Drone Survey & Visual Asset Inspections

Shannon Estuary North Embankments - Clare

WORKS ORDER REQUIREMENTS

Contents

1. Project Overview and Site Location

The Office of Public Works South West Region Arterial Drainage Maintenance & Construction division requires a Contractor to undertake;

(i) A drone survey
(ii) An Orthomosaic, Point Cloud and Textured Mesh 3D model
(iii) Visual asset inspections

of approx **54km** of estuarine embankments (including sluices) in County Clare, Ireland, along the banks of the Owenogarney River and the northern banks of the Shannon Estuary as shown in Figure 1 and listed in Tables 1 - 8.

The surveys and inspections will be used to establish the current visual asset condition of the embankments and sluices. The Contractor will be provided with the scheme cross section drawings for the embankments so that the surveyed embankments profiles can be compared with the as-built/ scheme design.

The Contractor shall prepare a Final Asset Inspection Report, which shall include an overall review of the surveys and inspections undertaken and provide recommendations for maintenance or further investigation by OPW.

Figure 1 shows the OPW embankments to be included in this study (note that sluices are not denoted on the maps). The embankments are denoted by the green polyline. The OPW reference numbers and lengths of the individual embankments are provided in Table 1, with the list of sluices provided in Table 2. The GIS shapefiles will be provided to the successful Contractor on award. **For tendering purposes, this mapping and chainages can be viewed online at https://www.floodinfo.ie/map/drainage_map.**

It is noted that there may be some errors in the Shapefiles which, if established by the Contractor during the Contract, shall be notified to OPW for rectification.

We note that the embankments to be surveyed/ assessed from part of four separate Certified Drainage Schemes and hence there is overlap of embankment and sluice numbering. For clarity, as part of the reporting for this contract, the contractor shall use the following nomenclature;

- a prefix C to denote the Coonagh scheme embankments and sluices,
- a prefix O to denote the Owenogarney scheme embankments and sluices
- a prefix S to denote the Sixmilebridge scheme embankments and sluices
- a prefix B to denote the Bunratty Rineanna scheme embankments and sluices,

Figure 1: Map of Study Location showing OPW Embankments to be assessed (north of Shannon Estuary only)

