



**SL06524**

**Penny Pie Park / Pogmoor Recreation Ground  
Footbridge**

**Barnsley**

**Mileage : -**

**OS Grid Ref : SE 328 064**

**FEASIBILITY STUDY**

**HBPW**  
CONSULTING ENGINEERS

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### Document Control Sheet

<b>HBPW Project No.</b>		<b>SL06524</b>
<b>Signature</b>		
<b>Prepared by</b>	<b>Name:</b>	J Livesey
	<b>Job Title:</b>	Partner
	<b>Date:</b>	21/02/2020
<b>Checked by</b>	<b>Name:</b>	A Millard
	<b>Job Title:</b>	Principal Engineer
	<b>Date:</b>	21/02/2020
<b>Approved by</b>	<b>Name:</b>	J Livesey
	<b>Job Title:</b>	Partner
	<b>Date:</b>	21/02/2020

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Prepared For	Prepared By:
Barnsley MBC Westgate Plaza One PO Box 603 Barnsley S70 9FD	HBPW LLP 43 Bridgegate Retford DN22 7UX

## 1.0 INTRODUCTION

Penny Pie Park is a Local Neighbourhood Green Space to the west of Barnsley town centre which covers an area of 4.92ha. It is bordered by Pogmoor Road to the west, Dodworth Road/A628 to the south, the Barnsley to Huddersfield rail line to the north and residential properties to the east. The park is approximately 500m to the east of Junction 37 of the M1, with Dodworth Road acting as a primary vehicular route into Barnsley town centre. See Figure 1.



**Figure 1 - Aerial plan of Penny Pie Park**

Barnsley Metropolitan Borough Council have undertaken a high level assessment of the cumulative impact of the forecast traffic in and out of Barnsley via Junction 37 of the M1 Motorway. Of particular consideration was the impact of traffic at the existing Dodworth Road / Pogmoor Road junction, adjacent to south west corner of Penny Pie Park.

The high level assessment concluded that the crossroad junction was nearing capacity and would be unlikely to accommodate the additional forecast development traffic that will be generated from current planning permissions, together with the employment and housing opportunities identified in the existing Core Strategy, and be able to operate within capacity.

Therefore a number of highway design solutions were produced which could improve the junction and after significant testing of the network layout options, Option G – a new signalised gyratory system accommodated within Penny Pie Park was chosen, see Figure 2 below. Construction is to start in 2020.

Whilst the gyratory only directly impacts Penny Pie Park, immediately to the north of the rail line lies Pogmoor Recreation Ground. This has been identified as a suitable area that could be enhanced to compensate for the loss of green space on Penny Pie Park.



**Figure 2 - Proposed Gyratory System**

As part of these enhancements, it has been proposed that a new footbridge be installed crossing the railway to provide direct access between Penny Pie Park & Pogmoor Recreation Ground. As well as improving the connectivity of these two green spaces, it will also facilitate a safer, direct access from Pogmoor to the north to Horizon Community College which is located to the south of Dodworth Road.



**Figure 3 - Proposed location of footbridge**

HBPW LLP have been commissioned by Barnsley MBC to undertake a Feasibility Study, including additional topographical survey and ground investigation, to determine the most appropriate solution for the footbridge and to provide the information to allow the detailed design to be completed.

Since the scheme does not affect the trunk road network it does not require an NMU audit as set out in HD 42/05 *Non-motorised User Audits*, however this report covers the salient points of the NMU Audit process where they are applicable.

For the purposes of this report the railway is assumed to run east – west and the new bridge north – south.



## 2.0 REMIT

The scope of work was discussed at a meeting held at Barnsley MBC offices on 18/11/2019, a summary of the main points is below:

- Feasibility to show 2/3 options for 'functional' bridge rather than 'statement' footbridge
- Feasibility to discuss differing widths to accommodate cycle route
- Bridge to allow sufficient clearance for electrification
- Bridge design to maximise pre-fabrication
- Feasibility to consider mesh canopy and lighting
- Feasibility to include drawings of proposed options & 3D visualisation of preferred option.
- Feasibility to include budget costs (+/- 30%) of options
- Ground Investigation (GI) to be undertaken to confirm foundation type
- Sufficient GI to be undertaken so as to allow foundation design without revisits
- HBPW to act as CEM & CRE for Network Rail 3<sup>rd</sup> party approvals

This report comprises the Feasibility elements described above.

## 3.0 CONSTRAINTS & IMPACT

### 3.1 HISTORY

A review of historic Ordnance Survey maps and the previous site investigation has been undertaken which show that the site has had a varied history.

The earliest OS map of 1855 shows the site to be largely unoccupied, consisting of open fields. Dodworth Road is situated in its present day location, intersected by a footpath in the position of the present day Pogmoor Road/Broadway. A sandstone quarry is shown in the south eastern corner of the site, just to the south of Dodworth Road. Adjacent to the northern site boundary is a railway line.

It is understood anecdotally that between 1861-1872 White Hill or Penny Pie Colliery was located within the site boundary, assumed to be centred around the two shafts seen on the 1891 & 1893 maps, although details of the colliery do not appear on any maps. However, the 1891 & 1893 maps show that the area of Penny Pie Park was now occupied by a brick works located next to the railway line, with a branch line from the railway line leading to the works. To the south and east of the brick works two clay pits are shown, which occupy most of the site between the brickworks and Dodworth Road to the south. A tramway is shown which connects the clay pits to the brick works. Two old shafts are also shown in the centre of the site. To the north of the railway is still shown as open fields.

The map of 1906 shows the clay pits and tramway have extended, with the tramway now shown to pass underneath Dodworth Road to a new pit in the southeast corner of the road. To the north of the railway is still shown as open fields.

The map of 1931 shows the clay pits to have extended further east and south, well beyond Dodworth Road and the tramway has been repositioned and now passes beneath Dodworth Road further west than it did previously. Several houses are shown along the south side of Dodworth Road, adjacent to the crossroads where the footpath has become West End Road until it meets the railway. To the north the present day Pogmoor Recreation Ground is now labelled as the Miners' Welfare Recreation Ground and to the west of that a drift mine is labelled as Farm House Colliery.

The 1938 map shows little change, although West End Road continues further to the north and the number of houses have increased.

The map of 1956 shows the beginning of the closure of the brickworks, with the tramway and western clay pits no longer shown on the maps. Farm House Colliery is now marked as disused.

By the 1960 map, the buildings associated with the brick works have been removed, and the portion of the site to the northeast of the crossroads appears to have been infilled, with no clay pits shown. It is understood anecdotally that the clay pits on site were backfilled with domestic waste. The two old shafts in the centre of the site are still shown, and are now labelled as disused. The branch line from the main line to the south has also been removed. In the south east corner of the site, south of Dodworth Road, disused clay pits are still shown. The entrance road into the brick works from Dodworth Road is still shown. More houses are shown to the north of the railway, but the Recreation Ground is still marked.

The 1969 map shows a filling station on the south side of Dodworth Road. To the south of this filling station, the former clay pits are labelled as a refuse tip. An electricity substation is also shown just north of the crossroads, on the east side of Pogmoor Road. The Recreation Ground is now marked as Playing Fields and have extended to the west.

The 1973 shows further residential development, but little other change. The 1978 & 1983 maps show that factories have been built on the refuse south of the filling station. A model railway is shown towards the north of Penny Pie Park with a few new buildings adjacent. The two shafts in the centre of the site are no longer shown. Both sides of the railway are labelled as Recreation Grounds. The surrounding area is now almost entirely residential.

On the 1988 map trees are shown along Pogmoor Road and Dodworth Road within Penny Pie Park. The crossroads have also been modified and enlarged slightly.

The map of 2000 no longer shows the model railway. The most recent map dated 2017 shows the filling station to have been removed and replaced with a car park which serves a school to the south.

### **3.2 SURVEY**

The topographical survey of Penny Pie Park (supplied by Barnsley MBC) was augmented with survey of Pogmoor Recreation Ground and remote survey of the rail tracks which was undertaken in November 2019. These surveys have been combined and a cross section of the railway in the location of the proposed bridge has been created and can be found in Appendix A.

Whilst the cutting slopes to the railway are reasonably good at 1:1.87 (north) / 2.07 (south), notes from the survey indicate that the cutting slopes show extensive signs of activity by rabbits, which is of particular concern in the proximity of a bridge given the ground conditions found (see Section 3.3). It is therefore recommended that as part of any construction works, the existing warrens are treated (gassed & grouted) and preventative measures installed. For ease, it is proposed that the Network Rail standard details for rabbit prevention measures are used (NR/CIV/SD/241, 242 & 243).

### **3.3 GROUND INVESTIGATION**

As discussed in Section 3.1, Penny Pie Park has been used as a colliery and brick works and has been remodelled extensively. The Pogmoor Recreation Ground has, however, had little alteration being used as agricultural fields and then Recreation Grounds.

Ground Investigation works were undertaken in Penny Pie Park in November & December 2018 as part of the development works for the gyratory. These were concentrated in the vicinity of the new road and did not extend as far as the location of the proposed footbridge.

Further investigation was therefore undertaken by Central Alliance on behalf of HBPW in December 2019. The work consisted of:

- 4 no trial trenches
- 4 no. Window Samples
- 3 no. Rotary Boreholes



The detailed results of the ground Investigation are contained in report SL06524-HBPW-xxx-DOC-C-CV-GIR (which accompanies this report) but the headline results are as follows:

- As expected, made ground is present to both sides
- Depth of made ground varies either side of the railway, approx. 4.6m to the north & 8.6m to the south
- The made ground is of particularly poor quality, particularly to the south where it appears to be poorly compacted refuse. (Note, some items were found in the made ground that would mean that any arisings would be considered to be contaminated waste.)
- To the south side, a 1.7m thick layer of cohesive weathered bedrock, a mixture of weathered, possibly reworked, mudstone & siltstone.
- The bedrock is generally weak to moderate mudstone & siltstone with a 0.4m thick coal band at approx. 22m below ground level.

The made ground is of such poor quality that the use of spread footings cannot not be recommended due to the risk from differential settlement. Whilst settlement between the north and south abutments could be accommodated (because the bridge is to be single span) there would still be risk from differential settlement within either abutment which cannot readily be accommodated. Therefore it is recommended that the bridge be founded on piles.

From the initial information received it is considered that 300Ø Continuous Flight Auger (CFA) piles would provide the most suitable solution. These are expected to need a socket of 2-3m into the mudstone to provide sufficient support.

Any areas for approach ramps to the bridge where there is a significant overburden will be at risk of future settlement due to the variability of the substrate. Therefore these areas will require some means of spreading load to mitigate against settlement. However, due to the contaminated nature of the fill it is preferable for the excavation to be minimised.

### **3.4 PLANNING & CONSENTS**

Construction of the bridge will require Planning consent through the normal process, but also will require consent from Network Rail as the new bridge will cross their property.

#### **3.4.1 Planning Consent**

Whilst not expected to be contentious as it will not overlook or affect the outlook of any residential properties, the design will need to be subject to the normal planning consent procedures. Upon completion of the feasibility stage and selection of a preferred option, a 3D visualisation of the preferred option will be produced with drawings will be submitted to the Planning Department. This process is expected to take 13 weeks to gain approval.

#### **3.4.2 Network Rail Approval**

Whilst the bridge should not impact on the railway, it will be necessary to secure consent from Network Rail for the construction of the bridge over the railway and ultimately Barnsley MBC & Network Rail will need to enter into a Basic Asset Protection Agreement (BAPA). The principal concern that will need to be addressed will be clearance to the railway. See Section 3.5.3.

Initial contact has been made with the Network Rail Third Parties team and further meetings/discussion will be required following confirmation of a preferred option.

### **3.4.3 Coal Authority Permit**

From previous studies by others in Penny Pie Park, the Dunsil Coal Seam was expected to be located at shallow depth beneath the area of the proposed footbridge. This seam is recorded to be of inferior quality and the Coal Authority Interactive Viewer indicates that this seam is not associated with probable or past shallow coal mine workings and therefore the mining risk was considered to be negligible. The ground investigation for the footbridge has proven that the coal seam is intact at a depth of 22.1m to 22.5m (0.4m thickness). As such, it is understood there are no further works required with regards to assessing the coal mining risk at the location of the proposed footbridge.

Given that coal is present at shallow depth beneath the site, should any works disturb the coal seams, permissions to enter by the Coal Authority are normally required. However given that we have proven the depth of the coal seam to be in excess of the depth of the proposed piles for the footbridge it is uncertain whether we will need the Coal Authority's permission for the works. The initial Coal Authority permit to enter for the ground investigation phase has yet to be closed out and discussions are ongoing with them to determine whether further permissions will be required for the construction (piling) phase. If permissions are required these normally take around 4 weeks to be granted.

### **3.4.4 Land Access**

Land on both sides of the railway being connected is owned by Barnsley MBC and it is not envisaged that permissions will be required from other land owners. Access to facilitate construction should be readily available from the south end through Penny Pie Park.

