A2 Bean and Ebbsfleet Junction Improvements

Environmental Statement

Volume 2 – Appendix H Road Drainage and the Water Environment

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Notice

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Appendix H. Road Drainage and the Water Environment

H.1 Groundwater abstractions

Table H.1: Groundwater abstraction licences

ID	Licence No.	Operator	Location	Purpose
1	SO/040/0037/006	Thames Water Utilities Ltd	Borehole at Point A, Western Bean Farm	Public water supply
			Borehole Point B, Western Drudgeon Farm	
			Borehole Point C1, Middle Drudgeon Farm (Abh)	
			Borehole Point C2, Middle Drudgeon Farm (Ebh)	
			Borehole Point D1, Western Beacon Wood ABH	
			Borehole Point D2, Western Beacon Wood	
			Borehole Point F, (Epm) Southfleet (Borehole and two audits)	
			Point G Ship Inn at Green Street Green	
			Point H Highcross at Beacon Wood	
			Point I Sandy Lane at Betsham	
			Point J Westwood Road at Betsham	
2	1/133	O'Rourke Civil Engineering Ltd	Bluewater Park Development, Greenhithe	General industrial
3	37/096	Dartford & Gravesham NHS Trust	Darenth Park Hospital	General industrial
				Private water undertaking
4	37/099	Bluewater Outer Area Limited	Unlined Chalk lake at Bluewater Park	Spray irrigation - direct
				Lake and pond throughflow
5	9/40/01/0120/GR	Thames Water Utilities Ltd	Borehole No.1 at Green Street Green	Public water supply
			Borehole No.2 at Green Street Green	
6	9/40/01/0504/G/R01	D T G Elliott & Son Ltd	Point A, Borehole, H5 Chalk, Southfleet	Spray irrigation - direct
			Point B, Borehole, H5 Chalk, Southfleet.	General washing / process washing

ID	Licence No.	Operator	Location	Purpose
7	01/152	Thames Water Utilities Ltd	Point B, Borehole at Southfleet, Kent	Public water supply
8	9/40/01/0088/B/GR	Empire Paper Limited	Point 1, Well Nr. New Barn in Swanscombe, Kent	Paper and printing: process Water
9	9/40/01/0128/GR	Thames Water Utilities Ltd	Wells and Adits at Southfleet PS, Southfleet	Public water supply
			Borehole 1 at Southfleet Pumping Station	
			Well 1 at Southfleet Pumping Station	
10	9/40/01/0050/GR	L S Eastern Quarry Limited	Point A at Eastern Quarry Swanscombe	Construction: process water
				Construction: general use (medium loss)
11	9/40/01/0523/G	Beslee Farms	Point C, Borehole, Joyce Hall Farm in Southfleet	Spray irrigation - direct
12	9/40/01/0500/G	D & M Gedney Ltd	Point A, Borehole, Nr. Court Lodge Farm, Southfleet.	Agricultural vegetable wash
				Spray irrigation - direct
13	01/0157	Ebbsfleet Investment (Gp) Limited	Point A, Wingfield Park Farm in Southfleet.	Spray irrigation - direct
14	01/154	Berendsen Uk Limited	Point A, Borehole at Springhead Enterprise Park	Industrial; commercial and public services: laundry use
15	9/40/01/0051/Gr	Lafarge Cement Uk Plc	Point A at Blue Lake Northfleet Cement Works; Point B at Blue Lake Northfleet Cement Works	Construction: non-evaporative cooling
				Spray irrigation - direct
				Construction: Process Water
				Construction: general use (medium loss)
				Construction: evaporative cooling
16	9/40/01/0092/B/GR	Kimberly-Clark Limited	Borehole 1, H5 Chalk, Northfleet	Paper and printing: process water
			Borehole 2, H5 Chalk, Northfleet	

ID	Licence No.	Operator	Location	Purpose
			Borehole 3, Springhead Lake, Northfleet	
17	01/026	Southern Water Services Ltd	Hazells PS, Southfleet	Public water supply
18	9/40/01/0511/G	Southern Water Services Ltd	Boreholes, Wells and Adits at Hazells PS, Northfleet	Public water supply

