

EXHIBIT LIST

Reference No: HOC/10007

Petitioner: Kings Bromley Viaduct

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HS2

HS2 Phase 2a: River Trent & Kings Bromley Viaducts Lowering alternative

April 2018

The Proposed Scheme

- Kings Bromley (980m) & River Trent (1900m) viaducts separated by Bourne Embankment (505m).
- The height of the route across the viaducts and embankment varies between 6 and 16m above ground level.
- The viaducts are designed:
 - with a minimum 0.2% vertical gradient to allow the viaduct to drain naturally without the need for additional measures on the viaduct itself;
 - with minimum standard headroom clearances provided for highways (5.7m), Public Rights of Way (PROW) and agricultural accommodation accesses (4.25m), which pass underneath.

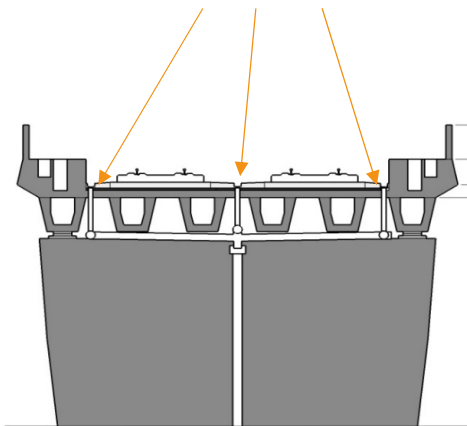
Options Considered

- Option 1: Lower alignment as far as practicable whilst retaining the highways under the viaducts with minimum standard headroom clearances.
- Option 2: Lower alignment as far as practicable whilst diverting highways over the viaduct, where appropriate, with minimum standard headroom clearance for the HS2 railway (7.15m from viaduct rail level to underside of highway overbridge).

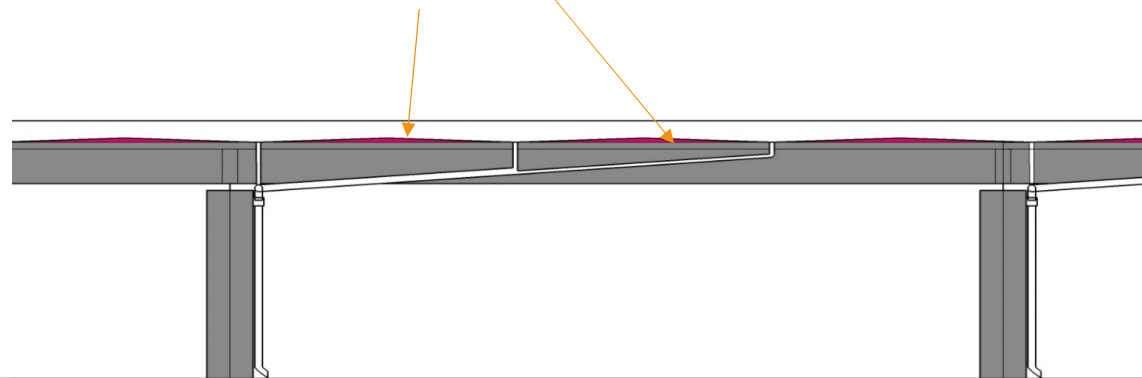
Viaduct Constraints

- To overcome the constraint of the viaduct gradient being at a grade less than the minimum 0.2% for natural drainage, it is necessary to introduce additional drainage measures (as illustrated), which require additional maintenance.

3 longitudinal channels



Forced falls in channels with down pipes at approx. 8m centres



Summary

- Under Option 1 it is feasible to reduce the height of the viaducts to varying degrees up to 3.5m (retaining highways etc. underneath) by introducing additional drainage measures.
- Under Option 2 the height of the viaducts could be lowered to varying degrees up to 8.2m, but the necessary diversion of highways over the railway would result in highway structures significantly higher than the Proposed Scheme itself, so defeating the objective of lowering the viaducts. This option is therefore not addressed further here.