Access to the north will be more restricted as the football pitches are well used and are in close proximity to the proposed footbridge. Therefore works will need to be phased so as to minimise impact on the use of the pitches and the use of prefabricated sections on this side especially is considered preferable.

### **3.4.5 South Yorkshire Police Consultation**

Whilst no formal permission or consent is required, in line with the NMU audit process it is appropriate that the Police are contacted and the proposed scheme discussed with them prior to construction.

### **3.4.6 Statutory Undertakers**

A review of the Statutory Undertakers returns has been undertaken and these have been compiled onto a drawing, see Appendix A. These show that there are 2 no. Yorkshire Water services in the vicinity of the proposed bridge foundations on the north side of the railway (surface water and foul sewer). Given that the bridge will require piled foundations it will be necessary to ensure that the piles do not clash with the services.

However, the current location is based on archive records only and so cannot be considered accurate. The bridge designs proposed are flexible and the span can be adjusted to suit the exact location of the services once they have been located by Yorkshire Water.

### 3.5 BRIDGE GEOMETRY

The potential users of the bridge were discussed at the start-up meeting. It was clear that the intention is that this is to be considered principally as a footbridge rather than a cycle or equestrian bridge and therefore the standards laid out in *BD29/17 Design Criteria for Footbridges* are considered to be the primary guidance to be followed. However, whilst equestrian use is considered unlikely, the proximity of the bridge to a college, the recreation ground and the multi-use arena proposed in Penny Pie Park would mean that occasional cycle use is considered to be realistic.

#### 3.5.1 Width

BD29/17 cl. 6.3 states that the clear width of a footbridge should not be less than 2.0m. However, cl. 12.4 discusses the width required for combined footway/cycleways. None of the proposed paths in Penny Pie Park are to be segregated and therefore an unsegregated bridge is appropriate. Therefore if this were to be considered as an unsegregated combined footway/cycleway the width would need to be increased to 3.5m.

Discussions with steelwork fabricators on previous schemes has suggested that to use a bridge of 3.5m clear width incurs additional complexity and cost as transportation of a structure of this width would require a separate transport movement order. This can lead to more lead in time being required through the procurement process. The previous version of this standard, BD29/04, required only 2.0m width for an unsegregated bridge in clause 12.4.

Given that this bridge is intended to provide for occasional cycle use it is proposed that a bridge with 3.0m clear width is used as a reasonable compromise between available width and cost and maximising the use of off-site fabrication as far as possible as requested by Barnsley MBC. (This approach was used on the recently completed bridge over the railway on the Wakefield – Castleford Greenway.)

Since this bridge is being considered as a footbridge, this is not thought to constitute a derogation or deviation from standard, but should be noted in the Approval in Principle.

Notwithstanding the above, there is potentially additional funding available but this would be conditional on the bridge having 3.5m clear width. Therefore whilst this will not be shown on the options drawings, an approximate extra/over cost will be shown for the chosen option if it were to be supplied in the larger width.

#### 3.5.2 Gradient

BD29/17 cl. 6.6 states that the preferred gradient shall not exceed 1 in 20 (5%) but this can be increased to a maximum of 1 in 12 (8.3%) over short lengths where this is more appropriate or site conditions dictate. The proposed gradients varies for the differing options and is discussed in more detail in respective sections 4.1 – 4.3.

The design shall address the needs of all users, including access for wheel chairs and mobility scooters, and people with prams and buggies.

### 3.5.3 Clearance

HBPW have undertaken other work on this stretch of railway (on behalf of Network Rail) and we do not believe that there is a long term aspiration by Network Rail for this railway to be electrified. Platforms have recently been extended to facilitate new diesel rolling stock which is due to be introduced in 2020.

However, notwithstanding the above, we believe it is prudent for the proposed footbridge to be able to accommodate 'free running' overhead line equipment (i.e. without the need for it to be connected to the bridge). This should make acceptance of the proposed design simpler on behalf of Network Rail. Generally, the preferred minimum clearance on bridges over electrified lines is 6.1m which means that the bridge will not interfere with a standard overhead line system. However, with relatively simple adjustments to the overhead line systems, the clearance can be reduced to 5.7m whilst still allowing a free-running system to be installed.

Further reductions to the clearance can be discussed with Network Rail, especially since the clearance to the adjacent bridge carrying Pogmoor Road (NR ref PED2/31, owned & maintained by Barnsley MBC, Ref B5.027) is only 4.78m. Note, whilst it is possible to maintain a free-running system below 5.7m, these reduce clearance between the bridge and the electrical systems which is less preferable on a footbridge.

The existing cutting is approximately 4.2m high (above highest rail level) and therefore it will be necessary for the bridge to be raised to provide sufficient clearance. Given the current topography, it is felt that to provide 6.1m clearance would result in disproportionate additional costs and since a free running system at 5.7m is usually acceptable to Network Rail, the proposed arrangements developed allow for this clearance.

### 3.5.4 Parapets

BD29/17 requires the use of TD19/06 *Requirements for Road Restraint Systems* or PD CEN/TR16949:2019 *Road Restraint System – Pedestrian Restraint System – Pedestrian Parapets* since BS EN 1317 Part 6 has not yet been implemented. In turn, TD19/06 cl. 9.6 requires that all footbridge parapets are provided in accordance with BS 7818 *Specification for Pedestrian Restraint Systems in Metal*.

BS 7818 Table 1 suggests that a parapet height should be 1.5m over a railway (for pedestrians & cyclists).

Network Rail standards (NR/L3/CIV/020 *Design of Bridges*) also direct the designer to follow TD19/06 with regard to parapet height, however a later Letter of Instruction (NR/BS/LI/331 Iss 2) has been issued whereby parapets are to be increased 1.8m over electrified railways and where there is a '... high risk of trespass or vandalism...'. Whilst the potential for electrification is low, it is recommended that a 1.8m high solid parapet is installed, at least over the railway, to mitigate against future changes and to reduce the risk of trespass/climbing. In addition NR/L3/CIV/020 cl. 10.9 requires that the inner face is smooth, non-perforate without hand or footholds and with steep copings.

Since the bridge will extend beyond the railway boundary it may be possible to reduce the parapet height to 1.4m in accordance with TD19/06 Cl. 4.23. However it is considered that this may cause difficulties in gaining approval from Network Rail as they may still consider this to be a bridge crossing the railway and therefore it is felt more appropriate to use a 1.5m high parapet beyond the NR boundary to be consistent with their expectations/standards.

### **3.5.5 Trespass & Vandalism**

Trespass and vandalism can have a significant impact on the scheme and therefore needs to be carefully considered.

#### **3.5.5.1 Parapet Anti-climb**

TD19/06 cl. 4.28 requires the inclusion of anti climb panels to the rear face of the parapet to prevent unwanted access. The location of these needs to be detailed so as to ensure that as well as preventing access along the bridge they do not allow access from ground level beyond the panels.

The form of the anti-climb panels will vary depending on the form of construction chosen, and therefore the type and location will be discussed in Section 4.1 – 4.3.

#### **3.5.5.2 Mesh infill & canopy**

Requirements for the parapets have been detailed in section 3.5.4, but the need for mesh infill & canopy is dependent on the risk of trespass & vandalism. Since no bridge currently exists in this location it is difficult to ascertain the level of risk that will result at once the bridge has been installed. Barnsley MBC have indicated that the preference would be for the bridge to include for mesh infill and a canopy to mitigate against vandalism.

Different solutions are available depending on the form of construction used for the inclusion of mesh infill and a canopy and will be discussed for each type in Section 4.1 – 4.3.

As a canopy is to be installed then in accordance with BD29/17 cl. 8.5 a minimum headroom of 2.4m is required to accommodate pedestrians & cyclists.

It is also important to consider the aesthetics of incorporating mesh & a canopy, poor detailing can result in very poor appearance but good detailing can make a significant difference to the overall look & feel of the structure. Particularly with the bridge being in a semi-rural location it is important that the bridge does not feel imposing or unwelcoming which is especially significant with the requirement for solid, imperforate panels over the railway.





**Figure 4 - Fitzwilliam station footbridge before & after works to canopy**

### 3.5.5.3 Lighting

To minimise the risk of anti-social behaviour on the bridge Barnsley MBC have indicated that the bridge is to be lit. From BS EN 12464 Part 2:2014 *Light & lighting – Lighting of work places* we should be looking to achieve a level of 10 Lux with a uniformity of 0.25 over the bridge.

Numerous lighting solutions are available to achieve this, but there are a number of other constraints/issues that need to be considered. Firstly, since the bridge is over the railway the lights should be arranged to avoid glare to oncoming trains which could distract drivers. Secondly, given the semi-rural nature of the location it is felt to be important so as to minimise light pollution. Finally, the need for lighting on the approaches to the bridge.

A full lighting design would need to be undertaken as part of the next stage of works including the type of lights to be used, most appropriate source, cable routing etc.

## 3.6 ENVIRONMENTAL CONSTRAINTS

Whilst some trees are present in the vicinity of the bridge in Penny Pie Park, the new bridge would have very limited environmental impact. It is understood that there is much wider environmental & ecological works being undertaken as part of the new gyratory system and therefore this report has not considered them further.

However, as noted in Section 3.2, rabbit warrens are present within the vicinity of the bridge in the cutting slopes and measures will need to be put in place to remove them and to prevent rabbits re-establishing. The contamination of the fill material in Penny Pie Park as discussed in Section 3.3 should also be noted and cognisance taken in the proposed works.

## 3.7 SECURITY

The bridge is located adjacent to a residential area, but is slightly removed from the properties and therefore security during construction may be a significant issue. It is therefore recommended that the bridge is installed during the same time as the works to the gyratory when a wider security presence will be in place.

As discussed in Section 3.4.5 & 3.5.5.2, the bridge is not expected to raise any significant security issues in the long term, particularly given that the bridge is to include a mesh canopy and is to be lit.

### **3.8 PROGRAMME AND STAGING CONSIDERATIONS**

It is understood that it is considered preferable for the bridge to be installed as part of the gyratory scheme, although the works are not dependent on the wider scheme. However, given the need for piling equipment and cranes for installation the works will need to be carefully co-ordinated and controlled around the gyratory works.

Initial estimates would put the overall Contract Period as approximately 40 weeks with 20 weeks procurement & 20 weeks on site.

### **3.9 PROCUREMENT STRATEGY**

The proposed works are all of a relatively straightforward nature and therefore procurement of the works is likely to be reasonably straightforward.

It is envisaged that the scheme can either be progressed as a 'conventional' contract with all design being complete in advance and a construction only contract being let or the works could be let as a design & build contract with the contractor being responsible for the detailed design also. At this stage there is no clear advantage to either strategy and therefore procurement method will be purely down to the preference of Barnsley MBC.

### **3.10 CONSTRUCTABILITY**

The works are not expected to involve any novel construction techniques. It is envisaged that the bridge will be installed using an all-terrain mobile crane. From previous similar schemes, we would expect that a 500T crane should have sufficient capacity at the radius required. It would be preferable for a crane to be located on Penny Pie Park given that the work on the gyratory that is being undertaken there and the proximity of the football pitches on the Pogmoor side. However, ground conditions are significantly worse on that side and this may impact on the crane foundations required.

The piling rigs for piles of this size are readily available and should have minimal lead in time. Given the poor nature of the made ground they are expected to be very quick to install. The only concern with regard to the piling would be the variability of the fill and potential for obstructions, e.g. tyres etc. Therefore some flexibility over location of the piles will be necessary. In addition, as noted in Section 3.3 the fill in the made ground is likely to be considered as contaminated and therefore arisings will need to be disposed of in a licensed facility.

The bridge will obviously require closure of the rail line for installation. It should be possible to install the piles during normal working hours, but it may also be necessary for the piles to be installed in possession as the tracks may be within the collapse radius of the piling rig. Possession availability on that stretch of line is relatively straightforward and good duration possessions are available. Currently normal 'Rules of the Route' possessions are available as follows:

- Midweek 2340 – 0600
- Sat/Sun 2340 – 0930

Therefore the proximity of the railway is not likely to significantly affect construction.

### **3.11 MAINTAINABILITY**

Under the CDM 2015 regulations, the design needs to consider the future maintenance of the bridge.

The proposed deck types proposed are tried and tested and are common throughout the highway and railway networks and therefore no significant maintenance concerns are expected but some specific issues are discussed below.

#### **3.11.1 Painting**

As the bridges are to be formed from steel it is important that it is provided with suitable protective coating. It may be possible for the bridges to be formed using weathering steel to reduce the need for future painting but at the start-up meeting it was indicated that the preference was for the bridge to use conventional painted steel rather than using weathering steel.

It is suggested that following the selection of a chosen option that as part of the next stage of design a whole life costing exercise be undertaken to compare the use of painted steel and weathering steel to determine the most appropriate material.

If the bridges are not to be of weathering steel then are to be detailed to receive a coating in accordance with Highway England Specification for Highway Works Series 1900.

