



## **Detailed Design Report**

**16/010 - Water Network Management  
South-East Region - Watermain Rehabilitation  
Saint Thomas St, Dungarvan, Co. Waterford**

**Project ID - 26078800**

**Work Order - 26195360**



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## 1. Introduction and Scope Requirements

The work order (26195360) for this design involves the rehabilitation of approximately 1,428m of 50mm, 75mm, 100mm Cast Iron (CI) and 50mm, 75mm HDPE watermains with 572m of new 125mm HDPE and 298m 355mm HDPE pipeline, including any associated assets required, along public roadways in St Thomas Street, Fitzgeralds Terrace, St Brigid Terrace, St Martin's Terrace (cul-de-sac), Keating Street and Mitchell Street in Dungarvan, Co. Waterford. It also involves the transfer of approx. 125 No. of backyard services to the new 125mm HDPE and 355mm HDPE pipeline.

Please refer to Figure 1 to Figure 10 for photographs of the proposed pipeline route.

Please refer to Figure 15 within this report and the ArcGIS data for further details of the horizontal alignment details of the existing watermains and proposed pipelines.

Please note that discussions have taken place between representatives from Shareridge and Waterford City and County Council for the detailed design proposal.



Figure 1: View from Mitchell St where proposed works commence near Fitzgeralds Terrace facing an easterly direction.



Figure 2: View at Ryan's Way, where LA believes an existing main (unsurveyed) is present facing a northerly direction.



Figure 3: West end of St Thomas St near N2.



Figure 4: Near N2 in Fitzgeralds Terrace facing a southerly direction, overhead cables visible.



Figure 5: St Thomas St facing an easterly direction



Figure 6: St Brigid Terrace near N4 facing a northerly direction, overhead cables are visible.





**Figure 7: View at St Martin's Terrace (cul-de-sac) near N4 facing an easterly direction.**



**Figure 8: Junction at N12 (end of works) where O'Connell Street meet Keating Street facing a north-easterly direction.**



**Figure 9: View at Keating Street, narrow road with parked cars facing a southerly direction.**



**Figure 10: View from Mitchell Street towards Keating Street (between N10 and N11) facing a northerly direction.**

## 2. Site Details

It is proposed to rehabilitate approximately 1,428m of 50mm, 75mm, 100mm Cast Iron (CI) and 50mm, 75mm HDPE watermains along public roadways in St Thomas Street, Fitzgeralds Terrace, St Brigid Terrace, St Martin's Terrace (cul-de-sac), Keating Street and Mitchell Street in Dungarvan, Co. Waterford. It also involves the transfer of approx. 125 No. of backyard services to a newly proposed 125mm HDPE and 355mm HDPE pipeline. Refer to Figure 1 to Figure 10 for photographs taken during the site visit.

The proposed works commence at N1, at the junction where Fitzgeralds Terrace meets Mitchell Street at the west end of the scheme. The existing 50mm and 75mm Cast Iron watermain is running along the backyards of the properties in Fitzgeralds Terrace supplying water to the estate. At the east end of the scheme, it is evident that the existing 75mm Cast Iron watermain is running along the south end of Keating Street and St Brigid Street, branching from a 125mm Cast Iron watermain on Mitchell Street. The existing 75mm CI watermain is also evident to be passing along the backyards of properties facing Keating Street, St Brigid Street and Western Terrace. An existing 100mm Cast Iron watermain is also shown to be running from the south end of St Brigid Street towards O'Connell Street. The 100mm CI is shown to be passing along the backyard of properties facing Mitchell Street. An existing 50mm HDPE watermain is branching off and running parallel to the 100mm CI watermain at the north end of St Brigid Street. The 50mm HDPE watermain runs along the front of the properties located in cul-de-sac at St Martin's Terrace and through the front yard of properties along St Thomas Street. Additionally, a branch of the existing 50mm HDPE watermain is also evident to be passing through backyards of properties facing St Thomas Street. The existing 75mm HDPE is branching from an existing 250mm CI watermain on O'Connell Street on to Keating Street at the east end of the scheme. The existing 75mm HDPE watermain discontinues after approximately 40m on Keating Street. The scheme is mainly residential in nature with some commercial properties situated in O'Connell Street and Mitchell Street. Parking is predominantly on the street, to the front entrance of each of the properties. Please refer to Figure 11, Figure 12 and Figure 13 for sectional elevation showing topographical elevations along the proposed routes

From the ESB utility diagrams, overhead LV cables are evident to be passing along Fitzgeralds Terrace, St Thomas St, St Brigid Street and Keating Street crossing the proposed route at many locations. The LV cables along Fitzgeralds Terrace are not crossing the proposed route but are continuing to the west side of Fitzgeralds Terrace. It is also evident that LV cables on St Thomas Street are continuing along the south side and crosses over to the east side of St Brigid Street. The LV cables traverses on to Keating Street and continues along the east side of Keating Street. From the utility diagrams it is evident that the overhead LV cables cross the proposed route at approximately 3 No. locations. Underground LV/MV cables are shown crossing St Thomas Street onto Fitzgeralds Terrace and terminating after approximately 15m. Underground LV/MV cables are also shown continuing along eastbound carriageway of Mitchell Street and turning towards St Brigid Street. From the utility diagrams, underground cables cross the proposed route at approximately 2 No. locations.

