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Wednesday 01 March 23

Planning Department

South Dublin County Council

County Hall, Tallaght

Dublin 24

D24 A3XC

Ref: P2207053

RE: Vantage Data Centres Dub 11 Ltd., Construction of 1No. Two Storey Data Centre, Townlands of Ballybane & Kilbride within Profile Park, Clondalkin, Dublin 22

Planning Reg. Ref. No. SD22A/0420

Further to the Additional Information request pertaining to Items 4, 10, 13 & 14(a) in respect of the above development, as received from the Local Authority, dated 12th January 2023, we would respond as follows:-

Item 4: *The applicant is requested to submit a revised layout not less than 1:500 scale showing a footpath and cycle lane along the northern boundary to match the existing further west along the R134. The footpath and cycle lane shall be constructed to SDCC standards for public roads. The works on the public road will be undertaken by the applicant as part of the overall planning permission. The applicant is requested to secure the relevant letter of consent from SDCC.*

Response:

Refer to Pinnacle Consulting Engineers Drawing No. DUB13-DR-XX-C104-V1-WS3-PIN-C104 for details of the layout showing a footpath and cycle lane along the northern boundary to match the existing further west along the R134. The footpath and cycle lane will be constructed to SDCC standards for public roads.

Item 10: *The applicant is requested to demonstrate compliance with the SDCC SUDS Design Guide 2022, and Policies GI3, GI4, GI5, IE3, SM2, SM7, and sections 4.3.1, 12.7.6, 12.11.1, and 12.11.3. of the South Dublin County Development Plan 2022 - 2028 in relation to sustainable drainage systems.*

(B) In relation to SUDs, the applicant is requested to submit plans showing how surface water shall be attenuated to greenfield run off rates and showing what SuDS (Sustainable Drainage Systems)are proposed.

(C) SUDs Management - The applicant is requested to submit a comprehensive SUDS Management Plan to demonstrate that the proposed SUDS features have reduced the rate of runoff into the existing surface water drainage network. A maintenance plan should also be included as a demonstration of how the system will function following implementation.

(D) Natural SUDS features should be incorporated into the proposed drainage system for the development such as bio-retention/constructed tree pits, permeable paving, green roofs, filtration planting, filter strip etc. In addition, the applicant should demonstrate how the proposed natural SUDS features will be incorporated and work within the drainage design for the proposed development. The applicant is requested to refer to the recently published 'SDCC Sustainable Drainage Explanatory, Design and Evaluation Guide 2022' for acceptable SUDS tree pit details.

(E) The applicant is requested to submit a report to show surface water attenuation calculations for proposed development. Show on a report and drawing what surface water attenuation capacity each SuDS (Sustainable Drainage System) system has in m3 . Show in report what surface water attenuation capacity is required for proposed development. Show what different surface types, areas in m2 are proposed such as, green roofs, permeable paving, buildings, roads and their respective run off coefficients. Submit a drawing

Response:

(a) Compliance has been met as contained within the SDCC SUDS Design Guide 2022 and all relevant policies of the SDCC County Development Plan 2022 – 2028 pertaining to Sustainable Drainage, have been addressed as far as is practical and as demonstrated within this submission – refer below:-

- Policy G13 – Sustainable Water Management – This policy has been met and is covered off in the documentation as submitted by Ramboll / Neo Environmental and deals with the protection, enhancement, amenity & biodiversity value of existing watercourses, including for flood risk management & water quality etc. The integrity of riparian corridors along the edge of watercourses also forms part of this policy.

  Further to the above, SuDS elements have been addressed in the form of restricting the rate of discharge off the site via the introduction of flow control mechanisms, i.e. Hydrobrake manholes. Water quality has also been improved via the use of permeable paving and petrol / oil interceptors.

- Policy G14 – Sustainable Drainage Systems – Elements of this policy have been met in the form of restricting the overall run-off from the site to Green field run-off rates.

