	5.940	A
A-B	0.83	0.21			0.83				
A-C	3	0.83			3				
D-ABC	32	8	614	0.053	32	0.0	0.1	6.364	A
C-ABD	0	0	639	0.000	0	0.0	0.0	0.000	A
C-D	0	0			0				
C-A	0	0			0				

17:15 - 17:30

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-ACD	0	0	478	0.000	0	0.0	0.0	0.000	A
A-BCD	67	17	673	0.099	67	0.1	0.1	6.054	A
A-B	0.99	0.25			0.99				
A-C	4	0.99			4				
D-ABC	40	10	614	0.065	40	0.1	0.1	6.449	A
C-ABD	0	0	634	0.000	0	0.0	0.0	0.000	A
C-D	0	0			0				
C-A	0	0			0				

17:30 - 17:45

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-ACD	0	0	478	0.000	0	0.0	0.0	0.000	A
A-BCD	67	17	673	0.099	67	0.1	0.1	6.056	A
A-B	0.99	0.25			0.99				
A-C	4	0.99			4				
D-ABC	40	10	614	0.065	40	0.1	0.1	6.449	A
C-ABD	0	0	634	0.000	0	0.0	0.0	0.000	A
C-D	0	0			0				
C-A	0	0			0				

17:45 - 18:00

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-ACD	0	0	481	0.000	0	0.0	0.0	0.000	A
A-BCD	54	14	672	0.081	54	0.1	0.1	5.941	A
A-B	0.83	0.21			0.83				
A-C	3	0.83			3				
D-ABC	32	8	614	0.053	32	0.1	0.1	6.365	A
C-ABD	0	0	639	0.000	0	0.0	0.0	0.000	A
C-D	0	0			0				
C-A	0	0			0				

18:00 - 18:15

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-ACD	0	0	483	0.000	0	0.0	0.0	0.000	A
A-BCD	45	11	672	0.068	45	0.1	0.1	5.863	A
A-B	0.70	0.18			0.70				
A-C	3	0.70			3				
D-ABC	27	7	614	0.044	27	0.1	0.0	6.307	A
C-ABD	0	0	642	0.000	0	0.0	0.0	0.000	A
C-D	0	0			0				
C-A	0	0			0				

2021 Base, AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Major arm width	Arm A - Major arm geometry	For two-way major roads, please interpret results with caution if the total major carriageway width is less than 6m.
Warning	Major arm width	Arm C - Major arm geometry	For two-way major roads, please interpret results with caution if the total major carriageway width is less than 6m.

Junction Network

Junctions

Junction	Name	Junction type	Major road direction	Use circulating lanes	Junction Delay (s)	Junction LOS
1	untitled	Crossroads	Two-way		6.06	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D4	2021 Base	AM	ONE HOUR	07:45	09:15	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A		ONE HOUR	✓	66	100.000
B		ONE HOUR	✓	1	100.000
C		ONE HOUR	✓	11	100.000
D		ONE HOUR	✓	64	100.000

Origin-Destination Data

Demand (PCU/hr)

		To			
		A	B	C	D
From	A	0	1	0	65
	B	0	0	1	0
	C	10	0	0	1
	D	64	0	0	0

Vehicle Mix

Heavy Vehicle Percentages

From	To			
	A	B	C	D
A	0	0	0	9
B	0	0	0	0
C	0	0	0	0
D	2	0	0	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
B-ACD	0.00	0.00	0.0	A	0	0
A-BCD	0.11	6.59	0.1	A	60	90
A-B					0.83	1
A-C					0	0
D-ABC	0.11	6.65	0.1	A	59	88
C-ABD	0.00	0.00	0.0	A	0	0
C-D					0.92	1
C-A					9	14

Main Results for each time segment

07:45 - 08:00

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-ACD	0	0	481	0.000	0	0.0	0.0	0.000	A
A-BCD	49	12	668	0.073	49	0.0	0.1	6.335	A
A-B	0.70	0.17			0.70				
A-C	0	0			0				
D-ABC	48	12	624	0.077	48	0.0	0.1	6.373	A
C-ABD	0	0	642	0.000	0	0.0	0.0	0.000	A
C-D	0.75	0.19			0.75				
C-A	8	2			8				

