

11 MATERIAL ASSETS IMPACT ASSESSMENT

The Study Area, for the purposes of this Chapter, refers to the area in which works are proposed under the Bandon River (Bandon) Drainage Scheme as described in Chapter 3.

Material assets are generally considered to be the physical resources in the environment, which may be of human or natural origin. This chapter details the impact of the proposed Bandon River (Bandon) Drainage Scheme on these resources, namely transport infrastructure, subterranean infrastructure, traffic and the management of waste.

The impact assessment is based on a desk study, with details of major utilities taken from information supplied by Cork County Council (as part of Bandon Main Drainage Scheme) along with service providers. The road network was identified using Ordnance Survey Ireland (OSi) discovery series mapping along with an examination of aerial photography.

A number of documents were consulted in the preparation of this assessment, as follows;

- (i) Cork County Development Plan, 2009
- (ii) Cork County Council, Waste Management Plan, 2004
- (iii) EPA, Guidelines on the information to be contained in Environmental Impact Statements

11.1 RECEIVING ENVIRONMENT

The Bandon River (Bandon) Drainage Scheme, described in Chapter 3, comprises mainly of works to and in the vicinity of the Bandon River and Bridewell River. As such, potential impacts to material assets are restricted to these areas. The proposed scheme will have potential to impact on the following;

- Roads Network (incl. increased traffic)
- Pedestrian Bridge
- Wastewater Collection Network
- Surface Water Collection Network
- Water Distribution Network
- Bord Gáis Distribution Network
- Electricity Network
- Telecommunications Network

11.2 TRAFFIC AND ROADS

The construction phase of the Bandon River (Bandon) Drainage Scheme will have a temporary impact on traffic volumes in Bandon town and its environs. Dredging of the 3.6km of Bandon River over a five month period per annum will generate a significant volume of waste material that must be removed from the site. Hauling of the dredged material, combined with delivery of materials and work force traffic will be assessed in relation to existing traffic volumes and mitigation measures proposed.

11.2.1 Description Of Project And Roads Network

The majority of the proposed works under the Bandon River (Bandon) Drainage Scheme are contained within a 4km stretch of Bandon River. The works in the vicinity of the river comprise of 3.6km of dredging, with flood defence embankments and flood defence walls. Further flood defence walls are proposed on the Bridewell River, adjacent to the N71, along with on the Mill stream, between Old Quay road and Monarone road. The existing culvert on the Mill Stream will be upgraded along with the installation of a storm sewer on New Road. Detailed site investigation will also be required at the location of all proposed works. These proposed works are shown on Drawing MA002 in Appendix 11A.

The road network in Bandon town comprises mainly of local and regional roads throughout the town itself. The main artery through the town is the national secondary route (N71) which conveys traffic from Cork city to the south and west of County Cork and as far as Killarney in Co. Kerry.

The Bandon River (Bandon) Drainage Scheme, as described above and in more detail in Chapter 3, is mainly concerned with works to and in the vicinity of Bandon River, and therefore generally will not have any permanent impact on the road network. The potential impacts of the Bandon River (Bandon) Drainage Scheme on the road network are as follows;

- Laying approximately 900m of proposed storm water sewer on Glasslinn Road
- Upgrade of Culvert on Local road between Old Quay Road and Monarone Road
- Underpinning of Bandon Bridge (R586) as a result of dredging
- Temporary traffic disruption at Market Quay as a result of flood defence wall construction on Bridewell River
- Temporary traffic disruption on New Road (N71) as a result of flood defence wall construction on Bridewell River
- General Increase in traffic volumes throughout the town during construction phase

A further impact on the road network as a result of the proposed works is a temporary increase in traffic volumes as a result of construction activity. This section assesses this impact on the traffic in the study area and provides associated mitigation measures.

11.2.2 Existing Traffic

Cork County Council commissioned a traffic survey of Bandon town centre in 2008 which included detailed traffic counts on the main transport routes to and from the town centre, along with traffic surveys of the traffic within the town centre itself. It is considered that the data recorded during this study is relevant, and potentially conservative, as economic activity in the area is likely to have decreased in the interim, resulting in decreased peak hour traffic flows. This traffic survey will provide the baseline for the traffic impact assessment of the Bandon River (Bandon) Drainage Scheme.

The anticipated routes of the traffic generated during the construction phase are presented on Table 11.1 and shown on Drawing TIA 001 included in Appendix 11A.

Road Name	Peak Hourly Traffic Flow (am)	Peak Hourly Traffic Flow (pm)
N71 – Glasslinn Road	830 - 880	900 – 1,160
N71 – St. Patricks Quay	920	1,040
N71 – New Road	520	690
Bandon Bridge	1,350	1,150
Old Quay Road	No Data Available	No Data Available
McSwiney Quay	160	170
North Main Street	1,030	930
Watergate Street	No Data Available	No Data Available

Table 11.1 – Recorded Traffic Flows on Anticipated Construction Traffic Routes

The busiest area of the town, as shown above, was recorded as being Bandon Bridge. Further analyses of recorded data was carried out and it was found that 10,424 vehicles traversed this bridge daily between 7am and 7pm. 409 of these were recorded as being heavy good vehicles.

