PHASE 3A REMEDIATION STRATEGY

Plots O, N & M
Mayfield, Manchester

for

Mayfield Partnership Ltd

17 / 12 / 2020

COMPLEX CHALLENGES ...
MADE SIMPLE

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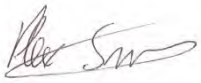
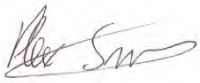
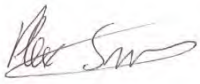
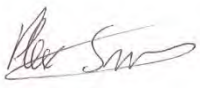
DESCRIPTION	DATE	AUTHORS		APPROVED BY
Phase 3a Remediation Strategy Report	17-12-20	Elizabeth Stewart	Alex Smiles 	Alex Smiles 
REVISION	**DESCRIPTION**	**DATE**	**AUTHOR**	**APPROVED BY**
R1	Groundwater RA	18-12-20	Elizabeth Stewart	Alex Smiles 
R2	Amendment to Asbestos screening value in material re-use specification	15-01-21	Alex Smiles 	

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1.0 Introduction

1.1 Background

1.1.1 RoC Consulting has been appointed by the Mayfield Partnership Ltd to produce a Phase 3a Remediation Strategy Report for the proposed developments across Plots O, N and M within the wider Mayfield Strategic Regeneration Framework. It is understood that the sites are to be redeveloped for commercial office space (Plots O+M) and a multi storey car park (Plot N).

1.1.2 The following assessment has been completed to support design and planning requirements for the site's redevelopment and follows on from a number of site investigations relating to the development site, specifically:

1) RoC Consulting 2020 Plots O+N Phase 2 Site Investigation (ref: ROCPLtd/LD/AS/4153-ROC-XX-XX-RP-ES-P2SI1)

2) REC 2019 Plots O+N Phase 2 Geo-environmental and Geotechnical Assessment (ref: 106841P2R0)

3) RoC Consulting 2019 Plot M Phase 2 Site Investigation (ref: LD/AS/P2/3986)

1.1.3 It is recommended reference be made to the abovementioned report(s) when reviewing the current assessment.

1.1.4 An indication of the approved development layout has been provided within Appendix A for each plot. The following Phase 3a Remediation Strategy has been collated to support the pre-commencement planning condition discharge associated with the planning application ref: 124972FO2019 relating to the site's development.

1.1.5 The scope of the report and its assessment has been based around the site's redevelopment proposals in accordance with the abovementioned redevelopment plans. It should be noted that any subsequent revision of the proposed redevelopment or site boundary away from the above-mentioned drawing may result in the full or partial re-interpretation of this report and assessment.

1.1.6 This document provides details on the remediation strategy of ground contamination across the site's in order to prevent potential risk to identified receptors at the site. The report also outlines the scope of remedial measures required by contractors in order to facilitate the site's safe development.

1.2 Remediation Objectives

1.2.1 The following strategy has been collated to address risks relating to soil and groundwater related contamination issues identified during ground investigation works across the site. Previous ground investigations have identified risks posed toward human health and controlled waters (surface and ground) arising as a result of previous industrial operations across the site.

1.2.2 The strategy seeks to demonstrate how these risks have been considered in the context of the site proposed redevelopment and how they will be mitigated against (during both construction and operational phases).

1.2.3 Specifically, the objectives of this remediation strategy are as follows:

1) Define sources of contamination identified during ground investigation works and potential receptors that could be at risk of exposure.

2) Consider potential exposure pathways that could be present, during both the construction and operational phases of the development.

3) Where applicable, complete further assessment of contaminants and potential linkages with identified receptors in order to further qualify risks posed.

4) Consider the ground contamination issues in the context of development proposals and specifically proposed earthworks and foundation construction operations.

5) Specify the scope of remediation measures that contractors will be required to enact during the construction process.

6) Specify the scope of site validation and monitoring works that will be required during the sites remediation in order to ensure conformity with this strategy.

7) Specify what, if any, residual risks will remain on conclusion of site remediation works and what mitigation / monitoring measures may be required.

1.2.4 Information on the sites setting and a synopsis on contaminative potential has been provided within Section 2.0 of this report with a description of contaminant modelling work and assumptions provided within Section 3.0. A specification for remediation works for contractors to review has been provided within Section 4.0 along with associated validation requirements.

1.3 Regulatory Engagement

1.3.1 Initial discussions and a brief appraise of site conditions have been held with Manchester City Council and the Environment Agency during November 2020. The initial results of ground investigations were discussed, and feedback received which has been considered when collating this strategy.

2.0 Site Setting and Context

2.1 Background Information

2.1.1 The following synopsis has been collated from various ground investigations completed across the site by RoC Consulting. It is recommended reference is made to the complete findings and recommendations of these reports when reviewing this strategy.

2.2 Site Description

2.2.1 The site currently comprises an area of recently demolished warehousing located in the Mayfield regeneration area, Central Manchester. The sites are located within a mixed industrial / commercial setting with several residential apartment blocks and the Freight Island and Mayfield Depot event space located in close proximity.

2.2.2 The River Medlock water course (GQRA rating E "Poor") passes along the site's northern boundary in an eastern to western orientation in a combination of open channel and culvert. A number of river walls of varying height (up to 4-5m) and construction form the sites northern boundary with the Medlock. The Medlock is known to flood and portions of the site are located within EA designated flood zones (further details of which are provided within the BuroHappold flood risk assessment and drainage strategy submitted in support of the planning consent).

2.2.3 Topographically levels fall from the north at the boundary with the River Medlock (circa 35.5mAOD) to the south west along Baring Street (circa 34.0mAOD). A rise in level is also noted to the south and east (circa 37mAOD), and across the Plot M site in an area of former basement (varying from the upper level c37mAOD to the south and 34mAOD along the boundary with the River Medlock to the north).

2.2.4 The underlying geology and ground model for the site has been revealed via intrusive ground investigation works and is described in detail within Section 1.4. The Sandstone bedrock is classed as a Principal Aquifer, although the site does not fall within any groundwater source protection zones and no sensitive water abstraction points (e.g. drinking water supply) are located within close proximity (500m) of the site. The surface covering across the site comprises a mixture of tarmac car parking, relic concrete floor slabs and open rough ground relating to recently demolished former warehouse structures.

2.2.5 The Plot O portion of the site currently comprises a vacant plot of land currently used as a hardstanding car park, bordered by a grassed area with a retaining wall forming the northern boundary (with an approximate 6m drop in elevation to the River Medlock beyond).

2.2.6 Plot N is located to the south of Plot O and comprises a bowl-shaped area covered by demolition fill at surface and a slope up to street level at the southern extents. Between site inspection and mobilising to site, a stockpile of material was deposited on site from the wider Mayfield site.

2.2.7 Plot M is located south of the River Medlock (forming the sites northern boundary) and is bound to the west by Nether Street and to the east by Manor Street and a large carpark. The site's southern boundary is formed by the edge of a grassed area adjacent to the A57(M) (Mancunian Way).

2.2.8 The site is intersected by Bond Street running east to west and contains the grassed area containing advertising boards, which gently slopes down to the north. North of Bond Street the site is hardstanding, formerly the demolished building's concrete floor, with a change in level to the exposed former basement level adjacent to the River Medlock.

2.3 Site History

Plots O+N

2.3.1 Earliest records dated 1848 indicate the site to comprise vacant land with an unknown building shown at the south west corner of the site. The wider area is shown to be relatively developed with numerous large buildings and possible terraced style residential housing surrounding the site. The River Medlock is shown in its current configuration to the north of the site.

2.3.2 Maps dated 1891 show the Mayfield Baths at the north of the site with residential housing at the south and extending beyond the south and western boundaries. Numerous large buildings are shown across the wider Mayfield site and the River Medlock is shown to have been partially culverted. Ardwick Tannery is shown to the east of the southern extents, with a Water Meter Works shown to the south east.

2.3.3 In 1908, part of the residential housing at the south of the site are replaced by Ice Works (later referred to as Ice Factory). In 1948, the remain residential housing / buildings surrounding the Ice Factory appear to be demolished. Maps dated 1950 show the former Mayfield Baths as having been demolished. In 1908, buildings to the north of the site appear to have been demolished.

2.3.4 It is understood that the building at the south of the site was demolished to ground level in 2019.

Plot M

2.3.5 Historical records indicate the site to be occupied by Chapelfield Dye Works, including a chimney, from the earliest available records (1848) and later (1908) becoming a rubber works. A Water Meter Works is noted during the pre-war era at the southern extent of the site.

2.3.6 There is no significant change, with exception of the works expanding to encompass the works to the north of the River Medlock (culverting the river immediately north of the site), until the period of WW2

when the site was affected by bombing. By the 1956 mapping record, the site is consolidated into a single building footprint and remained in this condition up until the demolition of the site in 2019.

2.4 Previous Site Investigation Reports

2.4.1 The following reports have been used to complete a geo-environmental assessment of the site and the remediation strategy follows on from and is based around recommendations made as part of these reports.

ROC Consulting 2020 Plot O+N Phase 2 Site

2.4.2 Site investigation works were completed between the 10th and 18th August 2020 and comprised the formation of six cable tool / rotary boreholes and ten trial pits.

2.4.3 Ground conditions within the footprint of the former Mayfield Baths (Plot O) were reported to comprise Made Ground to depths between 2.90 and 7.00mbgl underlain by either weathered sandstone bedrock or orangish brown gravelly sand.

2.4.4 Made Ground was generally reported as car park construction overlying a dark greyish brown gravel of brick, concrete, ash and clinker. Asbestos cement board was identified at numerous locations. Concrete obstructions, relic tiled flooring and brick masonry was reported at numerous locations.

2.4.5 The former Mayfield baths site was subsequently fully exposed and excavated by Salford Archaeology as part pre-commencement planning condition discharge relating to archaeological surveys. These works have revealed the majority of the swimming baths structure and ancillary walls / drainage are still largely intact. A visual inspection of the area was completed by engineers from RoC Consulting to assess what (if any) areas of potential contamination had been revealed, although no visual or olfactory evidence of significantly impacted soils was noted during this inspection.

Plate 2.0: Mayfield Baths site following excavation

2.4.6 Shallow ground conditions across the former industrial development (Plot N) were reported to comprise demolition fill consisting of dark brown gravel of brick, concrete, slate, glass, rebar and timber to depths between 0.60 and 5.70mbgl. Obstructions were encountered at two locations relating to the recently demolished structures.

2.4.7 Natural deposits (of suspected alluvial origin) were encountered within five exploratory hole locations underlying Made Ground deposits. Composition of the superficial deposits was varied and reported as either orangish brown gravelly sand, sandy gravel or soft brown slightly gravelly very sandy silt/clay. At a number of exploratory hole locations, the weathered bedrock fraction was reported directly underlying the Made Ground deposits.

2.4.8 Bedrock was encountered at depths ranging between 6.6m (28.74mAOD) by the northern retaining wall and 7.0mbgl (28.15mAOD) in the centre of the site. At the southern extent bedrock was encountered at depths between 27.64mAOD (BH107) and 29.32 (BH108). Bedrock was reported to be completely weathered recovered as reddish-brown sand. With increasing depth bedrock generally reported as extremely weak reddish brown distinctly weathered sandstone.

2.4.9 Visual and olfactory evidence of contamination was noted at a number of locations during ground investigations including within TT02 at 1.50m where a bitumen odour was noted upon exposing a concrete obstruction. No further olfactory evidence of contamination was noted during fieldworks, although suspected asbestos cement was noted within three locations (BH105, TT03 and TT01) within Made Ground deposits. Subsequent analysis confirms the material to be chrysotile cement.

2.4.10 Chemical analysis results were screened against a “Commercial” end-use scenario. Exceedances were noted by lead at three locations and benzo(a)pyrene at a single location. Asbestos fibres and

asbestos containing materials were noted at x7 locations within made ground deposits, the distribution of these materials is sporadic, and it is likely the contamination has arisen during previous site clearances when building insulation and other materials have been mixed with demolition fill and placed below ground.

2.4.11 Elevated levels of TPH were identified within Made Ground deposits across the site at thirteen locations between depths of 0.50 and 3.00m. However, levels were not found to be in exceedance of relevant screening criteria.

2.4.12 A programme of groundwater and gas monitoring was completed across the site using wells installed during both the RoC Consulting 2020 and previous 2019 REC Ltd site investigations. Spot measurements of resting water levels were made following at 4 intervals between the 11 September and 20 October 2020. These measurements indicate a water table beneath the site at a depth circa 3.6 to 5.6m below ground level (29.8 to 30.36mAOD). The flow gradient (in mAOD) is relatively flat with a slight trend to the south and west.

2.4.13 In addition to spot measurements of water levels the in-situ monitoring of groundwater was completed at two locations across the site, namely within the proposed basement of Plot O (BH105), and within a monitoring well immediately adjacent the River Medlock to the north (BH110). The from in-situ monitoring works indicate resting groundwater levels between 31.2 and 29.9mAOD beneath this portion of the site, appearing to respond with little if any lag to rainfall events (and subsequent increases in flow within the River Medlock).

2.4.14 The gas screening value derived from gas monitoring results equates to a Characteristic 1 Situation. It is noted that a marginal exceedance of 5.0% CO_2 was noted at a single borehole which, in line with CIRIA C665, requires a Characteristic Situation 2 with some remedial measures required.

2.4.15 With reference to development proposal's, it was noted a basement structure is proposed beneath the Plot O office footprint which will require the removal of all made ground materials from this area (and by extension sources of gas generation). Similarly, the open-air multistorey car park proposed at Plot N will reduce the severity and impact of any ground gases in this area. As such the need for remedial measures to control ground gases is not considered appropriate.

2.4.16 Chemical analysis of groundwaters beneath the site indicate exceedances of screening values for Mercury, Selenium, Fluoranthene and Benzo(a)pyrene in groundwater samples obtained from wells sealed into Made Ground deposits. Exceedances of arsenic, mercury, cadmium, lead and fluoranthene were noted in groundwater samples obtained from wells sealed into glacial till and bedrock deposits. It is considered the source of these contaminants has arose from the leaching of

chemicals contained within ashy demolition type fill materials, and other wastes, that were historically used to infill basements, swimming pools and other below ground structures beneath the site.

REC Ltd 2019 Phase 2 Geo-environmental and Geotechnical Assessment

2.4.17 Site investigations were undertaken by REC in March 2019 comprising four window sampler boreholes to depths of up to 5.00mbgl, six trial pits to depths of up to 2.10mbgl and eight cable tool boreholes with rotary follow-on at select locations to depths of up to 25.00mbgl.

2.4.18 Made Ground was reported across the site to a maximum depth of 5.50mbgl and was generally reported as asphalt overlying gravelly sand or gravelly clay with gravels of concrete, limestone and brick.

2.4.19 Natural strata underlying Made Ground was reported as either sandy clay, sandy gravel or fine to medium sand. The sandstone bedrock was reported at depths between 2.80 and 5.50mbgl. At shallow depths the bedrock was recovered as red sand becoming reddish brown gravel of sandstone.

2.4.20 Chemical analysis of site soils indicates an exceedance of screening levels for Arsenic and Benzo(a)pyrene within shallow Made Ground at two locations (CPBH04 and CPBH02 respectively).

2.4.21 A Photo-Ionization Detector was used to assess levels of volatile compounds within site soils. The highest value recorded was within CPBH02 at 0.20mbgl and recorded a concentration of 10.7ppm. It was noted that this is a relatively low value.

2.4.22 Ground gas monitoring results show a maximum CO2 concentration of 3.3% with maximum flow rates of 0.2l /hr. Depleted oxygen levels and an absence of CH4 was also recorded.

RoC Consulting 2019 Plot M Phase 2 Site Investigation

2.4.23 A site investigation was completed between the 30 September and the 18 October 2018 and comprised the formation of four cable tool with rotary follow boreholes and six window sampler boreholes.

2.4.24 Ground conditions were generally found to comprise relic concrete floor slabs overlying either Made Ground or natural strata. Made Ground was reported at 7 locations generally reported as clay with brick, glass and slate to depths between 1.0 and 4.1mbgl.

2.4.25 Weathered bedrock was encountered at 7 locations from depths between 0.3 to 4.1mbgl and recovered as reddish-brown sand or sandy gravel. Competent bedrock was encountered from depths between 27.94 and 22.00maOD and reported as distinctly weathered thinly bedded sandstone.

2.4.26 Olfactory evidence of hydrocarbon contamination was noted at a single location at 3.80mbgl and asbestos containing material was identified beneath the upper floor slab. When compared against a “Commercial” end-use scenario, no exceedances of criteria were noted in results of soil chemical

analysis. Loose asbestos fibres were noted at a single location. Elevated levels of PAH were noted within some Made Ground deposits however were not in exceedance of screening criteria.

2.4.27 Groundwater monitoring indicates a resting groundwater table within the sandstone deposits at depths of 33.70mAOD. Chemical analysis of a single groundwater indicated all determinands to be below the relevant screening criteria.

2.4.28 The ground gas regime at the site was reported as Characteristic 1 Situation with no remedial measures required.

2.5 Summary of Identified Risks

2.5.1 The following section comprises a summary of the identified risks to receptors recorded within previous site investigation reports. Reference should be made to the aforementioned reports for a more detailed account of the results.

2.5.2 Risks to Human Health (both construction operatives and future site users) and controlled waters (River Medlock and Sandstone Aquifer) receptors have been identified. These risks include:

1) Elevated levels of Heavy Metals, Poly Aromatic Hydrocarbons (PAH) and Asbestos presents a risk to both construction persons and future site users via their potential inhalation and ingestion when exposed to site soils.

2) Elevated levels of Heavy Metal and PAH contamination has been identified within the underlying shallow groundwater table that has a potential to impact the adjacent River Medlock and underlying Sandstone Aquifer.

3) Future foundation construction (and specifically piling works) has the potential to create preferential movement pathways for contaminants toward the underlying Sandstone bedrock aquifer.

4) Elevated levels of ground gas generation have been identified at Plots O + N which poses a risk to future site users. Construction workers are at risk of ground gas accumulation when working in below ground excavations or enclosed spaces across the wider site. Risks posed from ground gases toward future site users is considered to be reduced by the nature of the proposed development (i.e. multistorey car park and office with basement).

5) A programme of bulk earthworks will be required in order to facilitate basement construction and any other wider ground reprofiling works. There is a risk of sediment rich surface run off flows emanating from the site during rain fall events entering and contaminating the River Medlock.

Similarly, such risks will be active during periods of flood, particularly where construction works fall within areas of known flooding.

6) Given the range of substances reported in made ground materials beneath the site, a possible risk toward potable water supply is also present. The nature of this risk will be specific to the areas in which proposed new water supply connections will run, which at the time of writing, are yet to be defined. As such further consideration and completion of a United Utilities Pipe Work Risk Assessment will be required at such time when the locations of these service runs are defined.

2.5.3 An indication of the remediation measures required to mitigate against the above concerns is provided within Section 3.0.

2.5.4 It should be noted the above risks and contaminant linkages are active in the site in its current configuration and have the potential to be altered by proposed earthworks and development operations. As such, the remediation requirements outlined in Section 4.0 take due consideration of the earth and construction works. A description of the proposed development and earthworks is provided in Section 2.6.

2.6 Description of proposed earthworks

2.6.1 The site is to be developed for commercial led end uses comprising the following:
- Plot O “Poulton” 8 storey commercial office with basement
- Plot N “MSCP” x storey car park
- Plot M “Republic” Commercial office

2.6.2 Ground investigation works have revealed a significant portion of the development site contains numerous below ground obstructions and structures including the almost completely intact Mayfield Baths (comprising swimming pools, walls, floors and foundation bases) as well as other relic foundations, basement floors and walls relating to former phases of the development across the site.

2.6.3 The Mayfield Baths site has been completely excavated and recorded by Salford Archaeology and its spatial extent is well defined as such. Other below ground structures away from this area have been revealed during ground investigations although their complete extent remains undefined.

2.6.4 A programme of enabling earthworks is proposed across the site in order to resolve and remove below ground obstruction risks. These works will take two forms, namely:

1) Excavation and “turning over” of made ground deposits until natural alluvial strata is uncovered, with all below ground structures broken out in the process (within footprints of Plots N and M).

2) Excavation and “turning over” of made ground materials within the footprint of the proposed Poulton building with excavations continuing to the underlying Sandstone bedrock.