The surface water has been managed in the form of small sub-catchments, incorporating a treatment train discharge via an open channel which discharges into the existing watercourse.

- Policy G15 – Climate Resilience – This calls for the enhancement of the biodiversity and ecosystems. Another objective is for the provision of green roofs.

  Documentation as submitted by Ramboll / Neo Environmental provide information pertaining to this policy. Green roofs have not been considered in this instance, as it is an element that isn't normally associated with data centre developments.

- Policy IE3 – Surface Water & Groundwater – This calls for the management of surface water and enhancement of ground and surface water quality.

  Elements of this policy have been addressed by introducing detention basins, permeable paving, interceptors & flow restrictors. Responses to groundwater have also been addressed by submissions from Ramboll / Neo Environmental.

- Policy SM2 – Walking & Cycling – This deals with sustainable modes of travel, prioritizing walking and cycling facilities.

  Elements of the above have been dealt with under Item 4, as contained within this response.

- Policy SM7 – Car Parking & EV Charging – Elements of Objective 9 within this policy, have been complied by the introduction of permeable paving areas into the scheme, together with structural tree pits.

- 4.3.1 - Components of the GI Network – Responses to the majority of queries pertaining to the GI Network have been addressed in submissions by Kevin Fitzpatrick Landscape Architecture (KFLA) & Ramboll / Neo Environmental.

- 12.7.6 – Car Parking Design & Layout – This was addressed in the response under Policy SM7 above.

- 12.11.1 – Water Management:– (i) Flood Risk Assessment - an independent flood risk assessment has been carried out by Kilgallen & Partners in respect of this development; (ii) Surface Water – the surface water outflow has been calculated in accordance with greenfield run-off rates using the Qbar calculation (refer Appendix A); (iii) Sustainable Urban Drainage Systems (SuDS) – (a) in meeting SuDS requirements, the following have been installed - detention basins, permeable paving & tree pits, (b) the existing stream has been bridged over as opposed to being culverted and the outflow from Detention Basin 1 has been conveyed in an open channel prior to discharging into the existing stream; (iv) Groundwater – this has been addressed by Ramboll / Neo Environmental; (v) Rain Water Harvesting – this has not been proposed in this scheme.

- 12.11.3 – Waste Management – this item has been fully addressed in submissions by Ramboll / Neo Environmental.

(b) The proposed Drainage Layout, Dwg. No. DUB13-DR-UG-C127-V2-WS4 Rev. V2, issued as part of the planning pack, clearly identified the Hydrobrake manholes, i.e. SWMH5.1 & SWMH 4.2, with associated restricted outflow rates of 0.3l/s & 2.5l/s respectively. The total green field run-off rate was calculated and issued as part of the surface water calculations, as contained within Appendix B of the Engineering Planning Report. The total allowable outflow from the development, based on the Qbar calculation is 2.9l/s and we have restricted the total outflow from the development to 2.8l/s.

Further to the above, the Drainage Layout, Dwg. No. DUB13-DR-UG-C127-V2-WS4 Rev. V3, as submitted as part of this response, has been slightly modified to accommodate revisions to the overall site masterplan. This drawing clearly illustrates the 2 No. Hydrobrake manholes, i.e. SWMH15.1 & SWMH 4.2, with associated restricted outflow rates of 0.3l/s & 2.5l/s respectively. As mentioned in (a) above, the total outflow has been restricted in accordance with the calculated Greenfield run-off formula – this calculation has been included in Appendix A.