As can be seen on Table 11.1 above, Old Quay Road and Watergate Street were not identified as significant to the flow of traffic through Bandon Town and therefore were not included in the traffic study.

11.2.3 Construction Traffic

Construction related traffic will be used for delivery of materials to site, removal of surplus excavated material from site and transport of employees to/from site and throughout the site. The main materials to be delivered include concrete, clay, stone, pipes and culvert sections. The estimated number of round trips (to/from site) is approximately 2,250 spread over the anticipated construction period of 2 years. (WYG, Scheme Details for EIS, January 2012).

The removal of surplus material will comprise principally of material dredged from the river, material excavated for foundations for walls and embankments and material excavated from trenches for pipe lines and culverts. The estimated number of round trips from the site is 14,500 over the anticipated 24 month programme (WYG, Scheme Details for EIS, January 2012). The majority of the estimated number of trips will be associated with the removal of the dredged material from site and could amount to 12,500 (WYG, Scheme Details for EIS, January 2012).

The estimated number of round trips for construction personnel employed on site is approximately 20 round trips per day over the construction period. It is estimated that construction of the scheme will take 572 working days (24 month programme working 5 day weeks during winter, and 6 day weeks during summer) to be completed, with dredging to be carried out for 264 working days (5 month programme per annum).

All estimated numbers of round trips and the estimated works programmes were provided by the engineer for the Bandon River (Bandon) Drainage Scheme (WYG, Scheme Details for EIS, January 2012).

Table 11.2 gives a breakdown of the estimated construction traffic.

Description of Trip	Total Round Trips	Round Trips Per Day*	Location
Delivery of Materials	2,250	4	All Routes
Removal of Dredged Material	12,500	48	Glasslinn Road, Bandon Bridge, McSwiney Quay, North Main Street & Watergate St.
Removal of Excavated Material	2,000	3	All Routes
Workforce	11,440	20	All Routes
Total (while dredging)		75	
Total (outside of dredging)		27	

**Trips per Day calculated based on total works programme of 572 working days and dredging programme of 264 working days*

Table 11.2 – Estimated Construction Traffic

11.2.4 Potential Impacts on Traffic and Transport Infrastructure

11.2.4.1 Potential Impact on Transport Infrastructure

Potential Temporary Moderate Impact

The proposed scheme has the potential to impact on the transport infrastructure in the area, most significantly during the construction phase. This impact could occur in the following areas;

1. Glasslinn Road (N71)
2. Bandon Bridge
3. The Pedestrian Bridge
4. Culvert on the Mill Stream

Bandon Bridge will need to be underpinned as a result of the proposed dredging to an approximate depth of 1.6m in the area to prevent the bridge being undermined. There is a risk that the bridge structure could be damaged during these works.

It is proposed to replace the existing footbridge further upstream with a new footbridge, which will result in the temporary loss of this pedestrian route over the River during the construction phase.

Excavation of the culvert on the Mill Stream along with the storm sewer on Glasslinn Road will have a temporary impact on transport in these areas during the construction phase. The proposed works will not have a permanent impact as this transport infrastructure should be backfilled or reinstated completely.

Mitigation Measures

The underpinning of Bandon Bridge will be designed by a suitably qualified and experienced structural engineer working within an accredited quality system. The construction of these works will be carried out by a suitably qualified and experienced contractor who will be supervised to ensure that the works are carried out correctly. This will ensure that the bridge will be underpinned safely and effectively so as to safeguard the structural integrity of the existing structure.

Excavation and reinstatement of the Mill Stream culvert trench will be carried out in consultation with the town engineer, and will also follow the Department of Environment and Local Government published document entitled 'Guidelines for the Opening, Backfilling and Reinstatement of Trenches in Public Roads'. These works will be designed and supervised by a suitably qualified and experience professional to ensure they are carried out correctly.

Construction of storm sewer on Glasslinn Road will be carried out consultation with the National Roads Authority and will follow the NRA published specification entitled 'Specification for the Reinstatement of Openings in National Roads'. These works will be designed and supervised by a suitably qualified and experienced professional to ensure they are carried out correctly.

Residual Impacts - Potential Temporary Slight Impact

Taking into account the abovementioned mitigation measures, the residual impact of the proposed scheme on the transport infrastructure will be imperceptible.

11.2.4.2 Potential Impact of Construction Traffic

Neutral Impact

Taking into account the large numbers of vehicles using the road network in and in the vicinity of Bandon, it is unlikely that traffic generated during the construction phase will have a significant impact on traffic flow in the town.

