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Forth Crossing Bridge Constructors

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Project **FORTH REPLACEMENT CROSSING**

Document title

GEOLOGY, GROUNDWATER AND LAND CONTAMINATION MANAGEMENT PLAN

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GEOLOGY, GROUNDWATER AND LAND CONTAMINATION MANAGEMENT PLAN

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1 INTRODUCTION

1.1.1 This Geology, Groundwater and Land Contamination Management Plan details procedures and measures which have been implemented to limit environmental impacts and manage construction works, including the following:

- works that may affect designated geological sites;
- construction activities on land which may be contaminated;
- works which may affect the hydrogeological regime, including dewatering and settlement; and
- groundwater and ground gas monitoring.

1.1.2 It should be noted that private water supplies will not be affected by the works and the requirement for limiting adverse impacts no longer applies.

1.1.3 FCBC have consulted with the relevant local authorities and SEPA regarding the development of this Geology, Groundwater and Land Contamination Management Plan.

1.1.4 FCBC have undertaken a mining assessment (FCBC, 2012). It has been determined there are no activities to be carried out by FCBC that affect mine workings and no anticipated impacts to the project arising from mine workings.

1.1.5 The handling, storage, transfer, reuse, recycling and disposal of waste materials, including contaminated materials is included in the Waste Management Plan.

2 REGULATORY CONSULTATION REGARDING CONTAMINATED LAND

2.1.1 A contamination assessment was undertaken for the site (Forth Replacement Crossing Contamination Report, (Grontmij, July 2010)) and issued to SEPA and Fife Council in August 2010 for review. SEPA responded with a number of queries which were subsequently addressed by FCBC. Consultations relating to updated versions of these contamination reports (FRC Contamination Report North and South, Grontmij, 2012) took place in 2012 with SEPA and Fife Council.

3 LAND CONTAMINATION

3.1 General

3.1.1 All staff and operatives are responsible for identifying and reporting any unforeseen contamination. All staff and operatives receive training through tool box talks on how to identify contamination and the applicable controls. The Environmental Manager is responsible for ensuring training and competence. Training in which contaminants might be expected and what visual or olfactory signs to watch out for is also provided by the Design Joint Venture (the designers) to FCBC. In the event of suspected land contamination being discovered or encountered during the works the Environmental Manager shall notify the Employers' Delivery Team (EDT) immediately.

3.1.2 In the event that potential contamination is identified, works will cease once safe to do so until a suitably experienced advisor has assessed the contamination and determined the required controls.

3.2 Risk Assessment Summary

- 3.2.1 The site has been intensively intrusively investigated to identify both geotechnical and contamination properties of the soil and water. This information has been used to determine the presence of potential contamination, assess any risks and to identify the need for remedial works.
- 3.2.2 The Forth Replacement Crossing Environmental Statement (ES) (Jacobs Arup, 2009) and Network Connections – North Contamination Information Report (Jacobs Arup, 2010) identified a number of areas of potential contamination. These areas were then assessed by Grontmij as potentially containing significant pollutant linkages and were reviewed in accordance with the procedures set out in CLR11, taking into account site investigation data. The Grontmij studies have assessed the likelihood of the proposed works in the north and south areas encountering significant contamination and provide recommendations for dealing with any such contamination. These studies have included extensive desk-based research, intrusive site investigations and chemical testing of soil, leachate and water samples.
- 3.2.3 The results of the Grontmij assessment areas and associated actions were presented in the first version (Issue 1) of Contamination Assessment North and Contamination Assessment South (Grontmij, 2011). The sites were subsequently reassessed in accordance with CIRIA 552 and reported in Issue 2 of the Contamination Assessment North and Contamination Assessment South (Grontmij, 2012). The outcomes of these assessments are summarised below.

3.3 Contamination Assessment North

3.3.1 Following a period of extensive desk based research, and subsequent confirmatory site investigation where required, the Contamination Assessment North (Issue 2) (Grontmij, 2012) identified key recommendations relating to all 32 sites north of the Firth of Forth originally identified in the ES as requiring some form of investigation. The findings are outlined in Table 1. Those areas identified as requiring supervision of excavations have been summarised in more detail below.

Table 1: Recommendations for Sites North of the Firth of Forth.