This drawing also indicates all SuDS elements as indicated below:-

Attenuation Storage Element	**Total Storage Volume**
3 No. Detention Basins	1,640m^3
Permeable Paving	114m^3
3 No. Structural Tree Pits	60m^3
All Elements Combined	1,814m^3

(c) Filtration through the permeable paving into the stone sub-base below provides for reduced peak flows to watercourses thereby reducing the risk of flooding downstream. In addition, the aggregate sub-base provides for enhanced water quality, prior to discharge. Other benefits include the following:-

- Permeable Paving is a 'source control' method. Water is managed and dealt with on-site without piping off to storage tanks or surface water treatment systems.
- The Water Framework Directive (Directive2000/60/EC) requires that surface water discharge is managed to ensure that risk of contamination or pollution are mitigated. Permeable Paving systems filter contaminants by microbial action. There is no requirement for additional filtering/polishing with Permeable Paving in normal use
- Separate attenuation tank systems are not required
- No need for gullies or channels or conventional drainage
- Recharges ground water
- Roofs, roads, and other non-permeable areas can be discharged into permeable paving (no gullies required)
- No ponding or surface water
- Collected water can potentially be re-used for non-potable purposes
- Improves water quality

Various manufacturers of permeable paving products have specific maintenance guidelines and a full maintenance regime is presented on supply of the product.

The hydrobrake mechanisms are provided within manholes in order to restrict the outflow to the rates specified. Most manufacturers of these products provide cleaning, maintenance and repair service teams and partners, providing specialist operations and maintenance (O&M) cover, keeping water management equipment and systems operating at peak performance, effectiveness and efficiency.

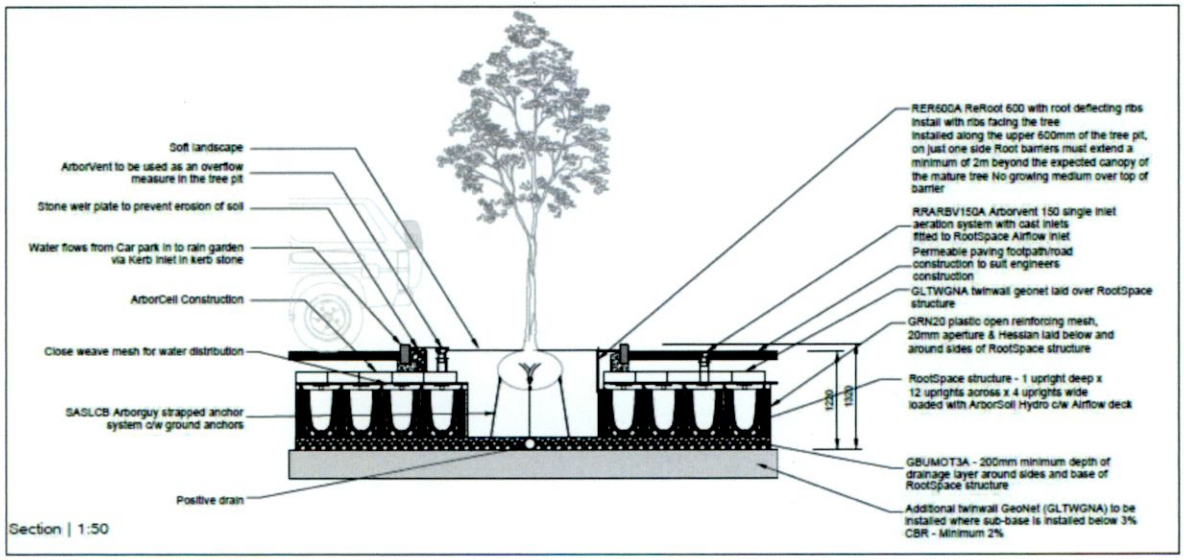
The maintenance of the detention basins and flood compensatory storage area will be in line with recommendations from the Landscape Architect (KFLA) on the scheme and / or recommendations by Parks Department.

(d) The SUDS elements which form part of this application are as follows:-

- 3 No. Surface water detention basins – the original application contained 2 No. Surface water detention basins
- Permeable paving – no change from the original application
- 3 No. Tree pits – new feature, these were not proposed under the original application
- Open swale / natural open channel (treatment train) linking Detention Basin 1 to the stream outfall – the original application contained a piped outfall from Detention Basin 1 into the stream
- Hydrobrake manholes restricting the outflow - no change from the original application
- Petrol / Oil Interceptors - no change from the original application

The proposed tree pits, as mentioned above, are detailed on Kevin Fitzpatrick Landscape Architecture Dwg. No. 0462 – 203 and these have been derived from the *'SDCC Sustainable Drainage Explanatory, Design and Evaluation Guide 2022'*.