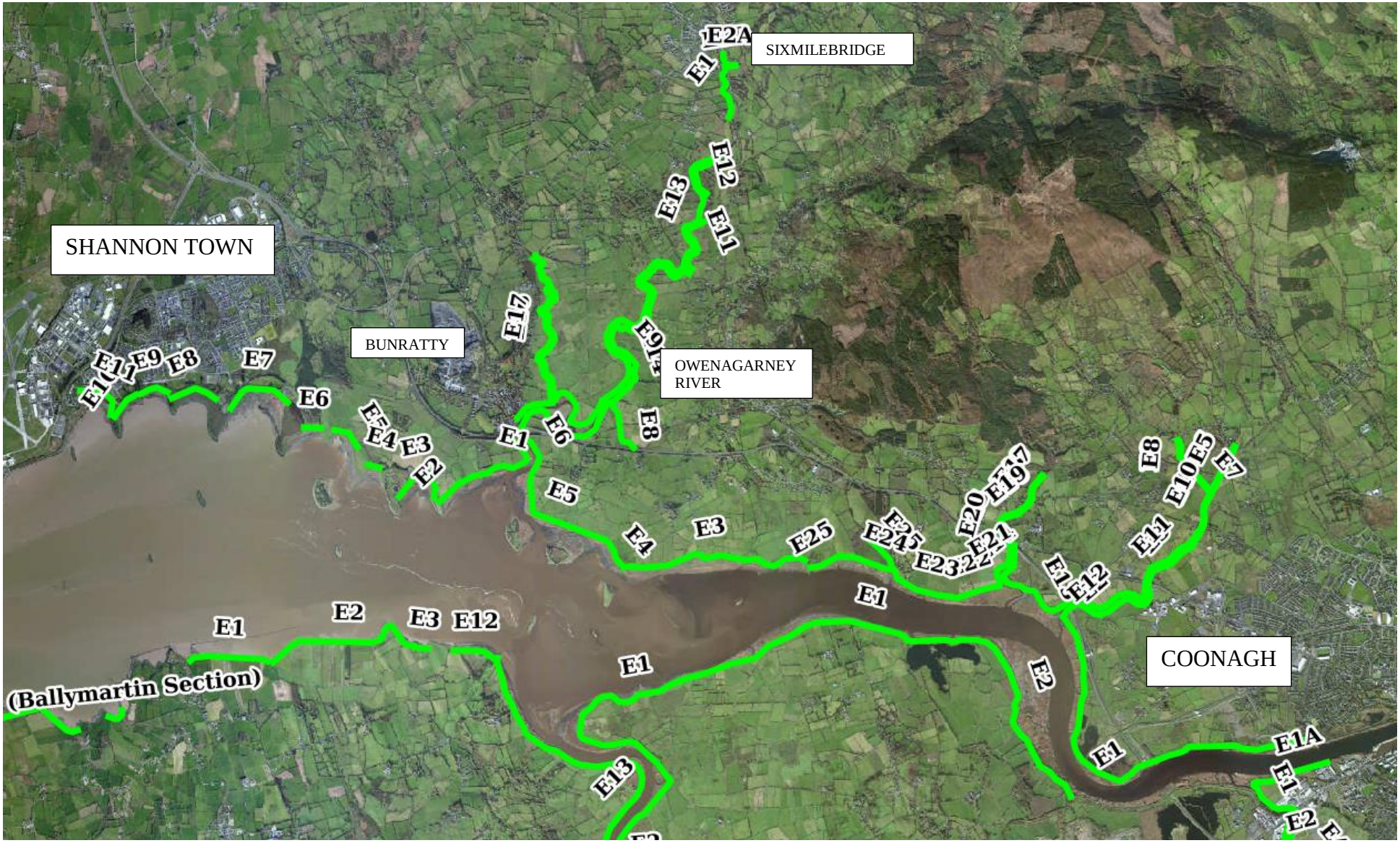

Table 1 - Scheme name: Coonagh
Embankments & Sluices to be surveyed

Prefix to use when surveying/ reporting: C- (reference number as below)

Embankment Ref.	***Length (m)***
E1	*5309*
E2	*1568*
E3	*1064*
E4	*704*
E5	*438*
E6	*440*
E7	*545*
E8	*438*
E9	*430*
E10	*857*
E11	*1059*
E12	*1461*
E13	*865*
E14	*567*
E15	*552*
E16	*262*
E17	*346*
E18	*349*
E19	*247*
E20	*556*
E21	*664*
E22	*569*
E23	*703*
E24	*1002*
E25	*575*
Total Length (m)	***21,570***

Sluice Ref.	Easting, Northing (ITM):
SL1	555227.7861, 656676.4011
SL2	554151.1440, 656633.3682
SL3 (SL2&3?)	554208.6625, 656626.0694
Sl4	552480.6561, 656760.3911
SL12	552732.7104, 658374.9645
SL14	553432.0653, 658561.2501
SL11	552626.9311, 658541.0245
SL10	552345.8980, 658493.5803
SL7	551899.3523, 658666.2697
SLX1	551897.9999, 658670.1433
SL15	551646.4209, 658970.7096
SL15A	551699.6913, 659282.0045
Sl16 (SLX1?)	551505.9652, 658964.4912
SL8	550374.8480, 658705.1885
SL19	550092.6131, 658955.1527
SL9	550079.0584, 658954.0853
SL9A	550015.8590, 658958.4728
Total No. of Sluice Locations = 17 no.	

Table 2 - Scheme name: Owenagarney
Embankments & Sluices to be surveyed

Prefix to use when surveying/ reporting: O- (reference number as below)

Embankment Ref.	***Length (m)***
E1	*-*
E2	*-*
E3	*2528*
E4	*250*
E5	*1869*
E6	*590*
E7	*-*
E8	*728*
E9	*5202*
E10	*-*
E11	*929*
E12	*710*
E13	*2048*
E14	*5083*
E15	*-*
E16	*2432*
E17	*2480*
E18	*-*
E19	*-*
E20	*-*
E21	*-*
E22	*-*
E23	*-*
E24	*-*
E25	*427*
Total Length (m)	***25,276***

