

Welsh Government

**M4 Corridor around Newport**

Environmental Statement

Supplement Volume 3:

Appendix S11.1 Replacement

Tables from Chapter 11 of the March

2016 ES

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**Table R11.11: Potential Impacts on Geology and Soils from Permanent Land Take**

Receptor Name	Receptor Type	Receptor Location	Potential Impacts
Solid geology	Rock in areas of cut - Castleton - mudstones and sandstone of the St Maughans Foundation (SMF). Magor – Tintern Sandstone Formation (TSF), Carboniferous Limestone and MMMF	Cuttings at Castleton and Magor	Loss of exposures. Alteration of rock properties following excavation, leading to changes in the hydrogeological regime/stability condition. Creation of new exposures of rock.
Superficial geology (Tidal Flat Deposits)	Soils	Majority of new section of motorway	Ground instability including excessive settlement.
Topsoils and subsoils	Topsoils and subsoils	Adjacent to carriageway through new section of motorway	Topsoil stripping and loss of local seed bank. Over half of the land within the permanent highway boundary crosses many brownfield sites and previously developed land such as Tata Steelworks, Newport Docks, industrial estates and existing paved areas. In many of these areas, topsoil is absent. Thus the potential impact of topsoil loss would be limited to greenfield areas such as farmland in the Gwent Levels and around Magor and Castleton.
Aquifers (superficial and bedrock)	Groundwater (Controlled water)	Beneath the new section of motorway	Migration of contaminants in soils and perched groundwater creation of new pathways including band drains and piling.
Surface waters (reens, rivers)	Surface water	Within and adjacent to new section of motorway	Migration of contaminants in soils and perched groundwater and surface water runoff into surface waters.
Surface waters (reens, rivers)	Surface water	Surface waters/reens adjacent and near areas where band drains are proposed within TFD.	Band drains creating vertical pathways connecting shallow groundwater and migration into surface waters.
<b>Specific Areas of Potential Land Contamination</b>			
<i>CL-26</i>			
Surface waters (reens)	Surface water	In and around CL-26	Migration of contaminants in lagoon wastes, treated materials, soils and

Receptor Name	Receptor Type	Receptor Location	Potential Impacts
			waters entering into surface water.

**Table R11.12: Magnitude of Impacts and Significance of Effects – Permanent Land Take**

Receptor Name	Potential Effects	Magnitude of Impacts	Potential Significance of Effect
Solid geology	Loss of exposures Alteration of rock properties following excavation, leading to changes in the hydrogeological regime/stability condition. Formation of new exposures providing overall increase in rock exposure.	Negligible (beneficial)	Neutral
Superficial geology	Ground instability - excessive settlement.	Minor (adverse)	Slight (adverse)
Topsoils and subsoils	Topsoil stripping and loss of local seed bank and potential creation of pathways for contamination migration.	Minor (adverse)	Slight (adverse)
Aquifers (superficial and bedrock)	Migration of contaminants in soil and perched groundwater into aquifer.	Minor to Moderate (adverse)	Neutral to moderate (adverse)*
Surface waters (reens, rivers)	Migration of contaminants in soil/perched groundwater and surface water runoff into surface waters.	Moderate (adverse)	Slight (adverse) to large (adverse)*
Surface waters (reens, rivers)	Band drains creating vertical pathways connecting shallow groundwater and migration into surface waters.	Negligible to Minor (adverse)	Slight (adverse) to moderate (adverse)*
<b>Specific Areas of Potentials Land Contamination</b>			
<i>CL-26</i>			
Surface waters (reens)	Migration of contaminants in lagoon wastes, treated materials, soils and waters entering into surface water.	Major (adverse)	Very large (adverse)

\*This receptor’s sensitivity varies along the length of the new section of motorway