An extract of same is included below:-



D Structural Tree Pit with SuDS Detail
1:50

(e) Refer to the External Works Layout, Dwg. No. DUB13-DR-SP-C130-V2-WS3 Rev. V3, as previously issued and since revised, in order to accommodate layout modifications, clearly details the various surface types in m^2 and their respective run-off co-efficients pertaining to this development.

The surface water attenuation capacities and respective storage elements are clearly notated on our Dwg. No. DUB13-DR-UG-C127-V2-WS4 Rev. V3, i.e. 3 No. Detention Basins, Permeable Paving & SuDS Tree Pits.

The overall attenuation volume for this development is ultimately derived from the green field Qbar run-off rate of 2.9l/s. In fact, attenuation on the site has now been over provided for, as the original submission catered for 970m^3 of storage in 2 No. detention basins + 114m^3 of storage within the permeable paving sub-base.

This has now been increased to 1,640m^3 of storage in 3 No. Detention Basins, the original 114m^3 of storage within the permeable paving sub-base and an additional circa 60m^3 of storage within the structural tree pit elements (3 No.). This has provided the overall site with an additional storage volume of attenuation of circa 730m^3.

Item 13: *(a) The sub catchment areas in the site do not add up to the total site area in surface water attenuation calculations submitted. Based on limited information submitted in terms of surface types and areas of same the surface water attenuation proposed of 970m3 or 1, 084m3 is undersized by approximately 2% to 11%. The applicant is requested to submit a report to show the areas in m2 of each surface type and their respective run off coefficients. Include the areas grasslands and explain why this has 0% runoff if that is the case. Note that the areas of all surface types should equal the total site area.*

(b) The applicant is requested to examine if any surface water pipes can be replaced with swales or filter drains at any location of the site. Submit a drawing showing what if any additional SuDS (Sustainable Drainage Systems) can be provided on site.

Response:-

(a) The area stated in the Qbar calculation of 1.43Ha, is the hard standing area of the site. This area is cross referenced to the areas of the various surface types as indicated in the extract below, as taken off the External Works Layout drawing - Dwg. No. DUB13-DR-SP-C130-V2-WS3 Rev. V3, as included in the submission.

KEY

	DESCRIPTION	AREA (m²)	CO-EFFICIENT
	PERMEABLE PAVING	759	0.6
	ROOF	6,384	1.0
	CONCRETE ROADS, GENERATOR YARDS, EXTERNALS CONCRETE SLABS	4,502	0.8
	ASPHALT ROAD	2,395	0.8
	WALKWAYS (CONCRETE)	394	0.8

The above area does not include for the existing road and walkways which fall under the redline boundary and it also excludes the landscaping areas as indicated on the layout.

Further to the above, the existing road (Falcon Avenue / Nangor Road) and walkways would never be considered as having to be attenuated under this development as they are entirely external, hence the area of same was not included. The landscaping berms and meadows contain tree and woodland planting and seeding elements, which cater for any rain water run-off falling on the berm elements themselves, due to their topography and shape and do not contribute run-off into any catchment areas feeding into the proposed surface water attenuation elements, hence the 0% co-efficient value.

Details of these landscaping elements are clearly detailed on Kevin Fitzpatrick Landscape Architecture Dwg. No. 0462 – 203. It should further be noted that the wet meadow area could not drain into the attenuation elements, as it is a depressed open area of the site, which is to be utilized as a flood compensatory storage area, as advised in the FRA produced by Kilgallen & Partners.

As stated in Item 10(e) above, even taking the worst case scenario of the attenuation being undersized by 11%, this would bring the total site attenuation requirement up to circa 1,203m^3. As we are now providing an overall volume of 1,814m^3, we would contend that we are in fact providing an over provision of attenuation in the amount of circa 611m^3.