2.6.5 The enabling works within the area of the Poulton Office building are being completed to allow construction of the proposed basement structure the floor slab of which will be set at a level circa 32.0mAOD. It is understood following discussions with the structural engineers for this building (Civic Engineers) that new office building will be founded using a raft type structure within the weathered fraction of the Sandstone bedrock. Where the Sandstone is not present at the founding level, excavations will be continued until it is encountered and restored to required level in material suitable to be used within raft construction.

2.6.6 Soils excavated during the enabling earthworks process will be taken to an onsite processing facility where they will be sorted and segregated based on their constituent type / properties. All deleterious, contaminated or unsuitable soils will be stockpiled for removal from site to a suitably licensed waste facility. Brick, concrete and other recyclable material won during these enabling works will be processed on site for reuse as engineered fill within the wider earthworks process.

2.6.7 It is envisaged all excavations completed during this enabling earthworks phases will be re-instated using approved site won material. This material will need to fall within the requirements of the RoC Consulting Earthworks Specification (ref: 4153-ROC-XX-XX-SP-C-D20) to ensure conformity with engineering fill requirements. The material will also need to comply with the chemical specification for reuse outlined within this Phase 3a Remediation Strategy report.

2.6.8 Further details of the proposed enabling earthworks operations have been provided in Appendix C of this report and should be reviewed in conjunction. In addition, the contractor will prepare a Materials Management Strategy for these works (with reference to the recommendations of this report and proposed earthworks strategy) which should also be reviewed when considering enabling earthworks.

2.6.9 Following completion of enabling earthworks the site will be left for the main works contractor to commence construction of the offices / multi storey car park. The timelines for these construction works are yet to be confirmed and elements of the remediation requirements (soft landscaping) will be completed by the main works contractor. GA layout plans and soft landscaping arrangements for these proposed developments are provided within Appendix A

3.0 Detailed Remediation Strategy

3.1 Remediation Philosophy and Summary

3.1.1 The scope of these remedial works focusses on the protection of receptors relating to human health at the proposed developments across Plots O, N and M within the Mayfield SRF.

3.1.2 Remedial measures have also been detailed to ensure protection of controlled waters at the site. A review of groundwater sampling data and soil analysis indicates that elevated levels for contaminants are locally impacting the groundwater quality at select locations. An absence of elevated levels of contaminants within all groundwater samples obtained indicates the contamination is not widespread within groundwater beneath the site.

3.1.3 Further remedial measures for the re-use of Made Ground deposits will likely be required across other plots within the wider Mayfield site to ensure protection of human health, controlled waters and other identified receptors.

3.1.4 Remedial measures have been selected based on a 'best sustainable approach, involving a minimal approach with respect to the removal and disposal of contaminated materials from site. It is noted that due to close proximity to the River Medlock at the north of Plots O+N, this area of site is considered to pose greater risks to the surface water feature than soils located at the far south of the site.

3.2 Remedial Requirements

Soft Landscaping

3.2.1 Elevated levels of contaminants have been identified within site soils that pose a risk to future site users. It is noted that development proposals comprise predominantly hardstanding which is considered sufficient to break the exposure pathway and reduce the risk to future site users.

3.2.2 Where areas of soft landscaping are proposed, a capping layer will be required to a minimum of 450mm. Soils used in soft landscaping capping should be natural nonreworked origin and will be subject to a program of chemical testing to confirm suitability for use in this context at a frequency of 1 sample / 250m^3 used. The results of this testing should be compared to the specification for reuse in "public open space" provided within Appendix C of the current report.

3.2.3 These results should be provided to RoC Consulting for independent verification and approval prior to being used on site. Any soils with substances that are above the values specified within Appendix C are not suitable for use and should not be employed as clear soil capping.

3.2.4 Photographic evidence that the required capping thickness has been achieved should be obtained at all soft landscaping locations.

3.2.5 Laboratory testing of soils for use in capping should be taken from soils that are intended to be imported onto site; the use of historical testing data provided by suppliers cannot be provided as evidence of validation.

Site Won Material Reuse

3.2.6 With reference to proposed earthworks operations (See section 2.6) it is noted made ground deposits across the site will be excavated and turned over to underlying natural strata across its entirety to remove below ground obstructions and any areas of grossly contaminated / impacted soils. Levels will then be reinstated in accordance with the site wide level strategy (refer to drawing 4153-ROC-XX-XX-DR-C-SK016) using site won material. Excavated made ground will be transported to an onsite treatment facility for processing by contractors prior to its reuse.

3.2.7 The reuse of this site won material will need to be done in compliance with the RoC Consulting Earthworks spec (ref 4153-ROC-XX-XX-SP-C-D20) in order to ensure its conformity with requirements as engineered fill. In addition, the material should be subject to chemical analysis at a frequency of 1 sample per 500m^3 used to ensure no sources of contamination are being introduced to site soils during the earthworks process. A chemical specification for this material reuse has been provided within Appendix B of this strategy.

3.2.8 As is the case with proposed landscaping capping, the contractor should ensure samples of site won material proposed as backfill are taken at the required frequency for chemical analysis. The results of this testing should be compared against the values prescribed in the above-mentioned specification prior to use on site. Adequate site records of both material volumes, chemical testing certification should be obtained for use as evidence within the Phase 3b Site Validation report. Photographic records should also be obtained throughout the process as further evidence of its completion.

Protection of Controlled Waters

3.2.9 It is noted the earthworks proposals will see the majority of made ground deposits excavated until natural strata (either alluvial deposits or Sandstone bedrock) is encountered. Site levels will then be restored using site won material that complies with the specification for material reuse outlined above. As such it is considered the risks posed towards both surface (Medlock) and bedrock aquifers will be reduced.

3.2.10 However, there are several locations that fall outside proposed new building footprints (e.g. along the boundary with the River Medlock to the north) where excavations and soil turn over will be limited. A review of groundwater and soil analyses indicates that Made Ground soils within the area of BH110 are impacting local groundwater quality, specifically relating to elevated levels of arsenic recorded. It is noted that this location is immediately adjacent the River Medlock and may be in hydraulic connectivity with the river.

3.2.11 As such, Made Ground at BH110 will require excavation and disposal to a suitably licensed landfill facility. Presence of contamination within surrounding soils should be investigated by way of trial trenches to delineate this area of contamination. Soils used for replacement are to be subject to chemical validation as outlined above.

3.2.12 Groundwater sampling and subsequent chemical analysis has revealed elevated concentrations of Heavy Metals and PAH contamination within the underlying shallow water table. It is likely these contaminants are arising as a result of the aforementioned soil sources of contamination and the quality of underlying groundwaters will likely improve with time with the removal of these hotspots.

3.2.13 As such and given already pre-existing water quality (GQRA Grade E) within the River Medlock and an absence of any sensitive groundwater abstraction points / source protection zones in close proximity to the site, the treatment (either ex or in-situ) and clean-up of groundwaters beneath the site is not considered to be warranted. A series of conceptual ground model sections (4.1-4.3) have been provided overleaf to graphically illustrate contamination and remediation requirements.

Protection of River Medlock during construction works

3.2.14 Special precautionary measures will be required when working in close proximity to the riverbank. Access to the riverbank should be restricted by way of fencing and / or rails. Access to the riverbank beyond protective barriers should not be permitted unless appropriate risk assessments have been undertaken and alternative safety measures employed.

3.2.15 Discussions with the Environment Agency regarding protection of the River Medlock and any works undertaken within close proximity of the river are subject to submission of adequate risk assessments and require approval before commencing works.

3.2.16 A strategy of surface water run-off control, particularly run off from bare soils, should be developed by the contractor to ensure no untreated waters emanating from the site enter the River Medlock. This requirement will apply to areas of both clean and potentially contaminated soils as allowing even clean sediment ingress into the Medlock could create build up in the channel, water turbidity and reduction in water quality.

3.2.17 Similarly suitable control measures will need to be taken by contractors to protect any groundwaters that are encountered during construction works, as well as the underlying Sandstone Bedrock aquifer.

3.2.18 Hydrological modelling, completed by BuroHappold in support of the current planning consent for Plots O, N and M, indicate the area is at risk of flooding during a 1 in 25 and 1 in 100-year scenarios. In order mitigate against flood waters entering the site from the Medlock (and potential for subsequent sediment rich / contaminated water flows back into the channel) temporary flood defence measures will be constructed in stages to protect the site for flooding and backwash risks. Further information on these temporary flood protection measures is provided on RoC Consulting drawings SK14 and SK15 (provided within Appendix C).

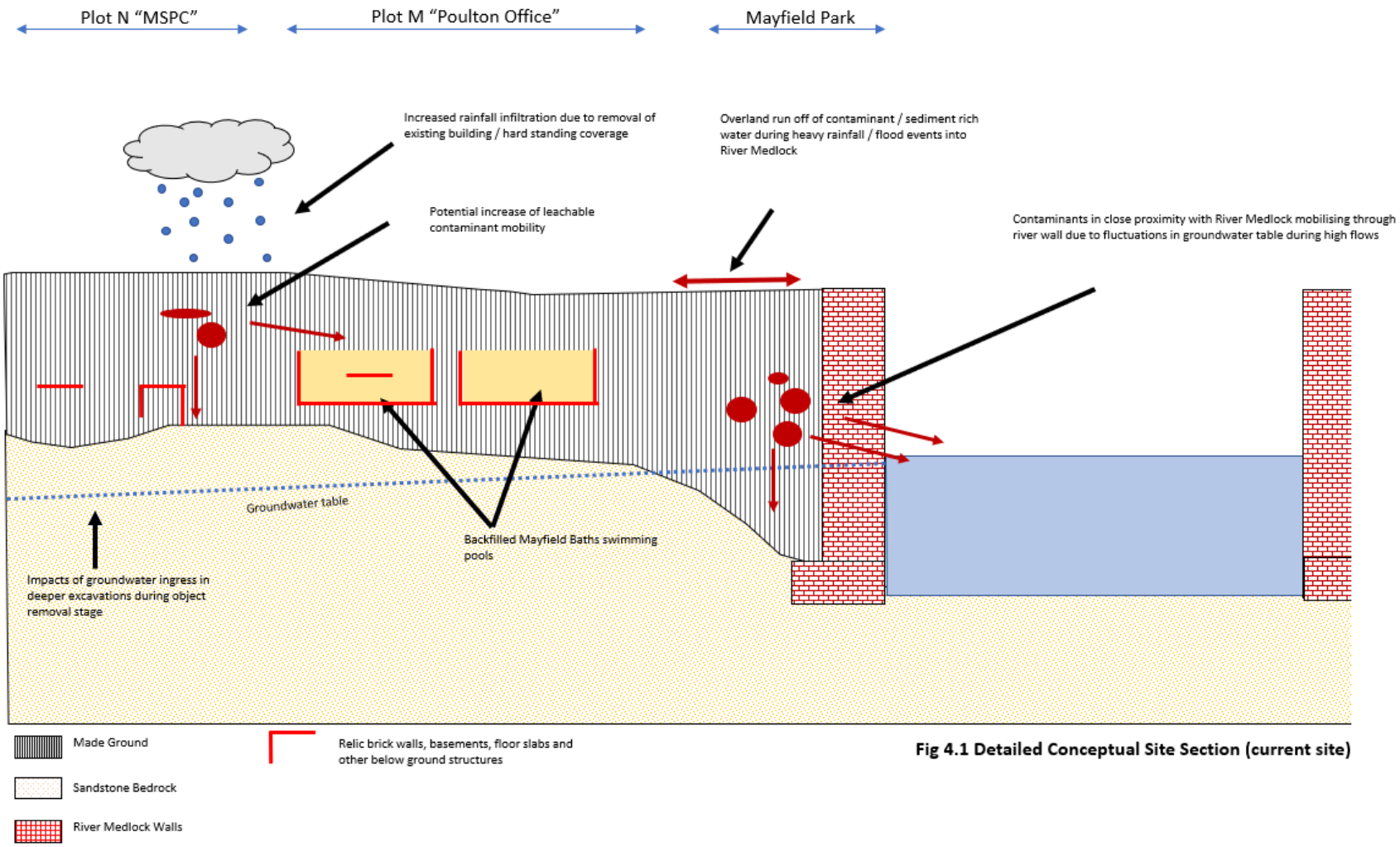


Fig 4.1 Detailed Conceptual Site Section (current site)

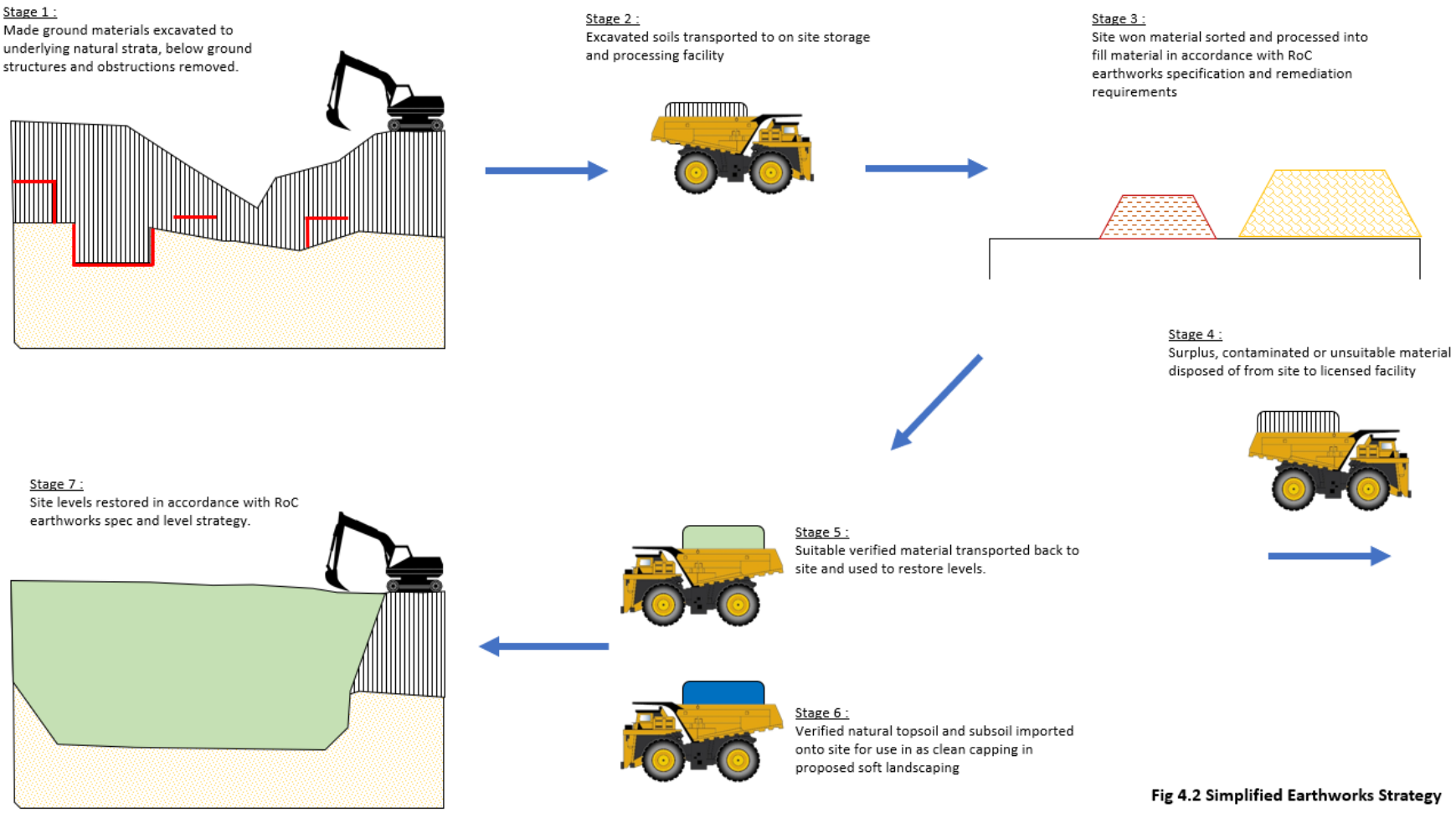


Fig 4.2 Simplified Earthworks Strategy

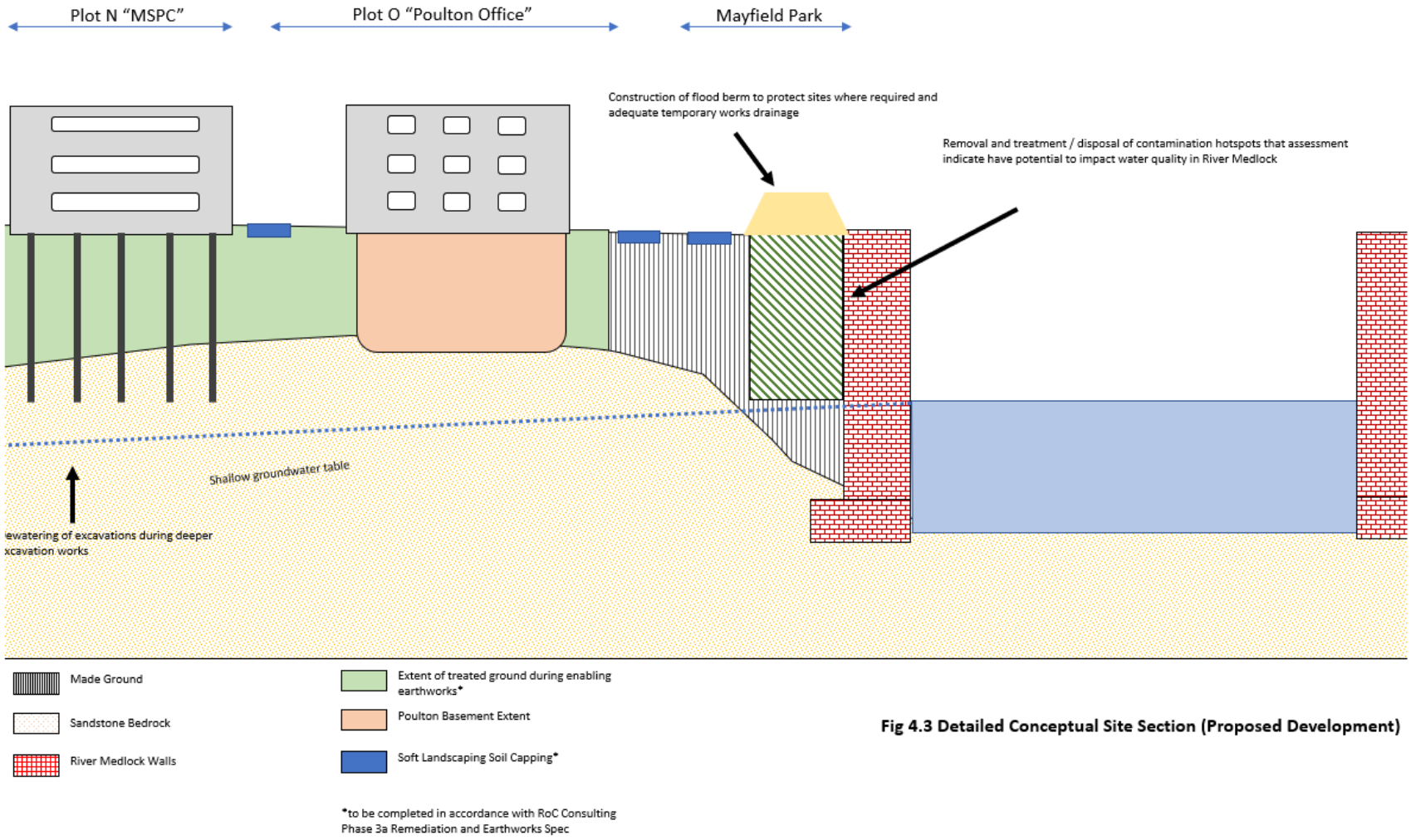


Fig 4.3 Detailed Conceptual Site Section (Proposed Development)

Foundations and piling

3.2.19 The use of piled foundations will be required on site associated with the construction of the proposed Plot N multi-storey car park and Plot M commercial office building. At the time of writing specific information on pile design (diameter, length etc) is yet to be confirmed but will likely comprise the formation of cast in-situ concrete piles using continuous flight auger (CFA) methods.

3.2.20 The excavation of piles through superficial deposits and into the Sandstone bedrock aquifer has the potential to create pollution linkages between this receptor any near surface contaminants (via either the movement of contaminated soil or groundwater down the pile shaft during boring works). Considering the proposed enabling works strategy, and soil reuse validation requirements, it is considered unlikely any sources of contamination will be introduced into the Sandstone aquifer during piling works.

