

BH0045 - Radcliffe Civic Hub Project

Method Statement for the protection of United Utilities 375mm diameter Combined Sewer laid within the site boundary.

1. Introduction

This document has been prepared in response to Planning Condition 9

No development, other than site clearance, demolition, remediation or ground works, shall commence unless or until details of the means of ensuring the 375mm combined water sewer that is laid within the site boundary is protected from damage as a result of the development have been submitted to and approved by the Local Planning Authority in writing. The details shall outline the potential impacts from construction activities and the impacts post completion of the development on the 375mm combined water sewer that crosses the site and identify mitigation measures to protect and prevent any damage to the water main both during construction and post completion of the development. Any mitigation measures shall be implemented in full in accordance with the approved details.

2. Combined Sewer Location

We have consulted the United Utilities Sewer Map, and also undertaken a GPR survey in order to locate all below ground services, including the sewers. The results of the GPR survey correlate well with the UU Infrastructure map. Furthermore, we have undertaken a full CCTV Sewer Condition Survey of all drains and sewers within the site boundary.

The records information, correlates with the CCTV survey and on site observations. As a result we know with a high degree of accuracy the position and depth of the 375mm combined water sewer that is to be protected.

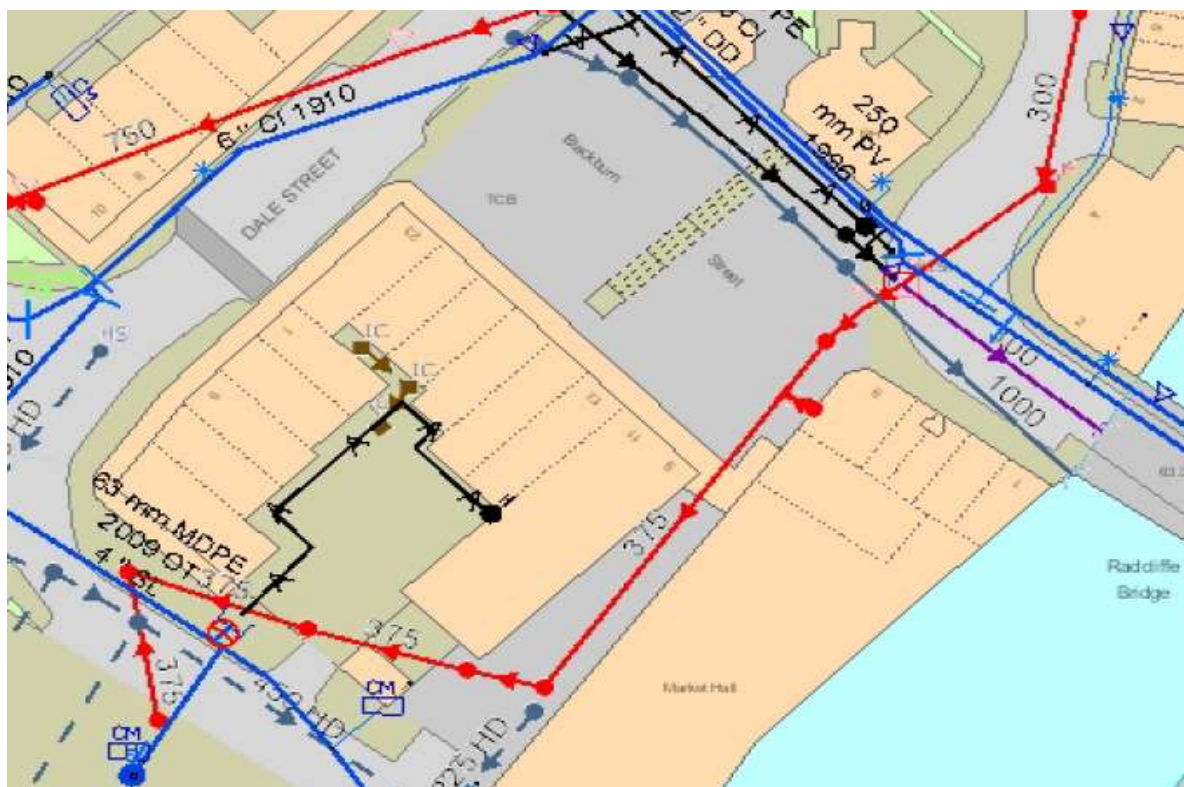


Fig 1 Extract from United Utilities Map for Safe Dig

We have taken the information from these record drawings and surveys, and overlaid on to a site plan to aid the identification of zones that may be affected by the proposed development. (see over)