Option Comparison

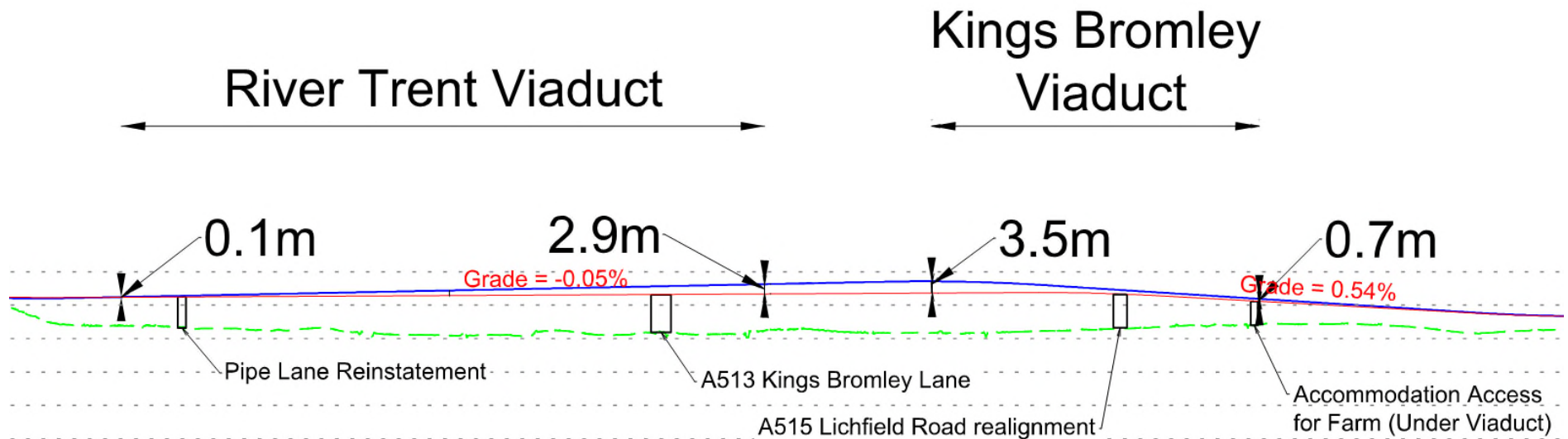
	Option 1 – Comparison with Proposed Scheme
Visual	Minor improvement due to reduction in visual prominence of the route
Disruption to existing infrastructure	Neutral
Construction traffic	Minor worsening due to increased transport requirements for a greater volume of exported fill
Operational traffic	Neutral
Noise	Neutral
Land	Neutral
Flooding	Neutral
Community Integrity	Neutral
Overall	Minor improvement to Proposed Scheme

Highway Constraints

- The highways which cross under the Proposed Scheme alignment require a minimum headroom to avoid vehicles striking the viaducts.
- The level of the diverted roads that pass under the viaducts must be above the flood level (1 in 100 year flood plus an allowance for climate change).