#### **3.11.2 Bearings**

All the proposed deck will be able to use simple elastomeric bearings. These are expected to have a design life in the region of 60 years, but may last significantly longer. However, the decks will be detailed so as to allow reasonable access to allow the bearings to be replaced in the future.

#### **3.11.3 Buried Concrete**

As noted in Section 3.3, the fill material is not based on 'natural' material and therefore could be considered to pose a risk to the buried concrete of the piles, bankseat and other elements. Testing is to be undertaken to classify the risk and the concrete will need to be detailed to be resistant to accommodate these without compromising the design life.

#### **3.11.4 Access**

Depending on the deck type chosen, it will be necessary for the design to consider access to all elements to accommodate future inspection & maintenance.

### **3.12 AESTHETICS**

Whilst a 'functional' rather than 'statement' bridge is required, the bridge is in a recreational space for local residents and therefore it is felt that the bridge should be in keeping with the surroundings and minimise visual impact.

Barnsley have confirmed that since the bridge is in a semi- rural location the top coat colour would be 14 C 39 Holly Green to BS 4800 if the bridge were to be painted.

The impact of each of the options is discussed in Section 4.1 – 4.3.

## 4.0 OPTIONS

Following an initial review of the information, three potential options were identified:

1. Modified Network Rail Standard Detail bridge
2. Truss bridge
3. Arched truss bridge

Some elements were common to all 3 options however.

- As noted in section 3.2, rabbit prevention measures are to be installed
- As noted in section 3.3, it is necessary for the bridge to be founded on piles to mitigate against unwanted settlement. Therefore all bridge options are to be founded on 300Ø CFA piles socketed into the mudstone/siltstone bedrock.
- To simplify land ownership & inspection issues, all substructures are to be positioned outside of the Network Rail boundary fencing.
- As discussed in section 3.5, all bridges are to provide:
  - i. 3.0m clear width
  - ii. 1.8m high solid parapets over the railway, 1.5m elsewhere
  - iii. 5.7m clearance to the railway
- It would be possible to position the foundations and substructures outside the boundary fences with a bridge span of approximately 19.5m. However, to meet the clearance requirements this would result in extensive wing walls, which would be expensive. Therefore it is proposed to position the foundations approximately at the crest of the embankments, which gives a bridge approximately 35m long. A 35m long, 3.5m wide bridge can be transported as a single unit, therefore optimising off-site fabrication.
- A minimum longitudinal fall of 1:100 is to be maintained on the bridge to facilitate drainage.
- All bridges to be supported on elastomeric pad bearings
- Maximum gradients on the approaches to be the bridge are to be 1:20
- Bollards to be included to prevent vehicular access

In summary the works would be as follows:

- Topsoil strip
- Create crane/piling platforms
- Installation of piles
- Trim piles & erect formwork
- Cast bankseats
- Install new bridge
- Install reinforced concrete troughs for approach ramps
- Backfill troughs
- Excavate & create load transfer platform
- Install surfacing for footpath
- Install joints & bollards
- Install lighting (if required)

Each of the options will be discussed with advantages & disadvantages detailed.



#### 4.1 OPTION 1 MODIFIED NETWORK RAIL STANDARD DETAIL BRIDGE

This is a tried and tested solution that is simple, efficient, robust and durable. A photograph of a similar bridge is given below.



**Figure 5 - Example of Network Rail standard footbridge over cutting**

Whilst based on the Network Rail standard on-station footbridge details, changes are required to accommodate 3.0m clear width and 1.8m parapets. In addition the span is outside the range of the NR standard details and therefore the top chord has been increased in size to give sufficient capacity. The webs of the main structural member provide the solid parapet and the top chord is arranged to provide an anti-climb coping. There is no flange outstand on the outer face so there is no foothold and no anti-climb measures are required. Holes will be provided within the web panels would be provided to facilitate recessed bulkhead lighting with an additional hollow section providing ducting. The Network Rail standard detail includes for the installation of a mesh screen and canopy with anti-climb measures to the ends of the bridge.

To provide sufficient clearance to the railway it will be necessary for the bridge to be seated on raised bankseats, approximately 1.5m high. As a result this will require significant approach ramps. Due to the lack of space on the Pogmoor Recreation Ground, this will require the use of 'hard' structures which will increase capital & maintenance cost. To minimise the potential for problems affecting the bridge it is recommended that the highest sections of these are piled. Whilst more space is available on the Penny Pie Park side the risk of settlement is higher and therefore a granular embankment is proposed with a geogrid reinforced load transfer platform.

The standardised nature of the bridge allows for a very simple design process and the familiarity of the bridge type to Network Rail should allow for simple approvals.

Drawings showing the proposed works are included in Appendix B.

Advantages      Very simple and durable structure  
                         Recognised design which should be readily accepted by Network Rail  
                         Simple maintenance regime

Disadvantages      Requires raised bankseats  
                         Requires long, intrusive approach ramps

## 4.2 OPTION 2 TRUSS BRIDGE

A similar bridge was recently designed by HBPW for Wakefield MDC and installed over a railway on the Wakefield – Castleford Greenway, near Whitwood.



**Figure 6 - Construction of Truss bridge as part of Wakefield – Castleford Greenway**

This is a bespoke design, but a very simple Pratt Truss bridge formed from hollow section members welded to form a half-through bridge. The deck will consist of transverse hollow sections welded to a deck plate. Solid steel sheets are used to form the parapets and are removable from the bridge deck to allow for full access to the truss members for future maintenance. (If preferred these could also be formed from GRP.) Solid sheet anti-climb panels would be fitted to the outer face of the truss. An additional angle can be added to the top chord to form an anti-climb coping (as above), however since a mesh canopy is to be installed this would not be required.

Whilst the solid sheets do not need to extend to the full height of the truss, mesh infill can be used above to decrease the risk of vandalism. To maintain the feeling of openness on the bridge it is suggested that an arch be introduced to the canopy

This solution would also use conventional bituminous surfacing over the bridge deck rather than an anti-slip waterproofing. Whilst this does result in the bridge carrying additional load, it results in a more durable surface that can be readily maintained with the same regime as the surrounding paths within Penny Pie Park and Pogmoor Recreation Ground.

Similar to Option 1, this would require raised bankseats to provide sufficient clearance, albeit slightly larger due to the increased construction depth. The approach ramps would also be similar, but slightly longer as the embankments need to be taller.

As can be seen in the above photograph, the parapet panels have been deliberately painted in a contrasting colour to the main truss members. This has the effect of ‘lightening’ the external elevations of the structure and results in an aesthetically pleasing design.

Lighting would consist of directional bulkhead lights fixed to the top chord, with cabling either running in trunking on the outer face or within the top chord.

As a similar bridge has been constructed recently over the railway it is expected that this form of construction would be readily accepted by Network Rail.

Drawings showing the proposed works are included in Appendix B.

Advantages

Aesthetically pleasing appearance  
Previously used design which should be readily accepted by Network Rail  
Bituminous surfacing used throughout

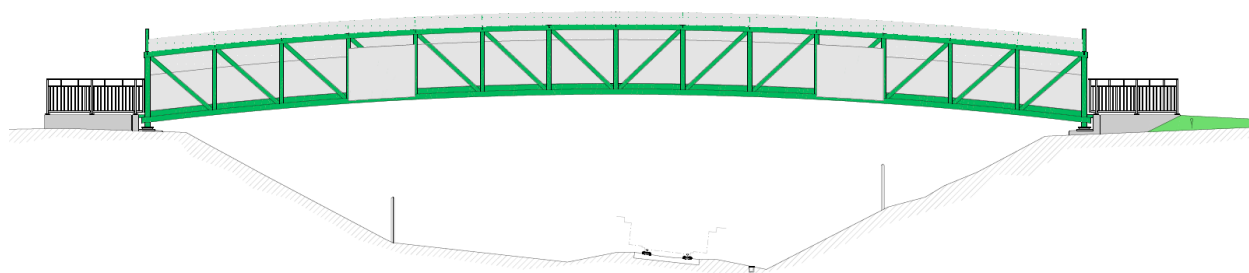
Disadvantages

More expensive solution  
Requires raised bankseats  
Requires long, intrusive approach ramps

### 4.3 OPTION 3 ARCHED TRUSS BRIDGE

A variation on Option 2 utilising the highly adaptable fabrication of a truss to provide additional clearance.

Using exactly the same form of construction as Option 2, but with an arch introduced to the bridge deck this increases the clearance over the railway without increasing the steel tonnage required. Fabrication costs would be slightly higher than for Option 2, but the arch means that the bankseat is close to ground level with the approach ramps dramatically reduced.



**Figure 7 - Visualisation of proposed arch bridge**

This would increase the gradient of the footpath at the ends of the deck above the 1:20 (5%) that is desirable, but it is within the limit of 1:12 (8.3%) given in BD29/17 and therefore not a departure from standard.

Mesh infill & canopy and lighting would be the same as for Option 2.

Whilst the brief is that the bridge is to be functional rather than a statement structure, the arched form is extremely elegant and visually attractive, especially with the contrasting parapet panels.

Drawings showing the proposed works are included in Appendix B.

<u>Advantages</u>	<p>Cheapest solution</p> <p>Aesthetically very pleasing appearance</p> <p>Reduced impact on Penny Pie Park &amp; Pogmoor Recreation Ground.</p> <p>Bituminous surfacing used throughout</p>
<u>Disadvantages</u>	<p>Slightly increase complexity in fabrication</p> <p>Increased gradients at deck ends</p>



#### 4.4 BUDGET ESTIMATES

High level (+/- 30%) estimates for the potential options are as follows:

Option 1	£666,000
Option 2	£714,000
Option 3	£572,000

Copies of the price breakdown can be found in Appendix B

The estimates above do not include for design & supervision costs, which would be anticipated to be in the region of 10% of the construction cost.

#### 4.5 DISCUSSION

Since Option 3 provides the cheapest, most attractive and minimal impact solution it is recommended that this arrangement be considered for the proposed new footbridge.

It is therefore recommended that this option be further developed. As discussed in Section 3.5.1, an extra/over price has been calculated based on a widening of this option to 3.5m clear width by pro-rata of the costs for Option 3. The increase in costs is expected to be approximately £35,000, an increase of 6.1%, taking the total to £607,000. A copy of the price breakdown can be found in Appendix B.

It is recommended that the following be undertaken:

- Barnsley MBC to confirm preferred width
- Planning drawings & 3D visualisation be produced and submitted for approval
- Outline design (AIP) drawings be produced and discussed with Network Rail
- Consultation with other stakeholders undertaken
- AIP produced
- Initiate procurement process for contractor

#### 4.6 PROJECT RISKS & ASSUMPTIONS

The following is a list of residual risks that will need to be resolved through the design process:

- a) Confirmation of clearance required by Network Rail
- b) Confirmation any restrictions on piling
- c) Identifying & booking possessions required for installation
- d) Creation & signing of BAPA agreement with Network Rail
- e) Securing funding
- f) Verification of section sizes

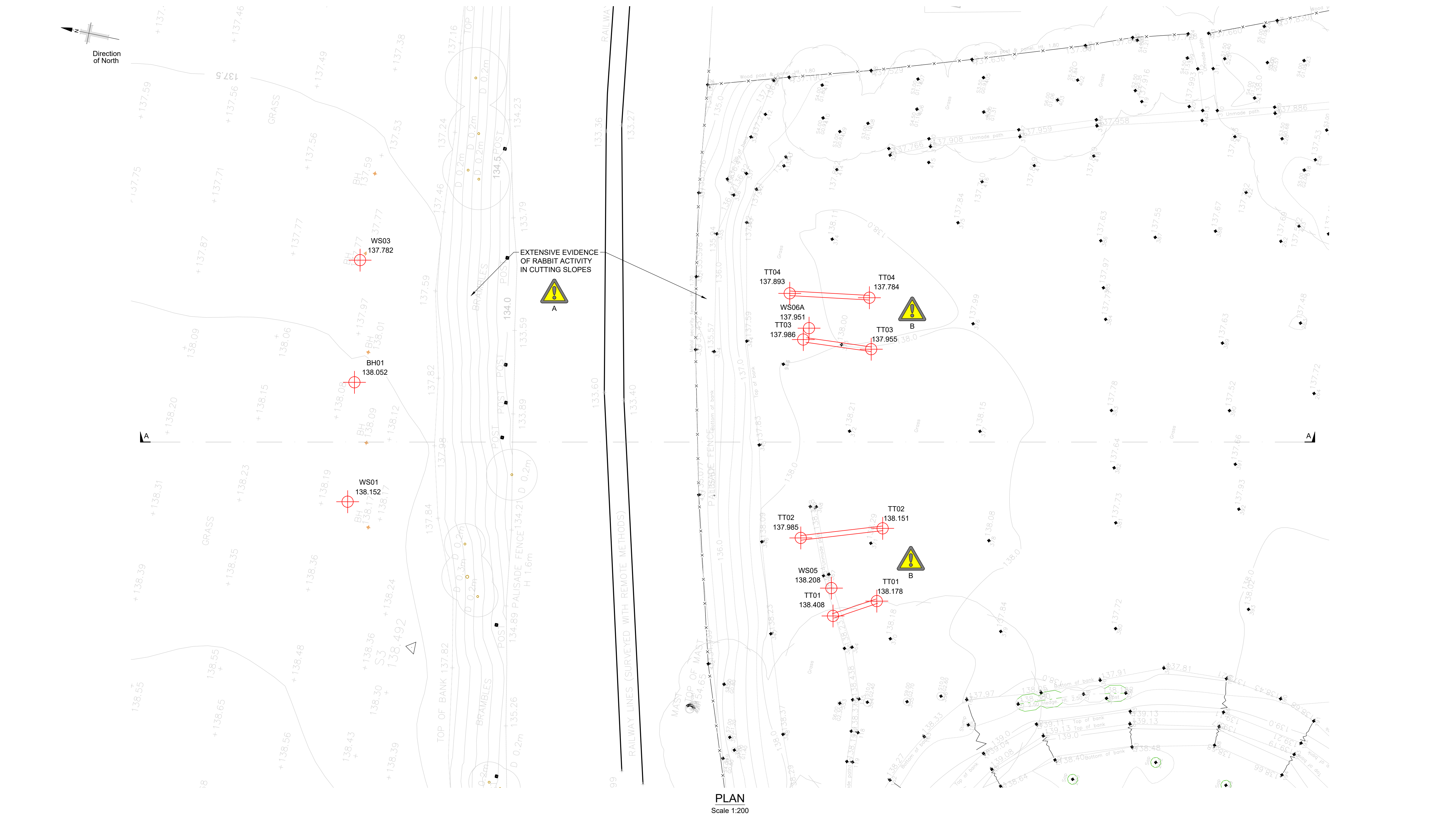
Please note this is not an exhaustive list and other considerations will be made during design.