With the position of the water mains laid on to the site plan, we consider there are 3 key areas to be considered;

Area 1 Vehicle Crossover of the 375mm sewer (Gate 1)

Area 2 Works above the 375mm combined sewer

Area 3 Works above the 375mm combined sewer

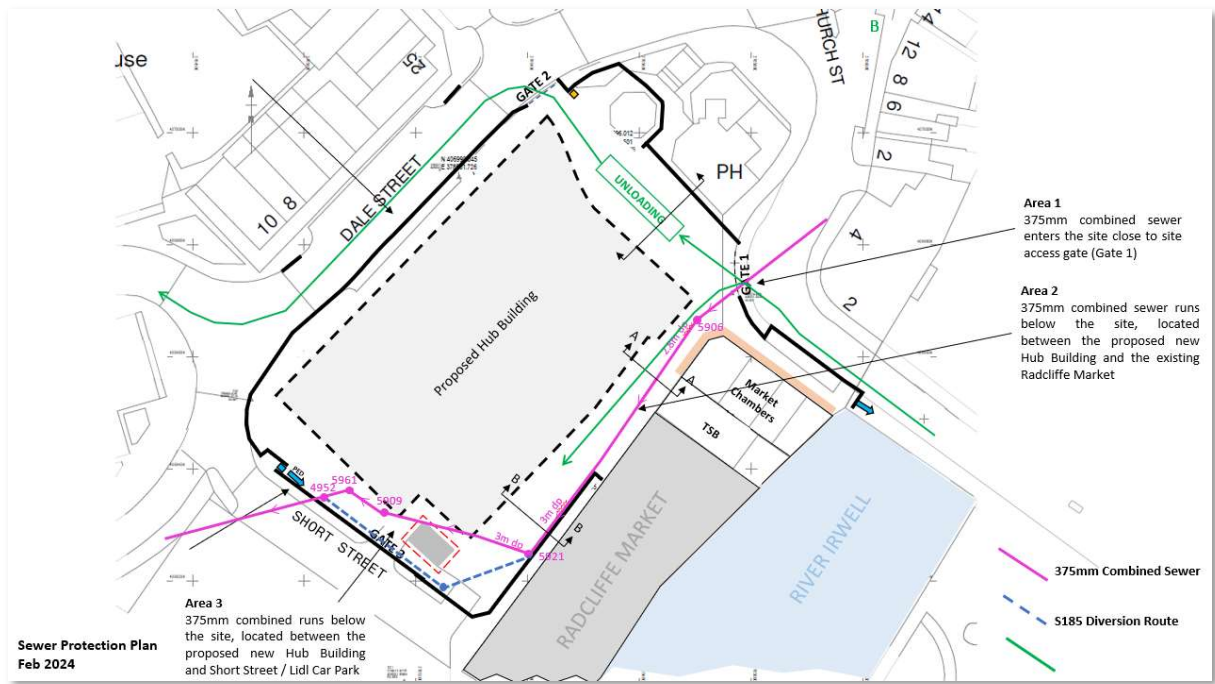


Fig 2 Site plan with combined sewer location shown

3. Combined Sewer Condition

During the pre-construction phase of this project we commissioned Lanes for Drains to undertake a CCTV condition survey of the sewer system passing below the site.

Below is a summary of condition of the 375mm combined sewer passing through the site.

MH 5906 > MH 5905

Survey Length = **8.46m**

Pipe Diameter = **375mm**

Asset Material = **Vitrified Clay**

Structural Defects				
STR No. Def	STR Peak	STR Mean	STR Total	STR Grade
0	0.0	0.0	0.0	1.0

Service & Operational Observations				
STR No. Def	STR Peak	STR Mean	STR Total	STR Grade
1	2.0	0.0	18.0	3.0

The report identifies no structural defects, but does identify some serviceability issues such as some standing water (10% of vertical dimension), and some settled deposits with 15% cross sectional area loss in 2 locations.