3.2.21 Similarly, although the underlying shallow groundwater table was found to have been impacted by previous site operations / made ground deposits, the severity of this contamination is not considered sufficient to pose a large-scale risk to water quality within the aquifer. As such, assuming the aforementioned enabling earthworks are enacted in compliance with the requirements of this strategy, we do not envisage any further remedial requirements with respect to piling or other penetrative methods of foundation construction.

Potable Water Supply

3.2.22 Elevated levels of contaminants have been identified that poses a risk to drinking water supply pipes. Completion of a United Utilities Risk Assessment including sampling of soils at depth and location of proposed water supply pipes will be required. Completed risk assessments complete with location plan, soil chemical analysis results and required pipe type will be required for submission to United Utilities for review. Certification of installation of any protective barrier pipes will be required.

General Remedial Comments

3.2.23 It is likely that contaminated material including Asbestos will be encountered during bulk earthworks. All construction persons should be properly briefed on the identification of Asbestos material and, where encountered, earthworks should cease whilst risks are properly considered. The regular damping down of excavations and excavated soils would also be prudent in such instances to prevent dust generation and release from any Asbestos contaminated soils.

3.2.24 It is recommended all construction contractors take reasonable precautions to control environmental impacts that may occur as a result of redevelopment works with respect to soil and groundwater quality. These measures should include (and not be limited to):

1) Any sources of contamination uncovered during site development works should be brought to the immediate attention of RoC Consulting for consideration and comment. As required, the findings and recommendations of the current assessment may require amendment to reflect changes in site condition.
2) A watching brief should also be adopted throughout ground works and any suspected sources of grossly contaminated soil brought to the immediate attention of RoC Consulting for consideration and comment.

3) The operation of plant and refuelling facilities should include appropriate provision to reduce the risk of leakage / spillage, particularly into the site's groundwater table or exposed natural soils.

4) All excavated materials stockpiled should be periodically dampened down to control dust release. Similarly, the disposal of any material from site should be completed using covered wagons.

5) During redevelopment the workforce will need to adopt full HSE measures to ensure that the elevated concentrations of contaminants requiring cover, treatment and/or removal are dealt with according to current guidelines and codes of practice. Suitably experienced and competent staff should be employed to carry out the on-site remediation. It is considered the use of full PPE and proper site welfare and hygiene practises will adequately mitigate against risks posed.

6) Dust mitigation measures are to be employed during the site's development, particularly when dealing with made ground that may contain asbestos fibres. Dust mitigation measures include but are not limited to the periodic damping down of stockpiled materials, avoidance of doubling handling and real time air quality / asbestos fibre monitoring. Asbestos awareness training should be provided for all groundworkers at the site.

3.2.25 Site personnel are not permitted to enter unstable excavations, nor excavations in which contamination is present, nor unsupported excavations deeper than 1.2m, in accordance with standard HSE protocols. Standard air sampling and monitoring equipment shall be used which emits an audible warning of the presence of any volatile gases and/or low oxygen atmospheres.

3.3 Validation Reporting

3.3.1 The Local Authority and Environment Agency will require evidence the recommendations and requirements outlined within this strategy have been in acted by the contractors during construction works. This validation will take the form of a Phase 3b Site Validation report which will be collated by RoC Consulting on conclusion of site works. The report will outline the following:

- A summary of the desk study, site investigation report and remediation strategy
- Details of who carried out the respective remedial works
- Details and justification of any changes from the original remediation strategy
- Substantiating validation data included as follows:

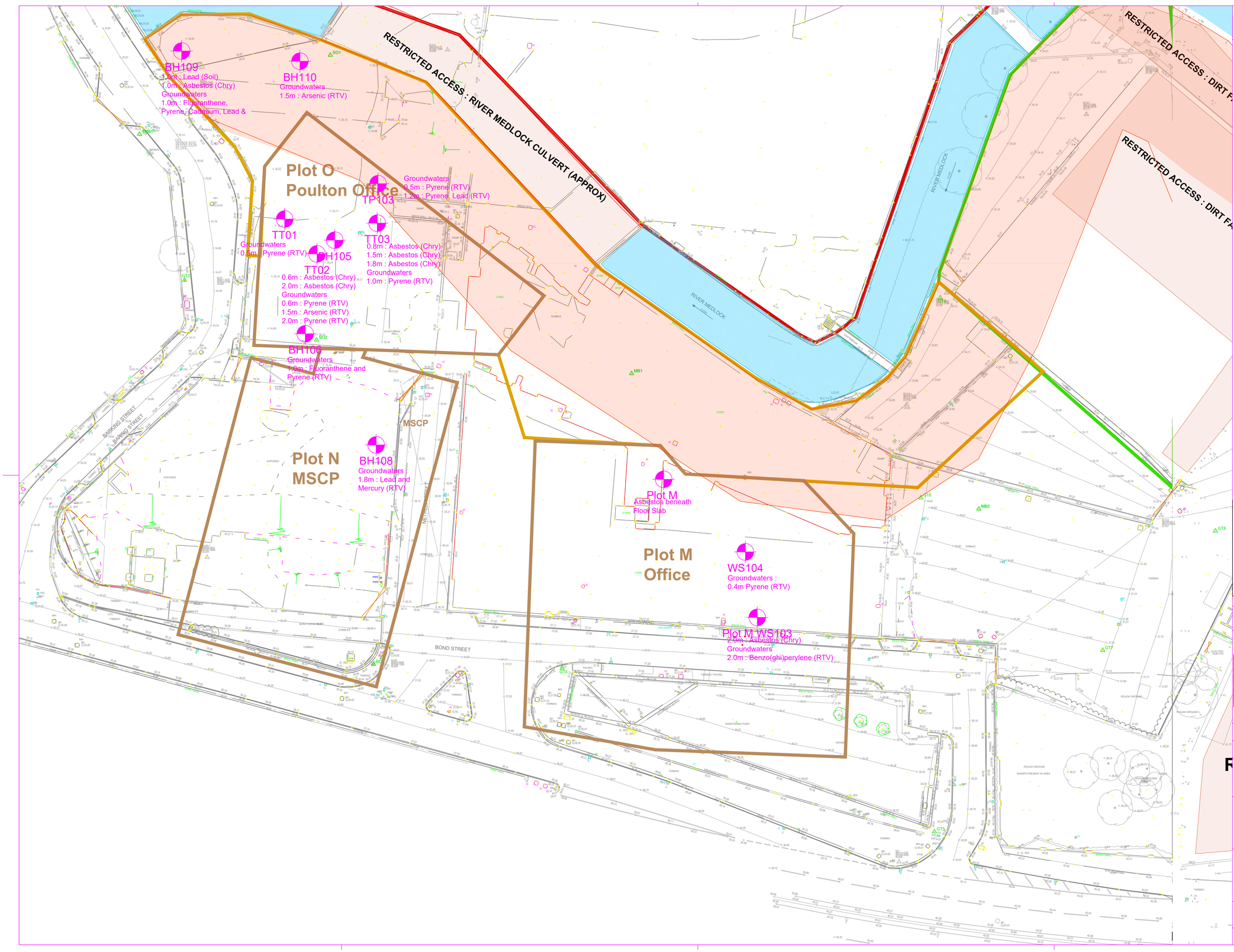
  - Laboratory and in-situ test results
  - Chemical test results relating to clean up criteria
  - Representative plans depicting treated areas and any amendments to strategy as a result of finding further contamination (if necessary)
  - Photographic records of excavations (both landscaping and general earthworks)
  - Waste management tip tickets and records (for any materials disposed of from site)
  - Details of any grossly or unidentified sources of contamination that were revealed during construction works and how they were dealt with
  - Evidence of the construction of temporary surface water drainage control and flood protection measures in order to demonstrate to the regulatory authorities that measures were taken to protect the River Medlock

3.3.2 RoC Consulting will attend site periodically throughout the remediation works to monitor and supervise various elements of the above. The suitability for reuse of site won or imported material will also need to be confirmed by RoC Consulting (ideally prior to its placement) via the review of chemical validation certification provided by the contractor.

3.3.3 These validation tests should be completed in accordance with the frequency and specification provided and issued to RoC Consulting for review in sufficient time to allow our comment prior to use on site. Any material placed without approval from RoC Consulting will be done so at the contractor's own risk.

3.3.4 On completion of site works RoC Consulting will collate the Phase 3b Remediation Strategy for submission to the regulatory authorities for their review and discharge of associated planning conditions. It should be noted the regulatory authorities will require adequate time to review and approve both this validation report (as well as the current Phase 3a Remediation strategy) and agreement of practical completion dates (and other contractual obligations) make adequate provision for these comments / approvals.

APPENDIX A - SITE DRAWINGS



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NOTES

BH108 Groundwaters Lead, Cadmium, Pyrene, Fluoranthene, Lead, Mercury (RTV)

CONTAMINATION HOTSPOT (AS REVEALED BY GROUND INVESTIGATIONS)

20M RIVER MEDLOCK BUFFER ZONE

NOTES

1) SOURCES OF CONTAMINATION IDENTIFIED ARE BASED ON RoC CONSULTING AND REC LTD INVESTIGATIONS COMPLETED ACROSS THE SITE.

2) REFERENCE IS MADE TO THE FINDINGS OF THE GROUND INVESTIGATIONS AND ROC CONSULTING PHASE 3a REMEDIATION STRATEGY WHEN REVIEWING THIS DRAWING

3) 20M MEDLOCK BUFFER ZONE HAS BEEN TAKEN FROM REMEDIAL TARGETS METHODOLOGY MODELING WORKS FOR THE PROTECTION OF SURFACE WATER QUALITY. A MORE STRINGENT SOIL CHEMICAL SCREENING CRITERIA IS PROPOSED FOR MATERIAL RE USE WITHIN THIS ZONE.

REV.	DATE	DETAILS	DRN.	CHK.

DRAWING STATUS
INFORMATION

RIBA STAGE

RoC CONSULTING
Commercial Wharf
6 Commercial Street
Manchester M15 4FZ
T 0161 214 5190
W rocconsulting.com

DRAWN	DATE	SCALES
AS	DEC 2020	NTW
CHECKED	DATE	THE ABOVE SCALES APPLY WHEN PLOTTED AT A1 SIZE --DO NOT SCALE--
APPRVD.	DATE	EMAIL FOR DRAWINGS info@rocconsulting.com

CLIENT
MAYFIELD PARTNERSHIP LTD

PROJECT TITLE
MAYFIELD MASTERPLAN

DRAWING TITLE
CONTAMINATION HOTSPOTS & REMEDIATION ZONING

PROJECT No.	DRAWING No.	REV.
4153	REM101	R1

C RoCp Ltd.

Landscaped area within hatched zone to be temporary pending proposals for the realignment of Baring Street coming forward with a future application.

BARING STREET

Baring Street MSCP

34.50
34.30
34.70
34.90
34.90
35.55
35.75
35.35
35.00
35.70
36.15
36.15
36.15
36.15
36.85
36.85
36.65
36.85
37.50
P1
P11
P15
P14

KEY

Levels

Baring Street MSCP Site Boundary

Levels

Proposed Levels

PavingTypes

P1 Paving Type 01

Description: Clay Paving Bricks
Finish: Diamond chequered pattern
Colour: Staffordshire blue
UK sourced

P11 Paving Type 11

Description: Temporary asphalt road surface
- Occasional traffic

P14 Paving Type 14

Description: Carriageway within Highways
Finish: Asphalt to adoptable highways standard
Levels: Tie into existing
*Please refer to Civil Engineer's plans for further information

P15 Paving Type 15

Description: Pavement within Highways
Finish: Asphalt to adoptable highways standard
Levels: Tie into existing
*Please refer to Civil Engineer's plans for further information

Trees

Tree Specimen 01

Size: Varied
Fixing: Underground guyed
Accessories: Rootrain precinct system
Soil depth: minimum 1000mm
Target soil volume per tree: 20m3
- An allowance for a root cell system will be required for all trees planted in hard landscape

Planting

Planting Type 01

Description: Street Planting

Planting Type 03

Description: Grassland

***NOTE:**
Refer to Tree Specifcation Document & drawing 0345-SEW-ZZ-00-DR-L-007104 for further information

Street Furniture

Bollard 02

Description: Powder coated steel bollards
Dimensions: 900mm high x 100mm dia
Finish: Powder coated - colour TBC

Bollard 03

Description: Retractable Powder coated steel bollards
Dimensions: 900mm high x 100mm dia
Finish: Powder coated - colour TBC

General Notes

No implied licence exists. This drawing should not be used to calculate areas for the purposes of valuation. Do not scale this drawing. All dimensions to be checked on site by the contractor and such dimensions to be their responsibility. All work must comply with relevant British Standards and Building Regulations requirements. Drawing errors and omissions to be reported to the architect.

Notes

Rev	Date	Description	Chk
P02	09.01.20	Temporary note added	SEW
P01	18.12.19	Updates in line with MSCP entrance change	SEW
P00	25.09.19	PLANNING	SEW

Keyplan

N

Scale Bar

0 10m

sew Studio Egret West
3 Brewhouse Yard
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EC1V 4JQ
0207 549 1730
hello@egretwest.com
egretwest.com
©2015 SEW ltd

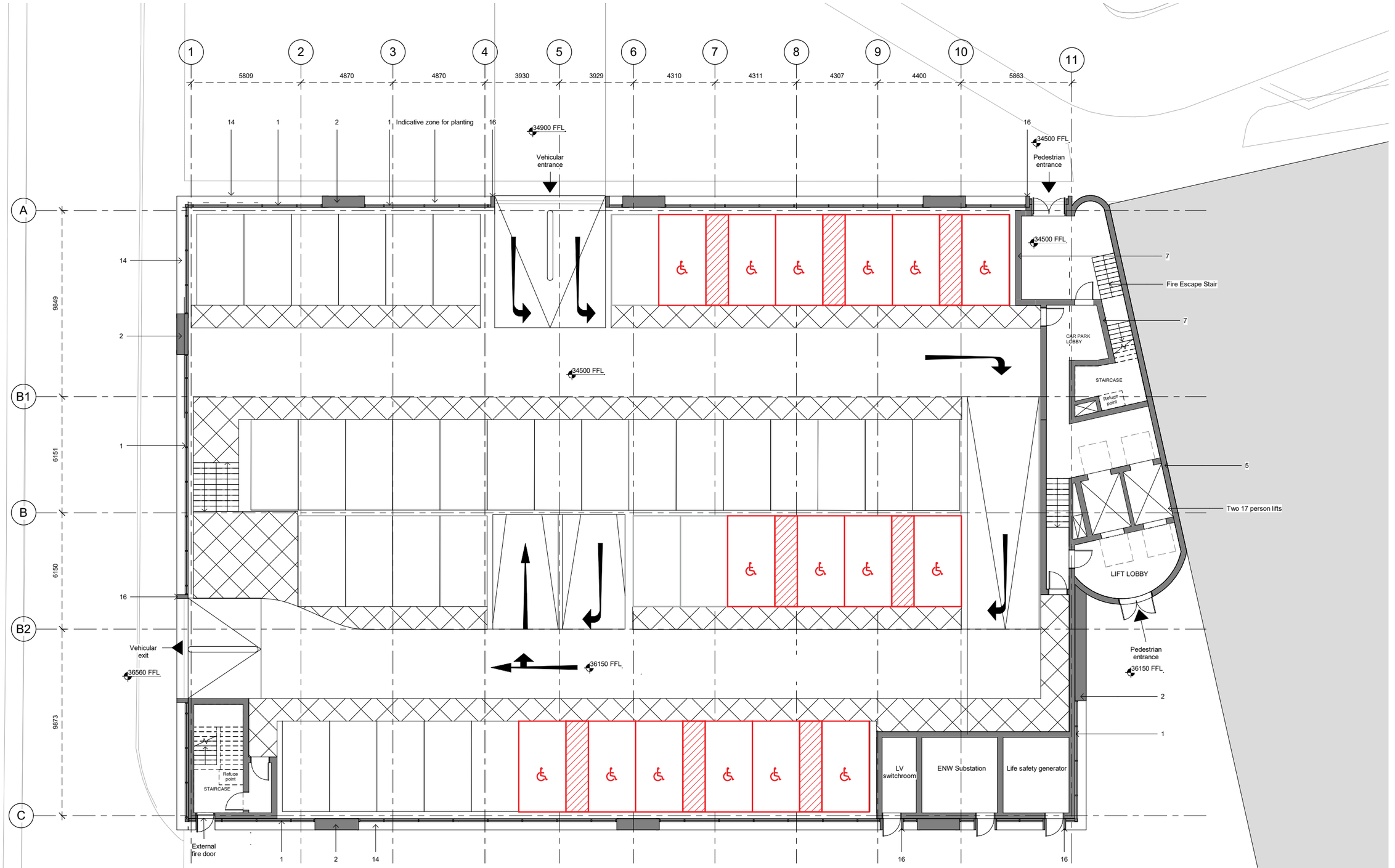
Client
Mayfield Partnership

Project
Mayfield Park

Drawing Title
Baring Street MSCP
Landscape General Arrangement

Project Number	Status
0345	Planning
Scale at A1	Date
1:200	25.09.19
Drawn by	Checked by
MA	SEW

Drawing Number	Revision
0345-SEW-N0-00-DR-L-001700	P02



NN_Level 00
1 : 100

TOTAL: 581 PARKING SPACES

Revised Total Parking Amount:

545 Parking Spaces (- 15 decrease)

36 Accessible Parking Spaces (+ 15 increase)

Revised Ground Floor Parking Amount:

33 Parking Spaces (- 2 decrease)

16 Accessible Parking Spaces (+ 2 increase)

General Notes

No implied licence exists. This drawing should not be used to calculate areas for any contractual purposes.
Do not scale this drawing for construction purposes. All dimensions to be checked on site by the contractor and such dimensions to be their responsibility.
All work must comply with relevant British Standards and Building Regulations requirements. Drawing errors and omissions to be reported to the architect.

Notes

1 - Steel Grating
2 - Louvred Grating
3 - Steel Grating with Fireproof Panel
4 - Louvred Grating with Fireproof Panel
5 - Precast Concrete Core
6 - PPC Steel Grating Balustrade
7 - Blockwork Wall with Fire Lining
8 - PPC Expanded Aluminium Mesh
9 - Expanded Mesh with Fire Lining
10 - PPC Aluminium Panels with Perforations
11 - PPC Aluminium Panels with Perforations and Fire Lining
12 - PPC Black Steel Structure
13 - PPC Steel Panel Balustrade
14 - Steel Trim
15 - Secondary support system for facade fixed to primary frame
16 - PPC aluminium trim to door surround
17 - Steel grating on access door to sub station.
18 - PPC Aluminium Panel

Rev	Date	Reason for Issue	
P2	18.12.19	P2	JC
P1	24.09.19	P1	JC

Keyplan

Scale Bar
@ 1:100

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020 7549 1745
hello@egretwest.com
egretwest.com
@EGRET WEST

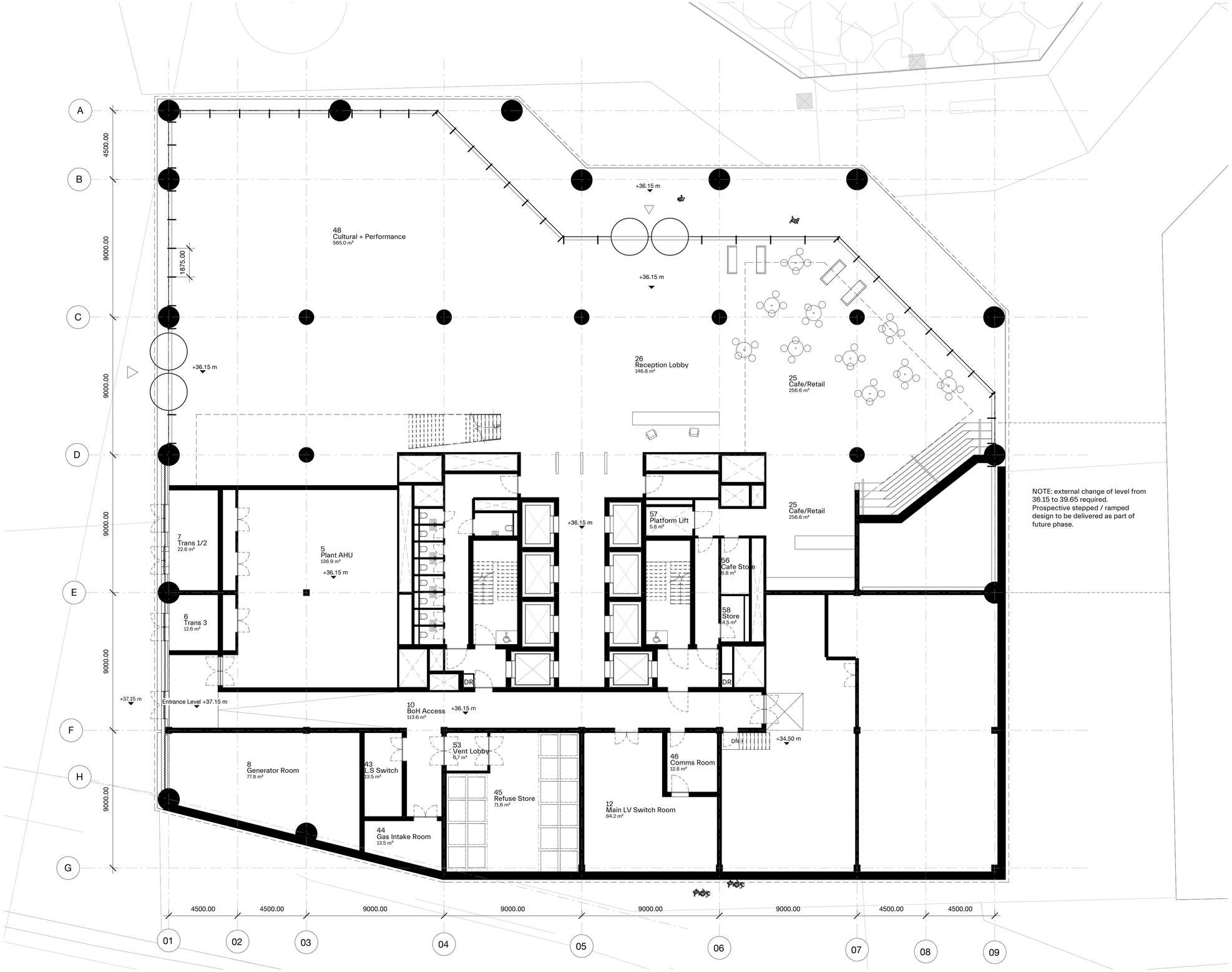
Client
The Mayfield Partnership

Project
0344 Mayfield Car Park

Drawing Title
Proposed Floor Plan
Proposed - Level 00 (Ground)

Project Number	Status
0344	Planning
Scale at A1: As indicated	Date: 18/12/19
Drawn by: FK	Checked by: SEW

Drawing Number: 0344-SEW-ZZ-00-DR-A-001100
Revision: P2



NOTE: external change of level from 36.15 to 39.65 required.
Prospective stepped / ramped design to be delivered as part of future phase.