**Table R11.13: Sensitive Receptors during Construction**

Receptor Name	Receptor Type	Receptor Location	Sensitivity
Topsoils and subsoils	Topsoils and subsoils	Adjacent to carriageway through new section of motorway	Medium
Aquifers (superficial and bedrock)	Groundwater	Beneath the new section of motorway.	Low to medium *
Surface waters (reens and rivers)	Surface water	Within and adjacent to new section of motorway	Low to very high *
Adjacent site users	Human	Adjacent to carriageway through new section of motorway	Very high
Construction workers	Human	Construction works area including temporary land take	High
<b>Specific Areas of Potential Land Contamination</b>			
<i>CL-13</i>			
Construction workers	Human	Construction works area within CL-13	High
<i>CL-14</i>			
Construction workers	Human	Construction works area within CL-14	High
<i>CL-17</i>			
Construction workers	Human	Construction works area within CL-17	High
Adjacent site users	Human	Adjacent to construction works area	Very high
<i>CL-18</i>			
Surface waters (River Usk)	Surface water	In and around CL-18	Very high
Construction workers	Human	Construction works area within CL-18	High
<i>CL-26</i>			
Construction workers	Human	Construction works area within CL-26	High
Adjacent site users	Human	Adjacent to construction works in CL-26	Very high
Surface waters (reens)	Surface water	In and around CL-26	Very high
Aquifers (superficial and bedrock)	Groundwater	Beneath and around CL-26	Low

\*This receptor's sensitivity varies along the length of the new section of motorway

**Table R11.14: Potential Impacts on Geology and Soils during Construction**

Receptor Name	Receptor Type	Receptor Location	Potential Impacts
Topsoils and subsoils	Topsoils and subsoils	Adjacent to carriageway through new section of motorway	Topsoil loss from stripping and associated loss of local seed bank. Uncontrolled surface runoff during construction and erosion of topsoil.
Construction workers	Human	Construction works area throughout new section of	Adverse health effects as a result of exposure to contamination through dermal contact, ingestion and inhalation of contaminated soil/soil

Receptor Name	Receptor Type	Receptor Location	Potential Impacts
		motorway	derived dust. Ground gas migration and inhalation of gases / explosion.
Construction workers	Human	Wentlooge and Caldicot Levels	Explosion from ground gas build up in confined space and during piling and band drain installation.
Construction workers	Human	Construction works area	Explosion from buried, unidentified unexploded ordnance.
Adjacent land users including general public	Human	Land adjacent to the new section of motorway	Explosion from buried, unidentified unexploded ordnance.
Construction workers and adjacent site users	Human	Magor Interchange	Collapse of potential dissolution features.
Aquifers (superficial and bedrock)	Ground water	Beneath the new section of motorway	Migration of contaminants in soil and perched groundwater. Piling and band drain installation may increase this risk during surcharging.
Surface waters (reens and rivers)	Surface water	Within and adjacent to new section of motorway	Migration of contaminants in soil and perched groundwater and runoff into surface water.
Surface waters (reens and rivers)	Surface water	Within and adjacent to new section of motorway	Piling and band drain installation allowing brackish groundwater or contaminated groundwater entering surface water during surcharging.
Construction workers and adjacent land users including general public	Human	Adjacent to carriageway through new section of motorway	Adverse health effects as a result of exposure to contamination through dermal contact, ingestion and inhalation of contaminated soil derived dust. Ground gas migration and inhalation of gases/explosion.
<b>Effects from Specific Areas of Potential Land Contamination</b>			
<i>CL-13</i>			
Construction workers	Human	Construction works area	Exposure to waste / Made Ground with potentially elevated levels of soil contamination and asbestos. Inhalation of ground gases with elevated concentrations.
Aquifers (superficial and bedrock)	Groundwater	Beneath and around CL-13	Installation of piles and band drains may create pathways connecting the impacted perched groundwaters and aquifer.
<i>CL-14</i>			
Construction workers	Human	Construction works area	Exposure to Made Ground with elevated levels of inorganic and hydrocarbon contamination. Inhalation of ground gases with elevated concentrations.
<i>CL-17</i>			
Construction workers	Human	Construction works area	Exposure to soil contamination and asbestos. Exposure to ground gas.
Construction workers and adjacent land users including general public	Human	Adjacent construction works area	Exposure to contaminated soil derived dusts and fibres.

Receptor Name	Receptor Type	Receptor Location	Potential Impacts
Aquifers (superficial and bedrock)	Groundwater	Beneath and around CL-17	Migration of contamination within Made Ground and perched groundwater during piling.
<i>CL-18</i>			
Construction workers	Human	Construction works area within CL-18	Exposure to groundwater contamination.
Surface waters (River Usk)	Surface water	In and around CL-18	Contaminants in groundwaters potentially mobilised during dewatering impacting upon surface waters.
<i>CL-26</i>			
Construction worker	Human	Constructions works area within CL-26	Exposure to contaminants in soils and waters and ground gases
Adjacent site users	Human	Adjacent to construction works in CL-26	Exposure to contaminated soil derived dusts and ground gases
Surface waters (reens)	Surface water	In and around CL-26	Migration of contaminants in lagoon wastes, soils and waters entering into surface waters.
Aquifers (superficial and bedrock)	Groundwater	Beneath and around CL-26	Migration of contaminants in lagoon wastes, soils and waters entering aquifer