As advised above, please refer to the External Works Layout, Dwg. No. DUB13-DR-SP-C130-V2-WS3 Rev. V3, for details pertaining to surface type areas and associated co-efficient percentages.

We have provided a detail explanation above, as to why all surface area types do not contribute to the total site area, particularly for the calculation of attenuation storage volumes.

(b) All of the proposed Suds features have been detailed in this response. As an additional element, the previously piped outfall from Detention Basin 1 into the stream, has been replaced by a natural open channel / open swale. This is further detailed under the response to Item 14.

Item 14: *(a) where possible, the applicant is requested to replace proposed overflow pipe with an open swale or natural open channel.*

Response:-

The previously piped outfall from Detention Basin 1 into the stream, has been replaced by a natural open channel / open swale – refer Dwg. No. DUB13-DR-UG-C127-V2-WS4 Rev. V3.

Typical Bio Swale detail below.

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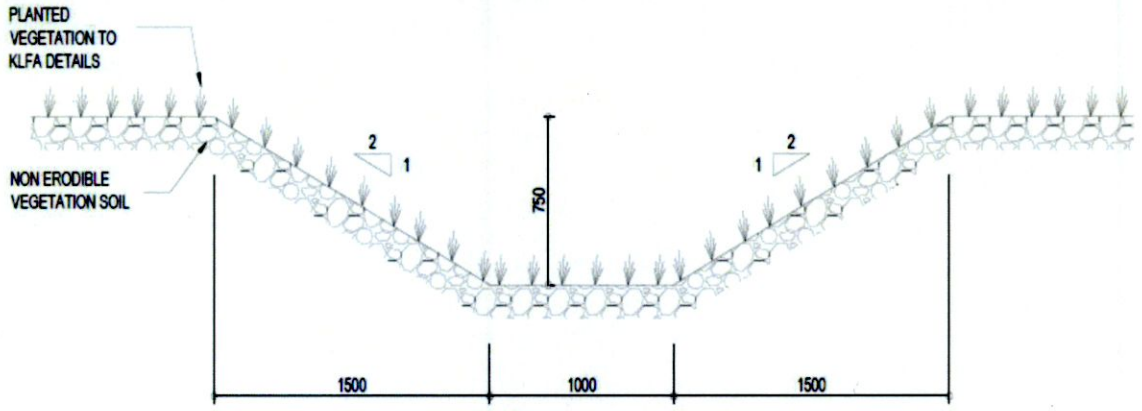

TYPICAL BIO SWALE DETAIL

Vdes = 0.7 m/s
Qdes = 0.94 m³/s

We trust that this adequately addresses the conditions as listed above.

Your sincerely

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APPENDIX A

Surface Water Calculations

Qbar Calculation
Using IOH Report 124 for Sites < 25 km²

Catchment Name
DUB 13

$^1Q_{bar} = 0.00108 * (AREA)^{0.89}(SAAR)^{1.17}(SOIL)^{2.17}$

Estimation of QBAR from IOH Report 124 for catchments less than 25 km² using the 3 variable equation

SITE AREA =	1.43	Ha	Overall Redline Area
CATCHMENT AREA =	1.43	Ha (excl. Public Open Space)	Overall Catchment Area (Hectares) For catchments < 50 hectares in area, flow rates are linearly interpolated for smaller areas.
AREA =	0.014	km^2	Area of the Catchment (km^2)
SAAR =	754	mm	Standard Annual Average Rainfall (mm)
SOIL =	0.30		
$M5_{60}$	16.8	mm	
$M5_{2DAY}$	61.9	mm	
$R=(M5_{60}/M5_{2d})$	0.27		

Soil Type Expressed as a Percentage	Soil 1	Soil 2	Soil 3	Soil 4	Soil 5
	0	100	0	0	0
SOIL Value	0.15	0.30	0.40	0.45	0.50

Soil index value (SPR) calculated from Flood Studies Report Vol V Fig I 4.18(1) - The Classification of Soils from Winter Rainfall Acceptance Rate .