NOTES:

SUPPLEMENTARY INFORMATION:
These drawings reflect the current position of the scheme development at RIBA Stage 2, they should be read in conjunction with the following information prepared by Morris+Company:

- N/A

Drawings should also be read in conjunction with information prepared by other consultants (where applicable), in order to demonstrate a coordinated design proposal at RIBA Stage 2:

- Structural Engineers Drawings and Specification. (ROC)
- MEP Engineers Drawings and Specification. (WSP)

EXTENTS AND BOUNDARIES:
These drawings combine survey and site information produced by others and as such should be verified for accuracy.

Site context, surrounding infrastructure, neighboring building extents and plots are derived from drawing: N/A

The freehold boundary shown is derived from drawing: N/A

Landscape derived from SEW drawing: N/A

DWG format is provided for information purposes only. Do not take measurements or derive detailing conclusions from .dwg file, refer instead only to pdf sheet file formats, with title blocks, formal issue dates, full annotations and dimensioned labels. Morris+Company Limited do not permit the re-use, appropriation or derivation of this cad data by any other consultant or third party.

revision	date	amendment
A	13.09.19	General Update
B	30.09.19	General Update
C	03.10.19	Stage 2 Issue

N

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www.morrisand.company

- Do not scale from this drawing
- All dimensions to be checked on site by the Contractor
- And such dimensions to be their responsibility
- Report all drawing errors and omissions to the Architect
- All dimensions in millimeters unless noted otherwise
- If in doubt ask Contract Administrator

job title
A283 MAYFIELD MANCHESTER

drawing title / location
GROUND FLOOR PLAN

status	For Information							
date	13/09/2019							
scale	1 : 125 @ A1				1 : 250 @ A3			
project	originator	zone	level	type	role	number	status - revision	
A283	MCO	XX	00	DR	A	01101	C	

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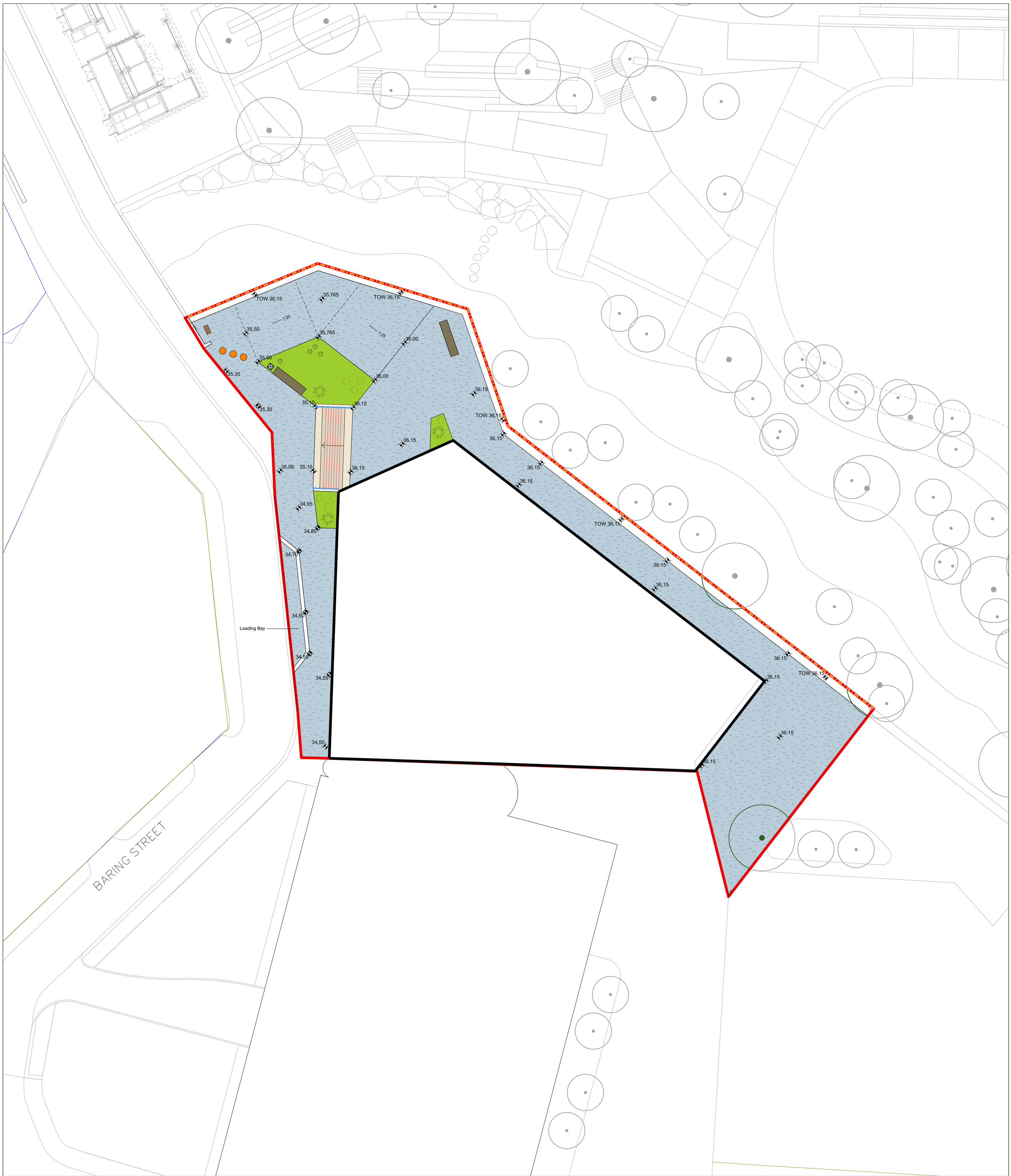

KEY

Boundaries

Baring Street Office No.1 Site Boundary

Levels

Proposed Levels

Top of Wall

PavingTypes

Paving Type 01

Description: Clay Paving Bricks
Finish: Diamond chequered pattern
Colour: Staffordshire blue
UK sourced

Paving Type 02

Description: Clay Paving Bricks with flush granite kerb demarcating Loading Bay
Finish: Diamond chequered pattern
Colour: Staffordshire blue
UK sourced

Steps

Step Type 01

Description: Access Steps - Pre cast concrete steps
Finishes: Variety of concrete finishes to differentiate treads from risers
Dimensions: 150mm risers x 280mm treads
Accessories: Allowance for handrails eitherside and integrated nosing visibility detail

Tactile Paving Type 02

Description: Tactile Hazard Warning Paving
Finishes: Light Buff
Dimensions: 400mm x 400mm

Retaining Structures

R1 Existing Walls Retained Type 01

Description: Walls and structures to be surveyed and made good
Engineers to provide further detail

R2 Retaining Structure Type 02

Description: Reinforced concrete retaining wall with industrial cladding material to face and top
Cladding: Weathered corrugated / sheet pilling

Trees

Tree Specimen 01

Size: Varied
Fixing: Underground guyed
Accessories: Rootrain preclnct system
Soil depth: minimum 1000mm
Target soil volume per tree: 20m3
- An allowance for a root cell system will be required for all trees planted in hard landscape

Planting

Planting Type 01

Description: Herbaceous, Ornamental Grass and Shrub Planting
Density: 9 per/sq.m (average)
Pot Size: 2L Pots (average)
Depth: 450mm minimum growing medium depth.

***NOTE:**
Refer to Tree Specifcation Document & drawing 0345-SEW-ZZ-00-DR-L-007104 for further information

Furniture & Seating

Seating 01

Description: Large rustic timber beams and weathered steel base
Dimensions:
Large bench - 4000(l) x 450(h) x 1000(w) mm
Small bench - 2000(l) x 450(h) x 500(w) mm
Finish: Treated hardwood timber, galvanised metal fixings and weathered steel base

Bollard

Description: Retractable Powder coated steel bollards
Dimensions: 900mm high x 100mm dia
Finish: Powder coated - colour TBC

Waste & Recycling Bin

Description: Powder coated steel waste and recycling bins

Cycle Stands

Description: Powder coated cycle stands
Finish: Powder coated - colour TBC

Balustrade & Handrails

Balustrade 01

Description: Varied concrete and slatted steel balustrade
Dimensions: 1100mm
Finish: Exposed aggregate concrete and powder coated steel - colour TBC

Handrail 01

Description: Powder coated steel post and slatted handrail
Dimensions: 900 - 1000mm
Finish: Powder coated steel - colour TBC

General Notes

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Notes

Rev	Date	Description	Chk
P01	18.12.19	Updates in line with Architecural changes	SEW
P00	25.09.19	PLANNING	SEW

Keyplan

N

Scale Bar 0 10m

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egretwest.com

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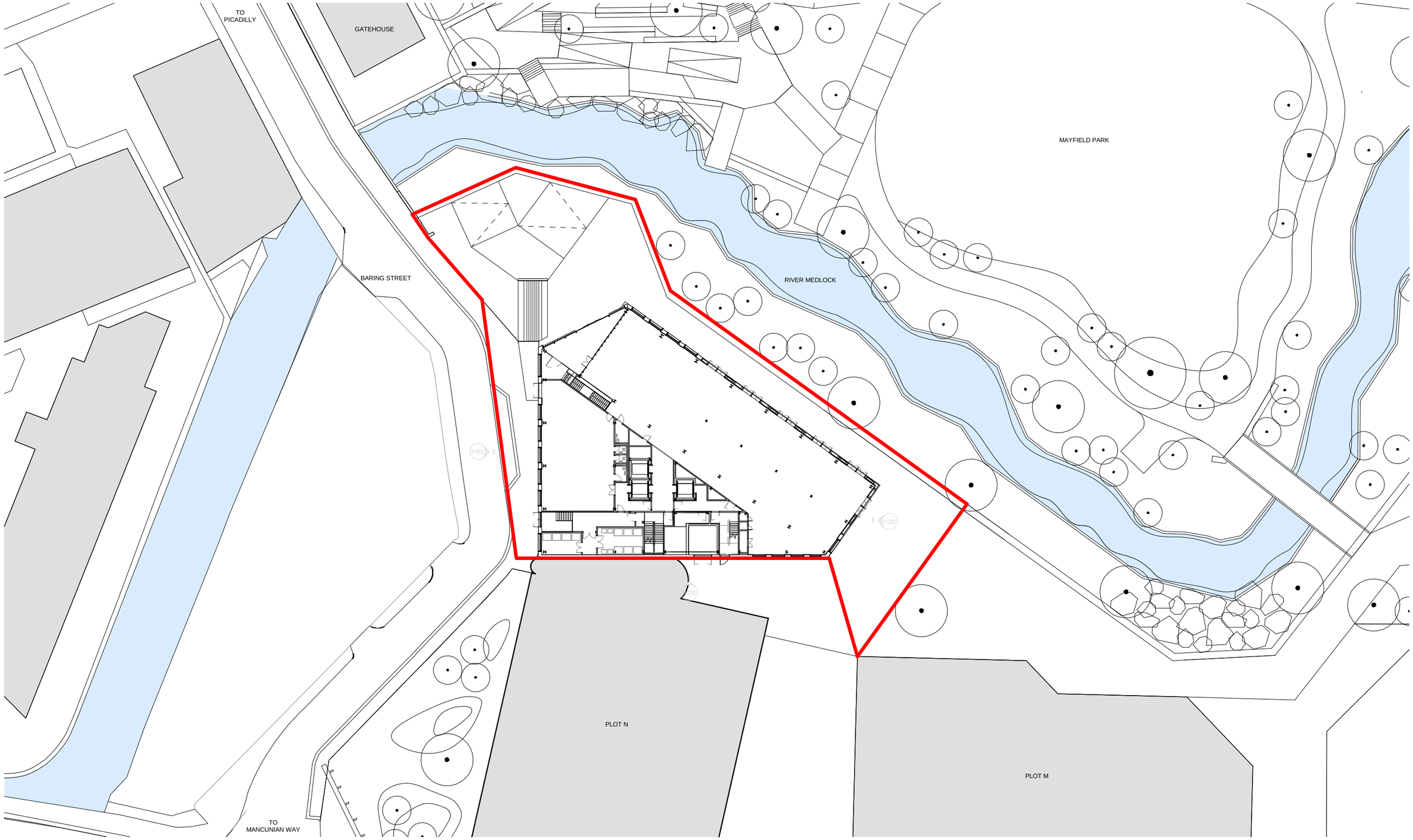
Client: Mayfield Partnership

Project: Mayfield Park

Drawing Title: Baring Street Office No.1 Landscape General Arrangement

Project Number	Status
0345	Planning
Scale at A1	Date
1:200	25.09.19
Drawn by	Checked by
MA	SEW
Drawing Number	Revision
0345-SEW-P0-00-DR-L-001710	P01



Rev	Date	Revision	By	Chk
\	190920	Issued for Planning	KC	AL
A	191216	Issued for Planning Addendum	JY	AL
B	191220	Issued for Planning Addendum	JY	AL

Notes

N

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E manchester@bennettsassociates.com
For Bennetts Associates' electronic information issue disclaimer -

Project
Baring Street Office 1
Mayfield Partnership

Project No. 1811

Drawing Title
Planning
Contextual ground floor plan
Proposed

Drawing Number
1811-BA-XX-00-DR-A-P-0002

Revision/Suitability
B

Scale @ A3
1:500

Scale @ A1
1 : 250

Revision Date
191220
YY MM DD

APPENDIX B – SOIL REUSE CHEMICAL VALIDATION CRITERIA

Soil Screening Values
For use in Public Open Space

Determinand (mg/kg)		Determinand (mg/kg)	
Heavy Metals		**Petroleum Hydrocarbons**	
Arsenic	170	TPH C5-C6 Aliphatic	95000
Beryllium	63	TPH C>6-C8 Aliphatic	150000
Boron	460000	TPH C>8-C10 Aliphatic	14000
Cadmium	560	TPH C>10-C12 Aliphatic	21000
Chromium (III)	33000	TPH C>12-C16 Aliphatic	25000
Chromium (VI)	220	TPH C>16-C35 Aliphatic	450000
Copper	44000	TPH C>35-C44 Aliphatic	450000
Mercury (Elemental)	25.8	TPH C>5-C7 Aromatic (Benzene)	76000
Mercury (Inorganic)	240	TPH C>7-C8 Aromatic (Toluene)	87000
Mercury (Methylmercury)	68	TPH C>8-C10 Aromatic	7200
Nickel	3400	TPH C>10-C12 Aromatic	9200
Selenium	1800	TPH C>12-C16 Aromatic	10000
Vanadium	5000	TPH C>16-C21 Aromatic	7600
Zinc	170000	TPH C>21-C35 Aromatic	7800
Polyaromatic Hydrocarbons		TPH C>35-C44 Aromatic	7800
Acenaphthene	29000	TPH C>44-C70 Ali and Aro	7800
Acenaphthylene	29000	**BTEX Compounds**	
Anthracene*	150000	Benzene	110
Benzo(a)anthracene*	49	Toluene	87000
Benzo(a)pyrene*"	10	Ethylbenzene	17000
Benzo(b)fluoranthene"	13	**Other Substances**	
Benzo(g,h,i)perylene*"	1400	Asbestos ID	ND
Benzo(k)fluoranthene*"	370		
Chrysene*	93		
Dibenz(a,h)anthracene	1.1		
Fluoranthene*"	6300		
Fluorene	20000		
Indeno(1,2,3-cd)pyrene*"	150		
Naphthalene*	1200		
Phenanthrene*	6200		
Pyrene	15000		
Benzene	110		

RoC CONSULTING

Table 1.1 Mayfield Masterplan Soil Screening Values
For site won material reuse beneath areas of building / hard standing (i.e. not landscaping)

Determinand (mg/kg)		Determinand (mg/kg)	
Heavy Metals		**Petroleum Hydrocarbons**	
Arsenic [3]	170	TPH C5-C6 Aliphatic [2]	9500
Beryllium [2]	63	TPH C>6-C8 Aliphatic [2]	150000
Boron [2]	460000	TPH C>8-C10 Aliphatic [2]	14000
Cadmium [1]	560	TPH C>10-C12 Aliphatic [2]	21000
Chromium (III) [2]	33000	TPH C>12-C16 Aliphatic [2]	25000
Chromium (VI) [2]	220	TPH C>16-C35 Aliphatic [2]	450000
Copper [2]	44000	TPH C>35-C44 Aliphatic [2]	450000
Mercury (Elemental) [1]	25.8	TPH C>5-C7 Aromatic [2]	76000
Mercury (Inorganic) [1]	240	TPH C>7-C8 Aromatic [2]	87000
Mercury (Methylmercury) [1]	68	TPH C>8-C10 Aromatic [2]	7200
Nickel [2]	3400	TPH C>10-C12 Aromatic [2]	9200
Selenium [1]	1800	TPH C>12-C16 Aromatic [2]	10000
Vanadium [2]	5000	TPH C>16-C21 Aromatic [2]	7600
Zinc [2]	170000	TPH C>21-C35 Aromatic [2]	7800
Polyaromatic Hydrocarbons		TPH C>35-C44 Aromatic [2]	7800
Acenaphthene [2]	29000	TPH C>44-C70 Ali and Aro [2]	7800
Acenaphthylene [2]	29000	**BTEX Compounds**	
Anthracene [2]	150000	Benzene [2]	110
Benzo(a)anthracene [2]	49	Toluene [2]	87000
Benzo(a)pyrene [1]	10	Ethylbenzene [2]	17000
Benzo(b)fluoranthene [2]	13	**Other Substances**	
Benzo(g,h,i)perylene [2]	1400	Asbestos ID	0.10%
Benzo(k)fluoranthene [2]	370	References :	
Chrysene [2]	93	1) Environment Agency C4SL HCVS with changes to exposure parameters (2014)	
Dibenz(a,h)anthracene [2]	1.1	2) LQM / CIEH Generic Assessment Criteria (Nov 2014)	
Fluoranthene [2]	6300	3) EIC/AGS/CL:AIRE Soil Generic Assessment Criteria (Dec 2009)	
Fluorene [2]	20000		
Indeno(1,2,3-cd)pyrene [2]	150		
Naphthalene [2]	1200		
Phenanthrene [2]	6200		
Pyrene [2]	15000		
Benzene [2]	110		