Refer to photos below;



0.4m – Water level at 10%



41.89m – Settled deposits, 15% cross sectional area

MH 5921 > MH 5906

Survey Length = **49.75m**

Pipe Diameter = **375mm**

Asset Material = **Vitrified Clay**

Structural Defects				
STR No. Def	STR Peak	STR Mean	STR Total	STR Grade
0	0.0	0.0	0.0	1.0

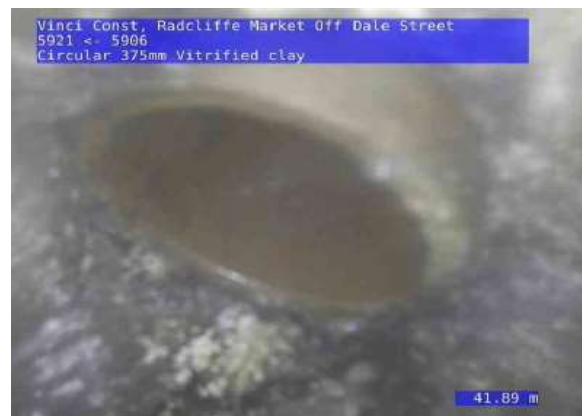
Service & Operational Observations				
STR No. Def	STR Peak	STR Mean	STR Total	STR Grade
2	5.0	0.0	7.0	4.0

The report identifies no structural defect, but does note some serviceability issues such as some standing water (10% of vertical dimension), one defective connection, and some hard/compacted settled deposits, with 15% cross sectional area loss.

Refer to photos below:



0.0m – Water level at 10%



41.89m – Intruding connection of 150mm pipe



46.86 – Hard or compacted settled deposits

MH 5921 > MH 5911

Survey Length = **5.90m**

Pipe Diameter = **375mm**

Asset Material = **Vitrified Clay**

Structural Defects				
STR No. Def	STR Peak	STR Mean	STR Total	STR Grade
0	0.0	0.0	0.0	1.0
Service & Operational Observations				
STR No. Def	STR Peak	STR Mean	STR Total	STR Grade
1	2.0	0.0	2.0	3.0

The report identifies no structural defects, but does note some serviceability issues such as some standing water (15% of vertical dimension), and some attached deposits, with 15% cross sectional area loss.

Refer to photos below:



0.4m – Water level at 15%



5.18 – attached deposits (encrustation)

MH 5911 > MH 5909

Survey Length = **30.03m**

Pipe Diameter = **375mm**

Asset Material = **Vitrified Clay**

Structural Defects				
STR No. Def	STR Peak	STR Mean	STR Total	STR Grade
0	0.0	0.0	0.0	1.0
Service & Operational Observations				
STR No. Def	STR Peak	STR Mean	STR Total	STR Grade
0	2.0	0.0	20.0	3.0

The report identifies no structural defects, but does note some serviceability issues such as some standing water (10% of vertical dimension), and some attached deposits, with 20% cross sectional area loss.

Refer to photos below:



0.0m – Water level at 10%



16.98m – defective connection (part blocked)



20.06m – Encrustacion (20% cross section loss)



30.02m – Encrustacion (20% cross section loss)

MH 5961 > MH 5909

No record

MH 59615 > MH 4907 (4955)

Survey Length = **0.4m**

Pipe Diameter = **375mm**

Asset Material = **Vitrified Clay**

Structural Defects				
STR No. Def	STR Peak	STR Mean	STR Total	STR Grade
0	0.0	0.0	0.0	1.0
Service & Operational Observations				
STR No. Def	STR Peak	STR Mean	STR Total	STR Grade
0	8.0	0.0	8.0	4.0

The report identifies no structural defects, but does note serviceability issues such as standing water (60% of vertical dimension), and some attached deposits, with 60% cross sectional area loss. The survey could not be continued at that time.

Whilst the condition survey identified several serviceability issues, it found no structural defects within any of the pipe sections laid within the site.