Flood Return Event	[5]Growth Factor	Permitted Flow (l/s)
1	0.85	2.4
QBAR	1	2.9
10	1.67	4.8
30	2.1	6.0
50	2.33	6.6
100	2.6	7.4
200	2.85	8.1
1000	3.5	10.0

[4]QBar from Site with Factorial Error Allowance

r^2 =	0.847
n =	71
fse =	1.651

Q'_{bar} = 4.71 l/s

(With Allowance for the standard factorial error)

Pro-rata based on 50 Ha Site area to calculate Qbar

Q_{bar} =	0.00004	cumecs/Ha
Q_{bar} =	2.0	l/s/Ha

$Q_{bar[rural]}$ = 2.9 l/s

Catchment Characteristics

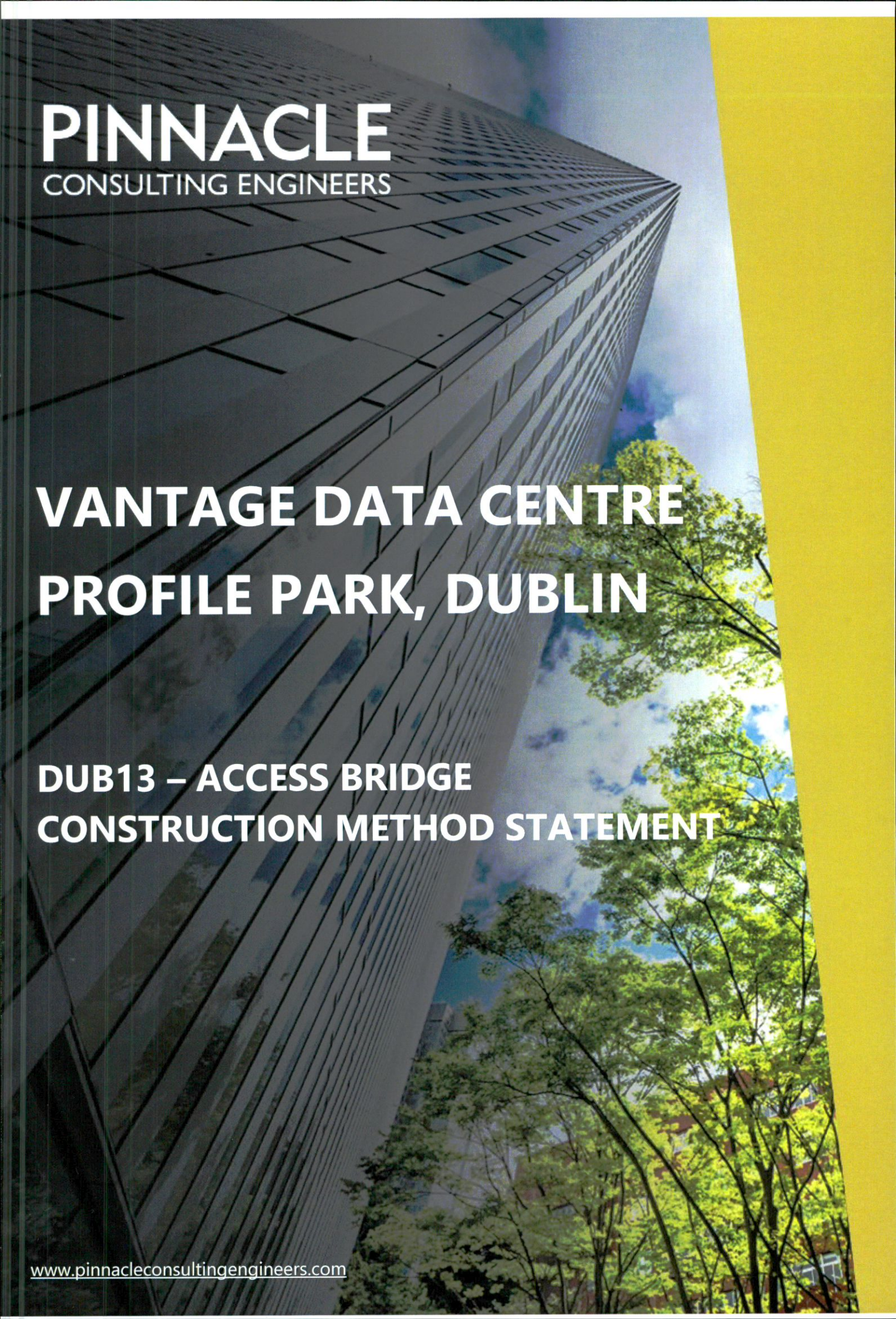
DUB 13	Area (m^2)	Runoff Coeff.	Effective Area (m^2)
Roofs & Balconies - Type 1 (Draining to gullies)	-	1.00	0.0
Roofs - Type 2 (Draining to SUDS Soakaway features)	-	0.90	0.0
Green Roofs	-	0.85	0.0
Roads and Footpaths - Type 1 (Draining to gullies)	-	0.80	0.0
Roads and Footpaths - Type 2 (Draining to Suds features)	-	0.70	0.0
Paved Areas	-	0.80	0.0
Permeable Paving	-	0.70	0.0
Grass over Basement	-	0.70	0.0
Parks (contributing)	-	0.30	0.0
Public Open Space (non-contributing)	-	0.00	0.0