## APPENDIX A

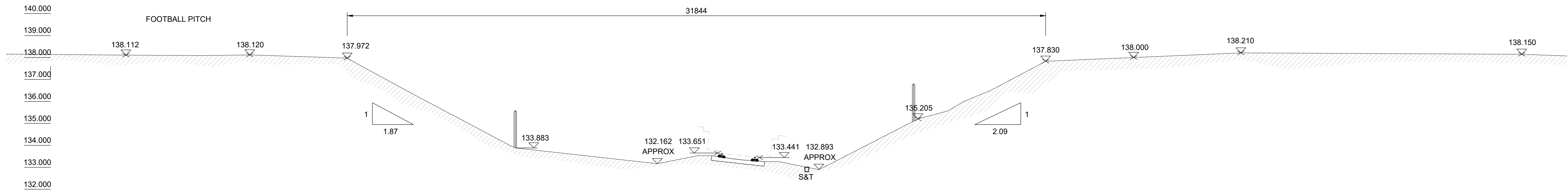
### EXISTING INFORMATION

- SL06524-HBPW-xxx-DRG-C-CV-100 Rev P01 Existing Plan & Section
- SL06524-HBPW-xxx-DRG-C-CV-101 Rev P01 Land Ownership & Buried Services

DO NOT SCALE - IF IN DOUBT ASK



PLAN  
Scale 1:200



LONG SECTION A-A  
Scale 1:100

NOTES

- DO NOT SCALE OFF THIS DRAWING.
- SHOULD THERE BE ANY CONFLICT BETWEEN THE DETAILS INDICATED ON THIS DRAWING AND THOSE INDICATED ON OTHER DRAWINGS THE ENGINEER SHOULD BE INFORMED PRIOR TO CONSTRUCTION ON SITE.
- ALL DRAWINGS ARE IN MILLIMETRES UNLESS OTHERWISE STATED.
- IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO EXECUTE THE WORKS AT ALL TIMES IN STRICT ACCORDANCE WITH THE REQUIREMENTS OF THE HEALTH AND SAFETY AT WORK ACT 1974 AND CDM REGULATIONS 2015.
- THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT DRAWINGS.
- NORTH SIDE TOPOGRAPHICAL SURVEY CARRIED OUT BY MET GEO ENVIRONMENTAL 04/12/2019

REV	DESCRIPTION	BY	CHK	APP	DATE
01	INITIAL ISSUE				07/01/20

<b>HBPW</b> CONSULTING ENGINEERS	43 BRIDGEGATE RET FORD NOTTINGHAMSHIRE DN22 7UX TEL. (01777) 869896 www.hbpw.co.uk
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CLIENT:	<b>BARNSELEY</b> Metropolitan Borough Council
CONTRACTOR:	

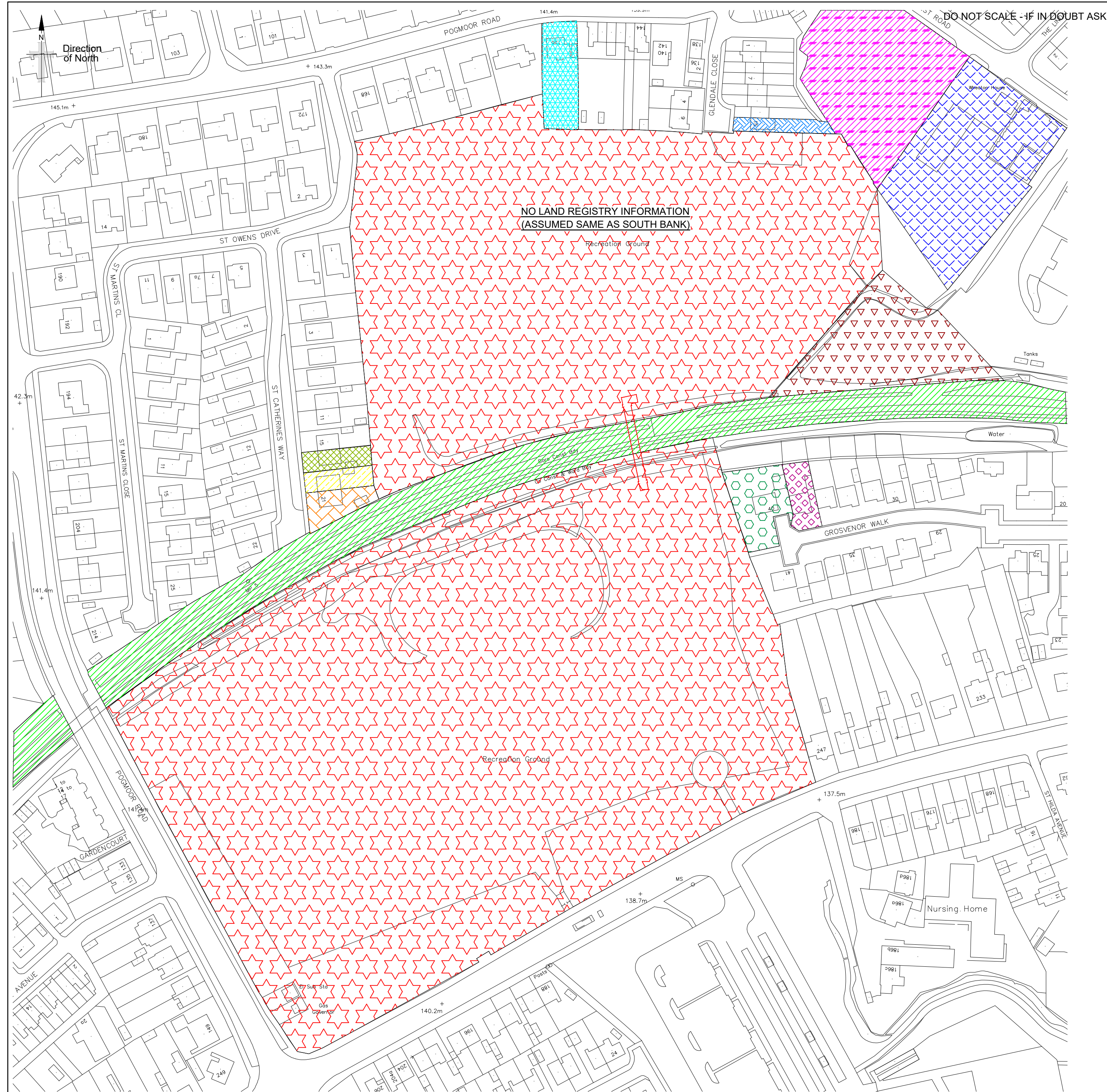
HBPW PROJECT NUMBER:  
**SL06524**

PROJECT:  
**Penny Pie Park / Pogmoor Recreation  
Ground Footbridge**

DRAWING:  
**Existing Plan & Section**

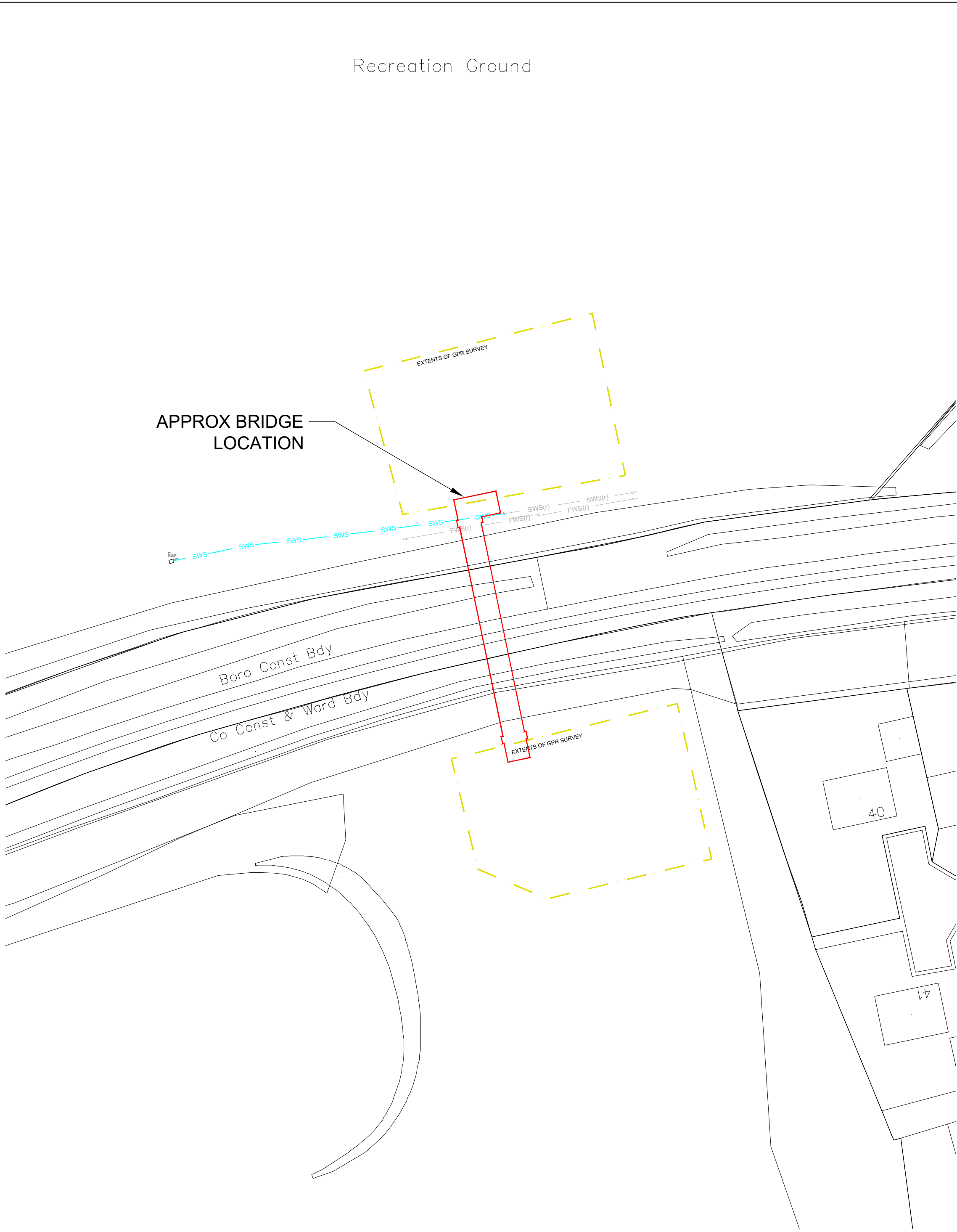
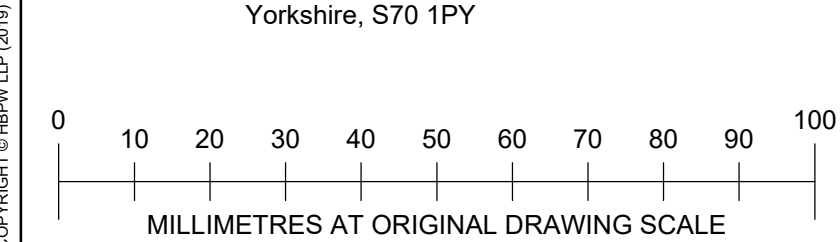
PROJECT ENGINEER: J Livesey		DRAWN: J Bent		
CHECKED: R Hardy		APPROVED: J Livesey		
DATE: 07.01.2020	SCALE: 1:000	SIZE: A1	SUITABILITY: DRAFT	REVISION: P01
DOCUMENT REFERENCE NUMBER: SL06524-HBPW-xxx-DRG-C-CV-100				