It is possible to quantify the predicted impact the construction traffic will have on the flow of traffic by calculating maximum hourly flows of construction traffic. These calculation are based on a working day of between 8am and 6pm and take into account the additional traffic generated by the removal of dredged material. It was also assumed that the workforce will arrive during peak morning traffic and leave during peak evening traffic. A conservative value of 2 deliveries in any one hour was taken as these trips are not likely to be spread evenly throughout the day. Each round trip was calculated as two trips, to site and from site.

Table 11.3 compares the construction traffic generated to the existing traffic flows;

Road Name	Existing Maximum Hourly Traffic Flow	Construction Traffic	
		Maximum Hourly Traffic Flow*	As a Percentage of Existing Traffic
N71 – Glasslinn Road	1,160	36	3.1%
N71 – St. Patricks Quay	1,040	26	2.5%
N71 – New Road	690	26	3.8%
Bandon Bridge	1,350	36	2.7%
Old Quay Road	-	26	-
McSwiney Quay	170	36	21%
North Main Street	1,030	36	3.5%
Watergate Street	-	36	-

*Maximum construction hourly traffic flow based on working day from 8am to 6pm, with workforce arriving during morning peak flow and leaving during evening peak flow.

Table 11.3 – Recorded Traffic Flows on Anticipated Construction Traffic Routes

It is predicted that McSwiney Quay will have the largest increase in traffic volume as a result of the Bandon River (Bandon) Drainage Scheme. The large increase predicted is as a result of the relatively low volume of traffic currently using this road and not as a result of a larger volume of construction traffic in this area.

It is not anticipated that the construction traffic will significantly affect the flow of traffic through Bandon town. The impact of construction traffic will be short term.

11.2.4.3 Potential Impact of Works in the Vicinity of Road Network

Potential Temporary Slight Impact

Localised traffic disruption are also likely to occur at locations of proposed works on, or in the immediate vicinity of the road network. These works include the laying of the proposed storm sewer on Glasslinn Road and replacement of existing flood defence infrastructure and upgrading of existing culverts. Detailed site investigation works will also be carried in the vicinity of all proposed works.

Mitigation Measures

The localised traffic disruptions as a result of other proposed works throughout the scheme will be mitigated through the use of industry standard traffic management measures. These traffic management measures should be designed in accordance with the 'Guidance for the Control and Management of Traffic at Roadworks – Second Edition'.

Residual Impact – Potential Temporary Imperceptible Impact

Relatively short, localised delays are likely to be encountered by motorists at the locations of proposed works in the immediate vicinity of the road network. This impact will be a short term impact and there will be no residual impact on completion of the proposed works.

11.2.4.4 Potential Impact of Road Closures

Potential Temporary Significant Impact

The underpinning works proposed to Bandon Bridge have the potential to cause the largest impact to the flow of traffic in the town. While the detailed design of works proposed at the bridge is not available at this time, it is possible that the bridge may be closed to heavy goods traffic for a period of up to 3 months, with bridge closures for all types of traffic anticipated for shorter periods of time within this period. As described in Section 11.2.2, the traffic survey of Bandon town recorded 10,424 vehicles using this bridge daily between the hours of 7am and 7pm. 409 of these are heavy good vehicles.

Any closure of the Bandon Bridge will cause significant disruption to the traffic flow in the town as the traffic will need to be diverted to either Innishannon Bridge (6.6km to the north east by road) or the bridge at Carhoon (5.7km south west by road). As the road bridge at Carhoon is part of the local road network, it is likely that the bridge at Innishannon on the national road network would be used as the main diversion route. The total length of this diversion would be approximately 13km with an estimated travel time of 20 minutes.

Mitigation Measures

The Bandon Bridge closures should be timed to minimise the impact to the flow of traffic throughout Bandon town, and if possible work should be carried out at off peak times to reduce the impact, particularly on heavy goods vehicles. All residents and interested parties should be consulted when planning these bridge closures to optimise the timing of same. A complete schedule of bridge closures should be published in advance of the works commencing to facilitate residents in making alternative arrangements where necessary.

Residual Impact – Potential Temporary Moderate to Significant Impact

The closure of the Bandon bridge to facilitate the proposed works is likely to cause a significant temporary impact to the flow of traffic throughout Bandon town. However, there will be no residual impact once the proposed scheme is completed.

11.3 POTENTIAL IMPACTS ON SERVICES AND PROPOSED MITIGATION MEASURES

The majority of proposed works pertaining to the Bandon River (Bandon) Drainage Scheme, described in detail in Chapter 3, are located in or in the vicinity of Bandon River. As such there is limited interaction between the scheme and existing services in the area. This section will explore the potential impact the scheme could have on existing services, and propose necessary mitigation measures.

Detailed Site Investigation will also be carried out in the vicinity of all proposed works. These works have the potential to impact existing services however standard industry methodologies will mitigate this impact. As such, the detailed site investigation has not been assessed in the individual sections below.