Area	Description	Recommendations
N1	St. Margaret's Marsh	Supervision of excavations by a suitably qualified/trained professional
N2	St. Margaret's Bay Landfill	
N3	Dunfermline WWTW	
N17	Weldean Quarries	
N9	Tanks associated with Former Railway Land	Be aware that contamination may be present and contact a suitably qualified professional is suspected contamination is encountered
N15	St. Margaret's Quarry	
N19	Old Quarry (Whinstone)	
N20	Ferrytoll Quarry	
N28	Ferrytoll Quarry North	
N29	HM Naval Base	
N4*	Belleknowes Industrial Estate	None (beyond a normal watching brief for potential contamination)
N5a	Ferrytoll Quarry Landfill North	
N5b*	Ferrytoll Quarry Landfill South	
N6	Ferry Hills Landfill	
N7	Refuse tips	
N8	Former Water Storage Tank	
N10*	Former Railway Lines and Tunnels	
N11*	Saltpan Works	
N12*	Cemetery	
N13	Old Quarry 1	
N14	Quarry 1	
N16*	Quarry 3	
N18	Old Quarry 2	
N21*	Castlandhill Quarry	
N22*	Old Quarry 3	
N23*	Old Quarry 4	
N24*	Old Quarry 5	
N25*	Fairykirk Quarry	
N26*	Unrecorded Coal Mines	
N27*	Weldean Cottages Made Ground	
N30	East Tip	
N31*	Made Ground of Main Carriageway	

*Site specific desk studies are not provided for these within Contamination Assessment North (Issue 2) as they have been previously ruled out as being insignificant to the proposed scheme in Contamination Assessment North (Issue 1).

N1: St. Margaret's Marsh and N2: St. Margaret's Bay Landfill

- 3.3.2 These areas (N1: St. Margaret's Marsh and N2: St. Margaret's Bay Landfill) are not formally considered to be contaminated land (according to the UK legal definition within Part IIA of the Environmental Protection Act (EPA) 1990), although they do contain contamination associated with dredging and former landfilling operations. Whilst the intention is to minimise disturbance of this area through integrated geotechnical and contamination assessment and design, some earthworks are required. Works in the area are limited to the Ferrytoll embankment, B981, SUDs detention basin and water gates to control tidal flow. Where works include excavation and removal of landfilled materials, a suitably trained or qualified professional is present on site to supervise such earthworks.
- 3.3.3 Where required, supplementary site investigations will confirm the chemical composition of the limited amount of material that will be disturbed by surficial earthworks operations, in order to confirm its potential for reuse. The results of investigations will be compiled into investigation and assessment reports that will then inform the Earthworks Method Statements and Site Waste Management Plans as appropriate.

N3: Dunfermline Wastewater Treatment Works

- 3.3.4 This area is not formally considered to be contaminated land (according to the UK legal definition within Part IIA of the EPA 1990). However, unexpected contamination may be encountered (e.g. asbestos fragments) during any excavation works of made ground materials and due to the proximity of the area to the waste water treatment works. Consequently, any earthworks associated with the realignment of the B981 through this area are supervised by a suitably qualified or trained individual.

N17: Weldean Quarries

- 3.3.5 Investigations have shown that the risk of contamination in this area is low and this area is not formally considered to be contaminated land (according to the UK legal definition within Part IIA of the EPA 1990). However, as the works at this area will include the excavation and removal of made ground in the north of the site associated with the St Margaret's Bay Landfill it is possible that potentially contaminated material may be encountered. As a result, a suitably qualified environmental professional is present on site during earthworks in this area.

3.4 Contamination Assessment South

- 3.4.1 Following a period of extensive desk based research and subsequent confirmatory site investigation where required, the Contamination Assessment South (Issue 2) (Grontmij, 2012) identified key recommendations relating to all 17 sites south of the Firth of Forth originally identified in the ES (Jacob Arup, 2009) as requiring an assessment of contamination potential. The findings are summarised below in Table 2. There are no areas identified as requiring supervision of excavations.

Table 2: Recommendations for Sites South of the Firth of Forth.

Area	Description	Recommendations
S2	Barracks Area	Be aware that contamination may be present and contact a suitably qualified professional if suspected contamination is encountered
S13	Former Oil Shale	
S14	Areas of Isolated Made Ground	
S17	Area of Elevated Ground Gas	
S1*	Sewage Pumping Station	None (beyond a normal watching brief for potential contamination)
S3	Stores Area	
S4*	Dundas Lime Works	
S5*	Refuse Tip 1	
S6*	Refuse Tip 2	
S7*	Oil Shale Processing Spoil Heap	
S8*	Bonded Warehouse	
S9*	Old Quarries	
S10*	Three Old Quarries (Lindsay's Craigs)	
S11*	Quarry 1	
S12*	Quarry 2	
S15*	Oil Storage Depot	
S16*	Sewage Works	

*Site specific desk studies are not provided for these within Contamination Assessment South (Issue 2) as they have been previously ruled out as being insignificant to the proposed scheme in Contamination Assessment South (Issue 1).