From the Eir utility diagrams, no overhead Eir cables are visible to be along the proposed route, but underground cables are shown along the proposed route. Underground cables continue along the eastbound carriageway of Mitchell Street branching off to Fitzgeralds Terrace and St Brigid Street. It is also shown to be running along the northside of St Thomas Street. From the utility diagrams, the underground cables cross the proposed route at approximately 5 No. locations.

The Virgin Media (VM) utility drawings indicate, there are unknown size ducts running along north side of Mitchell Terrace, east side of Ryan's way and east side of Fitzgeralds Terrace. The north and south side of St Thomas Street, east and west side of St Brigid Terrace and at the start of Keating Street branching from an unknown size duct at O'Connell Street. From the utility diagrams, the ducts cross the proposed route at approximately 8 No. locations.

From ENET utility drawings, no ducts are running along the proposed route, however this needs to be verified on site.

From the IW GIS, an unknown diameter size is shown running along the eastbound carriageway of Mitchell Street from the east end of the scheme and branches two separate sewers towards St Brigid Street. Additionally, the unknown diameter size sewer on the Mitchell Street divides up into two separate sewers of 300mm and one unknown size at the west end of the scheme. It is also shown that an unknown diameter size sewer is running along the north side of St Thomas Street and ceases after approximately 130m. At Keating Street, it is also shown that an unknown diameter size sewer crossing from O'Connell Street and passes on the backyard of properties along St Brigid Street. From the IW GIS, it can be observed the sewers cross the proposed route at approximately 5 No. locations. However, this needs to be further verified on site.

Based on the received utility drawing by Gas Networks Ireland, there are no Gas utilities along the proposed route, but this needs to be verified on site. Please refer to existing utility drawings, for guidance only, on underground and overhead services adjacent to the proposed works.

Available information of the area has advised the following:

- Direction of flow: North to South
- Existing watermains to be decommissioned and/or replaced consist of: 50mm, 75mm, 100mm Cast Iron (CI) and 50mm, 75mm HDPE;
- Existing main working pressure is approximately 3.5 Bar;
- PRV: located outside scope of works, programmed for replacement as part of separate works;
- Expected ground conditions: Made ground, boulder clay and stones. The ground conditions were noted to be not adequate for watermain drilling during SI works;
- Existing watermain depth – 1.2 m (Watermain not located during SI, TBC following pre-construction stage);



- Reasons for rehabilitation: Replacement of BYS (lead);
- Special users: None identified;
- Archaeology: Refer to Cultural Heritage Impact Assessment;
- Reinstatement: Details are for full road reinstatement for the full length of the scheme.

**Extra notes:**

- Presentation Community Centre located at south side of the scheme

The following structures exist along the route of the proposed pipeline which may create possible hazards during the proposed works:

- Stone walls, Boundary walls, Housing,
- Lighting
- Low hanging ESB/Eir lines.
- Fibre optics all over town

**Trial Holes Data:**

<b><u>Trial Hole No.</u></b>	<b><u>Ground Conditions</u></b>	<b><u>Services Located</u></b>
1	Made ground, boulder clay and stone.	<ul style="list-style-type: none"> <li>• No additional services.</li> </ul>
2	Made ground, boulder clay and stone.	<ul style="list-style-type: none"> <li>• ESB with 1000mm cover.</li> </ul>
3	Made ground, boulder clay and stone.	<ul style="list-style-type: none"> <li>• Eir with 900mm cover.</li> </ul>