LAND OWNERSHIP PLAN  
Scale 1:1250

	<b>REGISTERED Owner(s):</b> BARNSELY METROPOLITAN BOROUGH COUNCIL of Town Hall, Barnsley, South Yorkshire, S70 2TA		<b>REGISTERED Owner(s):</b> KEVIN COLIN LOGAN of 8 St Margarets Drive, Swinton, Mexborough, S64 8DH		<b>REGISTERED Owner(s):</b> DENNIS LYCETT of 4 Chatsworth Rise, Dodworth, Barnsley, S Yorkshire, S75 3SU		<b>PROPOSED FOOTBRIDGE LOCATION</b>
	<b>REGISTERED Owner(s):</b> DAVID ROOME and HILDA ROOME of 21 St Catherine's Way, Barnsley, South Yorkshire, S75 2LE		MARK CHRISTOPHER LOGAN of 30 Oakfield Walk, Barnsley, South Yorkshire, S75 2LW		VICKY SAMANTHA SIMPSON of PO Box 288, Barnsley, S Yorkshire, S70 4YX		
	<b>REGISTERED Owner(s):</b> ALAN EDWARD WOOD and JOAN ELIZABETH WOOD of 19 St Catherine's Way, Pogmoor, Barnsley, South Yorkshire, S75 2LE		ANDREA DENISE CLOWERY of Railway Cottage, Cone Lane, Silkstone Common, Barnsley, S75 4PU		<b>REGISTERED Owner(s):</b> MARK JOHN SANDERSON and SARA JANE SANDERSON of 156 Pogmoor Road, Barnsley, S75 2DX		<b>REGISTERED Owner(s):</b> NETWORK RAIL
	<b>REGISTERED Owner(s):</b> BLACK DIAMOND ENTERPRISES LIMITED (Co. Regn. No. 49272074) of 33 Park Grove, Barnsley, South Yorkshire, S70 1PY		<b>REGISTERED Owner(s):</b> F. BOOKER BUILDERS & CONTRACTORS LIMITED (Co. Regn. No. 939089) of Fall Bank Industrial Estate, Dodworth, Barnsley, South Yorkshire		<b>REGISTERED Owner(s):</b> HARPRIET SINGH BATTH and MANDEEP BATTH of 40 Grosvenor Walk, Barnsley, S70 6HG		
			<b>REGISTERED Owner(s):</b> PHILIP MARSDEN WILKINSON and KATHLEEN ELIZABETH WILKINSON of 15 Glendale Close, Pogmoor, Barnsley, S Yorkshire		<b>REGISTERED Owner(s):</b> PAUL STEPHENSON and JUSTINE ANNE STEPHENSON of 38 Grosvenor Walk, Barnsley, S70 6HG		



PLAN VIEW SHOWING BURIED SERVICES  
Scale 1:500

	YORKSHIRE WATER SURFACE WATER DRAINAGE		YORKSHIRE WATER SURFACE WATER DRAINAGE (ROUTE TAKEN FROM RECORDS)
	YORKSHIRE WATER FOUL WATER ROUTE (TAKEN FROM ARCHIVE RECORDS)		

- NOTES
- DO NOT SCALE OFF THIS DRAWING.
  - SHOULD THERE BE ANY CONFLICT BETWEEN THE DETAILS INDICATED ON THIS DRAWING AND THOSE INDICATED ON OTHER DRAWINGS THE ENGINEER SHOULD BE INFORMED PRIOR TO CONSTRUCTION ON SITE.
  - ALL DRAWINGS ARE IN MILLIMETRES UNLESS OTHERWISE STATED.
  - IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO EXECUTE THE WORKS AT ALL TIMES IN STRICT ACCORDANCE WITH THE REQUIREMENTS OF THE HEALTH AND SAFETY AT WORK ACT 1974 AND CDM REGULATIONS 2015.
  - THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT DRAWINGS.
  - LAND REGISTRY INFORMATION OBTAINED ON THE 14/02/2020 FROM HM LAND REGISTRY
  - SERVICE INFORMATION PROVIDED BY CENTRAL ALLIANCE SURVEYS ON 21/11/21

P01	INITIAL ISSUE	JB	RH	JL	14/02/20
REV	DESCRIPTION	BY	CHK	APP	DATE

REVISION TABLE

<b>HBPW</b> CONSULTING ENGINEERS		43 BRIDGEGATE RET FORD NOTTINGHAMSHIRE DN22 7UX TEL. (01777) 869896 www.hbpw.co.uk	
CLIENT:			
CONTRACTOR: 			
HBPW PROJECT NUMBER: SL06307			
PROJECT: Penny Pie Park / Pogmoor Recreation Ground Footbridge			
DRAWING: LAND OWNERSHIP AND BURIED SERVICES			
PROJECT ENGINEER: J Livesey		DRAWN: D Fedosov	
CHECKED: R Hardy		APPROVED: J Livesey	
DATE: 14/02/2020	SCALE: 1:000	SIZE: A1	SUITABILITY PRELIM
REVISION: P01			
DOCUMENT REFERENCE NUMBER: SL06524-HBPW-xxx-DRG-C-CV-101			

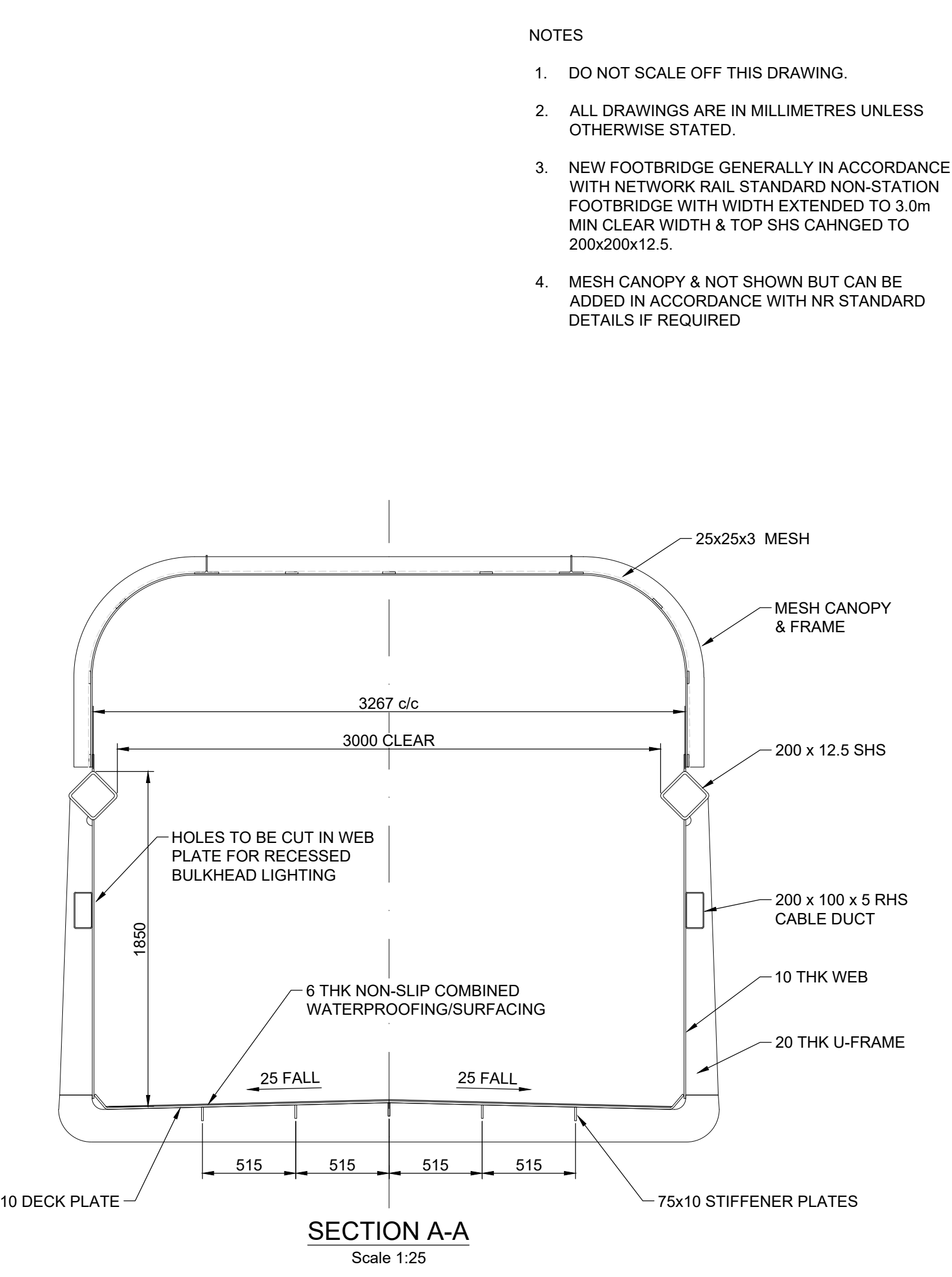
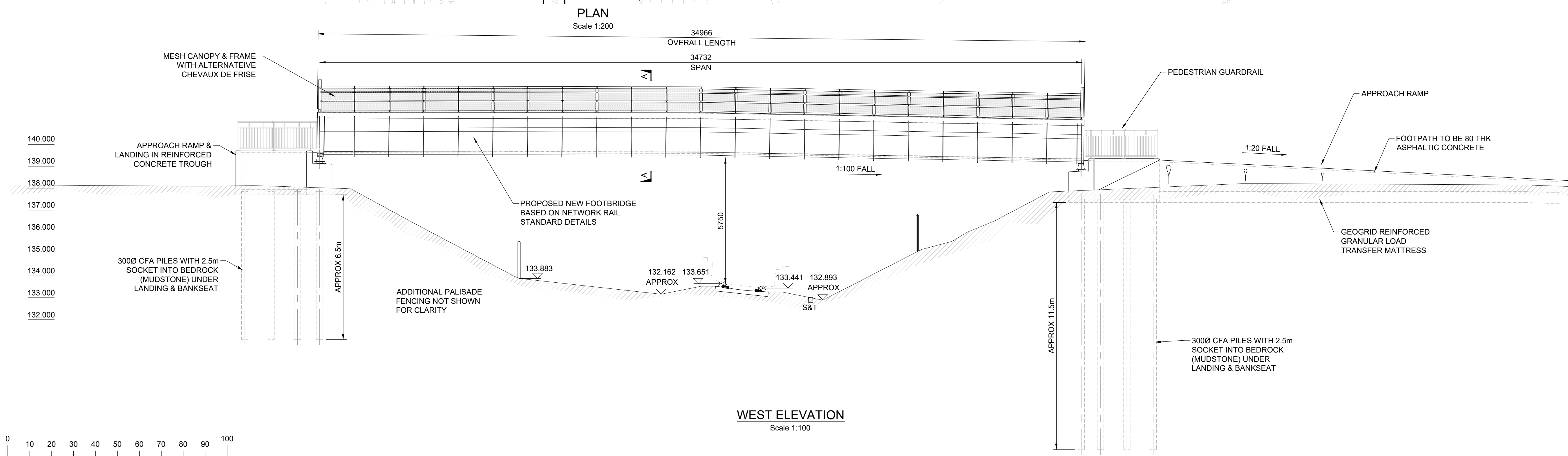
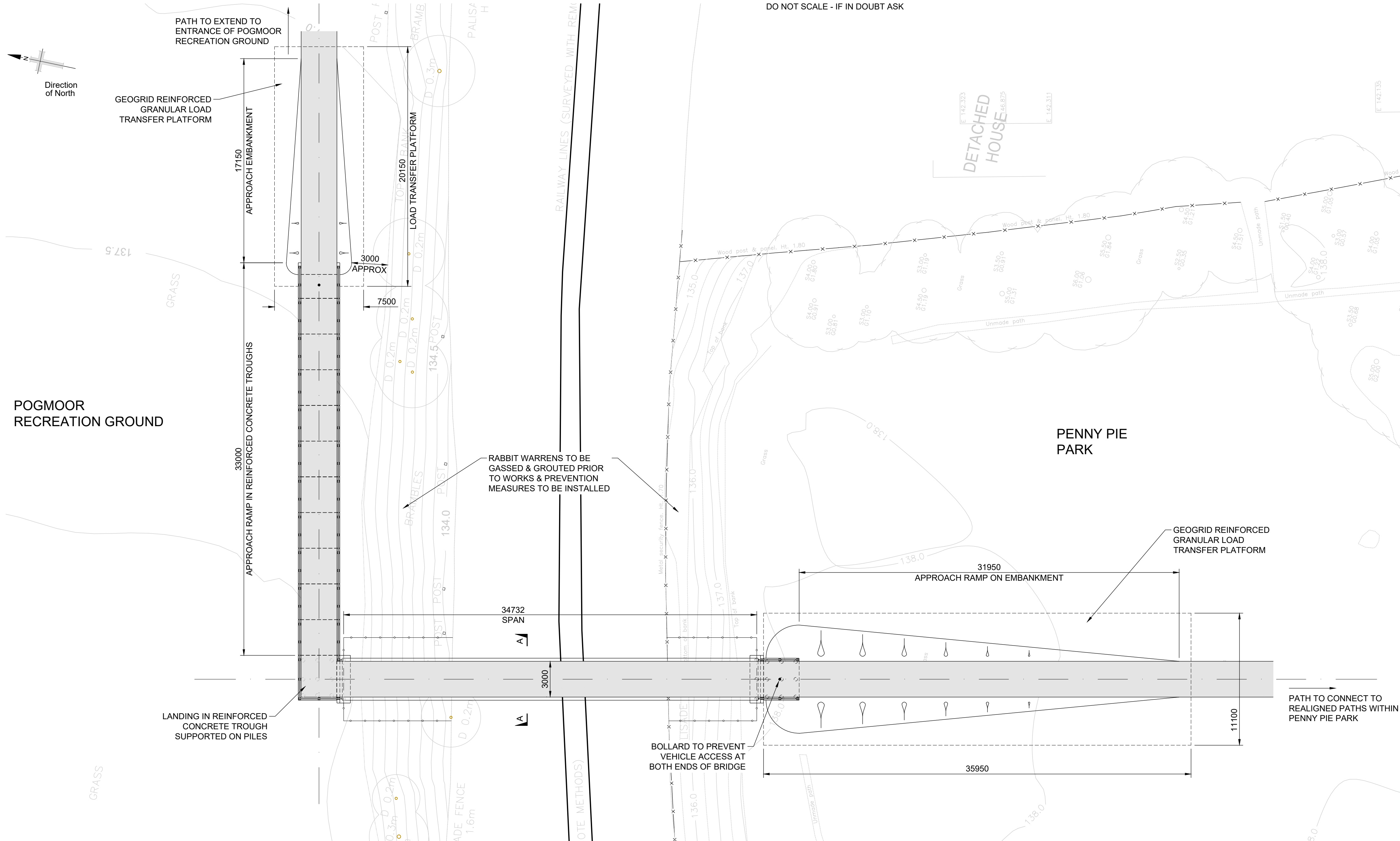