08:00 - 08:15

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-ACD	0	0	478	0.000	0	0.0	0.0	0.000	A
A-BCD	59	15	667	0.088	58	0.1	0.1	6.442	A
A-B	0.82	0.20			0.82				
A-C	0	0			0				
D-ABC	58	14	623	0.092	57	0.1	0.1	6.488	A
C-ABD	0	0	638	0.000	0	0.0	0.0	0.000	A
C-D	0.90	0.22			0.90				
C-A	9	2			9				

08:15 - 08:30

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-ACD	0	0	474	0.000	0	0.0	0.0	0.000	A
A-BCD	72	18	667	0.107	72	0.1	0.1	6.590	A
A-B	0.98	0.25			0.98				
A-C	0	0			0				
D-ABC	70	18	623	0.113	70	0.1	0.1	6.646	A
C-ABD	0	0	633	0.000	0	0.0	0.0	0.000	A
C-D	1	0.28			1				
C-A	11	3			11				

08:30 - 08:45

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-ACD	0	0	474	0.000	0	0.0	0.0	0.000	A
A-BCD	72	18	667	0.107	72	0.1	0.1	6.590	A
A-B	0.98	0.25			0.98				
A-C	0	0			0				
D-ABC	70	18	623	0.113	70	0.1	0.1	6.646	A
C-ABD	0	0	633	0.000	0	0.0	0.0	0.000	A
C-D	1	0.28			1				
C-A	11	3			11				

08:45 - 09:00

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-ACD	0	0	478	0.000	0	0.0	0.0	0.000	A
A-BCD	59	15	667	0.088	59	0.1	0.1	6.444	A
A-B	0.82	0.20			0.82				
A-C	0	0			0				
D-ABC	58	14	623	0.092	58	0.1	0.1	6.492	A
C-ABD	0	0	638	0.000	0	0.0	0.0	0.000	A
C-D	0.90	0.22			0.90				
C-A	9	2			9				

09:00 - 09:15

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-ACD	0	0	481	0.000	0	0.0	0.0	0.000	A
A-BCD	49	12	668	0.073	49	0.1	0.1	6.341	A
A-B	0.70	0.17			0.70				
A-C	0	0			0				
D-ABC	48	12	624	0.077	48	0.1	0.1	6.382	A
C-ABD	0	0	642	0.000	0	0.0	0.0	0.000	A
C-D	0.75	0.19			0.75				
C-A	8	2			8				

2021 Base, IP

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Major arm width	Arm A - Major arm geometry	For two-way major roads, please interpret results with caution if the total major carriageway width is less than 6m.
Warning	Major arm width	Arm C - Major arm geometry	For two-way major roads, please interpret results with caution if the total major carriageway width is less than 6m.

Junction Network

Junctions

Junction	Name	Junction type	Major road direction	Use circulating lanes	Junction Delay (s)	Junction LOS
1	untitled	Crossroads	Two-way		5.57	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D5	2021 Base	IP	ONE HOUR	15:00	16:30	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A		ONE HOUR	✓	69	100.000
B		ONE HOUR	✓	1	100.000
C		ONE HOUR	✓	9	100.000
D		ONE HOUR	✓	63	100.000

Origin-Destination Data

Demand (PCU/hr)

		To			
		A	B	C	D
From	A	0	1	6	62
	B	0	0	0	1
	C	7	0	0	2
	D	62	0	1	0

Vehicle Mix

Heavy Vehicle Percentages

From	To			
	A	B	C	D
A	0	0	0	0
B	0	0	0	0
C	0	0	0	100
D	0	0	0	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
B-ACD	0.00	0.00	0.0	A	0	0
A-BCD	0.10	5.97	0.1	A	57	86
A-B					0.84	1
A-C					5	8
D-ABC	0.11	6.54	0.1	A	58	87
C-ABD	0.00	0.00	0.0	A	0	0
C-D					2	3
C-A					6	10