**Table R11.15: Magnitude of Impacts and Significance of Effects during Construction**

Receptor Name	Potential Effects	Magnitude of Impacts	Potential Significance of Effect
Topsoils and subsoils	Topsoil stripping and loss of local seed bank. Uncontrolled run off and soils erosion.	Minor (adverse)	Slight (adverse)
Construction workers	Collapse of potential dissolution features.	Major (adverse)	Large (adverse)
Construction workers	Explosion from unidentified unexploded ordnance during construction.	Major (adverse)	Very large (adverse)
Adjacent land users including general public	Explosion from unidentified unexploded ordnance during construction.	Major (adverse)	Very large (adverse)
Construction workers and adjacent land users including general public	Exposure through dermal contact, ingestion and inhalation of contaminated soil derived dusts.	Minor (adverse)	Moderate (adverse)
Construction workers	Explosion or inhalation of ground gases.	Major (adverse)	Large (adverse)
Aquifers (superficial and bedrock)	Migration of contaminants in soils and perched groundwater through creation of new pathways including band drains and piling.	Negligible to Minor (adverse)	Slight to Moderate (adverse)*

Receptor Name	Potential Effects	Magnitude of Impacts	Potential Significance of Effect
Surface waters (reens and rivers)	Migration of contaminants in soils and perched groundwater and surface water runoff into surface waters.	Minor to Moderate (adverse)	Slight (adverse) to large (adverse)*
Surface waters (reens and rivers)	Piling and band drain installation allowing brackish or contaminated groundwater entering surface waters.	Negligible to Minor (adverse)	Slight to Moderate (adverse)*
<b>Specific Areas of Potential Land Contamination</b>			
<i>CL-13</i>			
Construction workers	Exposure to waste / Made Ground with potentially elevated levels of contamination and asbestos. Inhalation of ground gases with elevated concentrations.	Major (adverse)	Large (adverse)
<i>CL-14</i>			
Construction workers	Exposure to Made Ground with elevated levels of inorganic and hydrocarbon contamination. Inhalation of ground gases with elevated concentrations.	Moderate (adverse)	Moderate (adverse)
<i>CL-17</i>			
Construction workers	Exposure to soil contamination and asbestos. Exposure to ground gas.	Major (adverse)	Large (adverse)
Construction workers and adjacent land users including general public	Exposure to contaminated soil derived dusts and fibres.	Major (adverse)	Very large (adverse)
<i>CL-18</i>			
Construction workers	Exposure to groundwater contamination.	Major (adverse)	Large (adverse)
Surface waters (River Usk)	Contaminants in groundwaters potentially mobilised during dewatering impacting upon surface waters.	Moderate (adverse)	Large (adverse)
<i>CL-26</i>			
Construction worker	Exposure to contaminants in soils and waters and ground gases	Major (adverse)	Large (adverse)
Adjacent site users	Exposure to contaminated soil derived dusts.	Moderate (adverse)	Large (adverse)
Surface waters (reens)	Migration of contaminants in lagoon wastes, soils and waters entering into surface waters.	Major (adverse)	Very large (adverse)
Aquifers (superficial and bedrock)	Migration of contaminants in lagoon wastes, soils and waters entering aquifer.	Moderate (adverse)	Slight (adverse)

\*This receptor's sensitivity varies along the length of the new section of motorway