11.3.1 Potential Impacts on Wastewater Collection Network

Potential Temporary Significant Impact

The wastewater collection network currently includes five pipes crossing under the Bandon River in two separate locations. Both are just downstream of Bandon Bridge. These crossings are detailed on Table 11.4 below and shown on Drawing MA002;

Crossing Type	Diameter	Location	Existing Invert Level
Combined Sewer	225mm	Chainage: 12,553.3m X=149340.4, Y=55097.2	11.50mOD
Rising Main	2 x 560mm	Chainage: 12,586.4m X=149309.3, Y=55086	9.75mOD
Rising Main	2 x 250mm	Chainage: 12,586.4m X=149309.3, Y=55086	9.75mOD

Table 11.4 – Wastewater Pipework Crossings

The approximate proposed bed level of the Bandon River following the dredging works at the location of these crossings is 9.25mOD.

As can be seen from the levels quoted above, the proposed scheme has potential to have a significant impact on these crossings. In the absence of mitigation measures, these pipes will be left exposed,

unsupported and could break apart under the force of the flow in the river. This would lead to sustained pollution of the Bandon River and disruption of the wastewater collection system.

Furthermore, both the treated effluent outfall pipe and a secondary overflow discharge pipe from the Bandon Waste Water Treatment Plant are laid to approximately the centre of the river at or near existing bed level (8.67mOD), as shown on Drawing MA002. It is proposed to dredge the river to a bed level of 7.77mOD at this location. In the absence of mitigation measures, these outfalls will be damaged and the discharges to the river will be impacted. This impact would be temporary but significant.

There are 11 additional discharges to the river from the wastewater network throughout the Study Area. These discharges are detailed on Table 11.5 below;

Discharge Type	Receiving River	Location	At location of Proposed Flood Defence (Y/N)
Secondary Overflow	Bandon River	X=150074, Y=55292	No
Secondary Overflow	Bandon River	X=149316, Y=55103	No
Secondary Overflow	Bridewell River	X=149265, Y=54933	No
Stormwater Overflow	Bandon River	X=149145, Y=55055	No
Stormwater Overflow	Bridewell River	X=149281, Y=55040	No
Stormwater Overflow	Bandon River	X=149244, Y=55045	No
Stormwater Overflow	Bandon River	X=149265, Y=54996	No
Stormwater Overflow	Bridewell River	X=149293, Y=54948	Yes
Stormwater Overflow	Bridewell River	X=149116, Y=54830	Yes
Stormwater Overflow	Bridewell River	X=148819, Y=54459	Yes
Stormwater Overflow	Bridewell River	X=148552, Y=54267	No

Table 11.5 – Additional Discharges from Wastewater Network

These discharge pipes are unlikely to be affected by the proposed scheme as they do not currently encroach on the river bed, and none appear to be located at the sites where foundation excavation will be required.

There is also an additional combined sewer crossing the proposed works. This pipe is strapped to the existing footbridge. As the proposed scheme includes for the replacement of this bridge, this combined sewer will need to be decommissioned for the duration of the works on the pedestrian bridge. This could have a potentially significant temporary impact to the service of the properties served by this sewer.

Mitigation Measures

Consideration will be given to the abovementioned pipelines and discharge pipework at detailed design stage. These pipes will be redesigned and temporary pipelines will be provided during the dredging works. Construction methods will be devised so as not to affect the operation of the wastewater collection network and treatment process during the construction phase.

The combined sewer and four rising main pipes will be relaid to a sufficient depth so as to maintain the required cover to the pipe in relation to the proposed bed level prior to the dredging works.

To maintain the operation of the Bandon Wastewater Treatment Plant, the treated effluent outfall pipe will either be relaid following with the proposed dredging. A temporary outfall will be constructed, which will be in operation during the dredging works in the vicinity of the wastewater treatment plant.

A new combined sewer will be laid in the deck of the proposed pedestrian bridge. A temporary pipeline will be provided during the works on the bridge.

Residual Impact – Neutral Impact

Taking into account the abovementioned mitigation measures the residual impact of the proposed scheme on the wastewater collection network and treatment process will be imperceptible.

11.3.2 Potential Impacts to Existing Surface Water Network

Potential Temporary Slight Impact

There are five existing surface water outfalls, three of which discharge into the Bandon River and the remaining two into the Bridewell River. Details of these discharges are provided on Drawing MA003 and on Table 11.6;

Discharge Type	Receiving River	Location	At location of Proposed Flood Defence (Y/N)
Surface Water Discharge	Bandon River	X=149928.4, Y=55217.7	No
Surface Water Discharge	Bandon River	X=149734.2, Y=55123.9	No
Surface Water Discharge	Bandon River	X=149546.7, Y=55141.2	Yes
Surface Water Discharge	Bridewell River	X=148874.3, Y=54519.8	Yes
Surface Water Discharge	Bridewell River	X=148832.7, Y=54470.8	No

Table 11.6 – Surface Water Discharge

As these pipelines are not in the bed of the river they will not be affected by the proposed dredging. Two of the five discharge locations are however at proposed works locations, including proposed flood defence wall and upgrade of existing flood defence wall. It is possible that the excavation of foundation could impact on these pipe lines and therefore impact the surface water system.