Main Results for each time segment

15:00 - 15:15

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-ACD	0	0	480	0.000	0	0.0	0.0	0.000	A
A-BCD	47	12	671	0.070	47	0.0	0.1	5.764	A
A-B	0.70	0.18			0.70				
A-C	4	1			4				
D-ABC	47	12	621	0.076	47	0.0	0.1	6.270	A
C-ABD	0	0	642	0.000	0	0.0	0.0	0.000	A
C-D	2	0.38			2				
C-A	5	1			5				

15:15 - 15:30

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-ACD	0	0	478	0.000	0	0.0	0.0	0.000	A
A-BCD	56	14	671	0.084	56	0.1	0.1	5.852	A
A-B	0.82	0.21			0.82				
A-C	5	1			5				
D-ABC	57	14	621	0.091	57	0.1	0.1	6.382	A
C-ABD	0	0	638	0.000	0	0.0	0.0	0.000	A
C-D	2	0.45			2				
C-A	6	2			6				

15:30 - 15:45

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-ACD	0	0	474	0.000	0	0.0	0.0	0.000	A
A-BCD	69	17	672	0.103	69	0.1	0.1	5.973	A
A-B	0.99	0.25			0.99				
A-C	6	1			6				
D-ABC	69	17	620	0.112	69	0.1	0.1	6.536	A
C-ABD	0	0	633	0.000	0	0.0	0.0	0.000	A
C-D	2	0.55			2				
C-A	8	2			8				

15:45 - 16:00

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-ACD	0	0	474	0.000	0	0.0	0.0	0.000	A
A-BCD	69	17	672	0.103	69	0.1	0.1	5.973	A
A-B	0.99	0.25			0.99				
A-C	6	1			6				
D-ABC	69	17	620	0.112	69	0.1	0.1	6.536	A
C-ABD	0	0	633	0.000	0	0.0	0.0	0.000	A
C-D	2	0.55			2				
C-A	8	2			8				

16:00 - 16:15

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-ACD	0	0	478	0.000	0	0.0	0.0	0.000	A
A-BCD	56	14	671	0.084	56	0.1	0.1	5.854	A
A-B	0.82	0.21			0.82				
A-C	5	1			5				
D-ABC	57	14	621	0.091	57	0.1	0.1	6.387	A
C-ABD	0	0	638	0.000	0	0.0	0.0	0.000	A
C-D	2	0.45			2				
C-A	6	2			6				

16:15 - 16:30

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-ACD	0	0	480	0.000	0	0.0	0.0	0.000	A
A-BCD	47	12	671	0.070	47	0.1	0.1	5.772	A
A-B	0.70	0.17			0.70				
A-C	4	1			4				
D-ABC	47	12	621	0.076	48	0.1	0.1	6.277	A
C-ABD	0	0	642	0.000	0	0.0	0.0	0.000	A
C-D	2	0.38			2				
C-A	5	1			5				

2021 Base, PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Major arm width	Arm A - Major arm geometry	For two-way major roads, please interpret results with caution if the total major carriageway width is less than 6m.
Warning	Major arm width	Arm C - Major arm geometry	For two-way major roads, please interpret results with caution if the total major carriageway width is less than 6m.

Junction Network

Junctions

Junction	Name	Junction type	Major road direction	Use circulating lanes	Junction Delay (s)	Junction LOS
1	untitled	Crossroads	Two-way		5.95	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D6	2021 Base	PM	ONE HOUR	16:45	18:15	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A		ONE HOUR	✓	67	100.000
B		ONE HOUR	✓	3	100.000
C		ONE HOUR	✓	4	100.000
D		ONE HOUR	✓	37	100.000

Origin-Destination Data

Demand (PCU/hr)

		To			
		A	B	C	D
From	A	0	1	4	62
	B	1	0	0	2
	C	3	0	0	1
	D	35	2	0	0

Vehicle Mix

Heavy Vehicle Percentages

From	To			
	A	B	C	D
A	0	0	0	2
B	0	0	0	0
C	0	0	0	0
D	0	100	0	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
B-ACD	0.00	0.00	0.0	A	0	0
A-BCD	0.10	6.08	0.1	A	57	86
A-B					0.84	1
A-C					3	5
D-ABC	0.07	6.45	0.1	A	34	51
C-ABD	0.00	0.00	0.0	A	0	0
C-D					0	0
C-A					0	0