**Table R11.17: Potential Impacts on Geology and Soils during Operation**

Receptor Name	Receptor Type	Receptor Location	Potential Effects
Topsoils and subsoils	Topsoils and subsoils	Throughout the new section of motorway	Pollution of soils immediately adjacent to carriageway due to traffic spray/airborne pollutants
Adjacent land users including general public	Human health	Adjacent to carriageway through new section of motorway	Exposure through dermal contact, ingestion and inhalation of contaminated soil derived dusts. Ground gas migration and inhalation of gases.
End users and maintenance workers	Human health	On and adjacent to the carriageway through the new section of motorway	Exposure through dermal contact, ingestion and inhalation of contaminated soils and dusts. Ground gas migration and inhalation of gases.
End users, adjacent site users and maintenance workers	Human health	Wenlooge and Caldicot Levels	Explosion or inhalation of ground gases.
Surface waters (reens, rivers and road drainage)	Surface water	Within and adjacent to new section of motorway	Pollution from surface water runoff, accidental spillages.
Groundwaters	Groundwater	Beneath the new section of motorway	Pollution from surface water runoff, accidental spillages.
<b>Specific Areas of Potential Land Contamination</b>			
<i>CL-13</i>			
End users, adjacent site users and maintenance workers	Human health	Within and adjacent to the new section of motorway	Exposure through dermal contact, ingestion and inhalation of contaminated soils and dusts/fibres. Ground gas migration and inhalation of gases.
<i>CL-14</i>			
End users, adjacent site users and maintenance workers	Human health	Within and adjacent to the new section of motorway	Explosion or inhalation of ground gases.
<i>CL-17</i>			
Maintenance workers	Human health	Outside pier / embankment footprints	Exposure to elevated soil/asbestos contamination of Made Ground remaining on site.
End users and maintenance workers	Human health	On and adjacent to the carriageway through the new section of motorway	Exposure through dermal contact, ingestion and inhalation of contaminated soils/asbestos fibres and dusts. Ground gas migration and inhalation of gases.
<i>CL-26</i>			
Surface waters (reens)	Surface water	In and around CL-26	Migration of contaminants in lagoon wastes, treated materials, soils and waters



Receptor Name	Receptor Type	Receptor Location	Potential Effects
			entering into surface water.
Aquifers (superficial and bedrock)	Groundwater	Beneath and around CL-26	Migration of contaminants in lagoon wastes, treated materials, soils and waters entering into aquifer.
End users and maintenance workers	Human health	On and adjacent to the carriageway through the new section of motorway	Exposure through dermal contact, ingestion and inhalation of contaminated soils and dusts. Ground gas migration and inhalation of gases.

**Table R11.18: Magnitude of Impacts and Significance of Effects during Operation**

Receptor Name	Potential Effects	Magnitude of Impacts	Potential Significance of Effect
Topsoils and subsoils	Pollution of soils immediately adjacent to carriageway due to traffic spray/airborne pollutants.	Negligible (adverse)	Slight (adverse)
Adjacent land users including general public	Exposure through dermal contact, ingestion and inhalation of contaminated dusts. Ground gas migration and inhalation of gases.	Negligible (adverse)	Slight (adverse)
End users and maintenance workers	Exposure through dermal contact, ingestion and inhalation of contaminated soils and dusts. Ground gas migration and inhalation of gases.	Negligible (adverse)	Slight (adverse)
End users, adjacent site users and maintenance workers	Explosion or inhalation of ground gases.	Negligible (adverse)	Slight (adverse)
Surface Waters (reens and rivers)	Pollution from surface water runoff, accidental spillages.	Negligible (adverse)	Slight (adverse)
Aquifers	Pollution from surface water runoff, accidental spillages.	Negligible (adverse)	Slight (adverse)
<b>Specific Areas of Potential Land Contamination</b>			
<b>CL-13</b>			
End users, maintenance workers and adjacent site users	Exposure through dermal contact, ingestion and inhalation of contaminated soils and dusts/fibres. Ground gas migration and inhalation of gases.	Minor (adverse)	Moderate (adverse)
<b>CL-17</b>			
Maintenance workers	Exposure to elevated soil/asbestos contamination of Made Ground remaining on site.	Moderate (adverse)	Moderate (adverse)
End users	Exposure through dermal contact, ingestion and inhalation of contaminated soils/asbestos fibres and dusts. Ground gas migration	Minor (adverse)	Moderate (adverse)

Receptor Name	Potential Effects	Magnitude of Impacts	Potential Significance of Effect
	and inhalation of gases.		
CL 26			
Surface waters (reens)	Migration of contaminants in lagoon wastes, treated materials, soils and waters entering into surface water.	Major (adverse)	Very large (adverse)
Aquifers (superficial and bedrock)	Migration of contaminants in lagoon wastes, treated materials, soils and waters entering into aquifer.	Moderate (adverse)	Slight (adverse)
End users and maintenance workers	Exposure through dermal contact, ingestion and inhalation of contaminated soils and dusts. Ground gas migration and inhalation of gases.	Minor (adverse)	Moderate (adverse)