H.2 Significance of effects

Table H.2: Construction significant effects with mitigation

Receptor	Importance	Scheme element	Construction impact	With mitigation	
				Magnitude of impact	Significance of effect
River Ebbsfleet	High	New gantries	Deterioration in water quality resulting from: the excavation of materials, and the subsequent deposition of soils, sediment, or other construction materials; the spillage of fuels or other contaminating liquids; the mobilisation of contamination following the disturbance of contaminated ground or groundwater; and runoff from construction sites to surface waterbodies	Negligible	Neutral insignificant
Groundwater in Bedrock Principal Aquifer	Very high		Deep foundations may create rapid vertical flow pathways into the groundwater body for potentially contaminated runoff. Assuming design & construction is to industry standards, this risk to the groundwater body should be mitigated	Negligible	Neutral insignificant
Groundwater in Bedrock Secondary A Aquifer	High			Negligible	Neutral insignificant
Groundwater in Superficial Deposits: Secondary A and Secondary Undifferentiated	High		Potential for increased surface runoff from scheme to cause deterioration to water quality of groundwater body if runoff is contaminated. Potential secondary effects to groundwater dependant surface water bodies.	Negligible	Neutral insignificant
Groundwater in Bedrock Principal Aquifer	Very high	Northbound B255 widening	Deep foundations may create rapid vertical flow pathways into the groundwater body for potentially contaminated runoff. Assuming design & construction is to industry standards, this risk to the groundwater body should be mitigated	Negligible	Neutral insignificant
Groundwater in Bedrock Secondary A Aquifer	High			Negligible	Neutral insignificant
Groundwater in Superficial Deposits: Secondary A and Secondary Undifferentiated	High		Potential for increased surface runoff from scheme to cause deterioration to water quality of groundwater body if runoff is contaminated. Potential secondary effects to groundwater dependant surface water bodies	Negligible	Neutral insignificant

Receptor	Importance	Scheme element	Construction impact	With mitigation	
				Magnitude of impact	Significance of effect
Groundwater in Bedrock Principal Aquifer	Very high	Northbound Bean Lane widening	Deep foundations may create rapid vertical flow pathways into the groundwater body for potentially contaminated runoff. Assuming design & construction is to industry standards, this risk to the groundwater body should be mitigated	Negligible	Neutral insignificant
Groundwater in Bedrock Secondary A Aquifer	High			Negligible	Neutral insignificant
Groundwater in Superficial Deposits: Secondary A and Secondary Undifferentiated	High		Potential for increased surface runoff from scheme to cause deterioration to water quality of groundwater body if runoff is contaminated. Potential secondary effects to groundwater dependant surface water bodies	Negligible	Neutral insignificant
Groundwater in Bedrock Principal Aquifer	Very high	Bean North Roundabout enlargement	Deep foundations may create rapid vertical flow pathways into the groundwater body for potentially contaminated runoff. Assuming design & construction is to industry standards, this risk to the groundwater body should be mitigated	Negligible	Neutral insignificant
Groundwater in Bedrock Secondary A Aquifer	High			Negligible	Neutral insignificant
Groundwater in Superficial Deposits: Secondary A and Secondary Undifferentiated	High		Potential for increased surface runoff from scheme to cause deterioration to water quality of groundwater body if runoff is contaminated. Potential secondary effects to groundwater dependant surface water bodies	Negligible	Neutral insignificant
Groundwater in Bedrock Principal Aquifer	Very high	A296 eastbound exit widening	Deep foundations may create rapid vertical flow pathways into the groundwater body for potentially contaminated runoff. Assuming design & construction is to industry standards, this risk to the groundwater body should be mitigated	Negligible	Neutral insignificant
Groundwater in Bedrock Secondary A Aquifer	High			Negligible	Neutral insignificant
Groundwater in Superficial Deposits: Secondary A and Secondary Undifferentiated	High		Potential for increased surface runoff from scheme to cause deterioration to water quality of groundwater body if runoff is contaminated. Potential secondary effects to groundwater dependant surface water bodies	Negligible	Neutral insignificant
Groundwater in Bedrock Principal Aquifer	Very high		Deep foundations may create rapid vertical flow pathways into the groundwater body for potentially	Negligible	Neutral insignificant