Main Results for each time segment

16:45 - 17:00

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-ACD	0	0	483	0.000	0	0.0	0.0	0.000	A
A-BCD	47	12	672	0.070	47	0.0	0.1	5.869	A
A-B	0.70	0.18			0.70				
A-C	3	0.70			3				
D-ABC	28	7	615	0.045	28	0.0	0.0	6.302	A
C-ABD	0	0	642	0.000	0	0.0	0.0	0.000	A
C-D	0	0			0				
C-A	0	0			0				

17:00 - 17:15

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-ACD	0	0	481	0.000	0	0.0	0.0	0.000	A
A-BCD	56	14	672	0.083	56	0.1	0.1	5.957	A
A-B	0.82	0.21			0.82				
A-C	3	0.82			3				
D-ABC	33	8	614	0.054	33	0.0	0.1	6.366	A
C-ABD	0	0	638	0.000	0	0.0	0.0	0.000	A
C-D	0	0			0				
C-A	0	0			0				

17:15 - 17:30

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-ACD	0	0	477	0.000	0	0.0	0.0	0.000	A
A-BCD	69	17	673	0.102	69	0.1	0.1	6.076	A
A-B	0.99	0.25			0.99				
A-C	4	0.99			4				
D-ABC	41	10	614	0.066	41	0.1	0.1	6.454	A
C-ABD	0	0	633	0.000	0	0.0	0.0	0.000	A
C-D	0	0			0				
C-A	0	0			0				

17:30 - 17:45

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-ACD	0	0	477	0.000	0	0.0	0.0	0.000	A
A-BCD	69	17	673	0.102	69	0.1	0.1	6.078	A
A-B	0.99	0.25			0.99				
A-C	4	0.99			4				
D-ABC	41	10	614	0.066	41	0.1	0.1	6.454	A
C-ABD	0	0	633	0.000	0	0.0	0.0	0.000	A
C-D	0	0			0				
C-A	0	0			0				

17:45 - 18:00

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-ACD	0	0	480	0.000	0	0.0	0.0	0.000	A
A-BCD	56	14	672	0.083	56	0.1	0.1	5.959	A
A-B	0.82	0.21			0.82				
A-C	3	0.82			3				
D-ABC	33	8	614	0.054	33	0.1	0.1	6.370	A
C-ABD	0	0	638	0.000	0	0.0	0.0	0.000	A
C-D	0	0			0				
C-A	0	0			0				

18:00 - 18:15

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-ACD	0	0	483	0.000	0	0.0	0.0	0.000	A
A-BCD	47	12	672	0.070	47	0.1	0.1	5.875	A
A-B	0.70	0.17			0.70				
A-C	3	0.70			3				
D-ABC	28	7	615	0.045	28	0.1	0.0	6.305	A
C-ABD	0	0	642	0.000	0	0.0	0.0	0.000	A
C-D	0	0			0				
C-A	0	0			0				

2021 Base + Development, AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Major arm width	Arm A - Major arm geometry	For two-way major roads, please interpret results with caution if the total major carriageway width is less than 6m.
Warning	Major arm width	Arm C - Major arm geometry	For two-way major roads, please interpret results with caution if the total major carriageway width is less than 6m.

Junction Network

Junctions

Junction	Name	Junction type	Major road direction	Use circulating lanes	Junction Delay (s)	Junction LOS
1	untitled	Crossroads	Two-way		6.47	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D7	2021 Base + Development	AM	ONE HOUR	07:45	09:15	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A		ONE HOUR	✓	93	100.000
B		ONE HOUR	✓	1	100.000
C		ONE HOUR	✓	13	100.000
D		ONE HOUR	✓	85	100.000

Origin-Destination Data

Demand (PCU/hr)