4. Description of works and mitigation measures

In order to facilitate the construction of the new Radcliffe Civic Hub project a wide variety of construction activities will take place. It is noted however, that the 375mm combined water sewer is laid within the site boundary, but at a considerable depth. Our surveys have determined that the sewer is also in good structural condition.

Area 1

The 375mm combined sewer enters the site close to our Gate 1. In front of the gate is UU MH5905. This is located within the existing public highways, and appears to be of carriage way construction standard. At the point where construction deliveries physically pass over the water main, this too is in an area constructed to carriageway standard. So given the depth of the pipe, the robustness of the pavement construction above it, and the fact it is in good structural condition, we propose no further mitigations are required in order to prevent damage to the pipe at this location.

Area 2

The 375mm combined sewer located within the site in area 2 is at a depth ranging between 2.8m – 3.0m deep. Its position is approximately 3.4m in front of the existing Radcliffe Market, and approximately 7.5m from the southern elevation of the proposed new Civic Hub building. (*although this varies between 5m – 8.6m*)

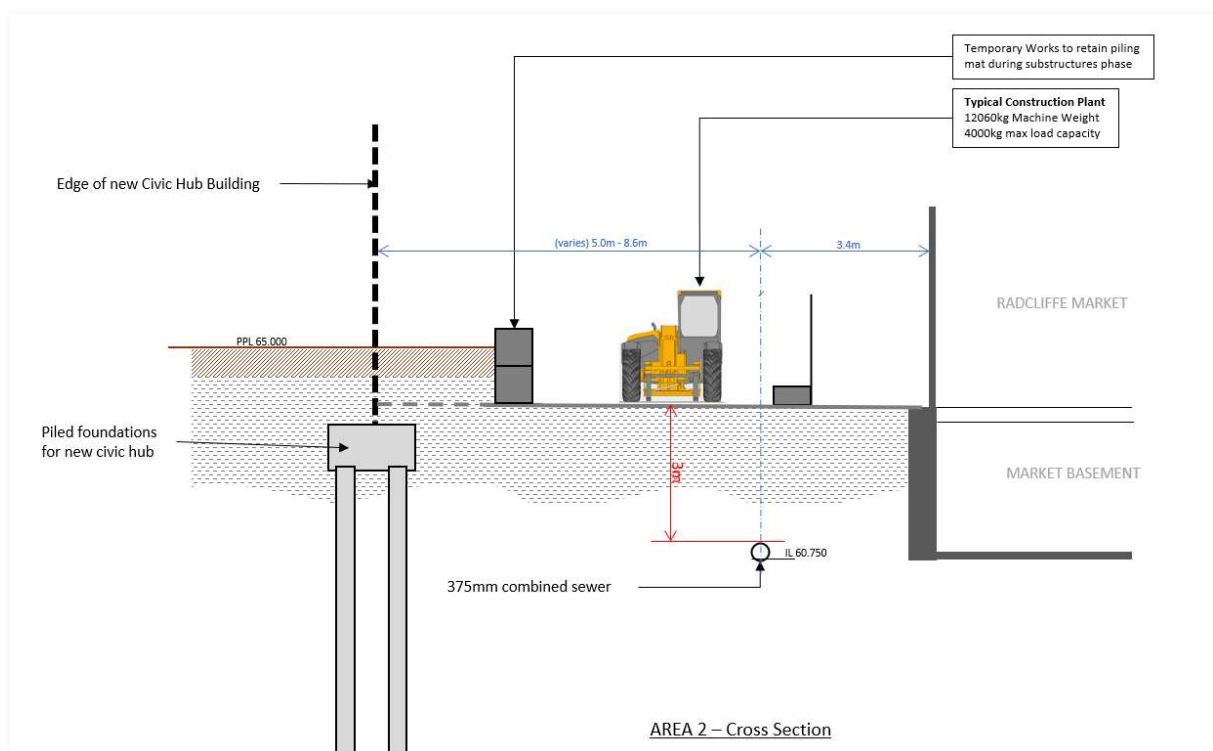
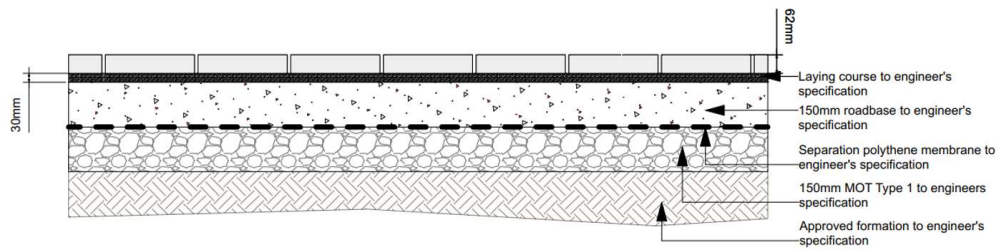