COMPLEX CHALLENGES ...
MADE SIMPLE

APPENDIX C – PROPOSED EARTHWORKS DRAWINGS & SPECIFICATION

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NOTES

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LEVELS BASED ON SURVEY OPS SURVEY 20H044_U SUBJECT TO VALIDATION AND AMALGAMATION

LEGEND

TOPO — SK008

U/S MADE GROUND — SK010

TOP OF ROCK — SK009

+ 36.87 TOPO LEVELS

SSL 36.000

PLOT O THE POULTON

SSL 32.000

SSL 34.550

SSL 34.500

PLOT N - MSCP

SSL 36.000

SSL 36.000

PLOT M

SSL 36.000

SSL 36.150

SSL 37.590

SSL 36.150

SSL 34.500

BARING STREET

PARKING STREET

NETHER STREET

BOND STREET

MANCUNIAN WAY SLIP ROAD

RIVER MEDLOCK

MANOR STREET

REV	DATE	DETAILS	DRN	CHK
P1	25.11.20	Issued For Comment	DJ	PW

DRAWING STATUS
FOR COMMENT

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APPRVD. PW	DATE 25.11.20	EMAIL FOR DRAWINGS info@rocconsulting.com

CLIENT
MAYFIELD PARTNERSHIP LTD

PROJECT TITLE
MAYFIELD PARK

DRAWING TITLE
POTS M,N & O
TOPO PLAN

PROJECT	ORIGIN	ZONE	LVL	TYPE	ROLE	No.	REV
4153-ROC-XX-XX-DR-C-SK007							P1

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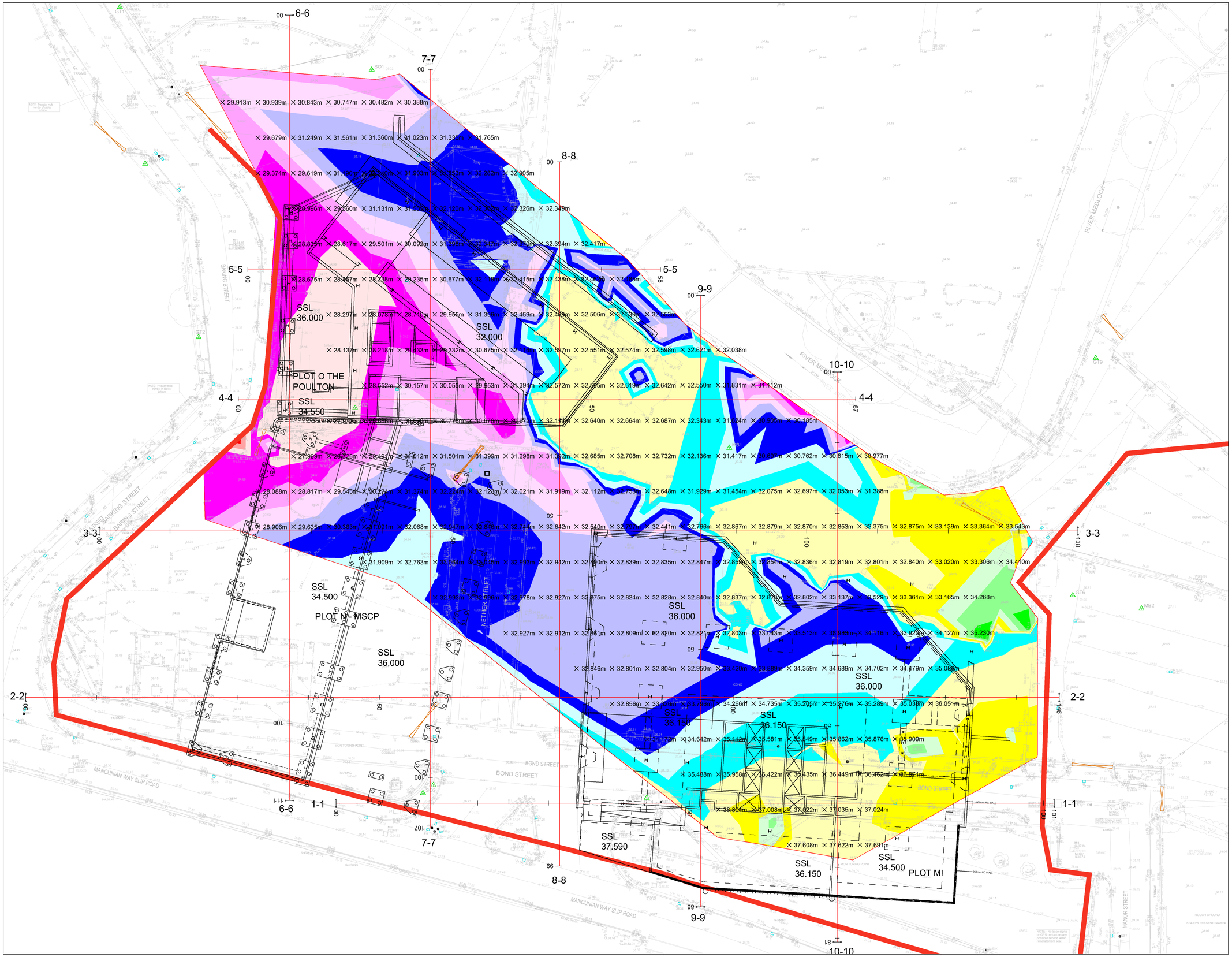

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LEVELS BASED ON SURVEY OPS SURVEY 20H044_U SUBJECT TO VALIDATION AND AMALGAMATION

LEGEND

TOPO — SK008

U/S MADE GROUND — SK010

TOP OF ROCK — SK009

SURFACE LEVEL DATA			
NUMBER	MINIMUM LEVEL	MAXIMUM LEVEL	COLOUR
1	-9.00	-8.20	
2	-8.20	-7.40	
3	-7.40	-6.60	
4	-6.60	-5.80	
5	-5.80	-5.00	
6	-5.00	-4.20	
7	-4.20	-3.40	
8	-3.40	-2.60	
9	-2.60	-1.80	
10	-1.80	-1.00	
11	-1.00	-0.20	
12	-0.20	0.60	
13	0.60	1.40	
14	1.40	2.20	
15	2.20	3.00	

THIS DRAWING REPRESENTS THICKNESS OF MATERIAL BETWEEN EXISTING GROUND LEVELS AND UNDERSIDE OF MADE GROUND

TOTAL CUT 20,539m³
TOTAL FILL 261m³

NET CUT 20.279m³

NOTE: VOLUMES ARE TAKEN TO THE BOUNDARY OF THE AVAILABLE S.I INFORMATION & CALCULATED FROM VERTICAL FACE BETWEEN THE STRATAS OMITTING ALL BATTERS

× 33.429m U/S MADE GROUND
+36.87 TOPO LEVELS

REV	DATE	DETAILS	DRN	CHK
P1	25.11.20	Issued For Comment	DJ	PW

DRAWING STATUS
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CLIENT
MAYFIELD PARTNERSHIP LTD

PROJECT TITLE
MAYFIELD PARK

DRAWING TITLE
PLOTS M,N & O
ISOPACHYTE DEPTHS
TOPO vs U/S MG

PROJECT	ORIGIN	ZONE	LVL	TYPE	ROLE	No.	REV
4153-ROC-XX-XX-DR-C-SK008							P1

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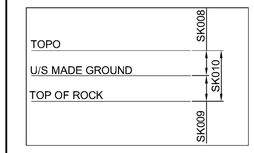
LEVELS BASED ON SURVEY OPS SURVEY 20H044_U SUBJECT TO VALIDATION AND AMALGAMATION

LEGEND



SURFACE LEVEL DATA			
NUMBER	MINIMUM LEVEL	MAXIMUM LEVEL	COLOUR
1	-4.00	-3.50	
2	-3.50	-3.00	
3	-3.00	-2.50	
4	-2.50	-2.00	
5	-2.00	-1.50	
6	-1.50	-1.00	
7	-1.00	-0.50	
8	-0.50	0.00	
9	0.00	0.50	

NOTE: VOLUMES ARE TAKEN TO THE BOUNDARY OF THE AVAILABLE S.I INFORMATION & CALCULATED FROM VERTICAL FACE BETWEEN THE STRATAS OMITTING ALL BATTERS

THIS DRAWING REPRESENTS THICKNESS OF UNDERSIDE OF MADE GROUND AND TOP OF ROCK

TOTAL CUT 3,157m³

REV	DATE	DETAILS	DRN.	CHK.
P1	25.11.20	Issued For Comment	DJ	PW

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PW	25.11.20	
APPRVD.	DATE	EMAIL FOR DRAWINGS
PW	25.11.20	info@rocconsulting.com

CLIENT
MAYFIELD PARTNERSHIP LTD

PROJECT TITLE
MAYFIELD PARK

DRAWING TITLE
PLOTS M,N & O
ISOPACHYTE DEPTHS
U/S MG vs TOP OF ROCK

PROJECT ORIGIN ZONE LVL TYPE ROLE No.	REV
4153-ROC-XX-XX-DR-C-SK009	P1

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LEVELS BASED ON SURVEY OPS SURVEY 20H044_U SUBJECT TO VALIDATION AND AMALGAMATION

LEGEND

TOPO — SK008

U/S MADE GROUND — SK010

TOP OF ROCK — SK009

SURFACE LEVEL DATA			
NUMBER	MINIMUM LEVEL	MAXIMUM LEVEL	COLOUR
1	-10.00	-9.00	
2	-9.00	-8.00	
3	-8.00	-7.00	
4	-7.00	-6.00	
5	-6.00	-5.00	
6	-5.00	-4.00	
7	-4.00	-3.00	
8	-3.00	-2.00	
9	-2.00	-1.00	
10	-1.00	0.00	
11	0.00	1.00	
12	1.00	2.00	

NOTE: VOLUMES ARE TAKEN TO THE BOUNDARY OF THE AVAILABLE S.I INFORMATION & CALCULATED FROM VERTICAL FACE BETWEEN THE STRATAS OMITTING ALL BATTERS

THIS DRAWING REPRESENTS THICKNESS OF EXISTING GROUND LEVELS TO TOP OF ROCK

TOTAL CUT - 23,530m³
TOTAL FILL - 94m³

NET CUT 23,436m³

× 33.429m TOP OF ROCK LEVELS
+26.87 TOPO LEVELS

REV	DATE	DETAILS	DRN	CHK
P1	25.11.20	Issued For Comment	DJ	PW

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CLIENT
MAYFIELD PARTNERSHIP LTD

PROJECT TITLE
MAYFIELD PARK

DRAWING TITLE
PLOTS M,N & O
ISOPACHYTE DEPTHS
TOPO vs TOP OF ROCK

PROJECT	ORIGIN	ZONE	LVL	TYPE	ROLE	No.	REV
4153-ROC-XX-XX-DR-C-SK010							P1

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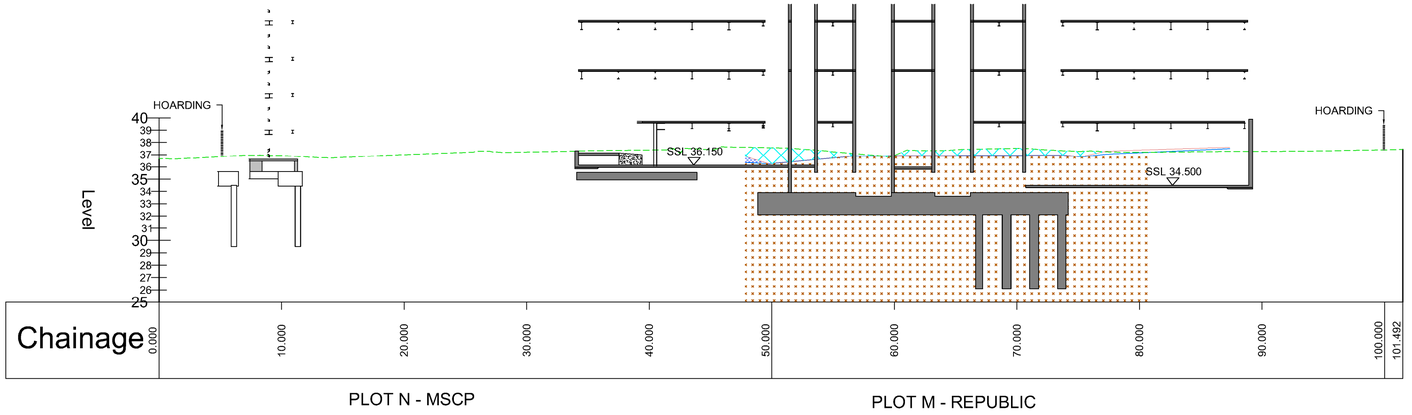

1-1 - LONGSECTION
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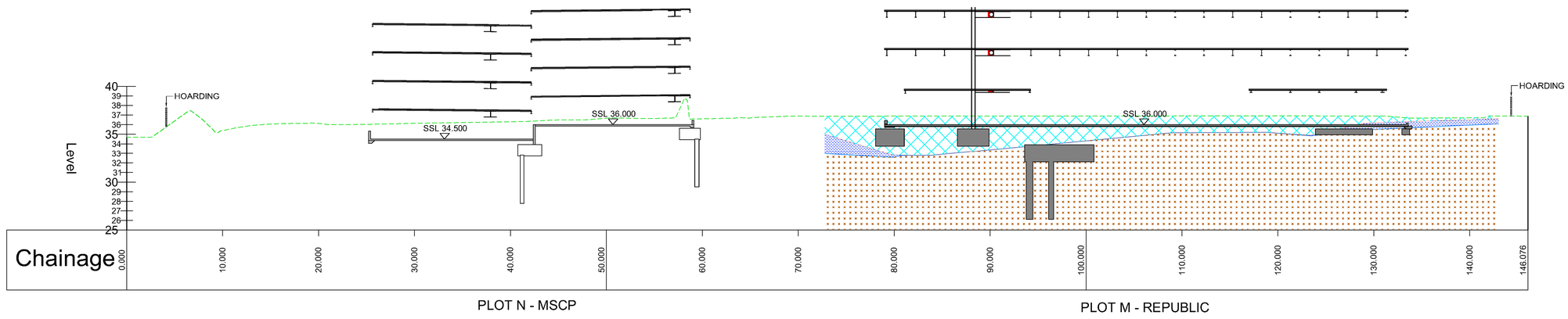

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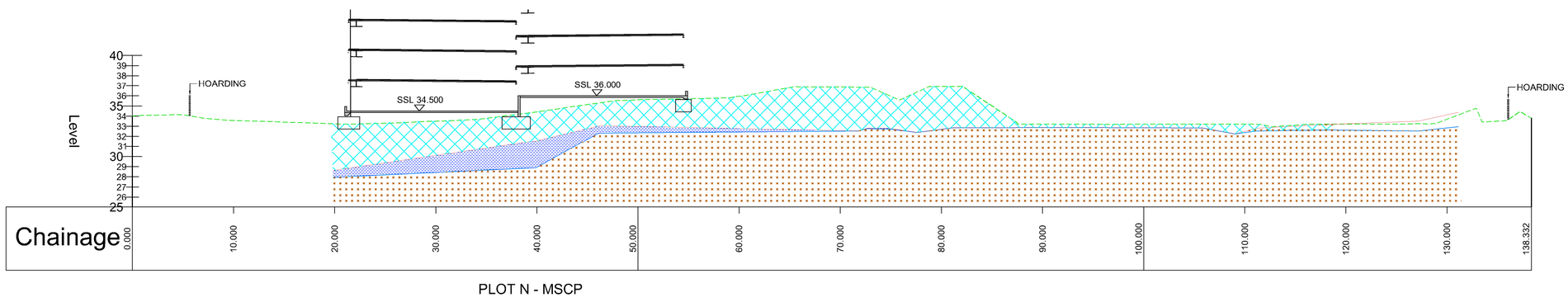

3-3 - LONGSECTION
SCALE: H 1:250,V 1:250. DATUM: 25.000

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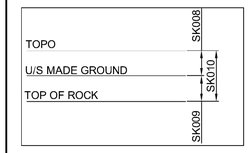
LEVELS BASED ON SURVEY OPS SURVEY 20H044_U SUBJECT TO VALIDATION AND AMALGAMATION

LEGEND



MADE GROUND - COMPRISING A PREDOMINATELY GRANULAR FILL MATRIX OF BRICK, CONCRETE, ROOF SLATE ETC WITH OTHER DELETERIOUS INCLUSIONS SUCH AS DECAYED TIMBER, ASH AND ASBESTOS FRAGMENTS.

ALLUVIUM - COMPRISING A MIXTURE OF FINE TO COARSE SAND AND GRAVEL WITH FREQUENT FINER SILT INCLUSIONS AND OCCASIONAL CLAYS. VARIABILITY IN STRATA IS AT RANDOM ACROSS THE SITE BASED ON HISTORIC FLOOD PLAIN OPERATION

WEATHERED SANDSTONE - COMPRISING A VERY DENSE FINE TO COARSE PINKING ORANGE SAND WITH FREQUENT INTACT SANDSTONE GRAVEL FRAGMENTS / INCLUSIONS.

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REV	DATE	DETAILS	DRN	CHK
P1	25.11.20	Issued For Comment	DJ	PW

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CLIENT
MAYFIELD PARTNERSHIP LTD

PROJECT TITLE
MAYFIELD PARK

DRAWING TITLE
PLOTS M,N & O SECTIONS SHEET 1

PROJECT ORIGIN ZONE LVL TYPE ROLE No.	REV
4153-ROC-XX-XX-DR-C-SK011	P1

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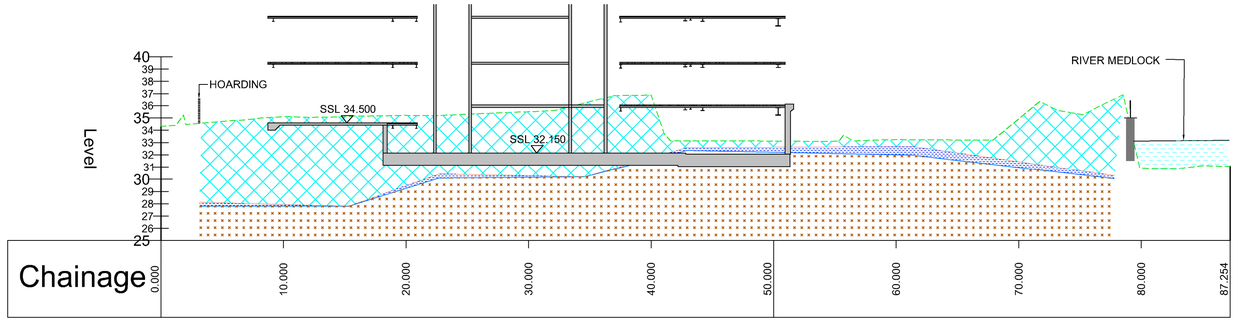

PLOT O - THE POULTON

4-4 - LONGSECTION
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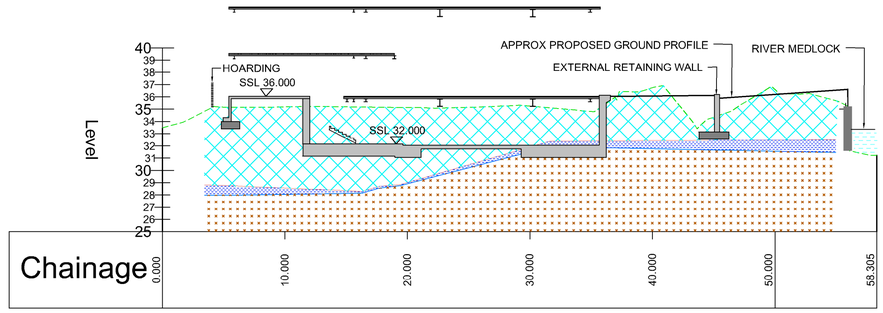

PLOT O - THE POULTON

5-5 - LONGSECTION
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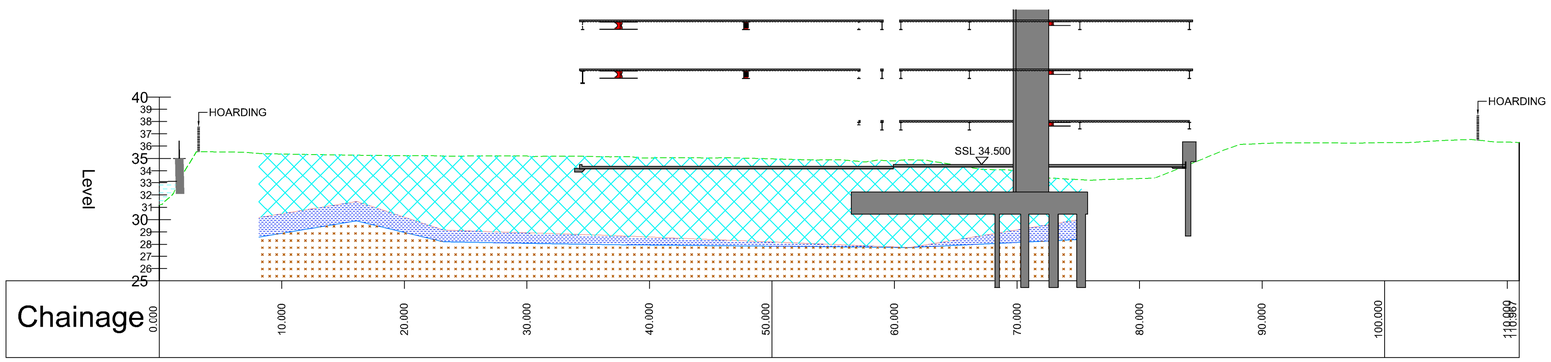

PLOT N - MSCP

6-6 - LONGSECTION
SCALE: H 1:250,V 1:250. DATUM: 25.000

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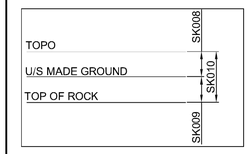
LEVELS BASED ON SURVEY OPS SURVEY 20H044_U SUBJECT TO VALIDATION AND AMALGAMATION

LEGEND



MADE GROUND - COMPRISING A PREDOMINATELY GRANULAR FILL MATRIX OF BRICK, CONCRETE, ROOF SLATE ETC WITH OTHER DELETERIOUS INCLUSIONS SUCH AS DECAYED TIMBER, ASH AND ASBESTOS FRAGMENTS.