Receptor	Importance	Scheme element	Construction impact	With mitigation	
				Magnitude of impact	Significance of effect
Groundwater in Bedrock Secondary A Aquifer	High	Bean South Roundabout enlargement	contaminated runoff. Assuming design & construction is to industry standards, this risk to the groundwater body should be mitigated Potential for increased surface runoff from scheme to cause deterioration to water quality of groundwater body if runoff is contaminated. Potential secondary effects to groundwater dependant surface water bodies	Negligible	Neutral insignificant
Groundwater in Superficial Deposits: Secondary A and Secondary Undifferentiated	High			Negligible	Neutral insignificant
Groundwater in Bedrock Principal Aquifer	Very high	New bridge parallel to Bean Road Overbridge	Deep foundations may create rapid vertical flow pathways into the groundwater body for potentially contaminated runoff. Assuming design & construction is to industry standards, this risk to the groundwater body should be mitigated Potential for increased surface runoff from scheme to cause deterioration to water quality of groundwater body if runoff is contaminated. Potential secondary effects to groundwater dependant surface water bodies	Negligible	Neutral insignificant
Groundwater in Bedrock Secondary A Aquifer	High			Negligible	Neutral insignificant
Groundwater in Superficial Deposits: Secondary A and Secondary Undifferentiated	High			Negligible	Neutral insignificant
Groundwater in Bedrock Principal Aquifer	Very high	New Bean Junction Eastbound on slip road	Deep foundations may create rapid vertical flow pathways into the groundwater body for potentially contaminated runoff. Assuming design & construction is to industry standards, this risk to the groundwater body should be mitigated Potential for increased surface runoff from scheme to cause deterioration to water quality of groundwater body if runoff is contaminated. Potential secondary effects to groundwater dependant surface water bodies	Negligible	Neutral insignificant
Groundwater in Bedrock Secondary A Aquifer	High			Negligible	Neutral insignificant
Groundwater in Superficial Deposits: Secondary A and Secondary Undifferentiated	High			Negligible	Neutral insignificant
River Ebbsfleet	High	Site-wide road drainage	Deterioration in water quality resulting from: the excavation of materials, and the subsequent deposition of soils, sediment, or other construction materials; the spillage of fuels or other contaminating liquids; the	Negligible	Neutral insignificant
Surface water drain on Ebbsfleet Green, south west of Ebbsfleet west	High			Negligible	Neutral

Receptor	Importance	Scheme element	Construction impact	With mitigation	
				Magnitude of impact	Significance of effect
roundabout (located within River Medway Lower WFD catchment)			mobilisation of contamination following the disturbance of contaminated ground or groundwater; and runoff from construction sites to surface waterbodies		insignificant
Surface water drain south west of Ebbsfleet east roundabout (located within River Medway Lower WFD catchment)	High			Negligible	Neutral insignificant
Groundwater in Bedrock Principal Aquifer	Very high		Deep foundations may create rapid vertical flow pathways into the groundwater body for potentially contaminated runoff. Assuming design & construction is to industry standards, this risk to the groundwater body should be mitigated	Negligible	Neutral insignificant
Groundwater in Bedrock Secondary A Aquifer	High			Negligible	Neutral insignificant
Groundwater in Superficial Deposits: Secondary A and Secondary Undifferentiated	High		Potential for increased surface runoff from scheme to cause deterioration to water quality of groundwater body if runoff is contaminated. Potential secondary effects to groundwater dependant surface water bodies.	Negligible	Neutral insignificant
Groundwater in Bedrock Principal Aquifer	Very high	Pepperhill link road realignment	Deep foundations may create rapid vertical flow pathways into the groundwater body for potentially contaminated runoff. Assuming design & construction is to industry standards, this risk to the groundwater body should be mitigated	Negligible	Neutral insignificant
Groundwater in Bedrock Secondary A Aquifer	High			Negligible	Neutral insignificant
Groundwater in Superficial Deposits: Secondary A and Secondary Undifferentiated	High		Potential for increased surface runoff from scheme to cause deterioration to water quality of groundwater body if runoff is contaminated. Potential secondary effects to groundwater dependant surface water bodies	Negligible	Neutral insignificant
Groundwater in Bedrock Principal Aquifer	Very high	A2 eastbound	Deep foundations may create rapid vertical flow pathways into the groundwater body for potentially	Negligible	Neutral insignificant