## APPENDIX B

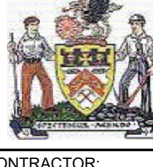
### PROPOSED OPTIONS

- SL06524-HBPW-xxx-DRG-C-CV-1001 Rev P02 Option 1 NR Standard Footbridge
- SL06524-HBPW-xxx-DRG-C-CV-1002 Rev P02 Option 2 Truss Footbridge
- SL06524-HBPW-xxx-DRG-C-CV-1003 Rev P02 Option 3 Arched Truss Footbridge
- SL06524-HBPW-xxx-DRG-C-CV-1004 Rev P02 Option 3 Visualisation
- Budget Estimate Breakdowns

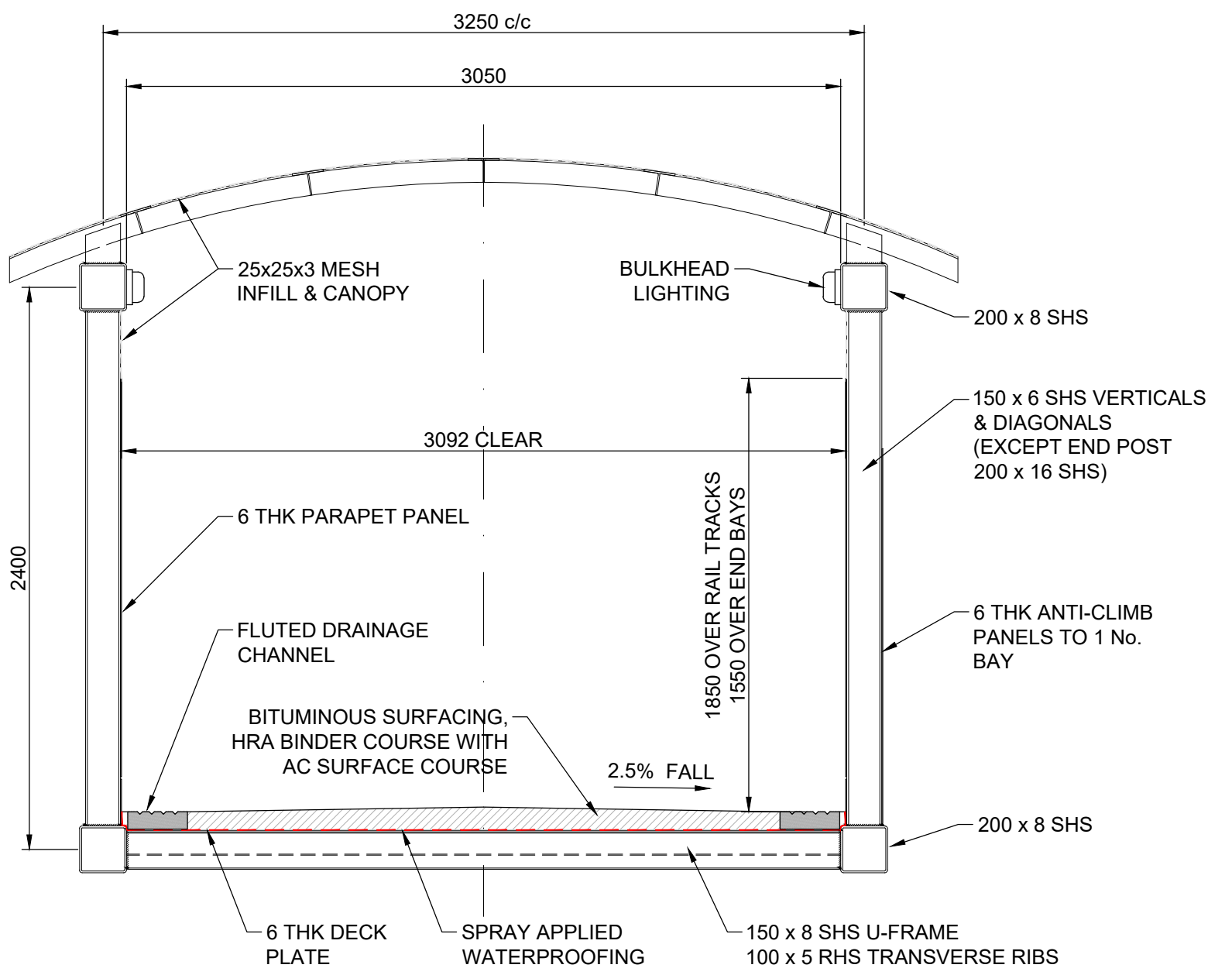




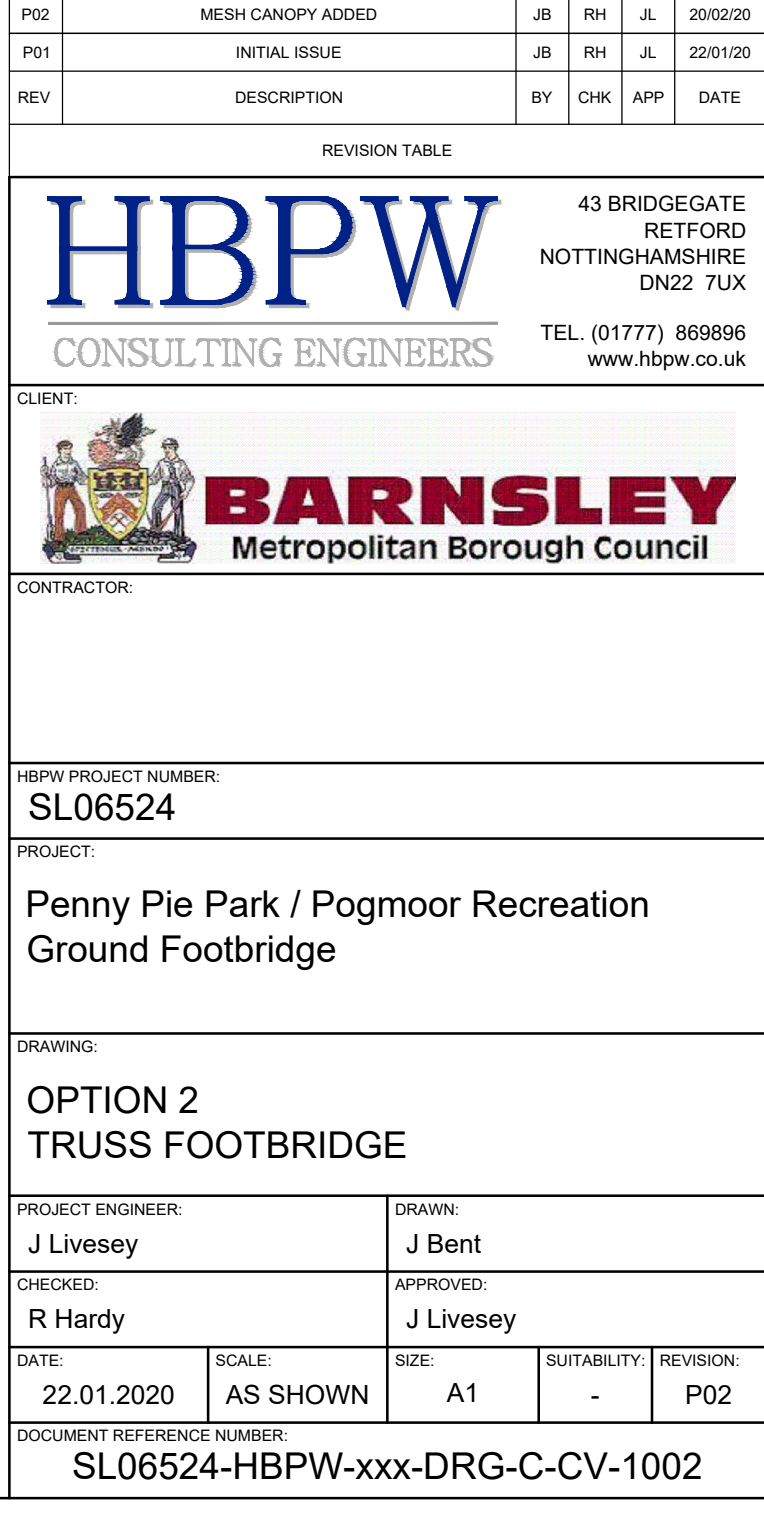
- NOTES
- DO NOT SCALE OFF THIS DRAWING.
  - ALL DRAWINGS ARE IN MILLIMETRES UNLESS OTHERWISE STATED.
  - NEW FOOTBRIDGE GENERALLY IN ACCORDANCE WITH NETWORK RAIL STANDARD NON-STATION FOOTBRIDGE WITH WIDTH EXTENDED TO 3.0m MIN CLEAR WIDTH & TOP SHS CAHNGED TO 200x200x12.5.
  - MESH CANOPY & NOT SHOWN BUT CAN BE ADDED IN ACCORDANCE WITH NR STANDARD DETAILS IF REQUIRED

PI2	MESH CANOPY ADDED	JB	RH	JL	21/02/20
P01	INITIAL ISSUE	JB	RH	JL	07/01/20
REV	DESCRIPTION	BY	CHK	APP	DATE
REVISION TABLE					
<div>HBPW</div> <div>CONSULTING ENGINEERS</div>		43 BRIDGEGATE RETFORD NOTTINGHAMSHIRE DN22 7UX TEL. (01777) 869896 www.hbpw.co.uk			
CLIENT: <div><div></div><div><div>BARNSELEY</div><div>Metropolitan Borough Council</div></div></div>					
CONTRACTOR:					
HBPW PROJECT NUMBER: SL06307					
PROJECT: Penny Pie Park / Pogmoor Recreation Ground Footbridge					
DRAWING: OPTION 1 NETWORK RAIL STANDARD FOOTBRIDGE					
PROJECT ENGINEER: J Livesey		DRAWN: J Bent			
CHECKED: R Hardy		APPROVED: J Livesey			
DATE: 22.01.2020	SCALE: AS SHOWN	SIZE: A1	SUITABILITY: -	REVISION: P02	
DOCUMENT REFERENCE NUMBER: SL06524-HBPW-xxx-DRG-C-CV-1001					





SECTION A-A  
Scale 1:25



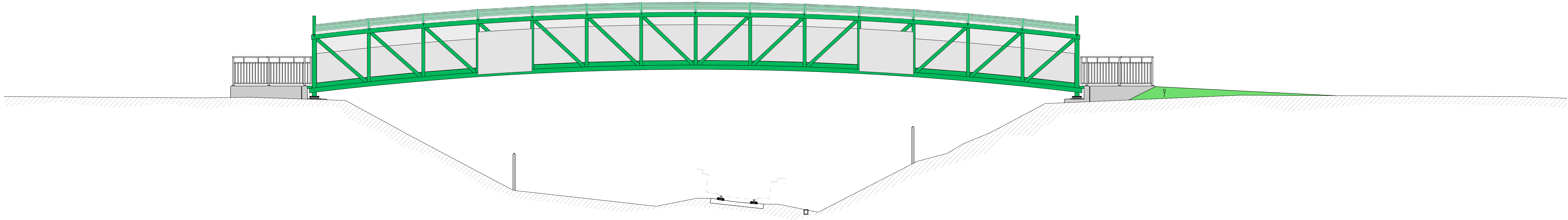




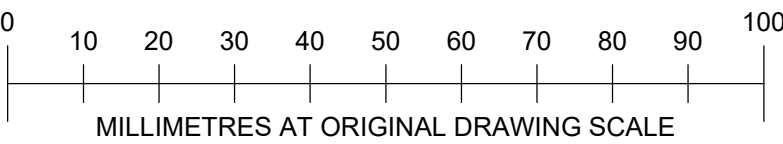
DO NOT SCALE - IF IN DOUBT ASK

NOTES

1. DO NOT SCALE OFF THIS DRAWING.
2. ALL DRAWINGS ARE IN MILLIMETRES UNLESS OTHERWISE STATED.
3. NEW FOOTBRIDGE USING SQUARE HOLLOW SECTION STEELWORK, SIMILAR TO NEW BRIDGE ON WAKEFIELD GREENWAY.
- 4.