Fig 3 Typical Cross Section through Area 2

Permanent works in this area are limited to installation of new drainage to serve the new hub building (relatively shallow), and new public realm paving works. The reduced level excavation required to install the proposed new paving scheme is likely to be 400-500mm from existing surface level. At this reduced formation level, the ground cover above the crown of the 375mm combined sewer pipe will be 2.3 – 2.5m.

The paving works are limited to approx. 400mm construction depth (below existing level)



TYPICAL PAVEMENT CONSTRUCTION

Fig 4 Typical Pavement Construction

The new surface level, is almost identical to the existing level, in order to maintain tie in levels at door thresholds of the adjacent market. Upon completion of the paving, ground cover will return to 2.8m – 3.0m.

During the construction period we intend to run construction plant above, and parallel to the combined sewer pipe. We have assessed likely plant movements in this zone and anticipate a 12 tonne wheeled telehandler to be typical of the plant to be used in this location.

We have undertaken a check of the imposed load of soils above the pipe together with the impact of site traffic surcharge on the combined sewer pipe, considering conservative (worst case) assumptions. [refer to APPENDIX 1]

Design loads & schematics for a standard 12t axle are as shown in **Figure 3**.

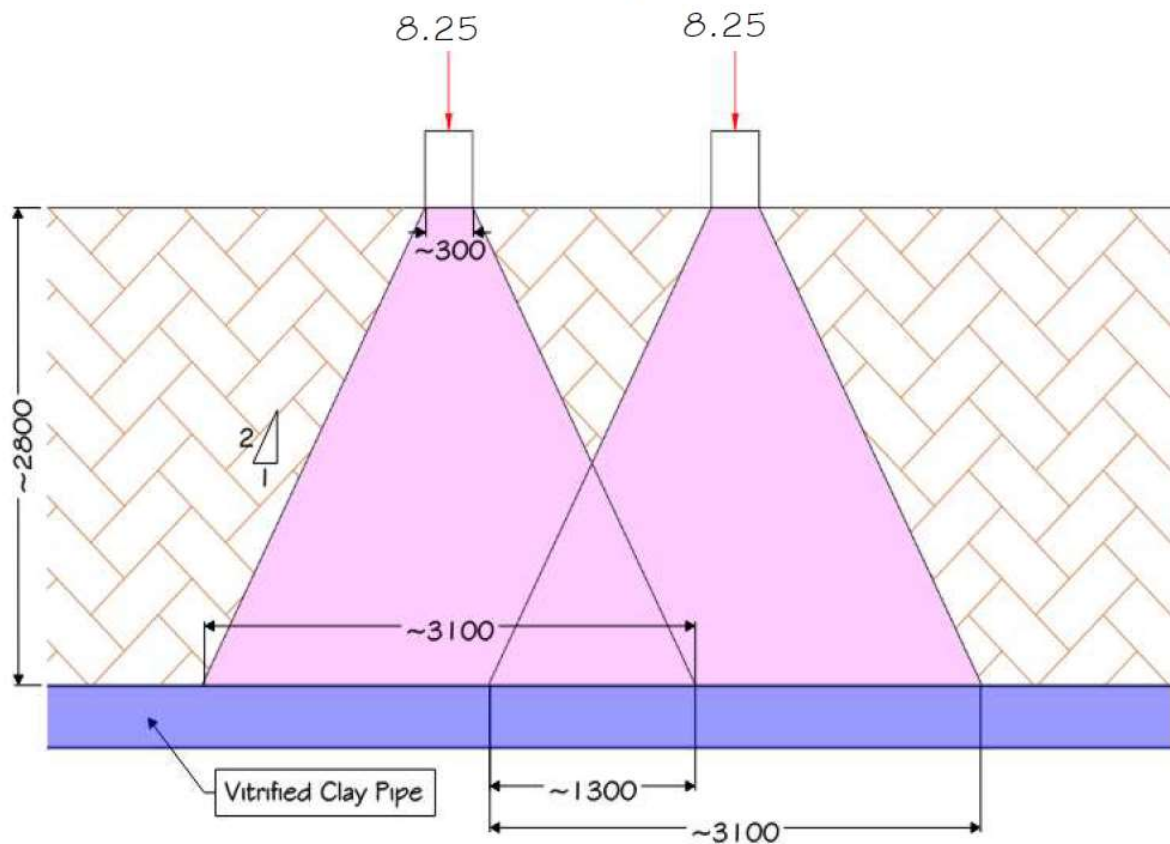


Fig 5 Loads and Spread scheme illustrated

The pipe diameter is 375mm with class D or N bedding, and strength class 120. The minimum crushing strength of the clay pipe is derived to **36.0 kN/m**

Ground investigation confirms the ground is granular made ground with gravel strata below. N SPT is measured to be 6 and 15 respectively. Using this information a spread of 2:1 (30°) is assumed.

The analysis concluded that the imposed axle load imposes 6.32kN/m and the soil imposes a dead load of 18.9kN/m giving a total load of **25.22kN/m**