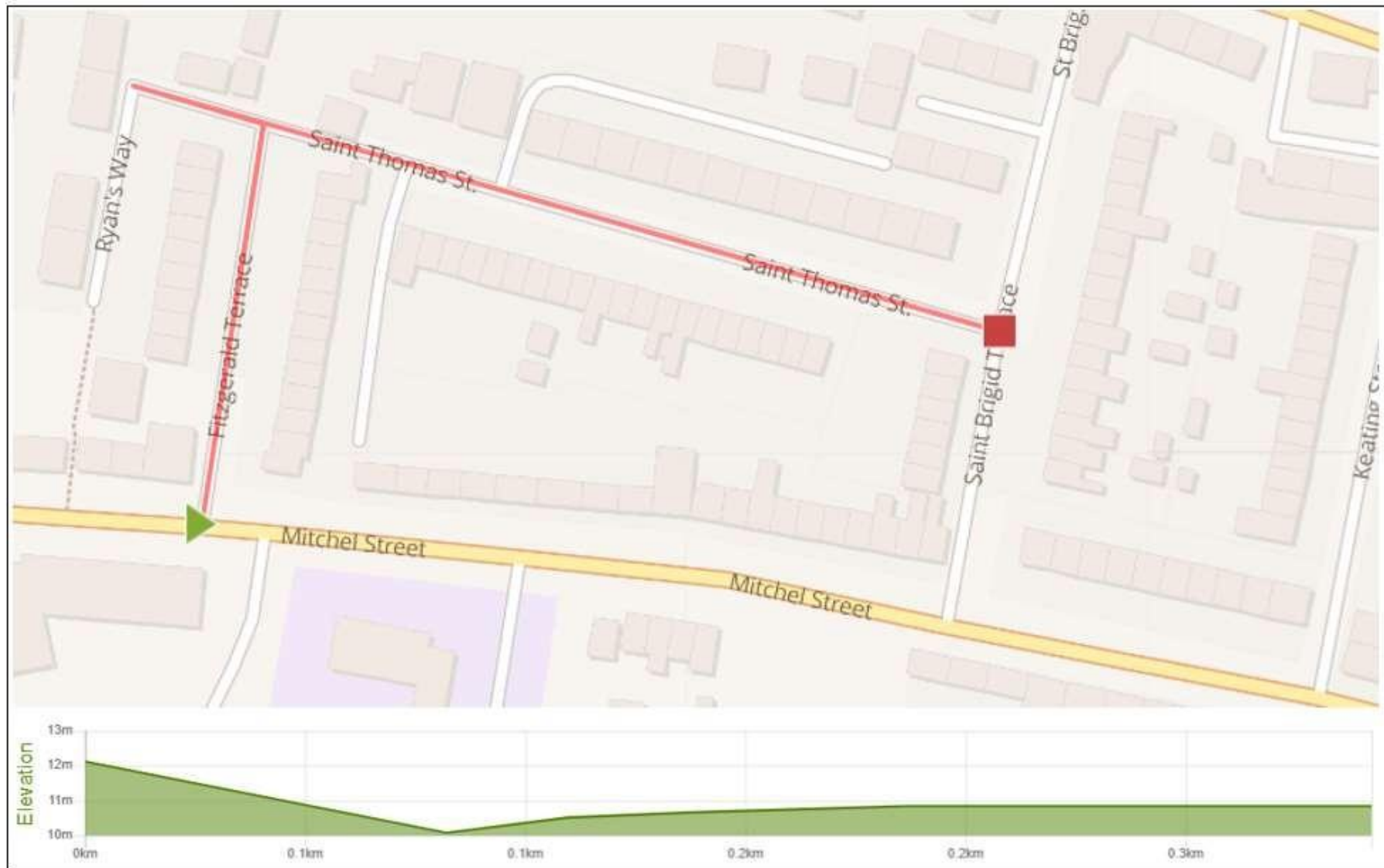


Figure 11: Proposed 125mm HDPE Elevation Profile at St Thomas Street and Fitzgerald Terrace