**Table R11.19: Magnitude of Impacts and Significance of the Land Take Effects Following Mitigation**

Receptor Name	Effect Resulting from the Development of the Scheme	Magnitude of Impact following Mitigation	Significance of Effect following Mitigation
Solid geology	Loss of exposures. Alteration of rock properties following excavation, leading to changes in the hydrogeological regime/stability condition. Formation of new exposures, providing overall increase in rock exposure.	Negligible (beneficial)	Neutral
Superficial geology	Ground instability - excessive settlement.	Negligible (adverse)	Slight (adverse)
Topsoils and subsoils	Topsoil stripping and loss of local seed bank and potential creation of pathways for contamination migration.	Negligible (adverse)	Slight (adverse)
Aquifers (superficial and bedrock)	Migration of contaminants in soil / perched groundwater into aquifer.	Negligible (adverse)	Slight (adverse)
Surface waters (reens and rivers)	Migration of contaminants in soil / perched groundwater and surface water runoff into surface waters.	Negligible (adverse)	Slight (adverse)
Surface waters (reens and rivers)	Band drains creating vertical pathways connecting shallow groundwater and migration into surface waters.	Negligible (adverse)	Slight (adverse)

Receptor Name	Effect Resulting from the Development of the Scheme	Magnitude of Impact following Mitigation	Significance of Effect following Mitigation
<b>Specific Areas of Potential Land Contamination</b>			
<i>CL-26</i>			
Surface waters (reens)	Migration of contaminants in lagoon wastes, treated materials, soils and waters entering into surface water.	Negligible (adverse)	Slight (adverse)

**Table R11.20: Magnitude of Impacts and Significance of the Construction Effects Following Mitigation**

Receptor Name	Effect Resulting from the Development of the Scheme	Magnitude of Impact following Mitigation	Significance of Effect following Mitigation
Topsoils and subsoils	Topsoil stripping and loss of local seed bank.	Negligible (adverse)	Neutral
Construction workers	Collapse of potential dissolution features.	Negligible (adverse)	Slight (adverse)
Construction workers	Explosion from unidentified unexploded ordnance.	Negligible (adverse)	Slight (adverse)
Adjacent land users including general public	Explosion from unidentified unexploded ordnance.	Negligible (adverse)	Slight (adverse)
Construction workers	Construction workers exposed through dermal contact, ingestion and inhalation of contaminated soil and soil derived dusts. Inhalation of vapours / gases.	Negligible (adverse)	Slight (adverse)
Construction workers	Explosion from ground gases on construction workers.	Negligible (adverse)	Slight (adverse)
Construction workers and adjacent land users including general public	Adjacent land users exposed through dermal contact, ingestion and inhalation of contaminated dusts.	Negligible (adverse)	Slight (adverse)
Aquifers (superficial and bedrock)	Migration of contaminants in soils and perched groundwater to aquifer.	Negligible (adverse)	Slight (adverse)
Surface waters (reens, rivers and road drainage)	Migration of contaminants in soils and perched groundwater and surface water runoff into surface waters.	Negligible (adverse)	Slight (adverse)
Surface waters (reens and rivers)	Piling and band drain installation allowing brackish or contaminated groundwater entering surface waters.	Negligible (adverse)	Slight (adverse)
<i>CL-13</i>			
Construction workers	Construction workers exposed to waste / Made Ground with potentially elevated levels of contamination and asbestos. Inhalation of ground gases with elevated concentrations.	Negligible (adverse)	Slight (adverse)

Receptor Name	Effect Resulting from the Development of the Scheme	Magnitude of Impact following Mitigation	Significance of Effect following Mitigation
<i>CL-14</i>			
Construction workers	Construction workers exposed to Made Ground with elevated levels of inorganic and hydrocarbon contamination. Inhalation of ground gases with elevated concentrations.	Negligible (adverse)	Slight (adverse)
<i>CL-17</i>			
Construction workers	Construction workers exposed to elevated soil contamination, asbestos and ground gases.	Negligible (adverse)	Slight (adverse)
Construction workers and adjacent land users including general public	Construction workers and adjacent land users exposed to contaminated soil derived dusts and fibres.	Negligible (adverse)	Slight (adverse)
<i>CL-18</i>			
Construction workers	Construction workers exposed to groundwater contamination.	Negligible (adverse)	Slight (adverse)
Surface waters (reens)	Contamination in groundwater potentially mobilised during dewatering impacting upon surface waters.	Negligible (adverse)	Slight (adverse)
<i>CL-26</i>			
Construction workers	Construction workers exposed to contaminants in soils and waters.	Negligible (adverse)	Slight (adverse)
Adjacent site users	Adjacent site users exposed to contaminated dusts.	Negligible (adverse)	Slight (adverse)
Surface waters (reens)	Migration of contaminants in lagoon waste, soils and waters entering surface waters. Band drains would not be installed through contaminated soils,	Minor (adverse)	Moderate (adverse)
Aquifers (superficial and bedrock)	Migration of contaminants in lagoon wastes, soils and waters entering aquifer.	Minor (adverse)	Neutral