Include Public Open Space in Effective Catchment Area? no

Assumed open space area does not drain to surface water network

Effective Catchment Area 0.0 m^2

Effective Catchment Runoff Coefficient 0.00



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VANTAGE DATA CENTRE
PROFILE PARK, DUBLIN

DUB13 – ACCESS BRIDGE
CONSTRUCTION METHOD STATEMENT

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Project:	DUB13, Vantage Data Centre< Profile Park	Date March 2023
Subject:	Access Bridge Construction Methodology	

1 INTRODUCTION

As part of the planning application for the new Data Centre DUB13, Pinnacle had proposed a culverted solution to cross the Baldonnell Stream to provide a link road between the permitted DUB11/12 site and the proposed DUB13 site.

The original design was based on the existing Falcon Avenue culvert which site approximately 20m to the east of the proposed bridge.

South Dublin County Council issued a RFI with the following item below relating to the culverting of the stream:-

14. (c) Significant concerns are maintained in relation to the proposed culverting of the stream and it is considered that alternative design solutions should be explored to avoid the proposed culverting.

The existing stream currently runs below a culvert on Falcon Avenue in close proximity to the proposed crossing point the below shows the stream heading west out of the culvert into the site.

View Looking West from the Existing Falcon Avenue Culvert

Consideration of alternative design in place of the culvert result in the requirement for the construction of a bridge across the stream linking the two sites the position of the bridge

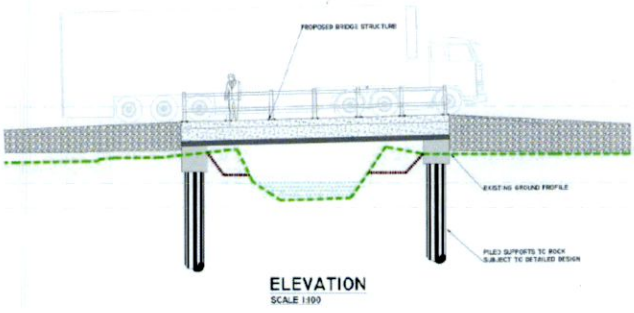
An alternative solution was requested in line with policy

