













The Contractor shall verify and be responsible for all dimensions. DO NOT scale the drawing. Any errors or omissions shall be reported to Stantec without delay.

Colour Disclaimer

This drawing has been documented in colour. This drawing is required to be printed in colour. Failure to do so may result in loss of information. Black and white printing may be used if specific black and white documents have been obtained from Stantec.

KEY

- SITE BOUNDARY
 CUT AND FILL BOUNDARY
 PROPOSED CONTOUR (0.1m INTERVALS)
 $\times 0.186\text{m}$ CUT AND FILL DEPTH

SURFACE LEVEL DATA				
MINIMUM LEVEL	MAXIMUM LEVEL	COLOUR	AREA	VOLUME
-6.000	-5.000		5m²	0m³
-5.000	-4.000		825m²	200m³
-4.000	-3.000		2328m²	1938m³
-3.000	-2.000		4266m²	5052m³
-2.000	-1.000		11371m²	12311m³
-1.000	0.000		35328m²	33911m³
0.000	1.000		38672m²	56803m³
1.000	2.000		17099m²	30173m³
2.000	3.000		6410m²	18688m³
3.000	4.000		8173m²	13170m³
4.000	5.000		8075m²	1938m³

Earthworks Assessment - Part 1, Sandy Bay

SUMMARY FOR OUTLINE PLANNING STAGE

Objective:

The purpose of this preliminary assessment is to quantify the magnitude of the bulk earthworks “cut and fill” volumes that may be required to enable the construction of the development on the Sandy Bay plot. The objective is to demonstrate physical viability and to assist with the development budget work.

The volume assessment has been carried out by comparing the level "surfaces" between the existing site stripped of its top surface layer (e.g. topsoil, hard surfacing and gravel) and the "formation" level surface, which has been set at a general average depth of 500mm below the proposed ground level. This is appropriate for this stage of the project.

Constraints:

The vast majority of the Sandy Bay Lake plot is underlain by wind-blown sands, which have some potential to be used as general fill in the right conditions. There may be other limited constraints relating to the quality and usability of excavated ground and some limited environmental factors. This does not adversely affect the technical viability of the proposed development and it will need to be considered within the development budget and the planning of the physical construction works.

Exclusions:

This preliminary assessment does not include the following excavations, which are not expected to significantly alter the outcome of the strategy and the conclusions made.

- Foundations (based on structures being piled)
- Drainage & Utilities (and diversions)
- Removal of near surface obstructions

This assessment does not cover geotechnical or geo-environmental aspects of the earthwork exercise, foundations, ground water, geotechnical design, settlement control, materials management, licensing and consents - all of which will be required at the appropriate later stage of the development and can be phased to suit the development programme.

Site Strip:

Considering the mix of grass, with limited gravel and hard surfacing across the plot, the general average depth of material to be removed during a site strip exercise is 200mm. The preliminary assessment shows an anticipated volume of 26,470m³ being generated during this exercise. 95% of this is deemed to be surplus sandy topsoil that does not serve a directly useful filling purpose within the proposed Salt Lake development proposals and shall need to be moved off site. The small remainder may be useful as general fill within this phase.

Bulk Earthworks Summary:

The key factor of the earthworks strategy for this plot is a significant filling exercise, both to fill the Sandy Bay Bowl and to raise general development levels to support the drainage strategy, by creating site falls from the mid-point out to the northern and southern boundaries.

It is important to understand the magnitude and influence of the works solely associated with filling the Sandy Bay Bowl, using the existing bunded material situated to the north of the bowl. The bowl has a volume of around 81,000m³, the bund is circa 22,000m³, therefore there is need for significant additional material required to bring that up to the top of the existing top of bowl level alone.

The preliminary comparison of the stripped and formation level surfaces shows that a total filling volume of 121,000m³ is expected to be required. This includes the filling of the bowl and excavation of the drainage basins. This suggests that around 65% of the overall filling works is associated with filling the bowl alone.

The comparison of the stripped and formation level surfaces shows that an excavated (cut) volume of 59,500m³ is expected to be generated. The majority of this is expected to be suitable for use as general fill, which contributes to the overall fill volume requirement. The need to transfer or import further materials from other phases, sites or suppliers is a key requirement for this plot and will inform the next stage of engineering design and the cost plan. Any removal and import of material must be undertaken in accordance with the appropriate legislation, standards and validation.

Therefore the preliminary estimate of additional fill material required to be brought to site is in the order of 61,200m³. During the developed design stage, adjustments to the overall development levels can be made to reduce the cut volume, but the conclusion is still expected to be that there is a significant of material to be brought into the site.

As an initial test, a general drop in proposed levels of around 500mm is expected to result in a closer cut and fill volume relationship, but implications on the drainage strategy will need to be determined through the next stage of design to determine the full feasibility of this improvement.

Phasing:

There is potential to move surplus suitable fill material from earlier enabling works phases to the Sandy Bay phase for re-use, providing processes are followed on materials management and consents.