ALLUVIUM - COMPRISING A MIXTURE OF FINE TO COARSE SAND AND GRAVEL WITH FREQUENT FINER SILT INCLUSIONS AND OCCASIONAL CLAYS. VARIABILITY IN STRATA IS AT RANDOM ACROSS THE SITE BASED ON HISTORIC FLOOD PLAIN OPERATION

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CLIENT
MAYFIELD PARTNERSHIP LTD

PROJECT TITLE
MAYFIELD PARK

DRAWING TITLE
PLOTS M,N & O SECTIONS SHEET 2

PROJECT	ORIGIN	ZONE	LVL	TYPE	ROLE	No.	REV
4153-ROC-XX-XX-DR-C-SK012							P1

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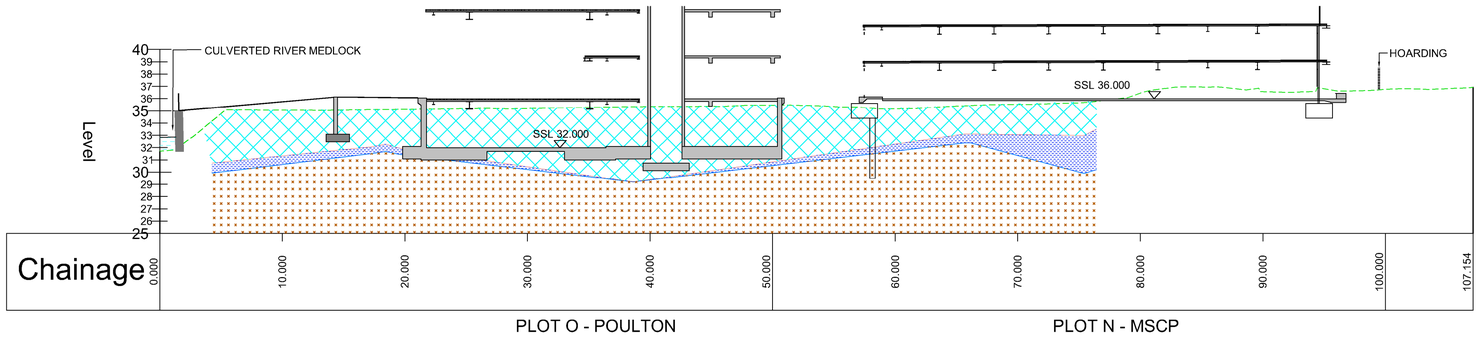

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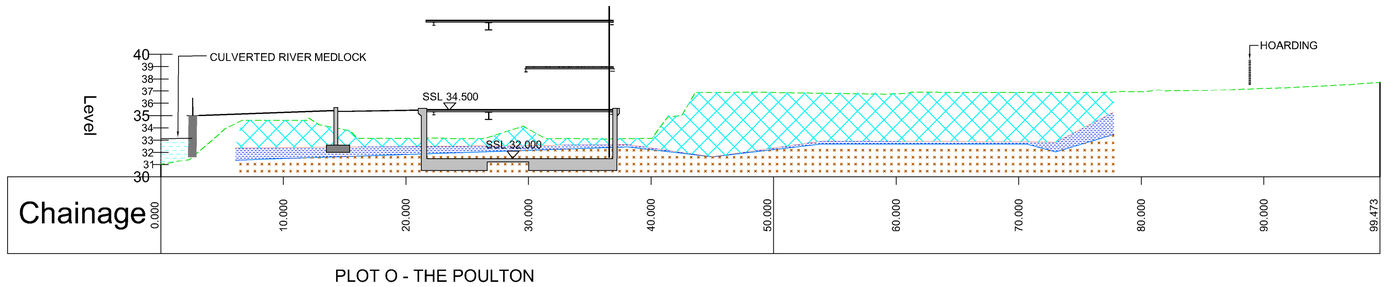

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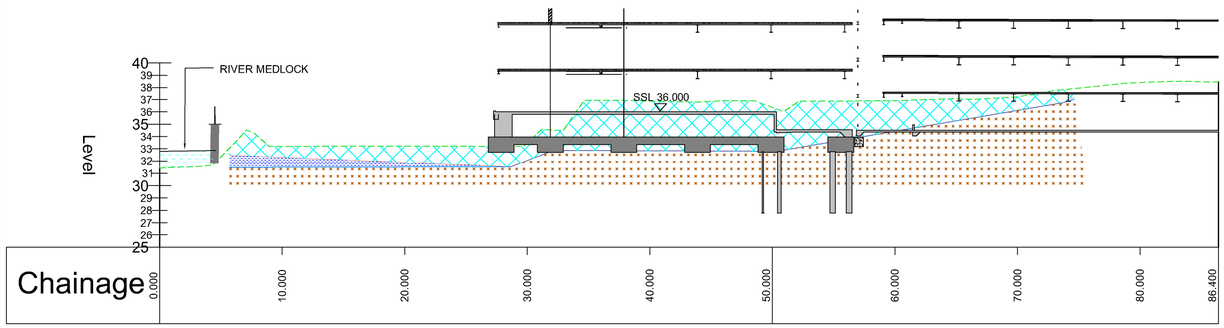

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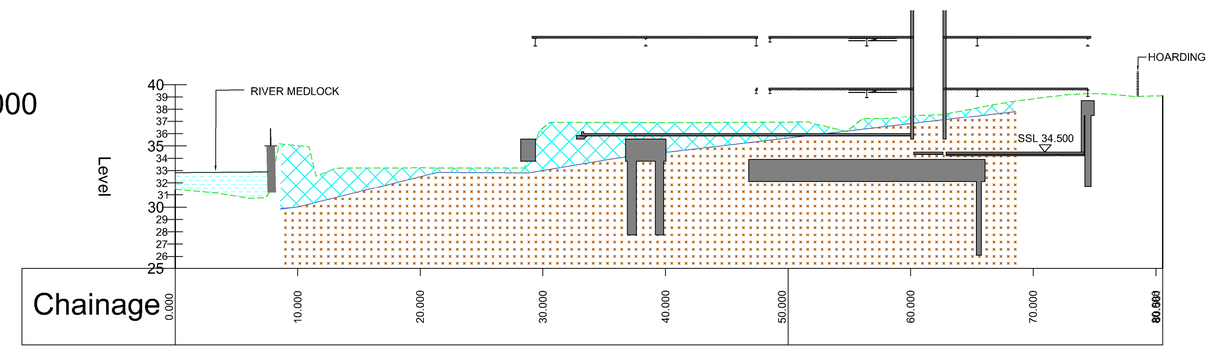

10-10 - LONGSECTION
SCALE: H 1:250,V 1:250. DATUM: 25.000

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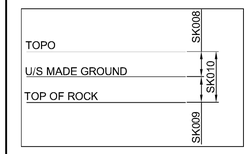
LEGEND



MADE GROUND - COMPRISING A PREDOMINATELY GRANULAR FILL MATRIX OF BRICK, CONCRETE, ROOF SLATE ETC WITH OTHER DELETERIOUS INCLUSIONS SUCH AS DECAYED TIMBER, ASH AND ASBESTOS FRAGMENTS.

ALLUVIUM - COMPRISING A MIXTURE OF FINE TO COARSE SAND AND GRAVEL WITH FREQUENT FINER SILT INCLUSIONS AND OCCASIONAL CLAYS. VARIABILITY IN STRATA IS AT RANDOM ACROSS THE SITE BASED ON HISTORIC FLOOD PLAIN OPERATION

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REV.	DATE	DETAILS	DRN.	CHK.
P1	25.11.20	Issued For Comment	DJ	PW

DRAWING STATUS
FOR COMMENT

RIBA STAGE

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CLIENT
MAYFIELD PARTNERSHIP LTD

PROJECT TITLE
MAYFIELD PARK

DRAWING TITLE
PLOTS M,N & O SECTIONS SHEET 3

PROJECT ORIGIN ZONE LVL TYPE ROLE No.	REV
4153-ROC-XX-XX-DR-C-SK013	P1

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NOTES

NB: SUBSTRATA GROUND MODEL SHOWN IS AN INTERPRETATION OF THE OVERALL RESULTS OF THE SITE INVESTIGATION AND IS SUBJECT TO REFINEMENT.

LEVELS BASED ON SURVEY OPS SURVEY 20H044_U SUBJECT TO VALIDATION AND AMALGAMATION

LEGEND

- MAINTAINED RIVER WALL
- LEGATO BLOCK WALL

RIVER WALLS MAINTAINED TO LEVELS ABOVE 34.6mAOD OR RAISED WITH LEGATO BLOCKS

LEGATO BLOCKS TOP SET AT 34.8mAOD TO PROTECT SITE FROM 1IN100 YEAR FLOOD

LEGATO BLOCKS TO TIE INTO EXISTING WALL

PLOT O THE POULTON

PLOT N - MSCP

PLOT M - REPUBLIC

REV	DATE	DETAILS	DRN	CHK
P1	25.11.20	Issued For Comment	DJ	PW

DRAWING STATUS
FOR COMMENT

RIBA STAGE

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CLIENT
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PROJECT TITLE
MAYFIELD PARK

DRAWING TITLE
PLOTS M,N & O RIVER WALL FLOOD PROTECTION PLAN

PROJECT	ORIGIN	ZONE	LVL	TYPE	ROLE	No.	REV
4153-ROC-XX-XX-DR-C-SK014							P1

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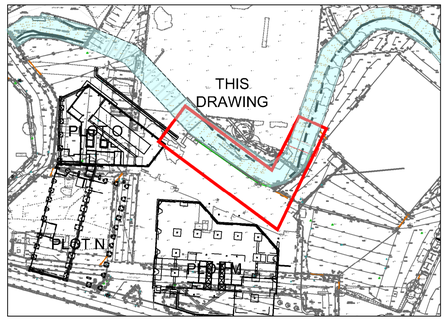
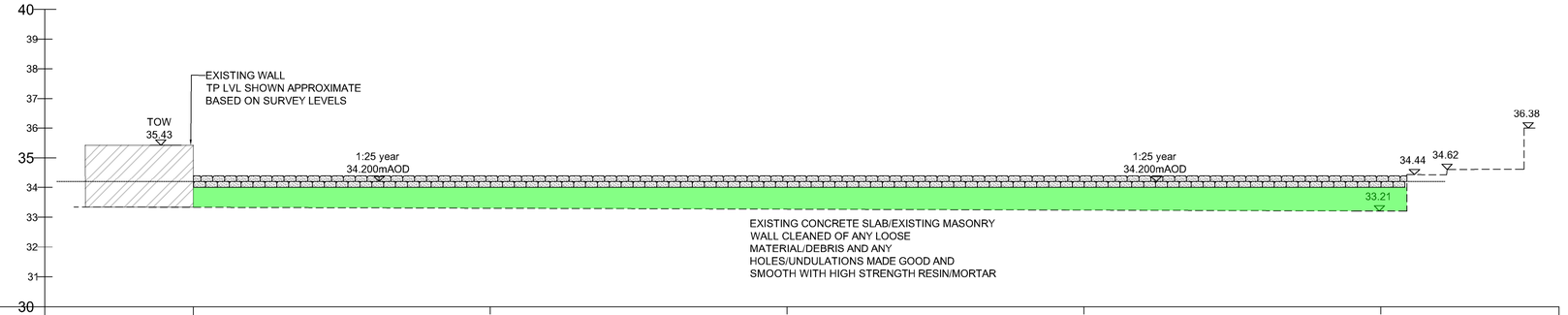
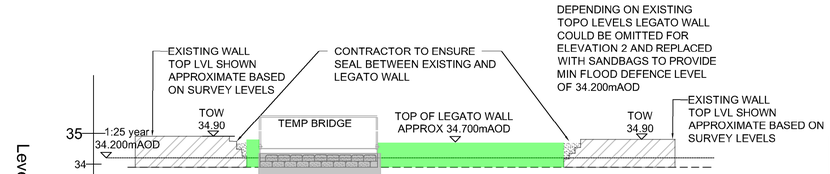


KEY PLAN
NTS



Chainage	-5.000	0.000	10.000	20.000	30.000	40.000	46.000
Existing Levels		APPROXIMATELY 33.200mAOD					

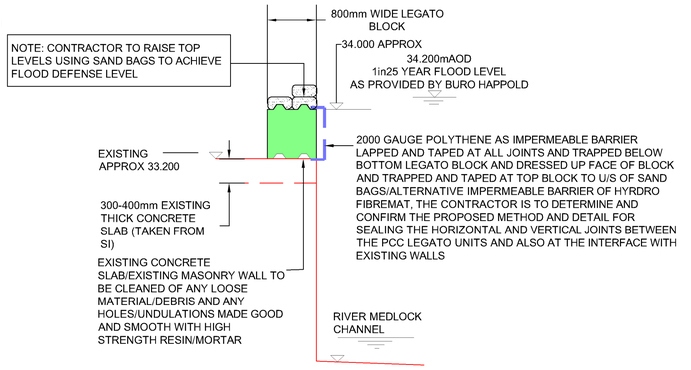


Chainage	-5.000	0.000	10.000	15.000
Existing Levels		APPROXIMATELY 33.900mAOD		

ELEVATION SIMILAR TO ELEVATION 1 EXCEPT EXISTING LEVELS INDICATE THAT TOP OF LEGATO WALL WILL BE ABOVE 1in25 YR FLOOD LEVEL OF 34.200mAD AND NO ADDITIONAL BUILD UP (SANDBAGS) WILL BE REQUIRED SUBJECT TO TOPO SURVEY LEVELS

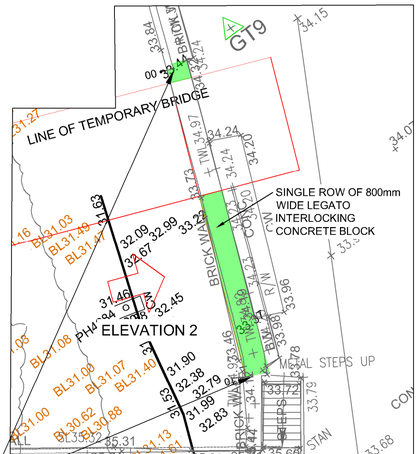
LEGATO WALL - ELEVATION 2
SCALE: H 1:100,V 1:100. DATUM: 33.000
(VIEWED FROM RIVER)

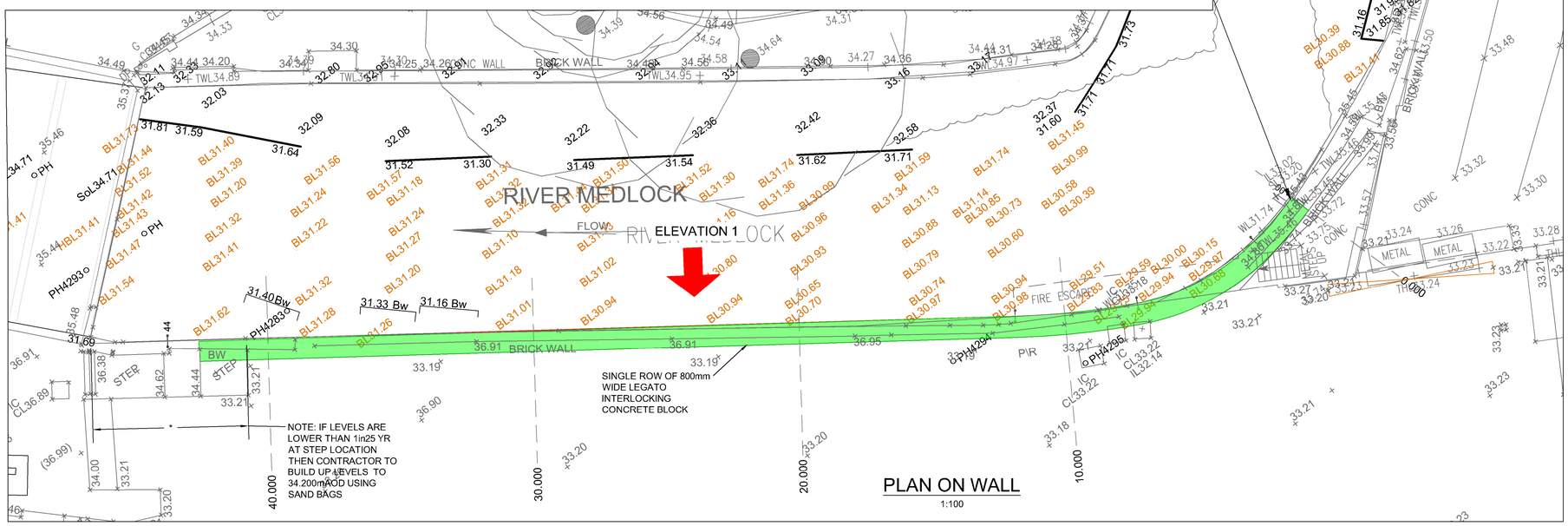
LEGATO WALL - ELEVATION 1
SCALE: H 1:100,V 1:100. DATUM: 30.000
(VIEWED FROM RIVER)



SECTION THROUGH WALL AT APPROX CHAINAGE 20 ON ELEVATION 1
SCALE 1:50

LEGATO BLOCKS TO TIE INTO EXISTING WALL





PLAN ON WALL
1:100

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LEVELS BASED ON SURVEY OPS SURVEY 20H044_U SUBJECT TO VALIDATION AND AMALGAMATION

FLOOD LEVEL DATA PROVIDED BY BURO HAPPOLD

LEGEND

FLOOD DEFENCE BARRIER WALL

NB: AS FLOOD BARRIER DEFENCE IS WITHIN 8m OF RIVER, E.A CONSENT (VIA BURO HAPPOLD) IS REQUIRED PRIOR TO COMMENCEMENT OF WORKS

NB: THE FLOOD DEFENSE SHOWN ON THIS DRAWING ARE FOR TEMPORARY FLOOD BARRIER STAGE 1 WORKS TO DEFEND AGAINST 1IN25 YEAR FLOOD EVENTS

REV	DATE	DETAILS	DRN.	CHK.
P3	07.12.20	Flood levels updated	DJ	PW
P2	03.12.20	Amended to suit 1in25 year defence	DJ	PW
P1	30.11.20	Issued For Comment	DJ	PW

DRAWING STATUS
FOR COMMENT

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CLIENT
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PROJECT TITLE
MAYFIELD PARK