Sluice Ref.	Easting, Northing (ITM):
SL22	549322.9742, 659100.2197
SL21	548100.0435, 659085.9548
SL20	545892.1948, 659543.2486
SL19	545319.8480, 660001.2059
SL18	545800.9132, 660728.0851
SL17	546400.8515, 661155.0530
SL16	546629.0165, 661415.5145
SL15	546680.6490, 661450.6370
SL14	546498.5103, 662121.9849
SL13	546860.2311, 662223.1416
SL12	546897.5008, 662891.9773
SL11	547201.9514, 662798.9870
SL10	547416.7048, 662902.7306
SL9	547489.8640, 663232.6688
SL8	547565.4801, 663948.2540
SL7	547312.0110, 663410.8547
SL6	547327.2145, 662984.9968
SL5	547106.5613, 663005.2893
SL4	546713.9834, 662772.8470
SL3	546469.9419, 662249.4796
SL2	546603.9767, 661600.9798
SL1	545631.1166, 661197.7418
SL1B	545637.8032, 661212.0156
SL1A	545606.9482, 661176.6700
Total No. of Sluice Locations = 24 no.	

Table 3 - Scheme name: Sixmilebridge
Embankments & Sluices to be surveyed

Prefix to use when surveying/ reporting: S- (reference number as below)

Embankment Ref.	***Length (m)***
E1	*970*
E2A	*136*
E2B	*133*
Total Length (m)	***1,239***

Sluice Ref.	Easting, Northing (ITM):
-	-
Total No. of Sluice Locations = 0	

Table 4 - Scheme name: Bunratty Rineanna
Embankments & Sluices to be surveyed

Prefix to use when surveying/ reporting: B- (reference number as below)

Embankment Ref.	***Length (m)***
E1	*1408*
E2	*334*
E3	*864*
E4	*157*
E5	*421*
E6	*224*
E7	*946*
E8	*645*
E9	*384*
E10	*655*
Total Length (m)	***6,038***

Sluice Ref.	Easting, Northing (ITM):
SLUICE 1	545144.2043, 660594.0496
SLX1	545128.7976, 660578.5464
SLUICE2	543843.6754, 660195.6529
SLUICE 3	541803.0871, 661346.1476
SLUICE 4	539400.8254, 661325.3007
Total No. of Sluice Locations = 0	

2. Site Constraints

These details provided for information purposes and the Contractor should not consider it an exhaustive list of site constraints.

- The embankments and sluices are located in remote areas and access for the proposed surveys and inspections must take this into consideration.
- The embankments and sluices are located adjacent to or within an SAC/SPA.
- The embankments and sluices may be located adjacent to national monuments or heritage sites.
- Overhead and underground services can be present at certain locations.
- Ground conditions may be poor and significant vegetation may be present at certain locations throughout the study area.
- The embankments are located in a coastal environment and hence there is an increased risk of high winds and adverse weather.

3. Health and Safety

The management of health, safety & welfare, and the management of risk generally, is a key priority for the OPW on this project. The identification and management of hazards and of any risks to employees, visitors, members of the public, and any other persons who may be affected by any aspects of the Project, is an integral part of this priority. The commitment to these issues will continue throughout the duration of the Project to completion.

Full compliance with the requirements of the Safety, Health and Welfare at Work Act 2005, and its revisions, and with all other safety, health and welfare legislation, regulations, codes of practice and standards, and their revisions, is required from all parties (including sub-consultant's, specialists and contractors) involved in this project.

The appointed Contractor will be required to undertake the duties of PSDP, PSCS and Contractor for this Project as required by the Statutory Instrument No 291 of 2013, namely Safety, Health & Welfare at Work (Construction) Regulations 2013, and its revisions.

The Contractor shall advise the OPW on any matters of health and safety, particularly in relation to current law, which may have implications for the OPW, or require action by, or on behalf of, the OPW in connection with the Project. The Contractor shall immediately advise the OPW verbally, and afterwards in writing of any accidents or dangerous occurrences, loss or damage to any personnel, third parties or property arising during the execution of their duties in relation to this project. Such accident reporting the OPW shall not relieve the Contractor of his statutory responsibilities for accident reporting to the relevant statutory authorities and/or insurers.