		To				
		A	B	C	D	
From	A	0	1	0	92	
	B	0	0	1	0	
	C	10	0	0	3	
	D	83	0	2	0	

Vehicle Mix

Heavy Vehicle Percentages

From	To			
	A	B	C	D
A	0	0	0	9
B	0	0	0	0
C	0	0	0	0
D	2	0	0	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
B-ACD	0.00	0.00	0.0	A	0	0
A-BCD	0.15	6.94	0.2	A	85	127
A-B					0.80	1
A-C					0	0
D-ABC	0.15	7.01	0.2	A	78	117
C-ABD	0.00	0.00	0.0	A	0	0
C-D					3	4
C-A					9	14

Main Results for each time segment

07:45 - 08:00

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-ACD	0	0	476	0.000	0	0.0	0.0	0.000	A
A-BCD	69	17	667	0.104	69	0.0	0.1	6.550	A
A-B	0.67	0.17			0.67				
A-C	0	0			0				
D-ABC	64	16	618	0.103	64	0.0	0.1	6.608	A
C-ABD	0	0	634	0.000	0	0.0	0.0	0.000	A
C-D	2	0.56			2				
C-A	8	2			8				

08:00 - 08:15

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-ACD	0	0	472	0.000	0	0.0	0.0	0.000	A
A-BCD	83	21	667	0.124	83	0.1	0.2	6.713	A
A-B	0.79	0.20			0.79				
A-C	0	0			0				
D-ABC	76	19	618	0.124	76	0.1	0.1	6.775	A
C-ABD	0	0	629	0.000	0	0.0	0.0	0.000	A
C-D	3	0.67			3				
C-A	9	2			9				

08:15 - 08:30

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-ACD	0	0	467	0.000	0	0.0	0.0	0.000	A
A-BCD	101	25	666	0.152	101	0.2	0.2	6.942	A
A-B	0.93	0.23			0.93				
A-C	0	0			0				
D-ABC	94	23	617	0.152	93	0.1	0.2	7.008	A
C-ABD	0	0	622	0.000	0	0.0	0.0	0.000	A
C-D	3	0.83			3				
C-A	11	3			11				

08:30 - 08:45

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-ACD	0	0	467	0.000	0	0.0	0.0	0.000	A
A-BCD	101	25	666	0.152	101	0.2	0.2	6.944	A
A-B	0.93	0.23			0.93				
A-C	0	0			0				
D-ABC	94	23	617	0.152	94	0.2	0.2	7.011	A
C-ABD	0	0	622	0.000	0	0.0	0.0	0.000	A
C-D	3	0.83			3				
C-A	11	3			11				

08:45 - 09:00

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-ACD	0	0	472	0.000	0	0.0	0.0	0.000	A
A-BCD	83	21	667	0.124	83	0.2	0.2	6.722	A
A-B	0.79	0.20			0.79				
A-C	0	0			0				
D-ABC	76	19	618	0.124	77	0.2	0.1	6.784	A
C-ABD	0	0	629	0.000	0	0.0	0.0	0.000	A
C-D	3	0.67			3				
C-A	9	2			9				

09:00 - 09:15

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-ACD	0	0	476	0.000	0	0.0	0.0	0.000	A
A-BCD	69	17	667	0.104	69	0.2	0.1	6.565	A
A-B	0.67	0.17			0.67				
A-C	0	0			0				
D-ABC	64	16	618	0.103	64	0.1	0.1	6.623	A
C-ABD	0	0	634	0.000	0	0.0	0.0	0.000	A
C-D	2	0.56			2				
C-A	8	2			8				

2021 Base + Development, IP

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Major arm width	Arm A - Major arm geometry	For two-way major roads, please interpret results with caution if the total major carriageway width is less than 6m.
Warning	Major arm width	Arm C - Major arm geometry	For two-way major roads, please interpret results with caution if the total major carriageway width is less than 6m.