Mitigation Measures

A survey will be carried out to ascertain the depth of the discharge pipework based on the invert level of the outfall. Should it be anticipated that excavation of the foundations for proposed works will impact on this pipework they will be taken into consideration at detailed design stage and replaced or deepened prior to foundation excavation if necessary.

Residual Impact - Neutral Impact

Taking into account the abovementioned mitigation measures the residual impact of the proposed scheme on the surface water network will be imperceptible.

11.3.3 Potential Impact to the Water Distribution Network

Potential Temporary Slight Impact

The proposed scheme will potentially impact the water distribution network in the following three locations, as shown on Drawing MA004 in Appendix 11A;

1. Bandon Bridge
2. The Pedestrian Bridge
3. Proposed Mill Stream culvert route

Should the underpinning of Bandon Bridge cause damage to the structure of the existing bridge, the watermain could be damaged. This could result in a number of properties in the town having no potable water supply.

The replacement of the pedestrian bridge will result in the watermain traversing the bridge being decommissioned for the duration of these construction works. This will result in properties served by this main having their water supply interrupted, if mitigation is not put in place.

Excavation for the upgrade of the culvert on the Mill Stream will encounter a watermain in the road. It is possible that this watermain could be damaged during the construction phase, resulting in properties having no potable water supply.

There is also a surface water abstraction point for the Inishannon Regional Water Supply Scheme downstream of the proposed works. It is not predicted that this abstraction will be impacted as any solids generated during construction phase should be settled out before reaching this area. This is discussed in more detail in Chapter 7.

Mitigation Measures

The underpinning of Bandon Bridge will be designed by a suitably qualified and experienced structural engineer working within an accredited quality system. The construction of these works will be carried out by a suitably qualified and experienced contractor who will be supervised to ensure that the works are carried out correctly. This will ensure that the bridge will be underpinned safely and effectively so as to safeguard the structural integrity of the existing structure and in turn safeguard the watermain attached to the bridge.

A temporary watermain will be provided across the river to serve the properties currently supplied by the watermain in the pedestrian bridge. These arrangements will be finalised at detailed design stage prior to construction works commencing to ensure an uninterrupted supply to the properties in question.

Slit trenches will be carried out prior to excavation of the culvert to locate and record the exact location and depth of the watermain in the road. Should existing watermain level clash with the level of the proposed culvert, this will be taken into consideration during the detailed design stage. The watermain will be raised locally to accommodate the proposed culvert.

The Contractor will be supplied with the information obtained in the slit trenches and the watermain location will be marked prior to excavation in the area. This will reduce the risk of striking the watermain and causing interruption to water supply during the construction phase.

Residual Impact - Neutral Impact

Taking into account the abovementioned mitigation measures, no residual impact to the watermains following the construction phase is predicted.

11.3.4 Potential Impact to the Gas Network

Potential Temporary Moderate Impact

There is an extensive gas distribution network throughout Bandon town which interacts with the proposed scheme in the three following places, as shown on Drawing MA005 in Appendix 11A;

1. Bandon Bridge
2. Proposed Mill Stream Culvert Route
3. Proposed Flood Defence Wall Improvements on Market Quay

Should the underpinning of Bandon Bridge cause damage to the bridge structure, the gas main could also be damaged. This would result in the loss of gas supply to a number of properties, leaking and possibly an explosion.

Excavation for the upgrade of the culvert on the Mill Stream will encounter a gas main in the road. It is possible that this gas main could be damaged during the construction phase, affecting the supply to a number of properties and potentially causing a fire or explosion.

Similar to at the Mill Stream, there is a gas main under the existing flood defence wall due to be upgraded on Market Quay. Should it be necessary to excavate foundations at this location it is likely the excavation will encounter, and possibly damage the gas main. This could result in the disruption of supply, a leak and possibly cause a fire or explosion.

The impacts described above are predicted to be temporary and significant.

Mitigation Measures

The underpinning of Bandon Bridge will be designed by a suitably qualified and experienced structural engineer working within an accredited quality system. The construction of these works will be carried out by a suitably qualified and experienced contractor who will be supervised to ensure that the works are carried out correctly. This will ensure that the bridge will be underpinned safely and effectively so as to safeguard the structural integrity of the existing structure and in turn safeguard the gas main within.

Slit trenches will be carried out prior to excavation of the culvert to locate and record the exact location and depth of the gas main in the road. Should existing gas main level clash with the level of the proposed culvert, this will be taken into consideration during the detailed design stage. The gas main will be raised locally to accommodate the proposed culvert.

The Contractor will be supplied with the information obtained in the slit trenches and the gas main locations will be marked prior to excavation in the area. This will reduce the risk of hitting the gas main and causing damage during the construction phase.

Residual Impact - Neutral Impact

Taking into account the abovementioned mitigation measures, there will be no residual impact to the gas mains following the construction phase.