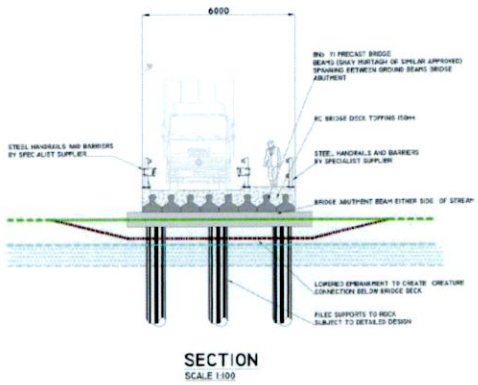
2 ALTERNATIVE DESIGN

Consideration of alternative design in place of the culvert result in the requirement for the construction of a bridge across the stream linking the two sites the position of the bridge abutments/support structure was discussed in relationship to the height of the stream banks and the levels of the proposed development on either side into which the bridge line was proposed.

Consideration has also been given to the overall width of the bridge structure to minimum, with the crossing being reduced to single carriageway width with signal controls on each side. A footpath is proposed on one side of the bridge.

Provision has been made for a creature underpass by lowering the stream embankment on below the bridge deck on either side of the stream to create a safe nature corridor.





3 BRIDGE DETAILS

The proposed bridge structure is formed from precast "Y" bridge beams forming a base onto which an in-situ concrete topping is poured. The Y beams are supported at either end onto a

RC beam spanning onto a set of pile which will be installed 2.0m off the top of the existing embankment.

The bridge is skewed to follow the direction of the proposed link road over the stream, the span off the bridge is circa 15.2m between support along the line of the road, circa 11.2m parallel between the supports.

The bridge deck in total is 6m wide, made up of a 4.2m carriageway and 1,8m footpath on the eastern side of the bridge.

The bridge deck formed from the Y beams clear spans the stream providing open free flow of the stream and below.

4 CONSTRUCTION METHODOLOGY

The bridge supports on either side of the stream will be supported on piles driven to rock. The support beam on either side of the stream will be constructed on or close to existing ground level.

The Y bridge beams will then be drained into position over the stream and secured into position onto bridge bearings cast into the support abutment beam.

Formwork will them be positioned along and below the bridge beams to along with suitable reinforcement to enable the in-situ concrete topping to be cast over the precast beams.

The wearing course of the road and footpath will be placed onto the in-situ concrete topping. The bridge deck will be constructed to a fall so that the road will drain to the south.

5 WORKING IN CLOSE PROXIMITY TO THE WATERCOURSE

All works around the stream will be undertaken in in line with the Guidelines on protection of Fisheries during construction works in and adjacent to waters with all measures incorporated into the construction works to prevent spoil and construction materials entering the stream.

Construction close to the stream will include for suitable silt barrier adjacent to the main works and where construction vehicles are present. All works will be undertaken from each side of the stream and with a suitable setback to prevent disturbance to the stream bank.

Any works undertaken to reprofile to existing stream embankment will be undertaken using light machinery and cut off walls installed along the edge of the stream to prevent and silt from entering the watercourse

The construction of the bridge using the precast bridge beams means that the primary bridge structure is constructed off site and craned into position. Consideration can be given to pre-casting the bridge beam support abutment to reduce and on site concrete works. The precast bridge beam provide permanent formwork for the in-situ bridge deck topping.

6 CONCLUSIONS

Based on the above proposal, this addresses the local authorities concerns over the previous proposal of culverting the stream, provides a route for wildlife to traverse under the bridge structure to provide and maintain a wildlife corridor along the line of the existing stream edge.

The proposed bridge has the following benefits over the previously proposed culvert:-

- The bridge provides a clear span over the stream with no effect on the flow.
- The construction of the bridge is primarily constructed from either side of the stream with minimal over stream construction.
- The prefabricated precast bridge beams, provide permanent support for the in situ concrete bridge deck topping

By proving a bridge structure the impact on the stream is minimised during construction with all works being undertaken from either side of the stream in a controlled manner, with silt and construction debris being controlled.

The permanent bridge provides a clear span passage over the stream with no interference of flow within the stream which could potentially impact on wildlife.

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