Receptor	Importance	Scheme element	Construction impact	With mitigation	
				Magnitude of impact	Significance of effect
Groundwater in Bedrock Secondary A Aquifer	High	slip road realignment	contaminated runoff. Assuming design & construction is to industry standards, this risk to the groundwater body should be mitigated	Negligible	Neutral insignificant
Groundwater in Superficial Deposits: Secondary A and Secondary Undifferentiated	Very low		Potential for increased surface runoff from scheme to cause deterioration to water quality of groundwater body if runoff is contaminated. Potential secondary effects to groundwater dependant surface water bodies	Negligible	Neutral insignificant
River Ebbsfleet	High	Ebbsfleet East Roundabout enlargement	Deterioration in water quality resulting from: the excavation of materials, and the subsequent deposition of soils, sediment, or other construction materials; the spillage of fuels or other contaminating liquids; the mobilisation of contamination following the disturbance of contaminated ground or groundwater; and runoff from construction sites to surface waterbodies	Negligible	Neutral insignificant
Surface water drain on Ebbsfleet Green, south west of Ebbsfleet west roundabout (located within River Medway Lower WFD catchment)	High			Negligible	Neutral insignificant
Surface water drain south west of Ebbsfleet east roundabout (located within River Medway Lower WFD catchment)	High			Negligible	Neutral insignificant
Groundwater in Bedrock Principal Aquifer	Very high		Deep foundations may create rapid vertical flow pathways into the groundwater body for potentially contaminated runoff. Assuming design & construction is to industry standards, this risk to the groundwater body should be mitigated	Negligible	Neutral insignificant
Groundwater in Bedrock Secondary A Aquifer	High			Negligible	Neutral insignificant
Groundwater in Superficial Deposits: Secondary A and Secondary Undifferentiated	High		Potential for increased surface runoff from scheme to cause deterioration to water quality of groundwater body if runoff is contaminated. Potential secondary effects to groundwater dependant surface water bodies.	Negligible	Neutral insignificant
River Ebbsfleet	High			Negligible	Neutral

Receptor	Importance	Scheme element	Construction impact	With mitigation	
				Magnitude of impact	Significance of effect
		Link Road between Ebbsfleet West and East Roundabouts widened	Deterioration in water quality resulting from: the excavation of materials, and the subsequent deposition of soils, sediment, or other construction materials; the spillage of fuels or other contaminating liquids; the mobilisation of contamination following the disturbance of contaminated ground or groundwater; and runoff from construction sites to surface waterbodies		insignificant
Surface water drain on Ebbsfleet Green, south west of Ebbsfleet west roundabout (located within River Medway Lower WFD catchment)	High			Negligible	Neutral insignificant
Surface water drain south west of Ebbsfleet east roundabout (located within River Medway Lower WFD catchment)	High			Negligible	Neutral insignificant
Groundwater in Bedrock Principal Aquifer	Very high		Deep foundations may create rapid vertical flow pathways into the groundwater body for potentially contaminated runoff. Assuming design & construction is to industry standards, this risk to the groundwater body should be mitigated	Negligible	Neutral insignificant
Groundwater in Bedrock Secondary A Aquifer	High			Negligible	Neutral insignificant
Groundwater in Superficial Deposits: Secondary A and Secondary Undifferentiated	High		Potential for increased surface runoff from scheme to cause deterioration to water quality of groundwater body if runoff is contaminated. Potential secondary effects to groundwater dependant surface water bodies.	Negligible	Neutral insignificant
River Ebbsfleet	High	Ebbsfleet West Roundabout enlargement	Deterioration in water quality resulting from: the excavation of materials, and the subsequent deposition of soils, sediment, or other construction materials; the spillage of fuels or other contaminating liquids; the mobilisation of contamination following the disturbance of contaminated ground or groundwater; and runoff from construction sites to surface waterbodies	Negligible	Neutral insignificant
Surface water drain on Ebbsfleet Green, south west of Ebbsfleet west roundabout (located within River Medway Lower WFD catchment)	High			Negligible	Neutral insignificant
Surface water drain south west of Ebbsfleet east roundabout (located	High			Negligible	Neutral insignificant

Receptor	Importance	Scheme element	Construction impact	With mitigation	
				Magnitude of impact	Significance of effect
within River Medway Lower WFD catchment)					
Groundwater in Bedrock Principal Aquifer	High		Deep foundations may create rapid vertical flow pathways into the groundwater body for potentially contaminated runoff. Assuming design & construction is to industry standards, this risk to the groundwater body should be mitigated	Negligible	Neutral insignificant
Groundwater in Bedrock Secondary A Aquifer	High			Negligible	Neutral insignificant
Groundwater in Superficial Deposits: Secondary A and Secondary Undifferentiated	Very low		Potential for increased surface runoff from scheme to cause deterioration to water quality of groundwater body if runoff is contaminated. Potential secondary effects to groundwater dependant surface water bodies.	Negligible	Neutral insignificant
Groundwater in Bedrock Principal Aquifer	Very high	Southbound A2260 widening	Deep foundations may create rapid vertical flow pathways into the groundwater body for potentially contaminated runoff. Assuming design & construction is to industry standards, this risk to the groundwater body should be mitigated	Negligible	Neutral insignificant
Groundwater in Bedrock Secondary A Aquifer	High			Negligible	Neutral insignificant
Groundwater in Superficial Deposits: Secondary A and Secondary Undifferentiated	High		Potential for increased surface runoff from scheme to cause deterioration to water quality of groundwater body if runoff is contaminated. Potential secondary effects to groundwater dependant surface water bodies	Negligible	Neutral insignificant
Groundwater in Bedrock Principal Aquifer	Very high	Northbound A2260 widening	Deep foundations may create rapid vertical flow pathways into the groundwater body for potentially contaminated runoff. Assuming design & construction is to industry standards, this risk to the groundwater body should be mitigated	Negligible	Neutral insignificant
Groundwater in Bedrock Secondary A Aquifer	High			Negligible	Neutral insignificant
Groundwater in Superficial Deposits: Secondary A and Secondary Undifferentiated	High		Potential for increased surface runoff from scheme to cause deterioration to water quality of groundwater	Negligible	Neutral insignificant