11.3.5 Potential Impact to Electricity Network

Potential Temporary Moderate Impact

The proposed scheme may impact on the underground electricity network at the following locations, as shown on Drawing MA006 in Appendix 11A;

1. Cable crossing in bed of Bandon River at Pedestrian Bridge
2. Bandon Bridge
3. Proposed Flood Defence Wall on Mill Stream
4. Proposed Flood Defence wall on Market Quay
5. Proposed Flood Defence measures on both North and South bank at existing Weir on Bandon River

Electricity cable laid in the bed of the Bandon River has the potential to damage by both the dredging and the construction of the rock ramp. This would result in the loss of power throughout the town and also could prove very dangerous, or even fatal, for site staff if struck during construction operations.

Should the underpinning of Bandon Bridge cause damage to the bridge structure, the electricity cables could also be damaged. This would result in the loss of electricity for a number of properties throughout the town.

Electrical cables could also be damaged during excavation for the foundations of the proposed flood defence measures. This would also result in the loss of electricity to a number of properties throughout the town and could also prove very dangerous, or even fatal, for site staff if struck during construction operations.

There are numerous locations where overground electricity cabling crosses in the vicinity of proposed works through Bandon town.

The potential impact to the electricity infrastructure as a result of the construction of the proposed works is predicted to be temporary and significant.

Mitigation Measures

Consultation with the relevant authority will be carried out at detailed design stage in order to redesign, and re lay the electrical ducting in the bed of the Bandon River at the pedestrian bridge. This work will have to be carried out in advance of any dredging works, or construction of the rock ramp in order to ensure these cables are not damaged or do not have the potential to cause injury. Upon completion of this diversion work permanent marker posts will be erected to inform site staff of the exact location of the cables to avoid damage during dredging works.

The underpinning of Bandon Bridge will be designed by a suitably qualified and experienced structural engineer working within an accredited quality system. The construction of these works will be carried out by a suitably qualified and experienced contractor who will be supervised to ensure that the works are carried out correctly. This will ensure that the bridge will be underpinned safely and effectively so as to safeguard the structural integrity of the existing structure and in turn safeguard the electrical cables within.

Slit trenches will be carried out prior to works commencing at the locations of the proposed flood defence measures to locate and record the exact location and depth of the electrical cables. The Contractor will be supplied with the information obtained in the slit trenches and the electrical cable locations will be marked prior to excavation in the area. This will reduce the risk of striking the cables and causing damage during the construction phase.

It is considered that any likely impacts to or from the overhead cables will be mitigated by applying standard construction practices.

Residual Impact - Neutral Impact

Taking into account the abovementioned mitigation measures there will be no residual impact to the electrical infrastructure following the construction phase.

11.3.6 Potential Impact to Telecommunications Network

Potential Temporary Moderate Impact

The telecommunications network intersects the proposed scheme in five locations, as shown on Drawing MA007 in Appendix 11A and listed below;

1. Bandon Bridge
2. Storm Sewer on Glasslinn Road
3. Proposed Flood Defence Wall on south bank of Bandon River downstream of Bandon Bridge
4. Proposed Flood Defence Wall upgrade on New Road
5. Proposed Mill Stream Culvert

Should the underpinning of Bandon Bridge cause damage to the bridge structure, the telecommunication cables could also be damaged. This would result in the loss of signal to a number of properties throughout the town.

Excavation will be required for the proposed works mentioned above where telecommunication cables are present. Should these cables clash with the works they could become damaged during construction phase.

The potential impacts are considered to be temporary and moderate.

Mitigation Measures

The underpinning of Bandon Bridge will be designed by a suitably qualified and experienced structural engineer working within an accredited quality system. The construction of these works will be carried out by a suitably qualified and experienced contractor who will be supervised to ensure that the works are carried out correctly. This will ensure that the bridge will be underpinned safely and effectively so as to safeguard the structural integrity of the existing structure and in turn safeguard the telecommunication cables within.

Slit trenches will be carried out in order to ascertain the exact location and depth of cables. In the case of the proposed flood defence walls (i.e. South bank of Bandon River and along Glasslinn Road) where the cables potentially run along the proposed wall route, these cables will have to be taken into consideration at detailed design stage. The cables may need to be diverted with the consent of the service provider.

The Contractor will be supplied with the information obtained in the slit trenches and the telecommunication cable locations will be marked prior to excavation in each area. This will greatly reduce the risk of striking the cables and causing damage during the construction phase.

Residual Impact - Neutral Impact

Taking into account the abovementioned mitigation measures there will be no residual impact to the telecommunications infrastructure following the construction phase.

11.4 WASTE MANAGEMENT DURING CONSTRUCTION

It is anticipated that the Bandon River (Bandon) Drainage Scheme will produce a significant volume of waste material during the construction phase. Through an extensive document review combined with information received from the scheme designers this section will examine the potential impacts associated with this waste and any mitigation measures required.