**Table R11.21: Magnitude of Impacts and Significance of the Operational Effects Following Mitigation**

Receptor Name	Effect Resulting from the Development of the Scheme	Magnitude of Impact following Mitigation	Significance of Effect following Mitigation
Topsoils and subsoils	Pollution of soils immediately adjacent to carriageway due to traffic spray/airborne pollutants.	Negligible (adverse)	Neutral
Adjacent land users including general public	Adjacent land users exposed to contaminated soil derived dusts and inhalation of ground gases.	Negligible (beneficial)	Slight (beneficial)
End users and maintenance workers	End users and maintenance workers exposed to contaminated soils and soil derived dusts and inhalation of ground gases.	Negligible (beneficial)	Slight (beneficial)

Receptor Name	Effect Resulting from the Development of the Scheme	Magnitude of Impact following Mitigation	Significance of Effect following Mitigation
End users, adjacent site users and maintenance workers	Explosion of ground gases for end users and maintenance workers.	Negligible (adverse)	Slight (adverse)
Surface waters (reens and rivers).	Pollution of surface waters from surface water runoff, accidental spillages.	Negligible (adverse)	Slight (adverse)
Aquifers	Pollution of groundwaters from surface water runoff, accidental spillages	Negligible (adverse)	Neutral
<i>CL-13</i>			
End users and maintenance workers	End users and maintenance workers exposed through dermal contact, ingestion and inhalation of contaminated soils/soil derived dusts and fibres.	Negligible (beneficial)	Slight (beneficial)
<i>CL-17</i>			
Maintenance workers	Maintenance workers exposed to elevated soil contamination within Made Ground remaining on site.	Negligible (adverse)	Slight (adverse)
End users	End users exposed through dermal contact, ingestion and inhalation of contaminated soils, soil derived dusts and asbestos fibres. Ground gas migration and inhalation of gases.	Negligible (beneficial)	Slight (beneficial)
<i>CL-26</i>			
Surface waters (reens)	Migration of contaminants in lagoon waste, treated materials, soils and waters entering surface water.	Negligible (adverse)	Slight (adverse)
End users and maintenance workers	Exposure through dermal contact, ingestion and inhalation of contaminations, soils and soil derived dusts. Ground gas migration and inhalation of gases	Negligible (beneficial)	Slight (beneficial)
Aquifers (superficial and bedrock)	Migration of contaminants in lagoon wastes, treated materials, soils and waters entering into aquifer.	Negligible (adverse)	Slight (adverse)

**Table R11.22: Summary of Likely Environmental Effects on Geology and Soils**

Receptor	Sensitivity of receptor	Description of impact	Short / medium / long term	Magnitude of impact (without mitigation)	Significance of effect (without mitigation)	Magnitude of impact (with mitigation)	Significance of effect (with mitigation)	Significant / Not significant
<b>Land Take</b>								
Solid geology	Negligible	Net creation of rock exposures.	Long term	Negligible (beneficial)	Neutral	Negligible (beneficial)	Neutral	Not significant
Superficial geology	Low	Ground instability - excessive settlement.	Medium term	Minor (adverse)	Slight (adverse)	Negligible (adverse)	Slight (adverse)	Not significant
Topsoils and subsoils	Medium	Topsoil stripping and loss of local seed bank and potential creation of pathways for contamination migration.	Long term	Minor (adverse)	Slight (adverse)	Negligible (adverse)	Slight (adverse)	Not significant
Aquifers (Superficial and bedrock)	Low to Medium*	Migration of contaminants in soil and perched groundwater into aquifer including migration via band drains.	Medium to long term	Minor to moderate (adverse)	Neutral to moderate (adverse)	Negligible (adverse)	Slight (adverse)	Not significant
Surface waters (reens and rivers)	Low to Very High*	Migration of contaminants in soil and perched groundwater and surface water runoff into surface waters.	Medium to long term	Moderate (adverse)	Slight to large (adverse)	Negligible (adverse)	Slight (adverse)	Not significant
Surface waters (reens and rivers)	Low to Very High*	Band drains creating vertical pathways connecting shallow groundwater and migration into surface waters.	Medium to long term	Negligible to minor (adverse)	Slight (adverse) to moderate (adverse)	Negligible (adverse)	Slight (adverse)	Not significant
Surface waters (reens) – CL-26	Very High	Migration of contaminants in lagoon wastes, treated soils and waters entering into surface water.	Medium to long term	Major (adverse)	Very large (adverse)	Negligible (adverse)	Slight (adverse)	Not Significant