Receptor	Importance	Scheme element	Construction impact	With mitigation	
				Magnitude of impact	Significance of effect
			body if runoff is contaminated. Potential secondary effects to groundwater dependant surface water bodies		
River Ebbsfleet	High	Construction site compounds	Temporary works within the floodplain, specifically material storage, may impact on the floodplain storage in this area which could result in increased flood levels. Temporary location of plant and materials may be mobilised during flood events causing blockage and hence backing up of flood water Deterioration in water quality resulting from: the excavation of materials, and the subsequent deposition of soils, sediment, or other construction materials; the spillage of fuels or other contaminating liquids; the mobilisation of contamination following the disturbance of contaminated ground or groundwater; and runoff from construction sites to surface water bodies.	Negligible	Neutral
Surface water drain on Ebbsfleet Green, south west of Ebbsfleet west roundabout (located within River Medway Lower WFD catchment)	High			Negligible	Neutral insignificant
Surface water drain south west of Ebbsfleet east roundabout (located within River Medway Lower WFD catchment)	High			Negligible	Neutral insignificant
Groundwater in Bedrock Principal Aquifer	Very high		Potential for increased surface runoff from scheme to cause deterioration to water quality of groundwater body if runoff is contaminated. Potential secondary effects to groundwater dependant surface water bodies	Negligible	Neutral insignificant
Groundwater in Bedrock Secondary A Aquifer	High			Negligible	Neutral insignificant
Groundwater in Superficial Deposits: Secondary A and Secondary Undifferentiated	High			Negligible	Neutral insignificant
Groundwater in Bedrock Principal Aquifer	Very High	Pre-earthwork ditches	Deep foundations may create rapid vertical flow pathways into the groundwater body for potentially contaminated runoff. Assuming design & construction is to industry standards, this risk to the groundwater body should be mitigated	Negligible	Neutral insignificant
Groundwater in Bedrock Secondary A Aquifer	High			Negligible	Neutral insignificant

Receptor	Importance	Scheme element	Construction impact	With mitigation	
				Magnitude of impact	Significance of effect
Groundwater in Superficial Deposits: Secondary A and Secondary Undifferentiated	High		Potential for increased surface runoff from scheme to cause deterioration to water quality of groundwater body if runoff is contaminated. Potential secondary effects to groundwater dependant surface water bodies	Negligible	Neutral insignificant
Groundwater in Bedrock Principal Aquifer	Very High	Earthworks grading surface (filling and cutting)	Deep foundations may create rapid vertical flow pathways into the groundwater body for potentially contaminated runoff. Assuming design & construction is to industry standards, this risk to the groundwater body should be mitigated Potential for increased surface runoff from scheme to cause deterioration to water quality of groundwater body if runoff is contaminated. Potential secondary effects to groundwater dependant surface water bodies	Negligible	Neutral insignificant
Groundwater in Bedrock Secondary A Aquifer	High			Negligible	Neutral insignificant
Groundwater in Superficial Deposits: Secondary A and Secondary Undifferentiated	High			Negligible	Neutral insignificant
River Ebbsfleet	High	Proposed drainage and attenuation works	Deterioration in water quality resulting from: the excavation of materials, and the subsequent deposition of soils, sediment, or other construction materials; the spillage of fuels or other contaminating liquids; the mobilisation of contamination following the disturbance of contaminated ground or groundwater; and runoff from construction sites to surface water bodies.	Negligible	Neutral insignificant
Groundwater in Bedrock Principal Aquifer	Very High		Potential for increased surface runoff from scheme to cause deterioration to water quality of groundwater body if runoff is contaminated. Potential secondary effects to groundwater dependant surface water bodies	Negligible	Neutral insignificant
Groundwater in Bedrock Secondary A Aquifer	High			Negligible	Neutral insignificant
Groundwater in Superficial Deposits: Secondary A and Secondary Undifferentiated	High			Negligible	Neutral insignificant
River Ebbsfleet	High			Negligible	Neutral