DRAWING TITLE
RIVER MEDLOCK FLOOD DEFENCE WALL STAGE 1 1in25 YEAR

PROJECT	ORIGIN	ZONE	LVL	TYPE	ROLE	No.	REV
4153-ROC-	XX-	XX-	DR-	C-	SK	015	P3

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LEVELS BASED ON SURVEY OPS SURVEY 20H044_U SUBJECT TO VALIDATION AND AMALGAMATION

LEGEND

- FORMATION LEVEL
- TOP/BOTTOM OF BANKS

34.6mAOD 1in100 FLOOD

34.8mAOD 1in100 FLOOD
34.20mAOD 1in25 FLOOD

FORMATION LEVEL 32.000mAOD

FORMATION LEVEL 34.500mAOD

FORMATION LEVEL 36.000mAOD

FORMATION LEVELS 36.000mAOD

1:3

NOTE: BATTERS TO START 1m INSIDE HOARDING LINE AS SHOWN

NOTE: BATTERS TO START 1m INSIDE HOARDING LINE AS SHOWN

NOTE: BATTERS TO START 1m INSIDE HOARDING LINE AS SHOWN

REV	DATE	DETAILS	DRN.	CHK.
P1	07.12.20	Issued For Comment	DJ	PW

DRAWING STATUS
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CLIENT
MAYFIELD PARTNERSHIP LTD

PROJECT TITLE
MAYFIELD PARK

DRAWING TITLE
PLOTS M,N AND O FORMATION LEVELS

PROJECT	ORIGIN	ZONE	LVL	TYPE	ROLE	No.	REV
4153-ROC-XX-XX-DR-C-SK016							P1

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RoC CONSULTING

Groundwork Specification Excavating & Filling

Mayfield Enabling Works

for

Mayfield Partnership Ltd

November 2020

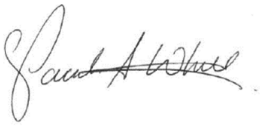
COMPLEX CHALLENGES ...
MADE SIMPLE

Groundwork Specification
Excavating & Filling

Mayfield Enabling Works

for

Mayfield Partnership ltd

TITLE	NAME	SIGNATURE	DATE
Report Author	ANDY JAMES		**25/1120**
Director	PAUL WHITE		**25/11/20**
Revisions			
Report Reference	4153-ROC-XX-XX-SP-C-D20		
Report Status	**DRAFT**		

COMPLEX CHALLENGES ...
MADE SIMPLE

CONTENTS

D20 EXCAVATING AND FILLING 1

APPENDIX 1/5 **TESTING TO BE CARRIED OUT BY CONTRACTOR**

APPENDIX 6/1 **REQUIREMENT FOR ACCEPTABILITY AND TESTING OF EARTHWORKS MATERIALS**

APPENDIX 6/3 **REQUIREMENTS FOR EXCAVATION, DEPOSITION, COMPACTION**

BLASTING FOR EXCAVATION

CUTTING FACE REQUIREMENTS

WATERCOURSES INCLUDING, DITCHES

EMBANKMENT CONSTRUCTION

COMPACTION

BENCHING OR SHAPING OF EARTHWORKS SLOPE FACES TO RECEIVE FILL

D20 Excavating and filling

To be read with Preliminaries/General conditions

GENERALLY/THE SITE

110 SITE INVESTIGATION
- Report: Refer to RoC Consulting Site Investigation Report.

145 VARIATIONS IN GROUND WATER LEVEL
- Give notice: If levels encountered are significantly different from levels in the site investigation report or previously measured.

CLEARANCE/EXCAVATING

170 REMOVING SMALL TREES, SHRUBS, HEDGES AND ROOTS
- Identification: Clearly mark trees to be removed.
- Small trees, shrubs and hedges: Cut down
- Roots: Grub up and dispose of without undue disturbance of soil and adjacent areas
- Safety: Comply with HSE/ Arboriculture and Forestry Advisory Group safety leaflets.

175 FELLING LARGE TREES
- Definition: Girth over 600 mm.
- Identification: Clearly mark trees to be removed.
- Safety: Comply with HSE/ Arboriculture and Forestry Advisory Group safety leaflets.
- Felling: As close to the ground as possible.
- Stumps: .
- Work near retained trees: Take down trees carefully in small sections to avoid damage to adjacent trees that are to be retained, where tree canopies overlap and in confined spaces generally.

220 STRIPPING TOPSOIL
- General: Before beginning general excavation or filling, strip topsoil from areas where there will be regrading, buildings, pavings/ roads and other areas shown on drawings.
- Depth:
  - Remove to an average depth of 300mm.
  - Give notice where the depth of topsoil is difficult to determine.
- Handling: Handle topsoil for reuse or sale in accordance with clause 225.
- Around trees: Do not remove topsoil from below the spread of trees to be retained.
- Site storage: .

221 TREATING TOPSOIL
- Treatment: Apply a suitable translocated nonresidual herbicide.
- Timing: Not less than two weeks before excavating topsoil.

225 HANDLING TOPSOIL
- Standard: To BS 3882.
- Aggressive weeds:
  - Species: Included in the Weeds Act, section 2 or the appropriate Wildlife and Countryside Act for the relevant jurisdiction.
  - Give notice: Obtain instructions before moving topsoil.
- Contamination: Do not mix topsoil with:
  - Subsoil, stone, hardcore, rubbish or material from demolition work.
  - Other soil or material containing aggressive weeds, sharps, plastics and non-soil forming materials and notifiable animal or plant diseases.

- Oil, fuel, cement or other substances harmful to plant growth.
- Other classifications of topsoil.

• Multiple handling: Keep to a minimum. Use topsoil immediately after stripping.

240 ADJACENT EXCAVATIONS

• Requirement: Where an excavation encroaches below a line drawn at an angle from the nearest formation level of another higher excavation, the lower excavation, all work within it and backfilling thereto, must be completed before the higher excavation is made.
• Angle of line below horizontal: 45°.
• Backfill material: Hardcore filling as clause 710.

244 EXCAVATIONS ADJACENT TO EXISTING FOUNDATIONS

• Prior to commencing excavation:
  - Excavate trial pits adjacent to existing foundations to determine extent and formation levels.
  - Allow for inspection of trial pits.
  - Allow time for amendment of details if required.
    Time period: .
• Backfill material to new excavation: .

250 PERMISSIBLE DEVIATIONS FROM FORMATION LEVELS

• Beneath mass concrete foundations: ±25 mm.
• Beneath ground bearing slabs and r.c. foundations: ±15 mm.
• Embankments and cuttings: ±50 mm.
• Ground abutting external walls: ±50 mm, but such as to ensure that finished level is not less than 150 mm below dpc.

310 UNSTABLE GROUND

• Generally: Ensure that the excavation remains stable at all times.
• Give notice: Without delay if any newly excavated faces are too unstable to allow earthwork support to be inserted.
• Take action: If instability is likely to affect adjacent structures or roadways, take appropriate emergency action.

320 RECORDED FEATURES

• Recorded foundations, beds, drains, manholes, etc: Break out and seal drain ends.
• Contaminated earth: Remove and disinfect as required by local authority.

330 UNRECORDED FEATURES

• Give notice: If unrecorded foundations, beds, voids, basements, filling, tanks, pipes, cables, drains, manholes, watercourses, ditches, etc. not shown on the drawings are encountered.

335 NEW FOUNDATIONS CROSSING OLD FOUNDATIONS OR WALLS

• Break out: The old foundation/ wall where it crosses the new foundation/ wall:
  - Length of breaking out: Width of the new foundation/ wall plus 50 mm on either side of new foundation.
  - Depth of breaking out: As necessary to permit the construction of the new foundation to its design cross section.
• Disturbed/ softened soil: When the formation for the old foundation/ wall is deeper than the formation of the new foundation.
  - Excavate: Soil that has been disturbed and/ or softened on either side of the old wall/ foundation, and for 100 mm into undisturbed ground on either side.
• Step up: The formation for the new foundation as necessary on either side of the old foundation/ wall until the formation is at its design level.
  - Size of steps: Minimum distance between steps 600 mm and maximum height of step

225 mm.
- Backfilling beneath design formation level: Lean mix concrete.

360 EXCESS EXCAVATION
- Excavation taken wider than required:
  - Backfill: Using selected site won material compacted in 300mm maximum layers or lean mix concrete.
  - Excavation taken deeper than required:
    Backfill: With well graded granular material or lean mix concrete

370 UNDERGROUND STRUCTURES IN LANDSCAPE AREAS
- Generally: Remove walls, roads, foundations, disused services, drains, manholes and the like to minimum depth.
- Minimum depth below finished levels:
  - Grass, ground cover and perennial planting: 500 mm.
  - Shrub planting: 750 mm.
  - Within 2 m of tree planting: 1000 mm.
- Walls and slabs remaining: In every 10 m² of wall or slab, make a drainage hole at least 600 mm diameter.

DISPOSAL OF MATERIALS

410 EXCAVATED TOPSOIL STORAGE
- Storage: Stockpile in temporary storage heaps.

415 EXCAVATED TOPSOIL REMOVAL
- General: Remove from site.

420 TOPSOIL STORAGE HEAPS
- Location: .
- Standard: To BS 3882.
- Height (maximum): .
- Protection:
  - Do not place any other material on top of storage heaps.
  - Do not allow construction plant to pass over storage heaps.
    Prevent compaction and contamination.

421 TOPSOIL STORAGE HEAP TREATMENT
- Treatment: .

441 SURPLUS SUBSOIL
- Excavated material: Stockpile in temporary storage heaps.
- Retained material: Spread and level surplus subsoil on site.
  - Locations: .
  - Protected areas: Do not raise soil level within root spread of trees that are to be retained.
- Remaining material: Remove from site.

450 WATER
- Generally: Keep all excavations free from water until:
  - Formations are covered.
  - Below ground constructions are completed.
  - Basement structures and retaining walls are able to resist leakage, water pressure and flotation.
- Drainage: Form surfaces of excavations and fill to provide adequate falls.
- Removal of water: Provide temporary drains, sumps and pumping as necessary. Do not pollute watercourses with silt laden water.

454 GROUND WATER LEVEL, SPRING OR RUNNING WATER

- Give notice: If it is considered that the excavations are below the water table.
- Springs/ Running water: Give notice immediately if encountered.

457 PUMPING

- General: Do not disturb excavated faces or stability of adjacent ground or structures.
- Pumped water: Discharge without flooding the site or adjoining property.
- Sumps: Construct clear of excavations. Fill on completion.
  Locations: .

FILLING

500 PROPOSED FILL MATERIALS

- Details: Submit full details of proposed fill materials to demonstrate compliance with specification, including:
  - Type and source of imported fill.
  - Proposals for processing and reuse of material excavated on site.
  - Test reports as required elsewhere.
- Timing: At least 21 days before starting filling.

510 HAZARDOUS, AGGRESSIVE OR UNSTABLE MATERIALS

- General: Do not use fill materials which would, either in themselves or in combination with other materials or ground water, give rise to a health hazard, damage to building structures or instability in the filling, including material that is:
  - Frozen or containing ice.
  - Organic.
  - Contaminated or noxious.
  - Susceptible to spontaneous combustion.
  - Likely to erode or decay and cause voids.
  - With excessive moisture content, slurry, mud or from marshes or bogs.
  - Clay of liquid limit exceeding 80 and/or plasticity index exceeding 55.
  - Unacceptable, class U2 as defined in the Highways Agency 'Specification for highway works', clause 601.

520 FROST SUSCEPTIBILITY

- General: Except as allowed below, fill must be non-frost-susceptible as defined in Highways Agency 'Specification for Highway Works', clause 801.8.
- Test reports: If the following fill materials are proposed, submit a laboratory report confirming they are non-frost- susceptible:
  - Fine grained soil with a plasticity index less than 20%.
  - Coarse grained soil or crushed granite with more than 10% retained on a 0.063 mm sieve.
  - Crushed chalk.
  - Crushed limestone fill with average saturation moisture content in excess of 3%.
  - Burnt colliery shale.
- Frost-susceptible fill: May only be used:
  - At depths below the finished ground surface greater than: 600 mm.
  - Within the external walls of buildings below spaces that will be heated. Protect from frost during construction.
    Where frost heave will not affect structural elements.

525 TESTING OF SUITABILITY OF FILL MATERIALS BEFORE START OF FILLING

- Laboratory: UKAS/ NAMAS accredited laboratory.
- Submit report to: Structural engineer (two copies).
  - Timing: 21 days before starting filling.

- Samples: Deliver to laboratory as required.
  - Additional requirements: Also deliver 25 kg samples to offices of structural engineer. On request, collect and dispose.
- Tests: As directed.
- Frequency: Submit with tender proposed rate and frequency of testing to demonstrate continuing compliance of imported or reprocessed fill with specified properties.

530 PLACING FILL

- Surfaces of excavations and areas to be filled: Free from loose soil, topsoil, organic material, rubbish and standing water.
- Freezing conditions: Do not place fill on frozen surfaces. Remove material affected by frost. Replace and recompact if not damaged after thawing.
- Adjacent structures, membranes and buried services:
  - Do not overload, destabilise or damage.
  - Submit proposals for temporary support necessary to ensure stability during filling.
  - Allow 14 days (minimum) before backfilling against in situ concrete structures.
- Layers: Place so that only one type of material occurs in each layer.
- Earthmoving equipment: Vary route to avoid rutting.

535 COMPACTION GENERALLY

- General: Compact fill not specified to be left loose as soon as possible after placing.
- After compaction: Surface of each layer must be well closed, showing no movement under compaction plant, and without cracks, holes, ridges, loose material and the like.
- Defective areas: Remove and recompact to full thickness of layer using new material.

540 BENCHING IN FILL

- Adjacent areas: If, during filling the difference in level between adjacent areas of filling exceeds 600 mm, cut into edge of higher filling to form benches 600 mm minimum width and height equivalent to depth of a layer of compacted filling.
- New filling: Spread and compact to ensure maximum continuity with previous filling.

610 COMPACTED FILLING FOR LANDSCAPE AREAS

- Fill: Material capable of compaction by light earthmoving plant.
- Filling: Layers not more than 200 mm thick. Lightly compact each layer to produce a stable soil structure.

615 LOOSE TIP FILLING FOR LANDSCAPE AREAS

- Filling: Do not firm, consolidate or compact when laying. Tip and grade to approximate levels in one operation with minimum of trafficking by plant.

617 HIGHWAYS AGENCY TYPE 1 UNBOUND MIXTURE

- Fill: To Highways Agency 'Specification for highway works', clauses 801 and 803:
  - Crushed rock (other than argillaceous rock).
  - Crushed concrete.
  - Recycled aggregates.
  - Crushed non-expansive slag.
  - Well-burned non-plastic colliery shale.
- Amendments to requirements in Highways Agency 'Specification for highway works': None.
- Filling: To Highways Agency 'Specification for highway works', clause 802.

618 HIGHWAYS AGENCY TYPE 2 UNBOUND MIXTURE

- Fill: To Highways Agency 'Specification for highway works', clauses 801 and 804:
  - Crushed rock (other than argillaceous rock).
  - Crushed concrete.
  - Crushed non-expansive slag.
  - Well-burned non-plastic colliery shale.

- Natural gravel.
- Natural sand.

- Amendments to requirements in Highways Agency 'Specification for highway works': None.
- Filling: To Highways Agency 'Specification for highway works', clause 802.

620 SUBGRADE IMPROVEMENT LAYER (CAPPING)

- Fill: To Highways Agency 'Specification for highway works', Table 6/1, Class 6F1 or 6F2.
- Filling: Place and compact to Highways Agency Specification for highway works, Table 6/1, clause 612 and clause 613.3, 613.9 and 613.10.

626 COMPACTED GENERAL FILL

- Suitable material: .
- Excavated material: Select suitable material and keep separate.
- Filling: Spread and level material in layers. As soon as possible thoroughly compact each layer.
- Required compaction: .
- Proposals: Well in advance of starting work submit details of proposed:
  - Materials to be used, including quantities of each type.
  - Type of plant.
  - Maximum depth of each compacted layer.

  Minimum number of passes per layer.

650 PROTECTION OF COMPACTED FILLING

- Temporary protective filling: Before allowing construction traffic, raise level of compacted cohesive soil filling at least 150 mm above formation level using properly compacted temporary filling.
- Removal: Remove temporary protective filling from site before permanent construction.

700 BACKFILLING AROUND FOUNDATIONS

- Under oversite concrete and pavings: Hardcore as clause 710.
- Under grassed or soil areas: Material excavated from the trench, laid and compacted in 300 mm maximum layers.

710 HARDCORE FILLING

- Fill: Granular material, free from excessive dust, well graded, all pieces less than 75 mm in any direction:
  - Test requirements:

  Minimum 10% fines value tested in a soaked condition to BS 812-111 Not required.
  Impact value SZ tested to BS EN 1097-2 Not required.
- In any one layer only one of the following:
  - Crushed rock (other than argillaceous rock) or quarry waste with not more binding material than is required to help hold the stone together.
  - Crushed concrete, crushed brick or tile, free from plaster, timber and metal.
  - Crushed non-expansive slag.
  - Gravel or hoggin with not more clay content than is required to bind the material together, and with no large lumps of clay.
  - Well-burned non-plastic colliery shale.
  - Natural gravel.
  - Natural sand.
- Filling: Spread and level in 150 mm maximum layers. Thoroughly compact each layer.

730 BLINDING

- Surfaces to receive sheet overlays or concrete:

  Blind with:
  - Concrete where shown on drawings; or
  - Sand, fine gravel, or other approved fine material applied to fill interstices. Moisten as

necessary before final rolling to provide a flat, closed, smooth surface.
- Sand for blinding: To BS EN 12620, grade 0/4 or 0/2 (MP).
- Permissible deviations on surface level: +0 -25 mm.

HIGHWAYS AGENCY EARTHWORKS SPECIFICATION APPENDICES

850 COMPACTED GENERAL FILLING/ EARTHWORKS
- Specification: Highways Agency 'Specification for highway works', Earthworks section, clauses .
  - Appendices (see clauses 900-970 in this section): .
  - Amendments to requirements in Highways Agency 'Specification for highway works': .
- Definition: References to the 'Overseeing Organisation' are deemed to be to the issuer of this specification.
- Fill material:
  - Permitted classes/ source: .
  - Assessment of acceptability: Tests as table 6/1 carried out by .
  - Preliminary tests: .
- Compaction: As table 6/4.

900 APPENDIX 6/1 - REQUIREMENTS FOR ACCEPTABILITY AND TESTING, ETC. OF EARTHWORKS MATERIALS
- .`

905 APPENDIX 6/2 - REQUIREMENTS FOR DEALING WITH CLASS U1B AND U2 UNACCEPTABLE MATERIAL
- .

910 APPENDIX 6/3 - REQUIREMENTS FOR EXCAVATION, DEPOSITION, COMPACTION (OTHER THAN DYNAMIC COMPACTION)
- .

~~915 APPENDIX 6/4 - REQUIREMENTS FOR CLASS 3 MATERIAL~~
- .

~~920 APPENDIX 6/5 - GEOTEXTILES USED TO SEPARATE EARTHWORKS MATERIALS~~
- .

~~925 APPENDIX 6/6 - FILL TO STRUCTURES AND FILL ABOVE STRUCTURAL FOUNDATIONS~~
- .

~~930 APPENDIX 6/7- SUB-FORMATION AND CAPPING AND PREPARATION AND SURFACE TREATMENT OF FORMATION~~
- .

~~935 APPENDIX 6/8 - TOPSOILING~~
- .

~~940 APPENDIX 6/9 - EARTHWORK ENVIRONMENTAL BUNDS, LANDSCAPE AREAS, STRENGTHENED EMBANKMENTS~~
- .

~~945 APPENDIX 6/10 - GROUND ANCHORAGES, CRIB WALLING AND GABIONS~~
- .

~~950 APPENDIX 6/11 - SWALLOW HOLES AND OTHER NATURALLY OCCURRING CAVITIES~~

~~AND DISUSED MINE WORKINGS~~

- .

~~955 APPENDIX 6/12 - INSTRUMENTATION AND MONITORING~~

- .

~~960 APPENDIX 6/13 - GROUND IMPROVEMENT~~

- .

965 APPENDIX 6/14 - LIMITING VALUES FOR POLLUTION OF CONTROLLED WATERS

- .