Receptor	Sensitivity of receptor	Description of impact	Short / medium / long term	Magnitude of impact (without mitigation)	Significance of effect (without mitigation)	Magnitude of impact (with mitigation)	Significance of effect (with mitigation)	Significant / Not significant
<b>Construction</b>								
Topsoils and subsoils	Medium	Topsoil loss and loss of local seed bank. Uncontrolled surface water runoff and erosion of topsoil.	Long term	Minor (adverse)	Slight (adverse)	Negligible (adverse)	Neutral	Not significant
Construction workers	High	Collapse of potential dissolution features - hazard to human health.	Long term	Major (adverse)	Large (adverse)	Negligible (adverse)	Slight (adverse)	Not significant
Construction workers and adjacent land users including general public	High and Very High	Explosion from buried unidentified unexploded ordnance - hazard to human health.	Long term	Major (adverse)	Very large (adverse)	Negligible (adverse)	Slight (adverse)	Not significant
Construction workers and adjacent land users including general public	Very High	Exposure to contamination through dermal contact, ingestion and inhalation of contaminated soil/soil derived dust.	Short to long term	Minor (adverse)	Moderate (adverse)	Negligible (adverse)	Slight (adverse)	Not significant
Construction workers	High	Explosion from ground gas build up in confined space and during piling and band drain installation - hazard to human health.	Long term	Major (adverse)	Large (adverse)	Negligible (adverse)	Slight (adverse)	Not significant
Aquifers (Superficial and bedrock)	Low to Medium*	Migration of contaminants in soil and perched groundwaters through creation of new pathways including piling and band drains.	Short term	Negligible to Minor (adverse)	Slight to Moderate (adverse)	Negligible (adverse)	Slight (adverse)	Not significant
Surface	Low to Very	Migration of	Short term	Minor to	Slight	Negligible	Slight	Not

Receptor	Sensitivity of receptor	Description of impact	Short / medium / long term	Magnitude of impact (without mitigation)	Significance of effect (without mitigation)	Magnitude of impact (with mitigation)	Significance of effect (with mitigation)	Significant / Not significant
waters (reens and rivers)	High*	contaminants in soil, perched groundwater and surface water runoff into surface waters.		Moderate (adverse)	(adverse) to large (adverse)	(adverse)	(adverse)	significant
Surface waters (reens and rivers)	Low to Very High*	Piling and band drain installation allowing brackish or contaminated groundwater entering surface waters.	Short term	Negligible to Minor (adverse)	Slight to Moderate (adverse)	Negligible (adverse)	Slight (adverse)	Not significant
Construction workers – CL-13	High	Exposure to waste/Made Ground with potentially elevated levels of soil contamination and asbestos. Inhalation of ground gases with elevated concentrations.	Short to long term	Major (adverse)	Large (adverse)	Negligible (adverse)	Slight (adverse)	Not significant
Construction workers - CL-14	High	Exposure to Made Ground with elevated soil contamination. Inhalation of ground gases with elevated concentrations.	Short term	Moderate (adverse)	Moderate (adverse)	Negligible (adverse)	Slight (adverse)	Not significant
Construction workers - CL-17	High	Widespread soil contamination and soil derived dusts/asbestos. Exposure to ground gas.	Short to long term	Major (adverse)	Large (adverse)	Negligible (adverse)	Slight (adverse)	Not significant
Construction workers and adjacent land users including general public- CL-17	Very High	Exposure to soil derived dusts and fibres.	Short to long term	Major (adverse)	Very large (adverse)	Negligible (adverse)	Slight (adverse)	Not significant
Construction workers - CL-	High	Exposure to groundwater contamination	Short term	Major (adverse)	Large (adverse)	Negligible (adverse)	Slight (adverse)	Not significant