Receptor	Importance	Scheme element	Construction impact	With mitigation	
				Magnitude of impact	Significance of effect
		Access tracks	Temporary works could involve soil compaction that would reduce the infiltration capacity of the ground and hence increased surface water runoff and/or accumulation rates. Temporary storage of material or equipment may alter surface alter flow paths diverting runoff and flooding to new areas. Temporary alterations to the existing drainage system for the road network, may also impact on surface water runoff routes.		insignificant
Surface water drain on Ebbsfleet Green, south west of Ebbsfleet west roundabout (located within River Medway Lower WFD catchment)	High			Negligible	Neutral insignificant
Surface water drain south west of Ebbsfleet east roundabout (located within River Medway Lower WFD catchment)	High			Negligible	Neutral insignificant
Groundwater in Bedrock Principal Aquifer	Very High			Negligible	Neutral insignificant
Groundwater in Bedrock Secondary A Aquifer	High			Negligible	Neutral insignificant
Groundwater in Superficial Deposits: Secondary A and Secondary Undifferentiated	High			Negligible	Neutral insignificant
River Ebbsfleet	High	Various works, potential including vehicle movement and plant storage	Temporary works could involve soil compaction that would reduce the infiltration capacity of the ground and hence increased surface water runoff and/or accumulation rates. Temporary storage of material or equipment may alter surface alter flow paths diverting runoff and flooding to new areas. Temporary alterations to the existing drainage system for the road network, may also impact on surface water runoff routes.	Negligible	Neutral insignificant
Surface water drain on Ebbsfleet Green, south west of Ebbsfleet west roundabout (located within River Medway Lower WFD catchment)	High			Negligible	Neutral insignificant
Surface water drain south west of Ebbsfleet east roundabout (located within River Medway Lower WFD catchment)	High			Negligible	Neutral insignificant

Receptor	Importance	Scheme element	Construction impact	With mitigation	
				Magnitude of impact	Significance of effect
Groundwater in Bedrock Principal Aquifer	Very High			Negligible	Neutral insignificant
Groundwater in Bedrock Secondary A Aquifer	High			Negligible	Neutral insignificant
Groundwater in Superficial Deposits: Secondary A and Secondary Undifferentiated	Very low			Negligible	Neutral insignificant
Groundwater in Bedrock Principal Aquifer	Very High	Any excavations or works below the existing ground level	Depending on site-specific groundwater levels, excavations may be at risk from groundwater flooding. Works below the existing ground level which covers a large plan area, or is an uninterrupted linear feature, may impact on groundwater flow paths causing backing up and an increased groundwater flood risk in the upstream area.	Negligible	Neutral insignificant
Groundwater in Bedrock Secondary A Aquifer	High			Negligible	Neutral insignificant
Groundwater in Superficial Deposits: Secondary A and Secondary Undifferentiated	High			Negligible	Neutral insignificant

Table H.3: Baseline operational effects

Road drainage catchment	Receiving watercourse	Existing mitigation	RST		EQS (µg/l)		SS test (Tier 1)	Water quality		Spillage risk[3]	Importance	Spillage risk	
			Copper	Zinc	Copper[1]	Zinc[2]		Magnitude of impact	Significance of effect			Magnitude of impact	Significance of effect
1	Groundwater (soakaway)	Attenuation pond (dry)	Fail (6hr + 24hr event)	Pass	1.7	5.82	Pass	Minor adverse	Moderate significance	0.0001	Very high	Negligible	Neutral insignificant