Junction Network

Junctions

Junction	Name	Junction type	Major road direction	Use circulating lanes	Junction Delay (s)	Junction LOS
1	untitled	Crossroads	Two-way		5.95	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D8	2021 Base + Development	IP	ONE HOUR	15:00	16:30	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A		ONE HOUR	✓	88	100.000
B		ONE HOUR	✓	1	100.000
C		ONE HOUR	✓	11	100.000
D		ONE HOUR	✓	86	100.000

Origin-Destination Data

Demand (PCU/hr)

		To				
		A	B	C	D	
From	A	0	1	6	81	
	B	0	0	0	1	
	C	7	0	0	4	
	D	83	0	3	0	

Vehicle Mix

Heavy Vehicle Percentages

From	To			
	A	B	C	D
A	0	0	0	0
B	0	0	0	0
C	0	0	0	100
D	0	0	0	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
B-ACD	0.00	0.00	0.0	A	0	0
A-BCD	0.13	6.20	0.2	A	75	113
A-B					0.81	1
A-C					5	7
D-ABC	0.15	6.91	0.2	A	79	118
C-ABD	0.00	0.00	0.0	A	0	0
C-D					4	6
C-A					6	10

Main Results for each time segment

15:00 - 15:15

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-ACD	0	0	477	0.000	0	0.0	0.0	0.000	A
A-BCD	61	15	671	0.092	61	0.0	0.1	5.902	A
A-B	0.68	0.17			0.68				
A-C	4	1			4				
D-ABC	65	16	617	0.105	64	0.0	0.1	6.512	A
C-ABD	0	0	636	0.000	0	0.0	0.0	0.000	A
C-D	3	0.75			3				
C-A	5	1			5				

15:15 - 15:30

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-ACD	0	0	473	0.000	0	0.0	0.0	0.000	A
A-BCD	74	18	671	0.110	73	0.1	0.1	6.026	A
A-B	0.80	0.20			0.80				
A-C	5	1			5				
D-ABC	77	19	616	0.126	77	0.1	0.1	6.678	A
C-ABD	0	0	631	0.000	0	0.0	0.0	0.000	A
C-D	4	0.90			4				
C-A	6	2			6				

15:30 - 15:45

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-ACD	0	0	468	0.000	0	0.0	0.0	0.000	A
A-BCD	90	23	671	0.134	90	0.1	0.2	6.194	A
A-B	0.95	0.24			0.95				
A-C	6	1			6				
D-ABC	95	24	615	0.154	95	0.1	0.2	6.912	A
C-ABD	0	0	625	0.000	0	0.0	0.0	0.000	A
C-D	4	1			4				
C-A	8	2			8				

15:45 - 16:00

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-ACD	0	0	468	0.000	0	0.0	0.0	0.000	A
A-BCD	90	23	671	0.134	90	0.2	0.2	6.196	A
A-B	0.95	0.24			0.95				
A-C	6	1			6				
D-ABC	95	24	615	0.154	95	0.2	0.2	6.914	A
C-ABD	0	0	625	0.000	0	0.0	0.0	0.000	A
C-D	4	1			4				
C-A	8	2			8				

16:00 - 16:15

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-ACD	0	0	473	0.000	0	0.0	0.0	0.000	A
A-BCD	74	18	671	0.110	74	0.2	0.1	6.031	A
A-B	0.80	0.20			0.80				
A-C	5	1			5				
D-ABC	77	19	616	0.126	77	0.2	0.1	6.687	A
C-ABD	0	0	631	0.000	0	0.0	0.0	0.000	A
C-D	4	0.90			4				
C-A	6	2			6				

16:15 - 16:30

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-ACD	0	0	476	0.000	0	0.0	0.0	0.000	A
A-BCD	61	15	671	0.092	62	0.1	0.1	5.911	A
A-B	0.68	0.17			0.68				
A-C	4	1			4				
D-ABC	65	16	617	0.105	65	0.1	0.1	6.525	A
C-ABD	0	0	636	0.000	0	0.0	0.0	0.000	A
C-D	3	0.75			3				
C-A	5	1			5				

2021 Base + Development, PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Major arm width	Arm A - Major arm geometry	For two-way major roads, please interpret results with caution if the total major carriageway width is less than 6m.
Warning	Major arm width	Arm C - Major arm geometry	For two-way major roads, please interpret results with caution if the total major carriageway width is less than 6m.