11.4.1 Background Information

'Best Practice Guidelines for the Preparation of Waste Management Plans for Construction and Demolition Projects (2006)' were published by the DoEHLG. These Guidelines outline the issues that need to be addressed at the pre-planning stage of a development all the way through to its completion.

Best Practice Guidelines sets thresholds to ascertain which projects require the preparation of C&D plans. The proposed development, the Bandon River (Bandon) Drainage Scheme, exceeds the following threshold and therefore requires a C&D Waste Management Plan;

- Civil Engineering projects producing in excess of 500m³ of waste, excluding waste materials used for development works on the site.

In 2004, Cork County Council produced a Waste Management Plan setting out targets and objectives for waste management within the county. According to the Waste Management Policy, "Cork County Council

is committed to a system of waste management that will see the least possible amount of waste going to modern engineered landfills.”

As outlined in Chapter 6, excavated material will be reused on site as much as practicable. Where this is not possible, the recycling rates for the C&D waste produced throughout the construction of the Bandon River (Bandon) Drainage Scheme should be maintained at or above 85%, if possible, as outlined in the Waste Management (Planning) Regulations 1997.

11.4.2 Classification Of Waste

The proposed scheme will give rise to a significant volume of excavated material, much of which will have to be exported from site. This material will comprise primarily of gravels, sands and broken rock with approximately 88% of C&D waste expected to be as a result of the 3.6km of river dredging proposed. During construction there will be a small amount of construction materials brought onto site and it is reasonable to assume that wastes from all of these materials can be anticipated.

The European Waste Codes (EWC) for typical waste materials that may possibly be generated during the construction phase are outlined in Table 11.7;

Waste Material	EWC
Soil, stones and dredged spoil	17 05
Bituminous mixtures, coal tar and tarred products	17 03
Concrete, Bricks, Tiles and Ceramics	17 01
Metals (including their alloys)	17 04
Waste Hydraulic Oils*	13 01
Wastes of Liquid Fuels*	13 07
* Denotes Hazardous Materials	

Table 11.7 – Applicable European Waste Codes

A breakdown of the estimated volumes of waste, origin of waste, and European Waste Codes are shown on Table 11.8;

Origin of Waste	EWC	Estimated Volume of Waste
River Dredging	17 05	150,000m ³
Wall Foundations	17 05/17 03	3,000m ³
Embankment Foundations	17 05/17 03	4,000m ³
Pipe Trenches	17 05/17 03	3,000m ³
Miscellaneous	17 05/ 17 04/17 03/17 01/ 13 01/ 13 07	10,000m ³
Total		170,000m³

Table 11.8 – Estimated C&D Waste resulting from the proposed scheme

11.4.3 Potential Impact during Construction Phase

Potential Temporary Moderate Impact

The potential impacts of the proposed scheme, in relation to construction and demolition waste are that, in the absence of a C&D Waste Management Plan (WMP), the target re-use and recycling rates outlined in the 'Waste Management (Planning) Regulations 1997' will not be achieved.

Should excavated waste not be managed appropriately, it is possible that waste deemed unsuitable for reuse or recycling, could be disposed of in facilities that do not carry the appropriate licenses.

In addition, if waste is not managed and stored correctly on site, it has the potential to cause nuisance and environmental impact. Litter may be generated from packaging taken from materials, mixed waste produced by the construction workers (lunches, cigarette waste etc.), or from debris from leftover/damaged construction materials. Poor management of waste may also result in water and ground pollution on the site or adjacent to the site.

Fuels and hydraulic oils/lubricants that will be used during the construction phase are classed as hazardous. There will be fuels stored on site for machinery and construction vehicles along with oils and lubricants. Should any spillages, waste or surplus liquids be disposed of incorrectly it could cause serious harm to the surrounding environment.

To summarize, the potential impacts of construction and demolition waste on the environment are predicted to be short term and moderate.

Mitigation Measures

All current and applicable waste management legislation will be applied and adhered to. Contractors that are engaged in the transport of waste off-site will comply with the provisions of the Waste Management Act (1996) (as amended), associated Regulations and the Waste Management Plan prepared in accordance with 'Best Practice Guidelines for the Preparation of Waste Management Plans for Construction and Demolition Projects (2006)'. As such, the Contractor must handle, transport and dispose of waste in a manner that ensures that no adverse environmental impacts occur as a result of any of these activities. A collection permit to transport waste must be held by the relevant contractor which has been issued by the Local Authority where the waste has been generated, i.e. Cork County Council.

Waste receiving facilities must also be appropriately licensed or permitted for the waste being received. Operators of such facilities can not receive any waste, unless in possession of a waste permit granted by the Local Authority under the 'Waste Management (Facility Permit & Registration) Regulations 2007' (as amended) or a waste license granted by the EPA. The permit/license held will specify the type and quantity of waste able to be received, stored, sorted, recycled and/or disposed of at the specific site. It has been confirmed that there are appropriate facilities in the area available to receive and process waste material.