Option 1 – Lowered Alignment

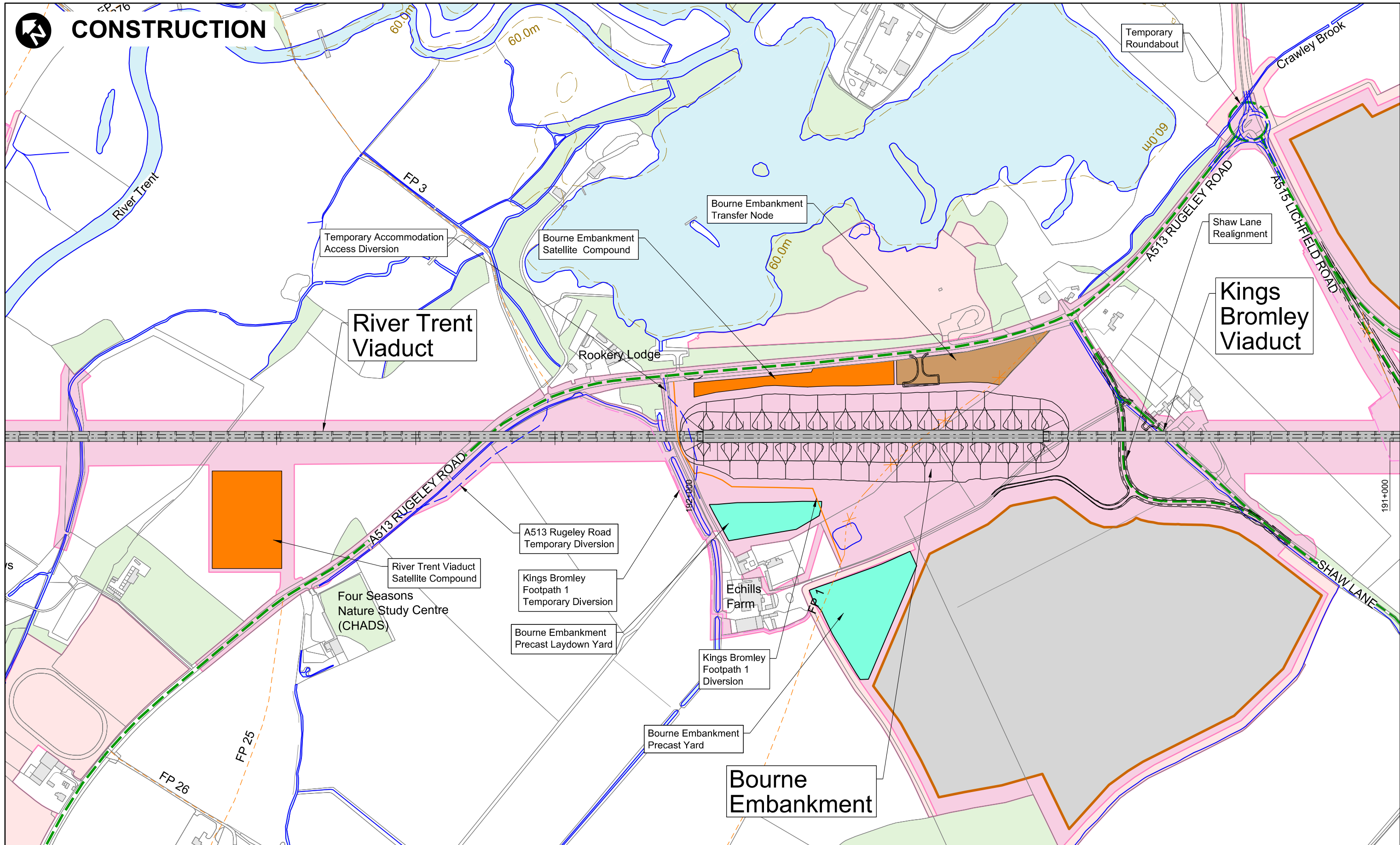
- Option 1 (red line) lowers the alignment to the minimum level necessary to meet the headroom requirements for the highway, public right of way and agricultural/accommodation access crossings, as compared to the Proposed Scheme (blue line). Existing ground level is shown by the (green) dashed line
- The range of height reductions achieved are indicated in the diagram below.



Option 1 – Effects

- Reduced height of Bourne Embankment and height of the viaducts will provide a minor improvement to the landscape and visual effects during construction and operation.
- During construction there is a minor improvement to the effects on cultural heritage. The reduction in number of mitigation earthworks and the decrease in elevation of construction activity associated with the reduction in embankment height, lead to a potential reduction in temporary impacts upon the Kings Bromley Conservation Area, Shaw Lane Farm and Echills Farm.
- Overall gross £3.3m cost reduction.

CONSTRUCTION



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	Description	Drawn	Checked	Con App	HS2 App	Scale with caution as distortion can occur.