Therefore as 25.22kN/m < 36.9kN/m it is concluded that the clay pipe does not require additional protection measures and is OK with the imposed surcharge load.

The additional pressure to vitrified clay pipe shall be calculated below:			
z (Depth of Cover)	2.8 m		
α (Spread Angle)	30 °		
b (Tyre Contact)	300 mm		
F,tyre (Load per Tyre)	8.25 t		
A,spread (Spread Area at Pipe Level)	9.61 m ²		
	Radcliffe Civic Hub		
S,pipe (Pressure at Pipe Level)	8.4 kPa		
	Check of Existing Services for Site Traffic Surcharge		
	As demonstrated in Figure 3, the pressure from same axle tyres overlap at pipe level at a 1.3m segment thus:		
	BH0045-VCUK-XX-XX-CA-Y-001901		
S,pipe,axel	16.84 kPa		
D (Pipe Diameter)	375 mm		
P,pipe,axel	6.32 kN/m		
γ ,soil	18 kN/m ³	Assumed for soil strata as shown in Figure 2)	
S,pipe,soil	50.4 kPa		
P,pipe,soil	18.9 kN/m	Assuming no soil arching above - conservative	
P,pipe,TOT	25.22 kN/m	<	36 kN/m (Refer to Chapter 4)

Area 3

The 375mm combined sewer located within the site in area 3 is at a depth in excess of 3.0m deep. Its position varies between the edge of the proposed new building and the site perimeter.

It sits below a likely site plant traffic route similar to area 2.

As we will be utilising the same plant in area 3 as in area 2, and the ground conditions are consistent across the site, we consider the plant surcharge assessment to be relevant at this location also.

It is noted that the line of the existing 375mm combined sewer will be diverted to avoid the proposed building and this will be subject to a full Section 185 agreement (this process has commenced)

Upon completion of the new Civic Hub development, it is intended that there will be new pedestrian footway, plus low level planting installed at the edge of the site boundary. There are no significant shrubs or trees planned so we conclude that this will pose no detriment to the sewer below.