970 APPENDIX 6/15 - LIMITING VALUES FOR HARM TO HUMAN HEALTH AND THE ENVIRONMENT

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Appendix 1/5

Testing to be Carried out by the Contractor

Unless otherwise stated the **Contractor** shall carry out all sampling and testing in this Appendix.
(N) indicates that testing shall be undertaken by a UKAS accredited laboratory for that particular material unless otherwise agreed with the **Project Manager**.
Unless otherwise shown in this Appendix, tests for work, goods or materials as scheduled under any one Clause are required for all such work, goods or materials in the Works.
Unless specifically mentioned to the contrary all samples used in the testing shall be taken from materials after delivery to the site for incorporation into the permanent works.
The tests scheduled in this Appendix shall only apply to those works, goods or materials required under the contract.

Clause	Work, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 600					
Clause 601, 631 to 637, 640	For each area of cutting	Classification of earthworks material	Each different type of material excavated		
	On carriageway earthworks Formation incl 6T material	Determination of vertical deflection and strength characteristics by Plate Loading test	1 every 20m and 1 per 200sqm of carriageway or change in material	Required BS1377 (1990) part 9	As instructed on site by the Project Manager. Certificate to include insitu CBR determined from Plate Load Tests results
Clause 601, 631 to 637, 640	**Class** Site Won General granular fill		Once per week. 2 per 500 tonnes 2 per 500tonnes max 5/day	Required (BS1377) (632)	Tests to be conducted at point of excavation
	1	Grading (N)	One per 1000m^3	(BS1377)	Test results to be supplied to the Designer 3 working days prior to the date proposed for fill placement. Test results will be used to determine the limits in Appendix 6/1 Tab 6/1.
		Uniformity coefficient		(SHW) (BS1377)	
		Optimum Moisture Content (N)	N/A		
		Moisture Content (N)	One per 500m^3		
		Contamination testing suite - soils - Metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel, selenium and zinc) - Speciated PAH - TPH – 6 banded - if contamination is encountered then TPHCWG should be undertaken. - pH	1 per 500m3		Testing as part of the environmental controls on earthwork operations

		Contamination testing suite - Leachate analysis - Metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel, selenium and zinc) - Speciated PAH - TPH – 6 banded - pH		3 per source		To ensure that there is not a risk to controlled waters. This should be via the BS EN 12457 method
		1C only	Resistance to fragmentation	Weekly		
			Los Angeles coefficient	3 per source	(Cl635)	
	2	Site Won General cohesive fill	Grading (N)	1 per 2000m^3		Test results to be supplied to the Designer 3 working days prior to the fill being placed. Test results will be used to determine the limits in Appendix 6/1 Tab 6/1. Quality control testing of materials.
			Moisture content / Plastic Limit (N)	1 per 500m3		
			Optimum Moisture Content (N)	1 per 2000m3		
			MCV	1 per 500m3		
			TRL 447 Test Nos. 1 and 2 (N)	1 per 1000m3 (minimum 6 per source)		
			Contamination testing suite - soils - Metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel, selenium and zinc) - Speciated PAH - TPH – 6 banded - if contamination is encountered then TPHCWG should be undertaken. - pH	1 per 500m3		Testing as part of the environmental controls on earthwork operations
			Contamination testing suite - Leachate analysis - Metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel, selenium and zinc) - Speciated PAH - TPH – 6 banded - pH	3 per source		To ensure that there is not a risk to controlled waters. This should be via the BS EN 12457 method
	4	Landscape fill	Grading (N)	Daily 1 per 2000m3 per source		
			Moisture Content (N)	Daily 1 per 2000m3 per source		
			MCV	Daily 1 per 2000m3 per source		
	5	Topsoil	Grading (N)	Daily per source		
	6	Selected granular fill	Grading / uniformity coefficient (N)	1 per 1000m3		Class 6C testing shall exclude: Plasticity Index, Optimum Moisture Content; Moisture Content;

			Plasticity Index (N)	6 per source		
			Los Angeles coefficient	3 per source		
			Optimum Moisture Content (N)	1 per 1000m3		
			Moisture / Water Content (N)	1 per 1000m3		
			Organic matter / water soluble sulphate content / oxidisable sulfides (OS) content (N)	Source approval plus 1 per 1000m3		
			pH/chloride ion content (N)			
602	Earthworks material beneath roads or paved central reserve (i) offsite source (ii) onsite source		Frost Heave (N)	3 per source 1 per 5000m3		
609, 621	Geotextiles		Tensile load	Current BBA Certificate for each geotextile in Lieu of testing frequency of 1 per 500m2		Reference shall be made to Appendix 6/9, Clause 19.3.3(v)
			Pore size			
			Permeability			
612	Compaction of Fills					
		Method Compaction	Field Dry Density Test	1 per 1000m3		Not more than 2 no. compaction layers shall be placed and compacted prior to carrying out field dry density tests at the required frequency.
		End Product	Undrained Shear Strength of remoulded material (Class 2 material)	1 per 250m3		
			OMC (2.5kg rammer/vibrating hammer method)	One per source		
			Field Dry density	1 per 1000m3		
618	Top soiling and grass seeding		Rate of spread of fertiliser	1 per 1000m2		
			Rate of spread of seeding			
			Chemical analysis of fertiliser	1 per source		
			Grass seed germination and purity (Manufacturer's test)	1 per source and mix variety	Required prior to sowing	
639	Drainage layers		Grading	1 per 1000m2		
642	Earthworks materials adjacent to structures		Constrained soil modulus (M)	3 on each side of each structure		

Appendix 6/1

Requirements for Acceptability and Testing of Earthworks Materials

Acceptable Limits for Fills

1. Acceptability testing is to be the responsibility of the Contractor and be carried out in accordance with Specification Appendix 6/1 and at the frequencies given in Appendix 1/5 in a UKAS accredited testing laboratory where required.

2. Earthworks materials are to comply with the 600 series of the Highways Agency 'The Manual of Contract Documents for Highway Works (SHW)' and with the particular requirements of this appendix.

3. A schedule of acceptability limits for the fill materials required for this contract is given in Appendix Table 6/1 following this Appendix. Unless described in this Appendix, other acceptability limits are shown in Tables 6/1 and 6/3 of SHW.

4. Unless described in this Appendix, the grading requirements for each class of fill are given in Table 6/2 in the SHW Series 600.

5. The compaction requirements are given in Table 6/4 SHW Series 600.

6. Where a material class is not shown on the Appendix Table 1 below, reference should be made to the SHW.

7. Where no test is required, this is indicated by NR.

8. The Contractor shall carry out the relevant classification and acceptability tests on each class of material to be used in the earthworks.

9. The Contractor shall submit two copies of all classification test results to the Designer within two working days of the completion of the test. The copies shall be signed by the Contractor's responsible engineer or technician.

10. The Contractor shall submit his classification of the materials in areas of excavation and import source to the Designer before the start of excavation or importation.

11. Final classification may be made after deposition. Where the Contractor is of the opinion that the classification of the site materials has changed, there may be a requirement to carry out new classification tests to check acceptability

12. Class 4 landscape material: The material used for Class 4 will be able to be transported and placed and be stable in its design profile. All acceptable materials excavated on site may be used as Landscape Fill, Class 4 as defined in Table 6/1. The Designer may impose restrictions on types of material or acceptability limits where necessary to ensure stability of the Works. Class U2 materials as defined in the Specification may not be used as Landscape Fill. The compaction shall be sufficient to construct landscaping in accordance with the Landscaping Design and to avoid subsequent excessive settlement (in the context of the required end use). The Contractor shall use appropriate plant to avoid over-compaction and maintain stability while working.

Requirements for Determining Acceptability

1. Where source approval of imported material is shown, the testing is to be the responsibility of the Contractor and be carried out in accordance with Specification Appendix 1/5 and 6/1. Source approval will comprise (as a minimum) 3 sets of the relevant test on each sub-unit of material to be used in the Contract.

2. The Contractor is to maintain full records on each sub-unit of imported materials including but not limited to, the location of the sources, the supplier's details the acceptability testing and the location it has been incorporated within the Permanent Works.

3. The preliminary classification of the earthwork's materials shall be carried out by the Contractor generally at the point of excavation for on-site materials and at each point of deposition for imported materials. The location of trial pits for classification work shall be determined by the Contractor and copied to the Designer for information.

4. Where the properties of the materials are suspected to have changed between excavation or deposition, or the material undergoes significant deterioration during compaction, further testing and sampling will be carried out at the point of deposition. The Designer shall be informed of any change in classification of earthworks materials.

5. The Contractor is to make all test result summaries available electronically for viewing, filtering/querying and print out on an open access database.

6. Where a nuclear density gauge is employed to monitor in situ or compacted density, dry density or moisture content, the gauge shall have been calibrated within the previous seven days, and the measurement shall have been calibrated against other measures of the required properties obtained by other tests,

7. The MCV test shall be used for control of acceptability of cohesive fill following calibration with undrained shear strength tests and dry density/moisture content relationship tests. Further site calibration tests should be carried out if the MCV relationship is considered to have changed.

8. The hand shear vane test shall only be used as an alternative to Clause 633 (triaxial test) when suitable calibration tests are undertaken

Designation (if required) of Material as Class 3

1. Class 3 material (chalk) is not expected to be excavated during the construction works. It is not expected that any chalk material will be imported.

Requirements for Removal off site of Excavated Acceptable Material or Unacceptable Material Requiring Processing or Retention of Surplus Material

1. No material is to be removed off site without the agreement of the appropriate regulatory authority.

2. Surplus material is to be temporarily stockpiled in areas designated for spoil storage. The earthworks design of the temporary stockpile is the responsibility of the Contractor.

Permitted use of Acceptable Material or Unacceptable Material Required to be Processed for Purposes other than General Fill

1. Processing of such material for re-use other than for general fill is not envisaged.

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Table 6/1A Acceptable Earthworks Materials

Classification and Compaction Requirements

Table 6/1A: Acceptable Earthworks Materials: Classification and Compaction Requirements								
Soil Class	**General material description**	**Typical use**	**Permitted constituents (all subject to requirements of clause 601 and appendix 6/1)**	**Material properties required for acceptability (in addition to requirements on use of fill materials in clause 601 and testing in clause 631)**				**Compaction Requirements in Clause 612**
				PROPERTY (See exceptions in previous column)	**Defined and tested in accordance with:**	**Acceptable limits within:-**		
						LOWER	**UPPER**	
1A	Well graded granular material	General Fill	Any material or combination of materials other than material designated as Class 3 in the Contract. Recycled aggregate.	Grading	BS 1377: Part 2	Tab 6/2	Tab 6/2	SHW Tab 6/4 Method 2
				Uniformity coefficient	See Note 5	10	-	
				Moisture content	BS 1377: Part 2	OMC-2%	OMC+2%	
1B	Uniformly graded granular material	General Fill	Any material or combination of materials other than chalk. Recycled aggregate.	Grading	BS 1377: Part 2	Tab 6/2	Tab 6/2	SHW Tab 6/4 Method 3
				Uniformity coefficient	See Note 5	-	10	
				Moisture content	BS 1377: Part 2	OMC-2%	OMC+2%	
1C	Coarse granular material	General Fill	Any material or combination of materials other than material designated as Class 3 in the Contract. Recycled aggregate.	Grading	BS 1377: Part 2	Tab 6/2	Tab 6/2	SHW Tab 6/4 Method 5
				Uniformity coefficient	See Note 5	5	-	
				Los Angeles coefficient	Clause 635	-	50	
2A	Wet cohesive material	General Fill	Any material or combination of materials other chalk.	Grading	BS 1377: Part 2	Tab 6/2	Tab 6/2	SHW Tab 6/4 Method 1 (using deadweight tamping or vibratory tamping rollers or grid rollers if material Liquid Limit >50%).
				Plastic Limit (PL)	BS 1377: Part 2	-	-	
				Moisture Content	BS 1377: Part 2	PL-4	-	

				MCV	Clause 632	9	16	
				Undrained Shear Strength of remoulded Material	Clause 633	50	200	
2B	Dry cohesive material	General Fill	Any material or combination of materials other chalk.	Grading	BS 1377: Part 2	Tab 6/2	Tab 6/2	SHW Tab 6/4 Method 2.
				Plastic Limit (PL)	BS 1377: Part 2	-	-	
				Moisture content	BS 1377: Part 2	-	PL – 4%	
				MCV	Clause 632	6.5	16	
				Undrained Shear Strength of remoulded Material	Clause 633	50	200	
2C	Stony cohesive material	General Fill	Any material or combination of materials other chalk.	Grading	BS 1377: Part 2	Tab 6/2	Tab 6/2	SHW Tab 6/4 Method 2.
				Plastic Limit (PL)	BS 1377: Part 2	-	-	
				Moisture content	BS 1377: Part 2	NR	NR	
				MCV	Clause 632	6.5	16	
				Undrained Shear Strength of remoulded Material	Clause 633	50	200	
6C	Selected uniformly graded granular material	Drainage Layer	Natural gravel, natural sand, crushed gravel, crushed rock other than argillaceous rock, crushed concrete, chalk, well burnt colliery spoil, slag or any combination thereof. Recycled aggregate	Grading	BS 1377: Part 2	Tab 6/2	Tab 6/2	Tab 6/4 Method 3
				Uniformity Coefficient	See Note 5	-	10	
				Plasticity Index	BS 1377: Part 2	Non Plastic		

				Los Angeles Coefficient	Clause 635	-	50	
				Moisture Content	BS 1377: Part 2	OMC-2%	OMC+2%	
6N	Selected well graded granular material	Fill to Structures	Natural gravel, natural sand, crushed gravel, crushed rock, crushed concrete, slag, well burnt colliery spoil or any combination thereof. None of these constituents shall include any argillaceous rock. Recycled aggregate except recycled asphalt.	grading	BS1377 Part 2 (on site)	Table 6/2	Table 6/2	End Product 95% of maximum dry density of BS1377:Part 4 (vibrating hammer method)
					BS-EN 933-2 (off site)	Table 6/5	Table 6/5	
				Uniformity Coefficient	See Note 5	10	-	
				Los Angeles Coefficient	Clause 635	-	40	
				Effective angle of internal friction (ϕ) and effective cohesion (c)	Clause 636	$\Phi = 35^{o}$ c = 0 kPa	NR	
				Permeability	Claus 640	10^{-3} m/s	NR	
				Moisture Content	BS 1377: Part 2	OMC-2%	OMC+2%	

Appendix 6/3

Requirements for Excavation, Deposition, Compaction

1. No excavation is to commence prior to the Contractor obtaining the appropriate permit to proceed.

2. No ground disturbing activities, including any earthmoving activities, are to commence prior to the Contractor obtaining any necessary permits or licences relating to protected species or habitats. If a licence or permit for such works is granted, those works shall only be undertaken during the periods as stated on the licence or permit under the direction of the licence or permit holder. A copy of the licence and/or permit shall be provided to the Employer prior to commencement of the relevant activities.

3. Material excavated and designated for treatment as Class U1A shall be transported to the appropriate process area for stockpiling and treatment. Clearly defined segregated stockpiles are required for different sub-classes of Class U1A. The maximum permitted height of stockpiles shall be 5.0 m.

4. Earthworks materials requiring to be stockpiled shall be stored in individual stockpiles for each earthworks class and end-use.

5. On completion of a stockpile the slopes shall be trimmed to falls to shed rainwater. Temporary drainage shall be provided at the base of the stockpile to collect runoff from the stockpile and to carry any surface water away from the base of the stockpile.

6. The Contractor shall provide and maintain such measures as necessary to eliminate the production of dust from the stockpile during the life of the stockpile.

Blasting for Excavation

1. Not required.

Cutting Face Requirements

1. Cut faces shall be made good using any of the methods set out in SHW 603.7. Isolated areas of soft, fragmented or insecure material shall be excavated and filled with material of similar surrounding characteristics.

2. In the case of drainage excavations at the toe of embankments, excavations shall be immediately followed by backfilling activities.

3. The Contractor shall provide additional drainage measures to intercept and discharge seepages from cutting slopes as required.

4. Cutting faces which are to have topsoil shall be made good prior to topsoil placement.

Watercourses, Including Ditches

1. The location of any existing water courses is as shown on the contract drawings.

2. Redundant watercourses shall be drained and cleaned in accordance with Clause 606.4. To be infilled with Class 1A in accordance with Table 6/1.

Embankment Construction

1. Prior to embankment construction, unless otherwise indicated on the design drawings, the formation shall be inspected, and proof rolled by the Contractor to identify any areas of soft ground (Soft means cohesive soils with an undrained shear strength of less than 40 kPa and/or organic soils).

2. Unless detailed otherwise on the design drawings, any soft areas shall either be:

    - Removed and replaced with a compacted suitable granular fill or lean mix concrete, or the embankment construction commenced from a basal starter layer comprising 600mm thickness of Class 6F2 material to facilitate adequate compaction of the fill above.

3. The suitability of the Formation Surface is to be determined by the Contractor prior to placing fill material.

4. Where earthworks embankments are to be constructed over existing road pavement or concrete hardstanding, the existing road pavement or concrete hardstanding is to be completely removed and treated as Class U1B or Class U1A for concrete material only.

5. Staged construction of embankments is not envisaged unless specifically detailed on the design drawings(s).

6. The Contractor shall not stockpile materials on other fill areas to a height greater than the finished embankment and/or surcharge pre-load height unless otherwise instructed or agreed by the Designer.

Compaction

1. Compaction shall comply with Clause 612 of the SHW.

2. Extra compaction in the top 600mm for Classes 2A, 2B, 2C and 2D over the full width of the embankment to Clause 612.10 is required. Temporary over-widening to achieve adequate compaction of the shoulders of the embankment will be permitted.

3. The frequency of field dry density testing shall be as set out in Appendix 1/5 except that for Class 2B material. An advance trial should be carried out on Class 2B material to determine the compaction achieved. Refer to end product compaction below for details on acceptable tests

4. The degree of compaction for non-engineered landscaped bunds will be sufficient to remove large voids and avoid subsequent excessive settlement. Landscaping is not intended to support foundations, fencing or vehicles.

5. A nuclear density gauge (NDG) is permitted for measuring field dry density where the NDG has been calibrated against sand replacement testing in similar materials. Calibration of the gauges will be checked weekly or as required by the Designer.

Benching or Shaping of Earthworks Slope Faces to Receive Fill

1. Where existing embankments are to be extended and where embankments are to be constructed on ground with a slope steeper than one in eight, such slope being measured at right angles across the width of the embankment, benching of the existing slope shall be formed as shown on the Earthworks Drawings. Bench heights are to be a multiple of the relevant compaction layer thickness.

2. Fill material in areas of benching shall be carefully placed and compacted to ensure that no voids occur at the upright steps of the benching.

3. Placing and compaction of the fill material shall continue to a level above an adjacent bench before material is placed upon that bench.

4. Four additional passes of the roller shall be made on the area within two metres each side of the upright face immediately following the compaction of the first layer of fill material on each bench.

Appendix 6/8

Topsoiling

1. Topsoiling shall be carried out with Class 5 materials complying with Table 6/1 and the requirements of Clause 618.3 shall apply.

2. Topsoil shall be treated in accordance with 618.4.

3. Topsoil is to be stripped off and stockpiled for re-use (pending acceptability testing) in accordance to Clause 602.10. Surplus or unacceptable materials shall be disposed of by the Contractor.

4. The thickness of topsoiling will depend on that taken from the initial site strip. No additional topsoil is intended to be imported other than where specified on the landscaping designed, which should be laid in accordance with Series 3000.

5. All excavated topsoil shall be kept separate from excavated subsoil.

6. Topsoil should not be removed from below the spread of trees to be retained.

7. Topsoil heaps are to be not more than 2m high with maximum side slopes of 1 (vertical) in 1.5 (horizontal).

8. Topsoil mounds to be stored for periods of greater than six months shall be seeded with a mix of slow growth grass seed.

9. No stockpiles of topsoil, or any other material shall be stored within the root zone of mature trees or in areas where existing trees/habitats may be damaged or where surface run off to watercourses would be detrimental to water quality

10. Topsoil heaps shall be treated at appropriate times to prevent seeding of weeds. No other material is to be placed on the top of topsoil heaps and no construction plant is to pass over them.

11. No topsoil shall be used which is derived from sites contaminated with pernicious weeds. Pernicious weeds shall include, but not exclusively the following:

- Docks - (*Rumex spp*)
- Thistles (*Cirsium spp*)
- Ragwort – (*Senecio spp*)
- Himalayan Balsam – (*Impatiens glandulifera*)
- Japanese Knotweed – (*Fallopia japonica*)
- Giant Hogweed – (*Heracleum mantegazzianum*)
- Rosebay Willow herb – (*Epilobium angustifolium*)
- Couch grass – (*Agropyron repens*

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