Legends/Notes:	
	Balancing pond
	Grassland habitat creation
	Landscape mitigation planting (scrub / woodland)
	Grassed areas
	Engineering earthworks
	Landscape earthworks
	Rail alignment
	Rail alignment formation
	Ditches - new
	Hedgerow habitat creation
	Existing public right of way
	Rail alignment
	HS2 Access road
	Compound
	Land potentially required during construction
	Temporary Material Stockpile
	Borrow Pit

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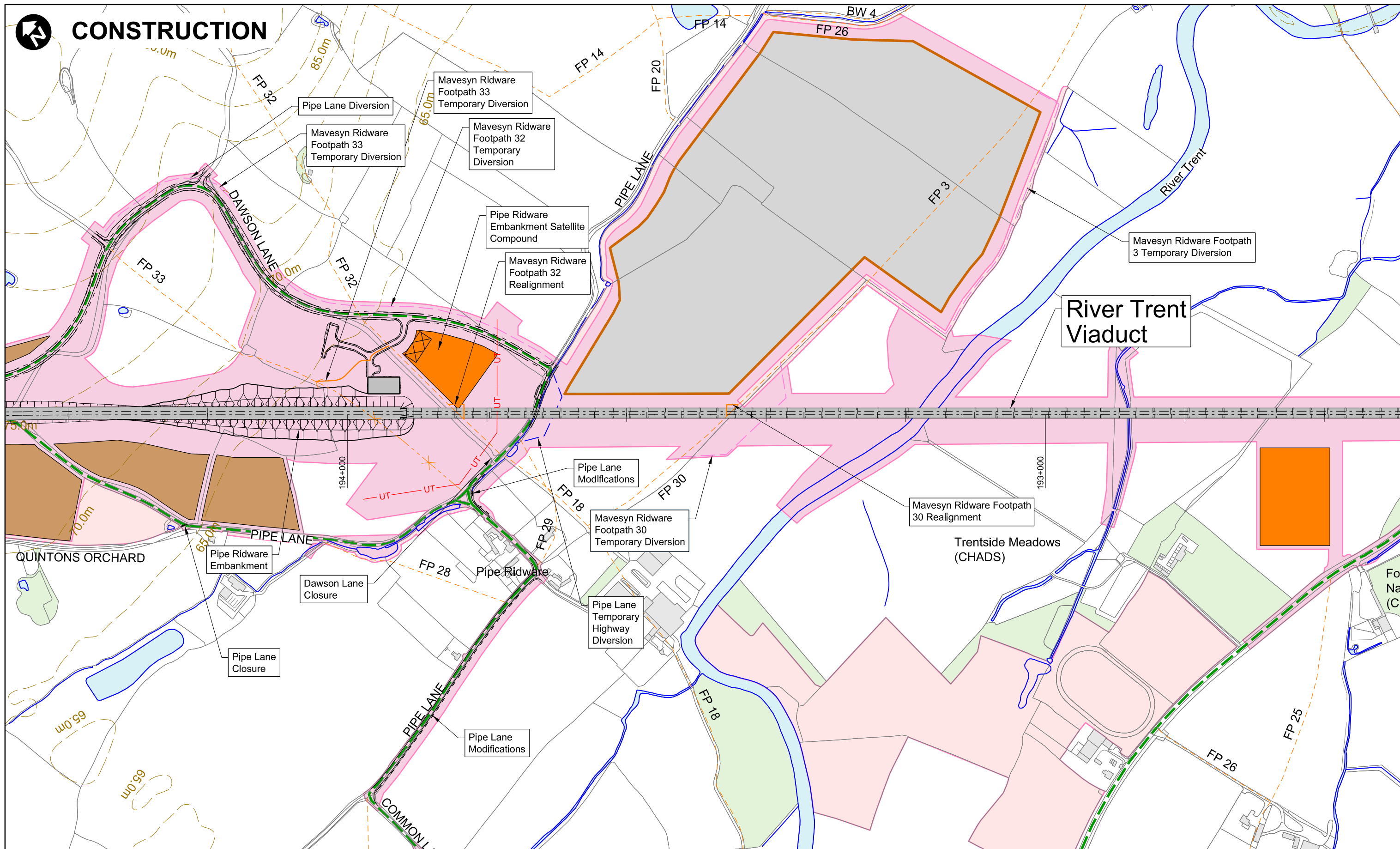
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Ove Arup & Partners international Ltd

Zone	CA1
Design Stage	Design for Petitions
Drawing Title	Kings Bromley Construction Phase