WEST ELEVATION  
Scale 1:100



P02	MESH CANOPY ADDED	JB	RH	JL	20/02/20
P01	INITIAL ISSUE	JB	RH	JL	03/02/20
REV	DESCRIPTION	BY	CHK	APP	DATE

REVISION TABLE

**HBPW**  
CONSULTING ENGINEERS

43 BRIDGEGATE  
RETFORD  
NOTTINGHAMSHIRE  
DN22 7UX  
TEL. (01777) 869896  
www.hbpw.co.uk

CLIENT:

**BARNSELEY**  
Metropolitan Borough Council

CONTRACTOR:

HBPW PROJECT NUMBER:  
**SL06524**

PROJECT:  
**Penny Pie Park / Pogmoor Recreation  
Ground Footbridge**

DRAWING:  
**OPTION 3  
ARCHED TRUSS FOOTBRIDGE  
VISUALISATION**

PROJECT ENGINEER: <b>J Livesey</b>	DRAWN: <b>J Bent</b>
CHECKED: <b>R Hardy</b>	APPROVED: <b>J Livesey</b>

DATE: <b>03.02.2020</b>	SCALE: <b>AS SHOWN</b>	SIZE: <b>A1</b>	SUITABILITY: <b>-</b>	REVISION: <b>P02</b>
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DOCUMENT REFERENCE NUMBER:  
**SL06524-HBPW-xxx-DRG-C-CV-1004**

Company Name: **HBPW**  
Report: **Format Bill File Only**  
Estimate Number: **HBPW001**  
Estimate Name: **PENNY PIE PARK FOOTBRIDGE**  
Print Date: **31/01/2020 @ 9:11**

Bill	Description	Quantity	Value	Total
1	OPTION 1 - NR STANDARD	1.00	665,657.20	665,657.20
2	OPTION 2 - TRUSS	1.00	714,382.88	714,382.88
3	OPTION 3 - ARCHED TRUSS	1.00	572,072.09	572,072.09
3a	OPTION 3a - ARCHED TRUSS 3.5m wide	1.00	607,083.06	607,083.06
Total for PENNY PIE PARK FOOTBRIDGE:				



Ref	Description	Quantity	Units	Rate	Value
<b>PENNY PIE PARK FOOTBRIDGE - OPTION 1</b>					
1/1/1	General site clearance	3,600.00	m2	2.46	8,856.00
1/1/2	Grouting of rabbit warrens - undertaken in RoR possessions	1.00	Sum	4,916.02	4,916.02
<b>Piling</b>					
1/1/3	Establish piling equipment on site	1.00	item	6,325.00	6,325.00
1/1/4	Intersite moves - N & S of railway	1.00	Nr	2,875.00	2,875.00
1/1/5	Move between piles	11.00	Nr	34.50	379.50
1/1/6	300 dia CFA piles with 2.5m socket into bedrock; 6.5m length	12.00	Nr	523.25	6,279.00
1/1/7	300 dia CFA piles with 2.5m socket into bedrock; 11.5m length	12.00	Nr	925.75	11,109.00
1/1/8	Pile testing allowance	1.00	item	4,025.00	4,025.00
1/1/9	Piling mat	1.00	item	2,700.80	2,700.80
1/1/10	Breakdown 300 dia CFA piles	24.00	Nr	170.00	4,080.00
1/1/11	Disposal of pile arrisings	16.00	m3	56.03	896.48
<b>Earthworks</b>					
1/1/12	Strip topsoil and stack on site	235.00	m3	8.68	2,039.80
1/1/13	Excavate for load transfer platforms	233.00	m3	8.76	2,041.08
1/1/14	Excavate for northern approach ramp	90.00	m3	11.33	1,019.70
1/1/15	Excavate for pile caps/abutments	30.00	m3	34.00	1,020.00
1/1/16	Preparation of formations	810.00	m2	1.26	1,020.60
1/1/17	Disposal of surplus excavated material off site to licensed tip	353.00	m3	29.93	10,565.29
1/1/18	Imported granular material 6N to transfer platforms	175.00	m3	49.88	8,729.00
1/1/19	Imported Type 1 subbase	116.00	m3	58.61	6,798.76
1/1/20	Geogrid reinforcement to transfer platforms	582.00	m2	8.80	5,121.60
1/1/21	Topsoil to sides of ramp including allowance for seeding	235.00	m3	8.68	2,039.80
<b>Reinforced Concrete</b>					
1/1/22	Provide and place blinding concrete	40.00	m3	161.36	6,454.40
1/1/23	Provide and place structural concrete to pile caps/abutment	40.00	m3	150.15	6,006.00
1/1/24	Provide and place structural concrete stitch to pcc ramp base	6.00	m3	163.08	978.48
1/1/25	Formwork; rough; vertical; exceeding 1.22m	13.00	m2	119.31	1,551.03
1/1/26	Formwork; fair; vertical; 0.4 - 1.22m	6.00	m2	119.31	715.86
1/1/27	Formwork; fair; vertical; exceeding 1.22m	36.00	m2	119.31	4,295.16
1/1/28	Reinforcement - allow 175 kg/m3	8.05	t	1,225.95	9,868.90
<b>Precast Concrete Units</b>					
1/1/29	L Section pcc units 1.5 x 1.25 x 2.0m long	33.00	Nr	2,311.36	76,274.88
<b>Structural Steelwork</b>					
1/1/30	Fabrication of NR Standard Footbridge	27.90	t	4,740.14	132,249.91
	e/o for mesh canopy	1.00	Sum	10,000.00	10,000.00
1/1/31	Erection of footbridge during 27 hour rail possession	27.90	t	776.25	21,657.38
1/1/32	Temporary laydown and assembly mat	140.00	m2	45.41	6,357.40
1/1/33	Crane hardstanding mat	48.00	m2	45.41	2,179.68
1/1/34	Provide and install bearings	1.00	Item	5,001.33	5,001.33
1/1/35	Provision of lighting to footbridge - Provisional Sum	1.00	Sum	10,000.00	10,000.00
1/1/36	Provision of power supply for lighting - Provisional Sum	1.00	Sum	10,000.00	10,000.00
<b>Surfacing</b>					
1/1/37	Footpath to be 80mm thick asphaltic concrete	280.00	m2	38.64	10,819.20
1/1/38	Tie-in to existing footpaths	2.00	Nr	1,365.03	2,730.06
1/1/39	Pcc concrete edgings	110.00	m2	15.42	1,696.20
1/1/40	6mm thick non-slip combined waterproofing/surfacing to bridge deck	105.00	m2	46.00	4,830.00
<b>Fencing</b>					
1/1/41	Palisade fencing	38.00	m	72.45	2,753.10
1/1/42	Pedestrian guardrails	66.00	m	131.07	8,650.62
<b>Preliminaries</b>					
1/1/43	Supervision of the Works	1.00	Sum	86,250.00	86,250.00
1/1/44	Compound, Offices, Welfare and Stores	1.00	Sum	50,772.50	50,772.50
1/1/45	Rail Safety Critical supervision	1.00	Sum	5,175.00	5,175.00
1/1/46	Temporary Works - access to site	1.00	Sum	20,552.69	20,552.69
1/1/47	Risk Allowance/Design Contingency	1.00	Sum	75,000.00	75,000.00
<b>Total for Page: 1</b>					<b>665,657.20</b>



Ref	Description	Quantity	Units	Rate	Value
<b>PENNY PIE PARK FOOTBRIDGE - OPTION 2</b>					
2/1/1	General site clearance	3,600.00	m2	2.46	8,856.00
2/1/2	Grouting of rabbit warrens - undertaken in RoR possessions	1.00	Sum	4,916.02	4,916.02
<b>Piling</b>					
2/1/3	Establish piling equipment on site	1.00	item	6,325.00	6,325.00
2/1/4	Intersite moves - N & S of railway	1.00	Nr	2,875.00	2,875.00
2/1/5	Move between piles	11.00	Nr	34.50	379.50
2/1/6	300 dia CFA piles with 2.5m socket into bedrock; 6.5m length	12.00	Nr	523.25	6,279.00
2/1/7	300 dia CFA piles with 2.5m socket into bedrock; 11.5m length	12.00	Nr	925.75	11,109.00
2/1/8	Pile testing allowance	1.00	item	4,025.00	4,025.00
2/1/9	Piling mat	1.00	item	2,700.80	2,700.80
2/1/10	Breakdown 300 dia CFA piles	24.00	Nr	170.00	4,080.00
2/1/11	Disposal of pile arrisings	16.00	m3	56.03	896.48
<b>Earthworks</b>					
2/1/12	Strip topsoil and stack on site	270.00	m3	8.68	2,343.60
2/1/13	Excavate for load transfer platforms	253.00	m3	8.76	2,216.28
2/1/14	Excavate for northern approach ramp	135.00	m3	11.33	1,529.55
2/1/15	Excavate for pile caps/abutments	30.00	m3	34.00	1,020.00
2/1/16	Preparation of formations	902.00	m2	1.26	1,136.52
2/1/17	Disposal of surplus excavated material off site to licensed tip	416.00	m3	29.93	12,450.88
2/1/18	Imported granular material 6N to transfer platforms	190.00	m3	49.88	9,477.20
2/1/19	Imported Type 1 subbase	116.00	m3	58.61	6,798.76
2/1/20	Geogrid reinforcement to transfer platforms	632.00	m2	8.80	5,561.60
2/1/21	Topsoil to sides of ramp including allowance for seeding	270.00	m3	8.68	2,343.60
<b>Reinforced Concrete</b>					
2/1/22	Provide and place blinding concrete	40.00	m3	161.36	6,454.40
2/1/23	Provide and place structural concrete to pile caps/abutment	40.00	m3	150.15	6,006.00
2/1/24	Provide and place structural concrete stitch to pcc ramp base	6.00	m3	163.08	978.48
2/1/25	Formwork; rough; vertical; exceeding 1.22m	13.00	m2	119.31	1,551.03
2/1/26	Formwork; fair; vertical; 0.4 - 1.22m	6.00	m2	119.31	715.86
2/1/27	Formwork; fair; vertical; exceeding 1.22m	36.00	m2	119.31	4,295.16
2/1/28	Reinforcement - allow 175 kg/m3	8.05	t	1,225.95	9,868.90
<b>Precast Concrete Units</b>					
2/1/29	L Section pcc units 1.5 x 1.25 x 2.0m long	36.00	Nr	2,311.36	83,208.96
<b>Structural Steelwork</b>					
2/1/30	Fabrication of Truss Footbridge	35.00	t	4,740.14	165,904.90
	e/o for mesh canopy	1.00	Sum	10,000.00	10,000.00
2/1/31	Erection of footbridge during 27 hour rail possession	35.00	t	700.72	24,525.20
2/1/32	Temporary laydown and assembly mat	140.00	m2	45.41	6,357.40
2/1/33	Crane hardstanding mat	48.00	m2	45.41	2,179.68
2/1/34	Provide and install bearings	1.00	Item	5,001.33	5,001.33
2/1/35	Provision of lighting to footbridge - Provisional Sum	1.00	Sum	10,000.00	10,000.00
2/1/36	Provision of power supply for lighting - Provisional Sum	1.00	Sum	10,000.00	10,000.00
<b>Surfacing</b>					
2/1/37	Footpath to be 80mm thick asphaltic concrete	280.00	m2	38.64	10,819.20
2/1/38	Tie-in to existing footpaths	2.00	Nr	1,365.03	2,730.06
2/1/39	Pcc concrete edgings	110.00	m2	15.42	1,696.20
2/1/40	6mm thick non-slip combined waterproofing/surfacing to bridge deck	105.00	m2	46.00	4,830.00
<b>Fencing</b>					
2/1/41	Palisade fencing	38.00	m	72.45	2,753.10
2/1/42	Pedestrian guardrails	72.00	m	131.07	9,437.04
<b>Preliminaries</b>					
2/1/43	Supervision of the Works	1.00	Sum	86,250.00	86,250.00
2/1/44	Compound, Offices, Welfare and Stores	1.00	Sum	50,772.50	50,772.50
2/1/45	Rail Safety Critical supervision	1.00	Sum	5,175.00	5,175.00
2/1/46	Temporary Works - access to site	1.00	Sum	20,552.69	20,552.69
2/1/46	Risk Allowance/Design Contingency	1.00	Sum	75,000.00	75,000.00
<b>Total for Page: 1</b>					<b>714,382.88</b>