Receptor	Sensitivity of receptor	Description of impact	Short / medium / long term	Magnitude of impact (without mitigation)	Significance of effect (without mitigation)	Magnitude of impact (with mitigation)	Significance of effect (with mitigation)	Significant / Not significant
18.								
Surface waters (reens) - CL-18.	Very High	Contaminants in groundwaters potentially mobilised during dewatering impacting upon surface waters.	Short term	Moderate (adverse)	Large (adverse)	Negligible (adverse)	Slight (adverse)	Not significant
Construction workers - CL-26.	High	Construction workers exposed to contaminated soils and groundwater and ground gases.	Short to Long term	Major (adverse)	Large (adverse)	Negligible (adverse)	Slight (adverse)	Not significant
Construction Adjacent site users- CL-26.	Very High	Exposure to contaminated soil derived dusts.	Short to Long term	Moderate (adverse)	Large (adverse)	Negligible (adverse)	Slight (adverse)	Not significant
Surface water (reens) CL-26.	Very High	Migration of contaminants in lagoon wastes, soils and waters entering surface waters.	Short term	Major (adverse)	Very large (adverse)	Minor (adverse)	Moderate (adverse)	Significant
Aquifers - CL-26.	Low	Migration of contaminants in lagoon wastes, soils and water entering aquifer.	Short term	Moderate (adverse)	Slight (adverse)	Minor (adverse)	Neutral	Not significant
<b>Operation</b>								
Topsoils and subsoils	Medium	Pollution of soils immediately adjacent to carriage way due to traffic spray/airborne pollutants.	Long term	Negligible (adverse)	Slight (adverse)	Negligible (adverse)	Neutral	Not significant
Adjacent land users including general public	Very High	Exposure through dermal contact, ingestion and inhalation of contaminated soil derived dusts. Ground gas migration and inhalation of gases.	Long term	Negligible (adverse)	Slight (adverse)	Negligible (beneficial)	Slight (beneficial)	Not significant

Receptor	Sensitivity of receptor	Description of impact	Short / medium / long term	Magnitude of impact (without mitigation)	Significance of effect (without mitigation)	Magnitude of impact (with mitigation)	Significance of effect (with mitigation)	Significant / Not significant
End users/ maintenance workers	High	Exposure through dermal contact, ingestion and inhalation of contaminated soil derived dusts. Ground gas migration and inhalation of gases.	Long term	Negligible (adverse)	Slight (adverse)	Negligible (beneficial)	Slight (beneficial)	Not significant
End users, adjacent site users and maintenance workers	Very High	Explosion from ground gases - human health hazard.	Long term	Negligible (adverse)	Slight (adverse)	Negligible (adverse)	Slight (adverse)	Not significant
Surface Waters (reens and rivers)	Low to Very High	Pollution of surface waters from surface water runoff, accidental spillages.	Long term	Negligible (adverse)	Slight (adverse)	Negligible (adverse)	Slight (adverse)	Not significant
Aquifers (superficial and bedrock)	Low to Medium	Pollution of groundwaters from surface water runoff, accidental spillages	Long term	Negligible (adverse)	Slight (adverse)	Negligible (adverse)	Neutral	Not significant
End users and maintenance workers and adjacent users - CL-13	High	Exposure through dermal contact, ingestion and inhalation of contaminated soil derived dusts and fibres. Ground gas migration and inhalation of gases.	Long term	Minor (adverse)	Moderate (adverse)	Negligible (beneficial)	Slight (beneficial)	Not significant
Maintenance workers - CL-17	High	Exposure to soil contamination from Made Ground remaining on site.	Medium term	Moderate (adverse)	Moderate (adverse)	Negligible (adverse)	Slight (adverse)	Not significant
End users – CL-17	High	Exposure through dermal contact, ingestion and inhalation of	Long term	Minor (adverse)	Moderate (adverse)	Negligible (beneficial)	Slight (beneficial)	Not significant

Receptor	Sensitivity of receptor	Description of impact	Short / medium / long term	Magnitude of impact (without mitigation)	Significance of effect (without mitigation)	Magnitude of impact (with mitigation)	Significance of effect (with mitigation)	Significant / Not significant
		contaminated soil derived dusts. Ground gas migration and inhalation of gases.						
Surface waters (reens) – CL-26	Very High	Migration of contaminants in lagoon wastes, treated materials soils and water entering surface water.	Medium term	Major (adverse)	Very Large (adverse)	Negligible (adverse)	Slight (adverse)	Not significant
Aquifers – CL-26	Low	Migration of contaminants in lagoon wastes, treated materials soils and water entering aquifers.	Medium term	Moderate (adverse)	Slight (adverse)	Negligible (adverse)	Slight (adverse)	Not significant
End users and maintenance workers – CL-26	High	Exposure through dermal contact, ingestion and inhalation of contaminations soils and soil derived dusts. Ground gas migration and inhalation of gases.	Long term	Minor (adverse)	Moderate (adverse)	Negligible (beneficial)	Slight (beneficial)	Not significant

\*This receptor’s sensitivity varies along the length of the new section of motorway