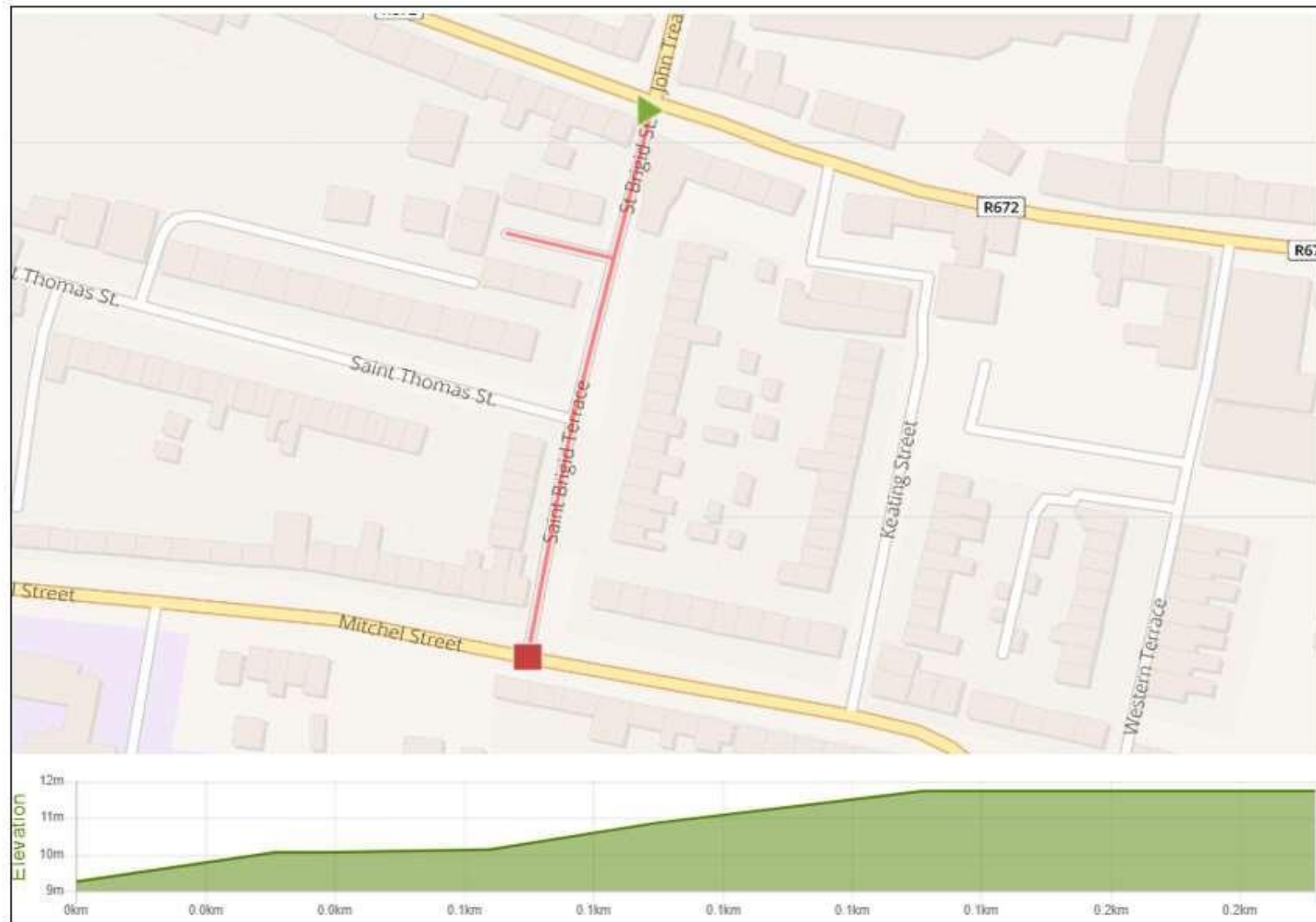


Figure 12: Proposed 125mm HDPE Elevation Profile at St Brigid Terrace and St Martin's Terrace(cul-de-sac)

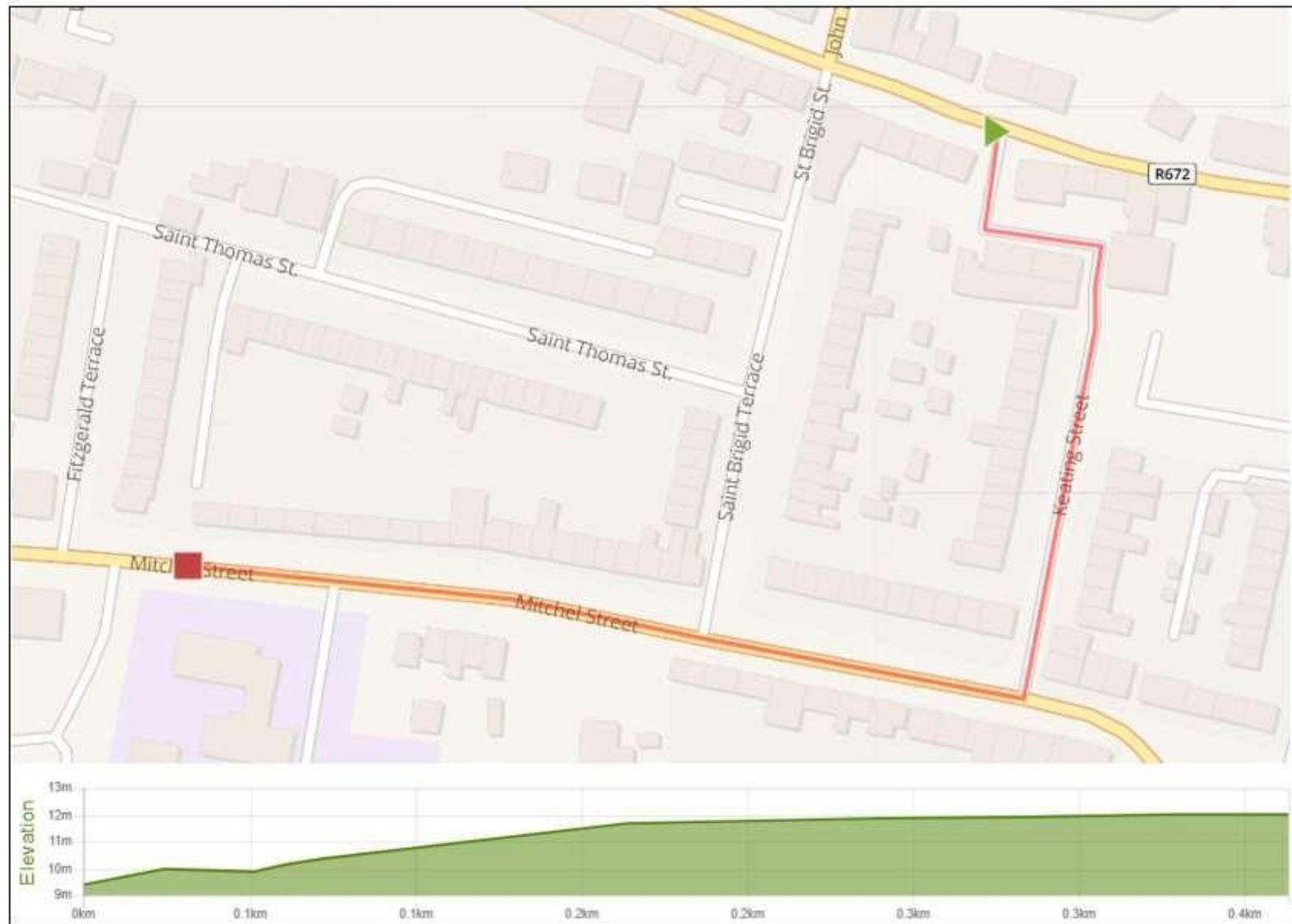


Figure 13: Proposed 125mm HDPE Elevation Profile at Keating Street and Mitchell Street