Project/Contract			P2A Civils Design & Environmental Service		
Discipline/Function			Engineering		
Drawn	Checked	Approved	RP	DH	TE
Date	Scale	Size	17/04/2018	1:5000	A3
Drawing No.					Rev.
C861-ARP-PT-DSK-000-000306					P01



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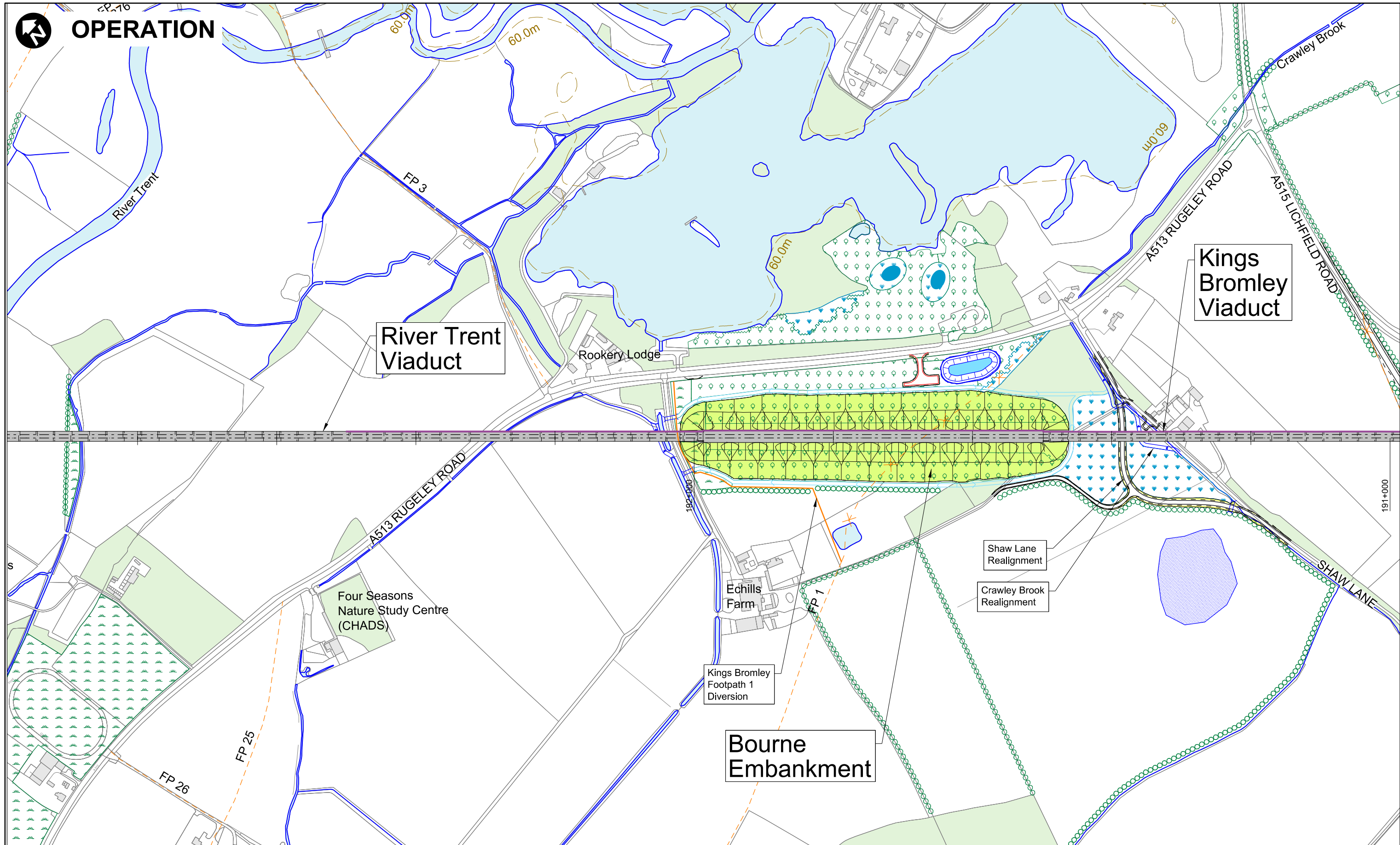
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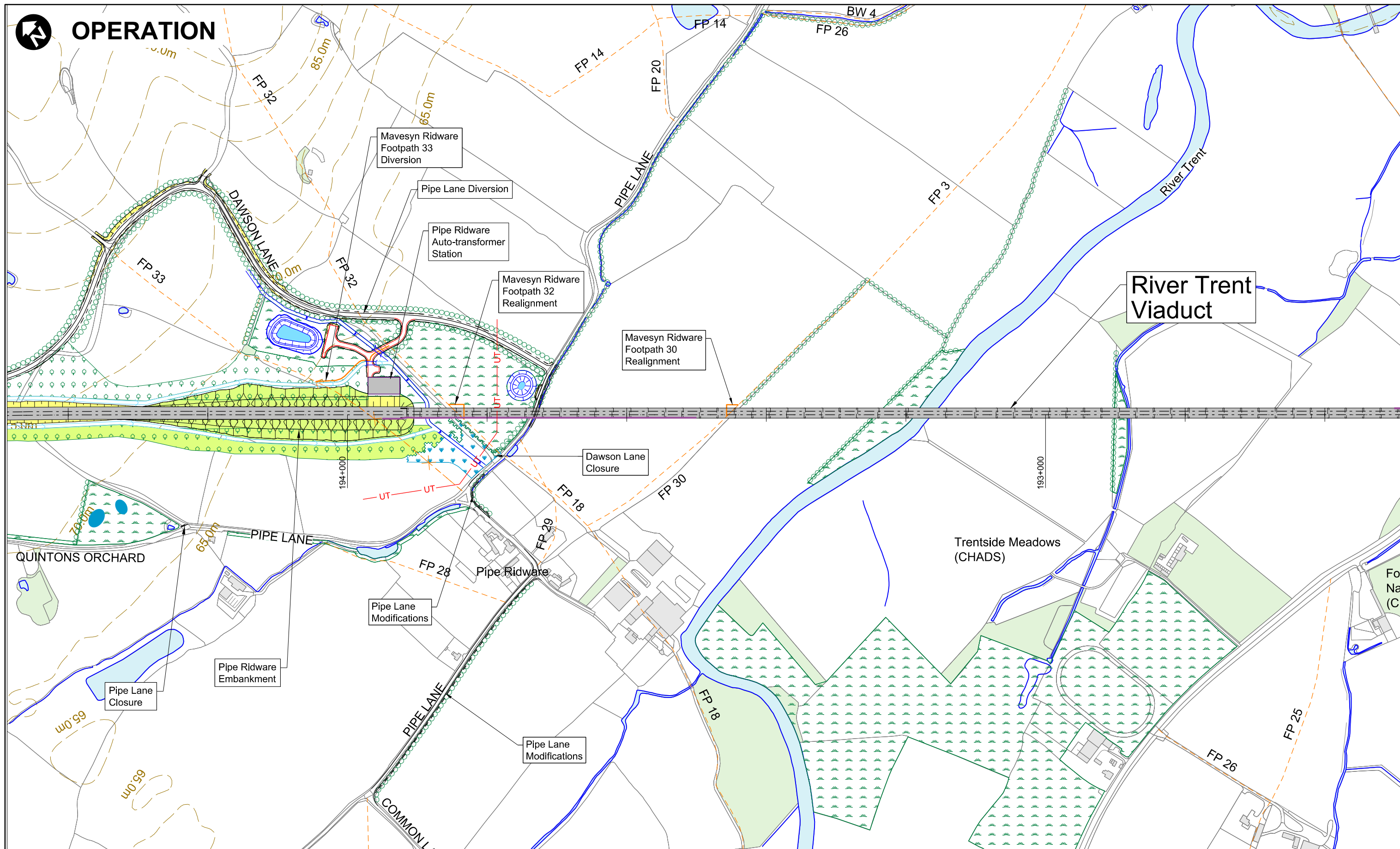
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