4. Scope of Services – Project Requirements and Deliverables

The scope of the services and deliverables that the Contractor shall deliver as part of the Project include, but is not limited to, the following;

4.1 Review of Data Provided

- Undertake a review of existing data and GIS Shapefiles for the Study Area provided by the OPW. The data/ Shapefiles will be made fully available to the successfully Contractor on award of the contract. Notify the OPW of any gaps or deficiencies in the data provided.
- Undertake a review of existing scheme embankment cross sections provided by OPW. Notify the OPW of any gaps or deficiencies in the data provided.

4.2 Drone Survey

- Undertake a drone survey of the entire length of the existing embankments (54,123m).
- Due to limited visibility of sluices, these shall be subject to separate Visual Asset Inspections as described in Section 4.5, but shall be numbered and referenced on the drone survey.
- The drone survey shall include 1 no. flyover of the embankments;
    - at a height of not more than 30m;
    - in a resolution of 1080p 30fps;
    - with a camera angle of -25° to the horizontal;
    - at a flight speed of approximately 4 m/s.
- The drone surveys shall be undertaken within 2 hours either side of low tide. Any proposed change to this (weather considerations etc.) shall be agreed in advance with OPW.
- All drone survey footage shall be presented with reference to existing mapping (inset/ adjacent) with chainages and embankment/sluice numbering clearly visible for ease of reference. An arrow on the map shall point to the moving location of the drone.

4.3 Orthomosaic, Point Cloud and Textured Mesh 3D model

- Undertake an ortho-mosaic survey of the entire length of the existing embankments in accordance with the following specification;
    - 1.5 cm/px GSD (Ground Sampling Distance)
    - The Orthomosaic must include NADIR images over the heel and toe of the embankments and any drainage channels
    - The survey shall be to ITM and Geoid OSGM15.

4.4 Software Platform

- Both Orthomosaic and video data should be presented in a format that allows the inspector to cross examine both datasets on a single software platform where the data can be stored, viewed, interacted with and downloaded by the user.
- The user should be able to carry out simple measurements on the Orthomosaic such as distance, volume, cross section and navigate a basic 3D point cloud.
- Make all survey data and reports available to OPW on the online software platform. The software platform shall be made available to OPW (min. 5 no users) to enable full access to the data for a period of not less than 5 years from the date of completion of this Contract.

4.5 Visual Asset Inspections

All Visual Asset Inspection and associated reviews shall be undertaken by accredited T98 inspectors (CIWEM/ UK Environment Agency Certification), details of which shall be provided to OPW with the tender. The OPW will attend site to meet inspectors and verify identity.

- Review of the drone and ortho-mosaic surveys in advance of the on-site inspections to identify potential defects and provide a report on location, type and extent identified.
- Undertake on-site visual asset inspections of the embankments and all sluices. All sluice inspections shall be undertaken within two hours either side of low tide.
- All inspections shall be undertaken in accordance with the UK Environment Agency Condition Assessment Manual (CAM).
- Where surveys cannot be undertaken due to vegetation cover/ access issues/ locations not found etc., the OPW should immediately be informed by email and photographs taken to validate same.
- Prepare Visual Asset Inspections reports for the study area, referencing existing embankment and sluice numbering and chainages and issue in soft copy to OPW.
- Provide a GIS layer with the Visual Asset inspection data.
- Complete a Final Asset Inspection report summarising the findings of the drone, ortho-mosaic and the visual asset condition inspections and with reference to the existing as-built scheme drawings. The report shall include comments relating to any defects (Size, material, photos etc.) and details of recommended actions.
- The survey data shall also be provided in raw format to the OPW as follows:
    - Raw images from the Orthomosaic should be provided via the software platform and on a hard drive
    - All inspection videos and photos made available for download via the software platform and on a hard drive

Project Management

- The Contactor shall undertake the role of Contractor, PSDP, PSCS for this project.
- The Contactor shall attend bi-weekly online Progress Meetings with the OPW for the duration of the Contract.

5. General Specifications

The Contractor shall comply with the following general spatial data specifications from the OPW. The latest version of these documents is available at;

https://www.gov.ie/en/publication/b15dd0-technical-specifications-and-guidance-notes/

- Engineering Spatial Data Specification Final Rev2.2 - April 2020
- Environmental Spatial Data Specification Final Rev 3.2 - July 2020