### 3. Field Work

A Site walkover was carried out on 6<sup>th</sup> September 2022 with Local Authority Representatives from Waterford City and County Council to assess the route, highlight design issues and discuss design options, construction methodologies and possible impacts of the proposed works.

Shareridge completed 3 No. Trial Holes as part of the site investigation works on the 29<sup>th</sup> November 2022 to further develop this design proposal. Please see Appendix F of this report for further information on ground conditions.

BHP has completed a WAC analysis of a soil sample taken from Trial Hole No. 2 to provide information on ground conditions. The results from this analysis are available in Appendix F and there are no elements that warrants pipe protection measures.

## 4. EnviroKit and Environmental Impact

The proposed route has been assessed with regards to its environmental impact and the Irish Water EnviroKit (version 4) tool has been completed.

An AA screening report has been carried out which confirms that appropriate assessment is not required.

An EIAR is not required for the project.

An Invasive Species survey has been carried out and an Invasive Species Summary Report has also been developed and included as part of the Detailed Design submission. An Invasive Species Management Plan (ISMP) will not be required prior to the commencement of construction stage works.



## 5. Desktop Archaeological Assessment

The desktop archaeological assessment has been undertaken by the Shanarc Archaeology Group on behalf of Shareridge Ltd.

## 6. Desktop Geotechnical Assessment

A desktop geotechnical assessment of the proposed route has been carried out. From The Geological Survey of Ireland, Quaternary Sediments dataset was used in QGIS which displays the dominant sediment type within 1m of the surface, to give an idea of what the subsoil conditions may be. The preliminary desktop geotechnical assessment indicates that ground conditions expected is Till derived from Devonian Sandstones and Urban, refer to Figure 14. Please see Appendix F, for further information on ground conditions.



Figure 14: Extract from the Quaternary GSI mapping with the proposed pipeline routes shown in purple

## 7. Proposed Design

It is proposed to decommission 125m of 50mm Cast-Iron, 646m of 75mm Cast-Iron, 269m of 100mm Cast-Iron, 348m of 50mm HDPE and 40m of 75mm HDPE watermain. To replace these mains, which are mostly located on private backyards, it is proposed to install 572m of 125mm HDPE and 298m of 355mm HDPE watermain on the public road. In addition, it is proposed to transfer approximately 125 No. of existing backyard services (BYS) to the proposed new 125mm and 355mm HDPE watermain.

It should be noted that the proposed 355mm watermain on St Brigids Terrace has been oversized in order to get water to Abbeyside if there is a break on the existing town 250mm watermain that runs along O'Connell Street. If there is a break along St Brigids Terrace, Uisce Éireann would be able to isolate St Brigids Terrace without affecting the rest of the network.

The proposed works commence at N1, located at the junction where Mitchell Street and Fitzgeralds Terrace meets. At N1, a DN300 Tee Connection Type 3 is proposed to connect to the existing 125mm Cast-Iron watermain that is continuing along east of Mitchell Street to a proposed 355mm HDPE watermain coming along west of Mitchell Street and 125mm HDPE watermain running north along Fitzgerald Terrace. From N1, the proposed 125mm HDPE watermain will be placed on the northbound carriageway of Fitzgeralds Terrace until N2 where a DN100 Tee Connection Type 5 is proposed to connect to the proposed 125mm HDPE that will pass along St Thomas Street.

From N2, the proposed 125mm HDPE watermain will continue along St Thomas Street until N3 to the northwest, where a DN100 Straight Connection Type 1 is proposed to tie in with an unsurveyed watermain on Ryan's Way. From N2, the proposed 125mm HDPE watermain will run in a southeast direction along St Thomas Street until N4. At N4, it is planned to tie the proposed 125mm HDPE watermain from N2 to N4 with proposed 355mm HDPE watermain on St Brigid Terrace via a DN300 Tee Connection Type 5. From N4, the proposed 355mm HDPE watermain will continue in a northerly direction until N5, where it will connect with the proposed 125mm HDPE watermain that will be placed along the St Martin's Terrace (cul-de-sac) via a DN300 Tee Connection Type 5. From N5 to N6, the proposed 125mm HDPE watermain will loop at the cul-de-sac and connect back to the proposed 125mm HDPE watermain at N6 via a DN100 Tee Connection Type 5. From N5, the proposed 355mm HDPE watermain that is on the St Brigid Terrace will continue until N7, where a DN300 Tee Connection Type 1 is proposed to connect with an existing 250mm Cast-Iron watermain on O'Connell Street.