Road drainage catchment	Receiving watercourse	Existing mitigation	RST		EQS (µg/l)		SS test (Tier 1)	Water quality		Spillage risk[3]	Importance	Spillage risk	
			Copper	Zinc	Copper[1]	Zinc[2]		Magnitude of impact	Significance of effect			Magnitude of impact	Significance of effect
2	Groundwater (soakaway)	Attenuation / Infiltration pond (wet) Oil interceptors, penstocks with storage tanks	Fail (6hr + 24hr event)	Pass	1.83	6.18	Pass	Minor adverse	Moderate significance	0.0002	Very high	Negligible	Neutral insignificant
3	Groundwater (soakaway)	Oil interceptors, penstocks with storage tanks,	Fail (6hr + 24hr event)	Pass	1.59	5.47	Pass	Minor adverse	Moderate significance	0.0001	Very high	Negligible	Neutral insignificant
4	Groundwater (infiltration ditch	None	Pass	Pass	0.24	0.59	Pass	Negligible	Neutral insignificant	0.0000	Very high	Negligible	Neutral insignificant
5	River Ebbsfleet	Oil interceptors, penstocks with storage tanks	Fail (6hr + 24hr event)	Fail (24hr event)	4.87	16.16	Fail	Major adverse	Large significance	0.0074	High	Negligible	Neutral insignificant

Road drainage catchment	Receiving watercourse	Existing mitigation	RST		EQS (µg/l)		SS test (Tier 1)	Water quality		Spillage risk[3]	Importance	Spillage risk	
			Copper	Zinc	Copper[1]	Zinc[2]		Magnitude of impact	Significance of effect			Magnitude of impact	Significance of effect
6	River Ebbsfleet	None	Pass	Pass	0.35	0.85	Pass	Negligible	Neutral insignificant	0.0003	High	Negligible	Neutral insignificant
7	Groundwater (soakaway)	None	Pass	Pass	0.4	0.96	Pass	Negligible	Neutral insignificant	0.0000	Very high	Negligible	Neutral insignificant
8	Groundwater (soakaway)	None	Pass	Pass	0.31	0.75	Pass	Negligible	Neutral insignificant	0.0001	Very high	Negligible	Neutral insignificant
9	Groundwater (soakaway)	None	Pass	Pass	0.27	0.65	Pass	Negligible	Neutral insignificant	0.0000	Very high	Negligible	Neutral insignificant
10	Groundwater (soakaway)	None	Pass	Pass	0.12	0.31	Pass	Negligible	Neutral insignificant	0.0000	Very high	Negligible	Neutral insignificant
11	Groundwater (soakaway)	None	Pass	Pass	0.34	0.81	Pass	Negligible	Neutral insignificant	0.0001	Very high	Negligible	Neutral insignificant
12	Groundwater (soakaway)	None	Pass	Pass	0.17	0.42	Pass	Negligible	Neutral insignificant	0.0000	Very high	Negligible	Neutral insignificant

Road drainage catchment	Receiving watercourse	Existing mitigation	RST		EQS (µg/l)		SS test (Tier 1)	Water quality		Spillage risk[3]	Importance	Spillage risk	
			Copper	Zinc	Copper[1]	Zinc[2]		Magnitude of impact	Significance of effect			Magnitude of impact	Significance of effect
13	Groundwater (soakaway)	None	Pass	Pass	0.37	0.9	Pass	Negligible	Neutral insignificant	0.0000	Very high	Negligible	Neutral insignificant
14	Groundwater (soakaway)	None	Pass	Pass	0.3	0.72	Pass	Negligible	Neutral insignificant	0.0000	Very high	Negligible	Neutral insignificant
15	Groundwater (soakaway)	None	Pass	Pass	0.49	1.14	Pass	Negligible	Neutral insignificant	0.0000	Very high	Negligible	Neutral insignificant
Key: [1]Copper EQS (at >100 – 250 mg/l $CaCO_3$) 10 µg/l; [2]Zinc EQS 7.8 µg/l; [3] Calculated spillage risks should not be greater than 0.005													

Table H.4: Proposed operational effects with mitigation

Road drainage catchment	Receiving watercourse	Existing mitigation	RST		EQS (µg/l)		SS test (Tier 1)	Water quality		Spillage risk[3]	Importance	Spillage risk	
			Copper	Zinc	Copper[1]	Zinc[2]		Magnitude of impact	Significance of effect			Magnitude of impact	Significance of effect
1	Groundwater (soakaway)	Attenuation pond (dry)	Fail (24hr + 6hr events)	Pass	1.77	6.05	Pass	Minor adverse	Moderate significance	0.0001	Very high	Negligible	Neutral insignificant