The construction compound for the proposed scheme should have a dedicated Waste Storage Area (WSA) for any construction waste generated. Receptacles/skips or bays will be provided for each recyclable material. Dedicated waste bins should also be provided on any water going vessel/platform to prevent litter from contaminating the River.

Bedrock, Block and Concrete

As approximately 88% of the C&D waste is anticipated to be generated from dredging the Bandon River over a 3.6km length, the majority of the material generated from the construction phase will comprise of inert gravels and broken rock. Up to 10,300m³ of this material can be reused to replace locally sourced material used for embankment construction. The remaining gravels and broken rock, not reused as part of fisheries mitigation measures recommended in Chapter 5, will be separated out from other materials and sent to the appropriate recycling facility.

It is reasonable to assume that further gravels and bedrock may be encountered during the excavations of foundations and pipe trenches. These materials will also be separated out and sent to the appropriate recycling facility or waste facility if deemed unsuitable for recycling.

During construction of flood defence walls and underpinning the bridges it is reasonable to assume that there will be some waste concrete and blocks generated. This waste will be adequately contained and stored within the WSA of the construction compound. It will then be disposed of to a permitted or licensed facility.

Soil/Subsoil

As mentioned above, the majority of the C&D waste generated from the construction phase will result from the proposed dredging works. A portion of this material will be silts/soils from the riverbed itself that has been deposited above the bedrock. This material will be stored separately from the gravels and bedrock and will be transported to an appropriately licensed facility by permitted contractors.

There will also be soils generated from other excavations carried out throughout the scheme which will be dealt with in a similar manner. It not considered likely that these materials will be hazardous, but should a portion of it be deemed to be contaminated they will be stored separately to the inert material. Samples will be taken and tested in order to appropriately classify the material as non-hazardous or hazardous to establish the criteria for the acceptance of waste at landfills. They will then be transported to an appropriately licensed facility by permitted contractors.

Scrap Metal

Reinforced concrete is likely to be used as part of the underpinning of Bandon bridge and construction of Pedestrian Bridge, and possibly for the construction of the proposed flood defence walls. As such it is reasonable to assume that a small amount of scrap metal be generated.

Scrap metal is highly recyclable and as such it will be segregated from other waste and recycled accordingly.

Timber

A small amount of timber waste may also be generated as a result of hoarding around works areas, or from shuttering for in-situ concrete pours. It is likely that this timber can be reused for a number of different functions throughout the construction phase however a small amount of waste will be generated, and the timber as a whole could be disposed of as the construction phase comes to a close.

Timber that is uncontaminated, i.e. free from paints, preservatives, glues etc, will all be recycled. Should any timber be deemed to be contaminated it will be collected by an appropriately permitted specialist contractor and disposed of in an appropriately licensed facility.

Hazardous Materials

If hazardous materials are used/encountered on site, i.e. timber with paint, asbestos concrete pipes, a specialist contractor will be employed to carry out an environmental clean-up to remove all traces of contaminated material from the site. The specialist contractor will be licensed under the 'Waste Management (Collection Permit) Regulations, 2007' (as amended). This will be disposed of at an appropriately licensed facility.

In order to avoid any hazardous materials infiltrating the ground water during construction and operation phase there will be a bunded area constructed within the site compound with sufficient volume to contain any spills. All plant refuelling, maintenance or washing will be carried out within the bunded area. Spill kits will also be available at this area to facilitate the quick and effective cleaning of any substances.

Documentation

Waste will be weighed, either by weighing mechanism on the truck or at the receiving facility, and these records will be kept by the contractor (both hard and soft copies).

A copy of all waste collection permits, issued by Cork County Council, for all waste contractors will be kept by the Waste Manager on site.

If the waste is being transported to another site, a copy of the waste permit or EPA Waste License for that site must be provided and kept by the Waste Manager. If the waste is being shipped abroad, a copy of the Transfrontier Shipping (TFS) document must be obtained from Dublin City Council (as the relevant authority on behalf of all local authorities in Ireland) and kept on site along with details of the final destination (permits, licenses etc). A receipt from the final destination of the material will be kept as part of the on-site waste management records.

All information will be entered into the waste management system to be maintained on site.

Residual Impacts – Neutral Impact

Taking into account the abovementioned mitigation measures the residual impact of the construction phase will be imperceptible.

11.4.4 Potential impact during the Operational Phase

Potential Temporary Slight Impact

The operational phase of the proposed scheme is unlikely to produce any waste of significant volume. Periodic maintenance of flood defences will be carried out which could generate very small volumes of litter, packaging, concrete, scrap metal, bitumen products or soils that if not disposed of correctly could adversely affect the local environment.

Mitigation Measures

For maintenance and repair work, all maintenance teams involved will take all waste generated on site back to their compounds to be placed in appropriate waste streams designated for recycling, reuse or disposal. No waste will be left at the site of the repair or maintenance.

Residual Impacts – Neutral Impact

Taking into account the abovementioned mitigation measures the residual impact of the operational phase will be imperceptible.