From N4, the proposed 355mm HDPE watermain will continue in a southerly direction until N8, where it will connect with the proposed 125mm HDPE watermain that is running along Mitchell Street via a DN300 Tee Connection Type 5. At N8, the proposed 125mm HDPE watermain will run up to N11 along Mitchell Street. The main proposed between N8 and N11 is to act as a rider main to supply properties on the

north side of Mitchell St. Due to the age of the existing 125mm CI main along Mitchell St. it was recommended by the LA that it not be utilised to supply houses along Mitchell St as the additional connection may cause issues to 80-year-old CI main

From N8, the proposed 355mm HDPE watermain will continue until N9 where it will be connected with the existing 125mm Cast Iron watermain along Mitchell Street towards east and a proposed 355mm HDPE watermain along Mitchell Street towards east, via a DN300 Tee Connection Type 3. The proposed 355mm HDPE watermain from N9 will continue along Mitchell Street and connect at N1, via DN300 Tee Connection Type 1.

At N11, a DN100 Tee Connection Type 5 is proposed to connect with watermain from N8, N10 & N12. From N11, the proposed 125mm HDPE watermain will continue along Keating Street until N12 in a northerly direction. At N12, the proposed 125mm HDPE watermain will tie in with an existing 250mm Cast Iron that is continuing along O'Connell Street via a DN250 Tee Connection Type 1. From N11, the proposed 125mm HDPE coming along Keating Street will continue until N10, where a Tee Connection Type 1 is proposed to tie in with the existing 125mm Cast Iron watermain on Mitchell Street.

There are three Online Air Valves proposed along the watermain strategically placed at high points.

Along the proposed watermain, six Offline Hydrants will be installed to meet firefighting requirements, and four offline hydrants will be installed at strategic points of the proposed watermain to also act as scouring hydrants. The proposed watermain diameter is above the minimum bore requirement of 100mm but the number of hydrants is in accordance with the required hydrant spacing, as per Section 3.7.1 in the Irish Water Code of Practice.

Private side works may be required for the decommissioning of the existing watermain where it enters private property. Any existing fittings shall be removed and the redundant chambers for any Sluice valve or fire hydrants. They shall be reduced and removed to a minimum depth of 750mm below ground. Any remaining chamber within the excavation shall be backfilled and the surface reinstated to match existing.

The proposed pipeline route alignment will be confirmed during the pre-construction stage and highlighted on the as-constructed drawings. Following the site investigation findings, the construction methodology proposed by Shareridge is both No-Dig and Open Cut. For the sections of the proposed watermain constructed using No-Dig, the proposed pipeline will be pulled into place behind the drilling tool. There will be excavations for the proposed watermain along the length of the existing watermain at tie-ins, at launch and reception points for the drilling equipment, at the locations of the fittings along the proposed watermain, and at all service pipe connections. The areas of excavations for No-Dig installations will typically be between 600mm<sup>2</sup> and 1,000mm<sup>2</sup>. For the sections using Open Cut techniques, the width of trenches will be in accordance with the Irish Water standard drawing STD-WNMP-013. The length of open cut installation will not exceed 100m (in accordance with the Guidelines for Managing Openings in Public Roads by the Department of Transport, Tourism and Sport (Purple Book 2<sup>nd</sup> Edition 2017) but excavations will be unlikely to exceed 40m in any given work day. Excavations in

roads will be backfilled at the end of a workday but any open excavations which may be in safe areas (i.e. suspended parking bays, footpaths, etc.), will be plated in accordance with traffic management guidelines and legislation including Chapter 8 of the traffic signs manual and guidance documents.

Consumer connections with existing boundary boxes will be re-established with the new pipeline through new service pipework. Consumer connections with existing stop cocks will be transferred to the new pipeline and will include installation of new boundary boxes and service pipework. Previously unknown non-domestic consumer connections identified will be transferred to the new pipeline and will include the installation of new boundary boxes, flow meters and service pipework.

Please see ArcGIS for all service connections.

The following connections, valves, hydrants, and associated network infrastructure are proposed:

- N1                      DN300 Tee Connection Type 3 (STD-WNMP-05).
- N2                      DN100 Tee Connection Type 5 (STD-WNMP-07).
- N3                      DN100 Straight Connection Type 1 (STD-WNMP-04)
- N4 & N5                DN300 Tee Connection Type 5 (STD-WNMP-07).
- N6                      DN100 Tee Connection Type 5 (STD-WNMP-07).
- N7                      DN300 Tee Connection Type 1 (STD-WNMP-05).
- N8                      DN300 Tee Connection Type 5 (STD-WNMP-07).
- N9                      DN300 Tee Connection Type 3 (STD-WNMP-05).
- N10                     DN100 Tee Connection Type 1 (STD-WNMP-05).
- N11                     DN100 Tee Connection Type 5 (STD-WNMP-07).
- N12                     DN250 Tee Connection Type 1 (STD-WNMP-05).
- 3 No. on-line 80mm double orifice air valve (STD-WNMP-22) is proposed at the locations shown on ArcGIS.
- 10 No. offline hydrants (STD-WNMP-19) are proposed at the locations shown on ArcGIS.