Road drainage catchment	Receiving watercourse	Existing mitigation	RST		EQS (µg/l)		SS test (Tier 1)	Water quality		Spillage risk[3]	Importance	Spillage risk	
			Copper	Zinc	Copper[1]	Zinc[2]		Magnitude of impact	Significance of effect			Magnitude of impact	Significance of effect
2	Groundwater (soakaway)	Attenuation / Infiltration pond (wet) Oil interceptors, penstocks with storage tanks	Fail (24hr + 6hr events)	Pass	1.93	6.49	Pass	Minor adverse	Moderate significance	0.0002	Very high	Negligible	Neutral insignificant
3	Groundwater (soakaway)	Oil interceptors, penstocks with storage tanks,	Fail (24hr + 6hr events)	Pass	1.57	5.4	Pass	Minor adverse	Moderate significance	0.0001	Very high	Negligible	Neutral insignificant
4	Groundwater (infiltration ditch	None	Pass	Pass	0.19	0.46	Pass	Negligible	Neutral	0.0000	Very high	Negligible	Neutral insignificant
5	River Ebbsfleet	Oil interceptors, penstocks with	Fail (24hr + 6hr events)	Pass	2.49	8.25 with swale	Fail	Major adverse	Large significance	0.0019	High	Negligible	Neutral insignificant

Road drainage catchment	Receiving watercourse	Existing mitigation	RST		EQS (µg/l)		SS test (Tier 1)	Water quality		Spillage risk[3]	Importance	Spillage risk	
			Copper	Zinc	Copper[1]	Zinc[2]		Magnitude of impact	Significance of effect			Magnitude of impact	Significance of effect
		storage tanks											
6	River Ebbsfleet	None	Pass	Pass	0.4	0.96	Pass	Negligible	Neutral insignificant	0.0003	High	Negligible	Neutral insignificant
7	Groundwater (soakaway)	None	Pass	Pass	0.37	0.89	Pass	Negligible	Neutral insignificant	0.0001	Very high	Negligible	Neutral insignificant
8	Groundwater (soakaway)	None	Pass	Pass	0.46	1.08	Pass	Negligible	Neutral insignificant	0.0016	Very high	Negligible	Neutral insignificant
9	Groundwater (soakaway)	None	Pass	Pass	0.44	1.09	Pass	Negligible	Neutral insignificant	0.0000	Very high	Negligible	Neutral insignificant
10	Groundwater (soakaway)	None	Pass	Pass	0.19	0.46	Pass	Negligible	Neutral insignificant	0.0000	Very high	Negligible	Neutral insignificant
11	Groundwater (soakaway)	None	Pass	Pass	0.35	0.84	Pass	Negligible	Neutral insignificant	0.0000	Very high	Negligible	Neutral insignificant
12	Groundwater (soakaway)	None	Pass	Pass	0.17	0.42	Pass	Negligible	Neutral insignificant	0.0000	Very high	Negligible	Neutral insignificant
13	Groundwater (soakaway)	None	Pass	Pass	0.42	1.0	Pass	Negligible	Neutral insignificant	0.0000	Very high	Negligible	Neutral insignificant

Road drainage catchment	Receiving watercourse	Existing mitigation	RST		EQS (µg/l)		SS test (Tier 1)	Water quality		Spillage risk[3]	Importance	Spillage risk	
			Copper	Zinc	Copper[1]	Zinc[2]		Magnitude of impact	Significance of effect			Magnitude of impact	Significance of effect
14	Groundwater (soakaway)	None	Pass	Pass	0.48	1.15	Pass	Negligible	Neutral insignificant	0.0000	Very high	Negligible	Neutral insignificant
15	Groundwater (soakaway)	None	Pass	Pass	0.49	1.14	Pass	Negligible	Neutral insignificant	0.0001	Very high	Negligible	Neutral insignificant

Key: [1]Copper EQS (at >100 – 250 mg/l $CaCO_3$) 10 µg/l; [2]Zinc EQS 7.8 µg/l; [3] Calculated spillage risk should not be greater than 0.005

Table H.5: Proposed operational effects Method B

Road drainage catchment	Receiving watercourse	Existing mitigation	RST		EQS (µg/l)		SS test (Tier 1)	Method B				Water quality	
			Copper	Zinc	Copper[1]	Zinc[2]		pH	DOC	Ca	Site-specific dissolved zinc EQS (µg l-1)	Magnitude of impact	Significance of effect
5	River Ebbsfleet	Oil interceptors, penstocks with storage tanks	Fail (24hr + 6hr events)	Pass	2.49	8.25 with swale	Fail	7.8	1	200	17.72	Moderate adverse	Moderate significance

Key: [1]Copper EQS (at >100 – 250 mg/l $CaCO_3$) 10 µg/l; [2]Zinc EQS 7.8 µg/l; [3] Calculated spillage risk should not be greater than 0.005

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