Junction Network

Junctions

Junction	Name	Junction type	Major road direction	Use circulating lanes	Junction Delay (s)	Junction LOS
1	untitled	Crossroads	Two-way		5.99	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D9	2021 Base + Development	PM	ONE HOUR	16:45	18:15	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A		ONE HOUR	✓	67	100.000
B		ONE HOUR	✓	3	100.000
C		ONE HOUR	✓	4	100.000
D		ONE HOUR	✓	43	100.000

Origin-Destination Data

Demand (PCU/hr)

		To				
		A	B	C	D	
From	A	0	1	4	62	
	B	1	0	0	2	
	C	3	0	0	1	
	D	41	2	0	0	

Vehicle Mix

Heavy Vehicle Percentages

From	To			
	A	B	C	D
A	0	0	0	2
B	0	0	0	0
C	0	0	0	0
D	0	100	0	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
B-ACD	0.00	0.00	0.0	A	0	0
A-BCD	0.10	6.08	0.1	A	57	86
A-B					0.84	1
A-C					3	5
D-ABC	0.08	6.49	0.1	A	39	59
C-ABD	0.00	0.00	0.0	A	0	0
C-D					0	0
C-A					0	0

Main Results for each time segment

16:45 - 17:00

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-ACD	0	0	483	0.000	0	0.0	0.0	0.000	A
A-BCD	47	12	672	0.070	47	0.0	0.1	5.869	A
A-B	0.70	0.18			0.70				
A-C	3	0.70			3				
D-ABC	32	8	616	0.053	32	0.0	0.1	6.311	A
C-ABD	0	0	642	0.000	0	0.0	0.0	0.000	A
C-D	0	0			0				
C-A	0	0			0				

17:00 - 17:15

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-ACD	0	0	480	0.000	0	0.0	0.0	0.000	A
A-BCD	56	14	672	0.083	56	0.1	0.1	5.957	A
A-B	0.82	0.21			0.82				
A-C	3	0.82			3				
D-ABC	39	10	616	0.063	39	0.1	0.1	6.384	A
C-ABD	0	0	638	0.000	0	0.0	0.0	0.000	A
C-D	0	0			0				
C-A	0	0			0				

17:15 - 17:30

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-ACD	0	0	477	0.000	0	0.0	0.0	0.000	A
A-BCD	69	17	673	0.102	69	0.1	0.1	6.076	A
A-B	0.99	0.25			0.99				
A-C	4	0.99			4				
D-ABC	47	12	616	0.077	47	0.1	0.1	6.485	A
C-ABD	0	0	633	0.000	0	0.0	0.0	0.000	A
C-D	0	0			0				
C-A	0	0			0				

17:30 - 17:45

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-ACD	0	0	477	0.000	0	0.0	0.0	0.000	A
A-BCD	69	17	673	0.102	69	0.1	0.1	6.078	A
A-B	0.99	0.25			0.99				
A-C	4	0.99			4				
D-ABC	47	12	616	0.077	47	0.1	0.1	6.485	A
C-ABD	0	0	633	0.000	0	0.0	0.0	0.000	A
C-D	0	0			0				
C-A	0	0			0				

17:45 - 18:00

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-ACD	0	0	480	0.000	0	0.0	0.0	0.000	A
A-BCD	56	14	672	0.083	56	0.1	0.1	5.959	A
A-B	0.82	0.21			0.82				
A-C	3	0.82			3				
D-ABC	39	10	616	0.063	39	0.1	0.1	6.388	A
C-ABD	0	0	638	0.000	0	0.0	0.0	0.000	A
C-D	0	0			0				
C-A	0	0			0				

18:00 - 18:15

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-ACD	0	0	482	0.000	0	0.0	0.0	0.000	A
A-BCD	47	12	672	0.070	47	0.1	0.1	5.875	A
A-B	0.70	0.17			0.70				
A-C	3	0.70			3				
D-ABC	32	8	616	0.053	32	0.1	0.1	6.313	A
C-ABD	0	0	642	0.000	0	0.0	0.0	0.000	A
C-D	0	0			0				
C-A	0	0			0				