Ancillary works including but not limited to; reinstatement, site investigation, and traffic management will form part of the construction stage.

Please refer to the ArcGIS mapping for further proposed design information.



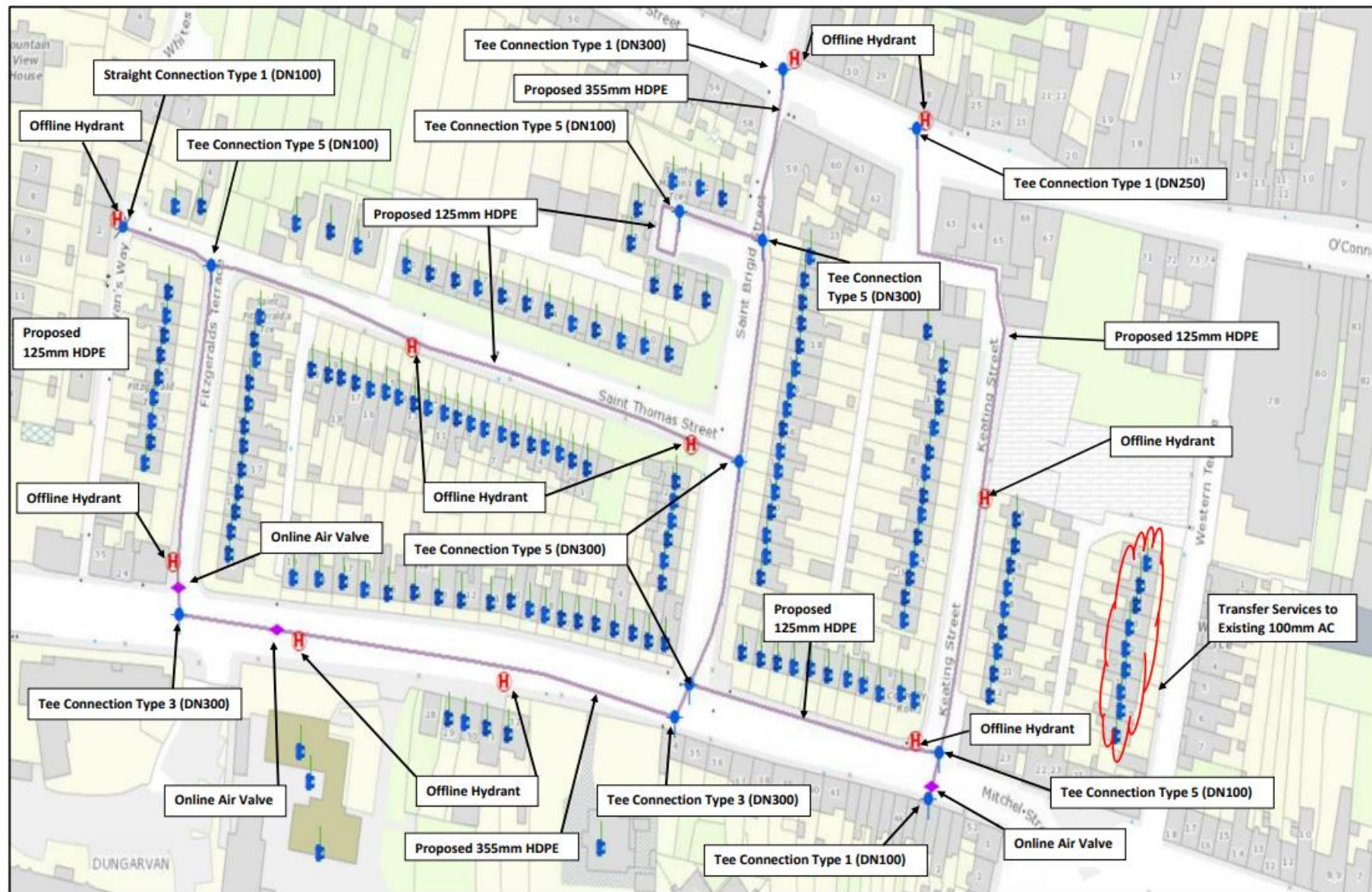


Figure 15 : Proposed Design Drawing



## 8. Constraints & Assumptions in the Design

As this rehabilitation work is being undertaken outside of DMA Establishment and Verification, no pressure, flow, or consumer demand information is available. This information will only be accurately available when DMA Establishment and Verification is undertaken in accordance with Sections 1.1.1 and 1.5.1.7 of Section 3 Schedule 1, Scope and Requirements. Therefore, no hydraulic modelling nor design calculations will be developed to further facilitate the detailed stage design.