Generally the planting is low level ornamental (Height 30 – 50cm) per the schedule below;

ORNAMENTAL	Abbreviations	Species	Common Name	Height	Pot Size	Density	Flowering
	Am	<i>Alchemilla mollis</i>	Ladys mantle	30-40cm	3L	5 per m2	
	Da	<i>Dryopteris affinis</i>	Scaly male fern	20-30cm	5L	3 per m2	
	Gp	<i>Geranium pratense</i>	Meadow Cranesbill	30-40cm	3L	5 per m2	
	Hf	<i>Heleborus foetidus</i>	Stinking hellebore	40-50cm	3L	3 per m2	
	Hs	<i>Heuchera 'Spearmint'</i>	Heuchera	30-40cm	3L	4 per m2	
	Lm	<i>Liriope muscari</i>	Lily turf	30-40cm	3L	5 per m2	
	Ln	<i>Luzula nivea</i>	Snow-white wood-rush	40-50cm	3L	5 per m2	
	Pa	<i>Persicaria affinis 'Darjeeling red'</i>	Knotweed	30-40cm	3L	5 per m2	
	So	<i>Salvia officinalis 'Purpurascens'</i>	Purple sage	30-40cm	5L	4 per m2	
	Sj	<i>Skimmia japonica 'White Globe'</i>	Skimmia	30-40cm	5L	3 per m2	
	Vd	<i>Viburnum davidii</i>	David viburnum	30-40cm	5L	3 per m2	

Fig 6 Ornamental Planting Schedule

Therefore, we conclude that there are no further protection measures required for Area 3

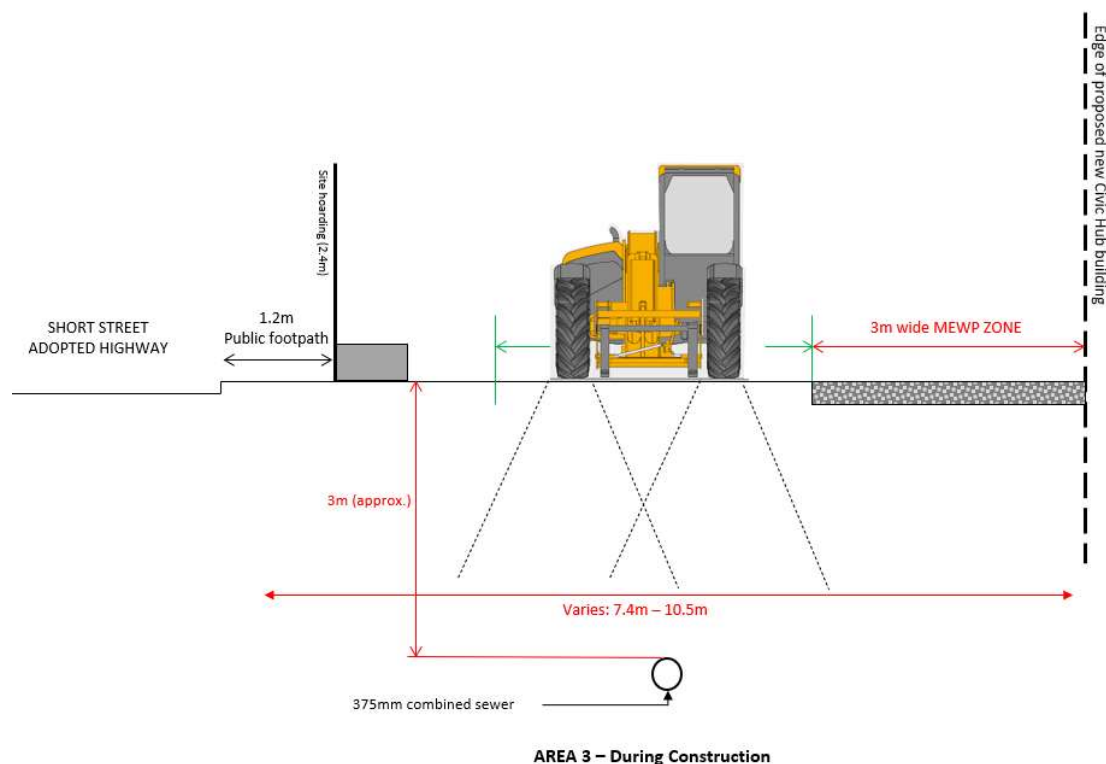


Fig 7 Typical Cross Section through Area 3

APPENDIX 1

CHECK OF EXISTING SERVICES FOR SITE TRAFFIC SURCHARGE

Prepared March 2024

VINCI Technical Services Department