PORTCAWL WATERFRONT - CUT AND FILL PART 1 - SANDY BAY

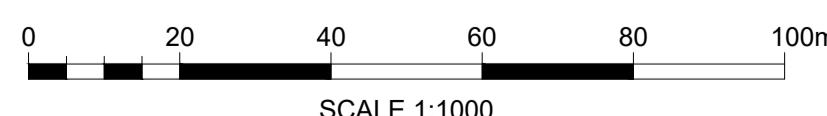
SITE STRIP SUMMARY TABLE

SITE STRIP SUMMARY TABLE					
	CUT FACTOR	FILL FACTOR	2D AREA (m ²)	STRIP DEPTH (m)	STRIP VOLUME (m ³)
SITE STRIP TOPSOIL - SANDY BAY SITE	1.000	1.000	128976.595	0.200	25795.31
SITE STRIP TOPSOIL - BUND IN SCHOOL AREA	1.000	1.000	3374.615	0.200	674.923
SITE STRIP TOTAL			132351.210		26470.24

SUBSOIL EARTHWORKS SUMMARY TABLE (SITE STRIP TO FORMATION LEVEL)

SUBSOIL EARTHWORKS SUMMARY TABLE (SITE STRIP TO FORMATION LEVEL)								
	CUT FACTOR	FILL FACTOR	2D AREA (m ²)	CONSTRUCTION DEPTH (m)	CUT (m ³)	FILL (m ³)	NET (m ³)	CUT OR FILL
FORMATION SITE WIDE	1.000	1.000	128976.595	0.500	52112.100	120766.900	68654.800	FILL
FORMATION BUND IN SCHOOL AREA	1.000	1.000	3374.615	0.200	7481.600	0.000	7481.600	CUT
FORMATION TOTAL	1.000	1.000	132351.210		59593.700	120766.900	61173.200	FILL

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NOTES:

1. DRAWING TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT PROJECT DRAWINGS AND PHASE 1 GEOTECHNICAL AND GEOENVIRONMENTAL DESK STUDY REPORT.
2. THIS BULK EARTHWORKS EXERCISE PRODUCED FOR OUTLINE PLANNING PURPOSES AND INDICATES THE POTENTIAL FINAL EARTHWORKS RESULT BASED ON A SIMPLIFIED SURFACE COMPARISON BASIS ONLY. IT IS SUBJECT TO DETAILED DESIGN AND FULL REASSESSMENT AGAINST PROPOSED FORMATION LEVELS DURING THE NEXT STAGE.
3. THIS PLAN SHOWS A CUT AND FILL VOLUME COMPARISON BETWEEN THE FOLLOWING TWO SURFACES,
(SITE STRIP MODEL) & (PROPOSED FORMATION MODEL)
WHICH IS THEN SPLIT IN A SUMMARY TABLE.
4. TOP SOIL AND NEAR SURFACE MATERIAL REMOVAL IS SEPARATED OUT AS A BULK VOLUME FIGURE IN THE SUMMARY TABLE.
5. THIS VOLUME IS THEREFORE NOT ALLOWANCE HAS BEEN MADE FOR OR BULKING OR SHRINKING OF ANY MATERIAL OR
GEOTECHNICAL SUITABILITY OF MATERIAL REUSE IN THE FINAL CONSTRUCTION. CONTRACTOR TO CONSULT THE GROUND INVESTIGATION AND INSTRUCT A DETAILED EARTHWORKS STRATEGY AND MATERIALS MANAGEMENT PLAN, BASED ON THE FINAL CUT AND FILL VOLUME ASSESSMENT TO DETERMINE FINAL SOLUTION.
6. OTHER THAN A GENERAL REFERENCE AND CONSIDERATION FOR THE OVERALL PRINCIPLES OF THE GEOTECHNICAL AND GEOENVIRONMENTAL PHASE 1 DESK STUDY, NO DETAILED REFERENCE HAS BEEN MADE TO SPECIFIC INTERPRETATIVE OR FACTUAL GROUND INVESTIGATION AND NO CONSIDERATION HAS BEEN MADE IN RELATION TO THE GEOTECHNICAL ACCEPTABILITY OF EXISTING EXCAVATED MATERIALS FOR REUSE IN FILL AREAS
7. CUT FILL VOLUMES HAVE BEEN DERIVED VIA A DIRECT VOLUMETRIC COMPARISON BETWEEN THE SITE STRIP MODEL (ASSUMED 200mm BELOW E.G.L.) AND THE PROPOSED FORMATION MODEL (ASSUMED UNIFORMLY 500mm BELOW P.G.L.) THIS EXERCISE TAKES NO ALLOWANCE FOR DEMOLITION OR ANY OTHER CONSTRUCTION VOLUMES (INCLUDING BUT NOT LIMITED TO FEATURES SUCH AS SOFT SPOTS, BURIED OBSTRUCTIONS, FOUNDATIONS, DRAINAGE, ARISING ETC)
8. ALL EXCAVATED MATERIALS SHOULD BE DISPOSED OF BY A SUITABLY LICENSED WASTE CARRIER WITH APPROPRIATE TESTING. IF EXCAVATED MATERIALS ARE TO BE RE-USED ON SITE THEN A MATERIALS MANAGEMENT PLAN MIGHT BE REQUIRED.

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Issue Status

S2 - FOR INFORMATION

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BRIDGEND COUNTY BOROUGH COUNCIL

PORTHCAWL WATERFRONT

Title
CUT AND FILL - PART 1
SANDY BAY

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