The following constraints and assumptions have been accounted for as part of the detailed design:

- Pipe diameters have been chosen based on, and in accordance with:
  - The outline design was discussed with Waterford City and County Council on 6<sup>th</sup> September 2022 during the Preliminary Design Stage. No comments were received from Waterford City and County Council;
  - The work order requirements issued by Irish Water;
  - Proposed construction methodology includes both No-Dig and Open Cut;
  - Section 1.4.2 and 1.4.3 of Section 3 Schedule 1, Scope and Requirements and Irish Water standard detail drawings.
- The burst history for the pipeline was received from Waterford City and County Council on 6<sup>th</sup> September 2022;
- Enabling works/ additional valving may be required to facilitate a shutdown of the trunk watermain;
- Pipe bedding, haunch and surrounds will be compliant with Sections 1.3.6 and 1.9.1 of Section 3 Schedule 1, Scope and Requirements and Irish Water standard detail drawing STD-WNMP-13;
- A valve register will be included in the Handover documents;
- Sluice valves and proposed locations have been determined in compliance with Sections 1.4.2.2.1 and 1.8.4 and 1.8.9 of Section 3 Schedule 1, Scope and Requirements and to allow safe construction, operation, maintenance, and continuity of supply during the construction and operation phase;
- Sluice valves will be provided to allow sectional isolation of the proposed pipeline at new connections and tie-in points in compliance with Irish Water standard detail drawings;
- Air valves are compliant with Clauses 1.4.2.2.3.1 and 1.8.7 and 1.8.9 of Section 3 Schedule 1, Scope and Requirements and Irish Water standard detail drawings;
- Air valves have been proposed at topographical high points along the length of the proposed pipeline which has been cross referenced with the existing air valve locations;

- Air valves will be fitted with an isolating valve which shall be a gate valve conforming to IS EN 1074-2 and shall be of boltless bonnet design in compliance with Clause 1.4.2.2.3.1 of Section 3 Schedule 1, Scope and Requirements and Irish Water standard detail drawings;
- The locations of hydrants are subject to the approval of the relevant Local Authority Fire Department;
- Hydrants have been provided in accordance with Section 1.8.6 and 1.8.9 of Section 3 Schedule 1, Scope and Requirements and Irish Water standard detail drawings, and according to site specific requirements including property locations and topographical low points;
- Where possible, hydrants will be located offline in footpaths in compliance with Section 1.8.6 of Section 3 Schedule 1, Scope and Requirements and Irish Water standard detail drawings;
- Washout hydrants will be designed and constructed in accordance with section 1.8.8 and 1.8.9 of Section 3 Schedule 1, Scope and Requirements and Irish Water standard detail drawings;
- Where trenchless techniques are to be utilised for the installation of new pipeline, the new pipeline will be an SDR 11 pipe in accordance with Irish Water requirements and Section 1.4.2 and Section 1.7.5 of Section 3, Schedule 1, Scope and Requirements;
- Backyard services and private side works will be executed in accordance with Sections 1.9.1 and 1.9.3 of Section 3 Schedule 1, Scope and Requirements and Irish Water standard detail drawings;
- Tee connections will be new all flange tees with three-way valve arrangement in compliance with Irish Water Standard Detail Drawings;
- Consumer connection works will be compliant with Sections 1.4.5, 1.4.6, 1.9 and 1.10 of Section 3 Schedule 1, Scope and Requirements and Irish Water standard detail drawings STD-WNMP-01, 02 and 03;
- Loading certificates will be required from non-domestic customers in compliance with Section 1.10.2 of Section 3 Schedule 1, Scope and Requirements;
- New service pipework, valves, hydrants, and connection assemblies will be in accordance with:
  - Section 3, Schedule 1, Scope and Requirements;
  - Section 3, Schedule 19 Irish Water standard detail drawings;
  - IW-TEC-1000-001.

## 9. Conclusions and Recommendations

Site investigation works have been undertaken and Shareridge have assessed the proposed pipeline route alignment, considering the proximity to identified existing services during trial holing and reviewing existing utility plans. These findings will be used to further the design proposal during the pre-construction stage. The construction methodology proposed by Shareridge is primarily open cut and HDD. Shareridge should seek agreement with Waterford County Council of the Detailed Design Stage proposal for the watermain rehabilitation works proposed for this Project.

It is recommended that an Independent Surveyor should undertake a site visit and condition assessment of the boundary walls and other structures to assess the possible hazards and determine if specific construction stage control measure such as vibration monitoring or specific shoring systems are required. This exercise will take cognisance of the construction methodology proposed by Shareridge.

Prior to decommissioning existing watermains, new boundary boxes and service connections including private side services should be constructed and commissioned for consumers supplied by the existing watermains proposed to be decommissioned.

The exact number of service connections required to be transferred onto the proposed pipeline should be confirmed at pre-construction stage.

It is recommended to confirm the reinstatement requirements with Waterford City and County Council Roads Department and ensure compliance with the Guidelines for Managing Openings in Public Roads by the Department of Transport, Tourism and Sport (Purple Book 2<sup>nd</sup> Edition 2017). Consideration should be given to existing pavement condition and the proposed construction methodology.

## Appendix A EnviroKit

## Appendix B Appropriate Assessment Screening Report

## Appendix C Design Drawings

Please refer to GIS.



## Appendix D Design Proposal Checklist

## Appendix E Site Photographs

Available on FTP or from Shareridge.

## Appendix E Site Investigation