Ref	Description	Quantity	Units	Rate	Value
<b>PENNY PIE PARK FOOTBRIDGE - OPTION 3</b>					
3/1/1	General site clearance	3,600.00	m2	2.46	8,856.00
3/1/2	Grouting of rabbit warrens - undertaken in RoR possessions	1.00	Sum	4,916.02	4,916.02
<b>Piling</b>					
3/1/3	Establish piling equipment on site	1.00	item	6,325.00	6,325.00
3/1/4	Intersite moves - N & S of railway	1.00	Nr	2,875.00	2,875.00
3/1/5	Move between piles	5.00	Nr	34.50	172.50
3/1/6	300 dia CFA piles with 2.5m socket into bedrock; 6.5m length	3.00	Nr	523.25	1,569.75
3/1/7	300 dia CFA piles with 2.5m socket into bedrock; 11.5m length	3.00	Nr	925.75	2,777.25
3/1/8	Pile testing allowance	1.00	item	4,025.00	4,025.00
3/1/9	Piling mat	1.00	item	2,700.80	2,700.80
3/1/10	Breakdown 300 dia CFA piles	6.00	Nr	170.00	1,020.00
3/1/11	Disposal of pile arrisings	4.00	m3	56.03	224.12
<b>Earthworks</b>					
3/1/12	Strip topsoil and stack on site	110.00	m3	8.68	954.80
3/1/13	Excavate for load transfer platforms	79.00	m3	8.76	692.04
3/1/14	Excavate for northern approach ramp	11.00	m3	11.33	124.63
3/1/15	Excavate for pile caps/abutments	30.00	m3	34.00	1,020.00
3/1/16	Preparation of formations	300.00	m2	1.26	378.00
3/1/17	Disposal of surplus excavated material off site to licensed tip	120.00	m3	29.93	3,591.60
3/1/18	Imported granular material 6N to transfer platforms	59.00	m3	49.88	2,942.92
3/1/19	Imported Type 1 subbase	30.00	m3	58.61	1,758.30
3/1/20	Geogrid reinforcement to transfer platforms	65.00	m2	8.80	572.00
3/1/21	Topsoil to sides of ramp including allowance for seeding	110.00	m3	8.68	954.80
<b>Reinforced Concrete</b>					
3/1/22	Provide and place blinding concrete	3.00	m3	161.36	484.08
3/1/23	Provide and place structural concrete to pile caps/abutment	8.00	m3	150.15	1,201.20
3/1/24	Provide and place structural concrete stitch to pcc ramp base	1.00	m3	163.08	163.08
3/1/25	Formwork; rough; vertical; exceeding 1.22m	13.00	m2	119.31	1,551.03
3/1/26	Formwork; fair; vertical; 0.4 - 1.22m	6.00	m2	119.31	715.86
3/1/27	Formwork; fair; vertical; exceeding 1.22m	24.00	m2	119.31	2,863.44
3/1/28	Reinforcement - allow 175 kg/m3	1.50	t	1,225.95	1,838.93
<b>Precast Concrete Units</b>					
3/1/29	L Section pcc units 1.5 x 1.25 x 2.0m long	4.00	Nr	2,311.36	9,245.44
<b>Structural Steelwork</b>					
3/1/30	Fabrication of Arched Truss Footbridge	35.00	t	4,910.50	171,867.50
	e/o for mesh canopy	1.00	Sum	10,000.00	10,000.00
3/1/31	Erection of footbridge during 27 hour rail possession	35.00	t	700.72	24,525.20
3/1/32	Temporary laydown and assembly mat	140.00	m2	45.41	6,357.40
3/1/33	Crane hardstanding mat	48.00	m2	45.41	2,179.68
3/1/34	Provide and install bearings	1.00	Item	5,001.33	5,001.33
3/1/35	Provision of lighting to footbridge - Provisional Sum	1.00	Sum	10,000.00	10,000.00
3/1/36	Provision of power supply for lighting - Provisional Sum	1.00	Sum	10,000.00	10,000.00
<b>Surfacing</b>					
3/1/37	Footpath to be 80mm thick asphaltic concrete	350.00	m2	38.64	13,524.00
3/1/38	Tie-in to existing footpaths	2.00	Nr	1,365.03	2,730.06
3/1/39	Pcc concrete edgings	160.00	m2	15.42	2,467.20
3/1/40	6mm thick non-slip combined waterproofing/surfacing to bridge deck	105.00	m2	46.00	4,830.00
<b>Fencing</b>					
3/1/41	Palisade fencing	38.00	m	72.45	2,753.10
3/1/42	Pedestrian guardrails	12.00	m	131.07	1,572.84
<b>Preliminaries</b>					
3/1/43	Supervision of the Works	1.00	Sum	86,250.00	86,250.00
3/1/44	Compound, Offices, Welfare and Stores	1.00	Sum	50,772.50	50,772.50
3/1/45	Rail Safety Critical supervision	1.00	Sum	5,175.00	5,175.00
3/1/46	Temporary Works - access to site	1.00	Sum	20,552.69	20,552.69
3/1/46	Risk Allowance/Design Contingency	1.00	Sum	75,000.00	75,000.00
<b>Total for Page: 1</b>					<b>572,072.09</b>

Ref	Description	Quantity	Units	Rate	Value	e/o for 3.5	Quantity	Value
<b>PENNY PIE PARK FOOTBRIDGE - OPTION 3a</b>								
3/1/1	General site clearance	3,600.00	m2	2.46	8,856.00	1.00	3600.00	8856.00
3/1/2	Grouting of rabbit warrens - undertaken in RoR possessions	1.00	Sum	4,916.02	4,916.02	1.00	1.00	4916.02
<b>Piling</b>								
3/1/3	Establish piling equipment on site	1.00	item	6,325.00	6,325.00	1.00	1.00	6325.00
3/1/4	Intersite moves - N & S of railway	1.00	Nr	2,875.00	2,875.00	1.00	1.00	2875.00
3/1/5	Move between piles	5.00	Nr	34.50	172.50	1.00	5.00	172.50
3/1/6	300 dia CFA piles with 2.5m socket into bedrock; 6.5m length	3.00	Nr	523.25	1,569.75	1.00	3.00	1569.75
3/1/7	300 dia CFA piles with 2.5m socket into bedrock; 11.5m length	3.00	Nr	925.75	2,777.25	1.00	3.00	2777.25
3/1/8	Pile testing allowance	1.00	item	4,025.00	4,025.00	1.00	1.00	4025.00
3/1/9	Piling mat	1.00	item	2,700.80	2,700.80	1.00	1.00	2700.80
3/1/10	Breakdown 300 dia CFA piles	6.00	Nr	170.00	1,020.00	1.00	6.00	1020.00
3/1/11	Disposal of pile arrisings	4.00	m3	56.03	224.12	1.00	4.00	224.12
<b>Earthworks</b>								
3/1/12	Strip topsoil and stack on site	110.00	m3	8.68	954.80	1.17	128.33	1113.93
3/1/13	Excavate for load transfer platforms	79.00	m3	8.76	692.04	1.17	92.17	807.38
3/1/14	Excavate for northern approach ramp	11.00	m3	11.33	124.63	1.17	12.83	145.40
3/1/15	Excavate for pile caps/abutments	30.00	m3	34.00	1,020.00	1.17	35.00	1190.00
3/1/16	Preparation of formations	300.00	m2	1.26	378.00	1.17	350.00	441.00
3/1/17	Disposal of surplus excavated material off site to licensed tip	120.00	m3	29.93	3,591.60	1.17	140.00	4190.20
3/1/18	Imported granuar material 6N to transfer platforms	59.00	m3	49.88	2,942.92	1.17	68.83	3433.41
3/1/19	Imported Type 1 subbase	30.00	m3	58.61	1,758.30	1.17	35.00	2051.35
3/1/20	Geogrid reinforcement to transfer platforms	65.00	m2	8.80	572.00	1.17	75.83	667.33
3/1/21	Topsoil to sides of ramp including allowance for seeding	110.00	m3	8.68	954.80	1.17	128.33	1113.93
<b>Reinforced Concrete</b>								
3/1/22	Provide and place blinding concrete	3.00	m3	161.36	484.08	1.17	3.50	564.76
3/1/23	Provide and place structural concrete to pile caps/abutment	8.00	m3	150.15	1,201.20	1.17	9.33	1401.40
3/1/24	Provide and place structural concrete stitch to pcc ramp base	1.00	m3	163.08	163.08	1.00	1.00	163.08
3/1/25	Formwork; rough; vertical; exceeding 1.22m	13.00	m2	119.31	1,551.03	1.00	13.00	1551.03
3/1/26	Formwork; fair; vertical; 0.4 - 1.22m	6.00	m2	119.31	715.86	1.00	6.00	715.86
3/1/27	Formwork; fair; vertical; exceeding 1.22m	24.00	m2	119.31	2,863.44	1.00	24.00	2863.44
3/1/28	Reinforcement - allow 175 kg/m3	1.50	t	1,225.95	1,838.93	1.00	1.50	1838.93
<b>Precast Concrete Units</b>								
3/1/29	L Section pcc units 1.5 x 1.25 x 2.0m long	4.00	Nr	2,311.36	9,245.44	1.00	4.00	9245.44
<b>Structural Steelwork</b>								
3/1/30	Fabrication of Arched Truss Footbridge	35.00	t	4,910.50	171,867.50	1.17	40.83	200512.08
	e/o for mesh canopy	1.00	Sum	10,000.00	10,000.00	1.17	1.17	11666.67
3/1/31	Erection of footbridge during 27 hour rail possession	35.00	t	700.72	24,525.20	1.00	35.00	24525.20
3/1/32	Temporary laydown and assembly mat	140.00	m2	45.41	6,357.40	1.00	140.00	6357.40
3/1/33	Crane hardstanding mat	48.00	m2	45.41	2,179.68	1.00	48.00	2179.68
3/1/34	Provide and install bearings	1.00	Item	5,001.33	5,001.33	1.00	1.00	5001.33
3/1/35	Provision of lighting to footbridge - Provisional Sum	1.00	Sum	10,000.00	10,000.00	1.00	1.00	10000.00
3/1/36	Provision of power supply for lighting - Provisional Sum	1.00	Sum	10,000.00	10,000.00	1.00	1.00	10000.00
<b>Surfacing</b>								
3/1/37	Footpath to be 80mm thick asphaltic concrete	350.00	m2	38.64	13,524.00	1.17	408.33	15778.00
3/1/38	Tie-in to existing footpaths	2.00	Nr	1,365.03	2,730.06	1.00	2.00	2730.06
3/1/39	Pcc concrete edgings	160.00	m2	15.42	2,467.20	1.00	160.00	2467.20
3/1/40	6mm thick non-slip combined waterproofing/surfacing to bridge deck	105.00	m2	46.00	4,830.00	1.00	105.00	4830.00
<b>Fencing</b>								
3/1/41	Palisade fencing	38.00	m	72.45	2,753.10	1.00	38.00	2753.10
3/1/42	Pedestrian guardrails	12.00	m	131.07	1,572.84	1.00	12.00	1572.84
<b>Preliminaries</b>								
3/1/43	Supervsion of the Works	1.00	Sum	86,250.00	86,250.00	1.00	1.00	86250.00
3/1/44	Compound, Offices, Welfare and Stores	1.00	Sum	50,772.50	50,772.50	1.00	1.00	50772.50
3/1/45	Rail Safety Critical supervision	1.00	Sum	5,175.00	5,175.00	1.00	1.00	5175.00
3/1/46	Temporary Works - access to site	1.00	Sum	20,552.69	20,552.69	1.00	1.00	20552.69
3/1/46	Risk Allowance/Design Contingency	1.00	Sum	75,000.00	75,000.00	1.00	1.00	75000.00
<b>Total for Page: 1</b>					<b>572,072.09</b>			<b>607,083.06</b>

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