3.5 Impacts on Services

- 3.5.1 Impacts on services and their potential to create a pathway for contaminant migration have been considered, where appropriate, within the contamination assessments undertaken for the North and South works areas.
- 3.5.2 As part of the northern road networks works, a sewer diversion is required adjacent to potentially contaminated ground. The proposed sewer diversion has the potential to act as a preferential groundwater flow pathway in the upper 2-3m of the existing ground at the eastern edge of St Margaret's Marsh. The risk of migration of contaminated groundwater in this area (where landfill is present) was highlighted in the design process and as such the design includes for concrete collars to be installed along the pipeline to minimise the risk of the pipe trench acting as a preferential pathway.
- 3.5.3 No additional issues with respect to services have been identified within the contamination assessments, therefore no further mitigation measures are proposed. Where further issues may arise, advice will be sought from the designers with regard to mitigation measures required.

4 ASBESTOS

- 4.1.1 Asbestos has been identified during site investigations adjacent to St Margaret's Marsh in the former landfill area. In addition, asbestos is present within a number of buildings at the FCBC marine area at Rosyth Docks.
- 4.1.2 Management of the risks associated with Asbestos is dealt with in the FCBC Health and Safety Management System Standards. If asbestos, or material suspected of containing asbestos, is discovered then the procedures outlined within the Health and Safety Management System Standards must be followed.

5 RADIOACTIVITY

- 5.1.1 Grontmij undertook an assessment on all available data and reports on radioactivity (Grontmij, 2012, Contamination Assessment North (Issue 2)). Rosyth Naval Base and Dalgety Bay were previously identified as potential sources of radiological contamination that may have affected the site. The potential for radionuclides to migrate to the site was considered to be low. Precautionary radioactivity monitoring was undertaken by Norwest Holst as part of the detailed and additional investigations (2008 and 2009); this monitoring did not identify radiation above background levels across the Site (Jacobs Arup, 2010).
- 5.1.2 Should further information become available which indicates that radioactive material may be present then a procedure to deal with this issue will be added to this plan.

6 POTENTIAL GROUND GAS ISSUES

- 6.1.1 A number of site investigations and risk assessments have previously been undertaken (refer to section 3). The Contamination Assessment South and Contamination Assessment North (Issue 2) (Grontmij, 2012) describe the risk assessment process undertaken.
- 6.1.2 The FRC Employer's Requirements set out the FCBC's responsibilities in relation to contaminated land. Section 24.8.5.3 states that:

"The Contractor shall ensure that the Site shall not be capable of being determined as Contaminated Land under and as defined by Part IIA of the Environmental Protection Act 1990 as a result of the Works. The Contractor shall ensure that existing linkages are minimised where practicable and new pollutant linkages are not created."

- 6.1.3 In terms of gas risk, the above requirement equates to not creating a structure in which hazardous concentrations of ground gas could accumulate. It is against this requirement that all gas risk assessments have been undertaken, using the guiding principles contained within CIRIA 665: Assessing Risks Posed by Hazardous Ground Gases to Buildings (CIRIA, 2007) and BS 8485: Code of Practice for the Characterization and Remediation from Ground Gas in Affected Developments (BSI, 2007). The findings of this risk assessment are presented in the Contamination Assessment South and Contamination Assessment North (Issue 2) (Grontmij, 2012) and summarised below.

- 6.1.4 Elevated ground gas levels are present in the southern section at depth. A supplementary site investigation has been undertaken in the area of the South Queensferry Junction cutting and elevated ground gases were encountered at various locations within the S17 area (area including the South Abutment). However, the source of this gas is considered to be within the bedrock, at a depth insignificant to the proposed works. A risk assessment specifically dealing with the South Abutment is contained within the Contamination Assessment North (Issue 2) (Grontmij, 2012); ground gas is not considered to be of significance to the South Abutment. Although some elevated levels of gas have been recorded, ground gas concentrations were generally low in the vicinity of the Queensferry Junction, and elsewhere the majority of works will take place above existing ground level.
- 6.1.5 Whilst the risk to the development from ground gases is generally considered to be low, there should be increased awareness of the potential for risks associated with ground gases anywhere within the area S17, although particularly where cutting is proposed in confined spaces in the vicinity of the Queensferry Junction. The risk assessment by the design team provides FCBC with further information regarding the potential risks and how they should be addressed during construction works. If any contamination is encountered during the construction phase, a suitably qualified environmental professional will be consulted on whether there is a risk of this contamination producing ground gas.

7 GEOLOGY

- 7.1.1 The ES (Jacobs Arup, 2009) contains details of the baseline geology.
- 7.1.2 It is not anticipated that Ferry Hill's SSSI will be impacted by the works. Detailed design undertaken after the ES resulted in the scheme moving to the west, thus avoiding the need to impact on the SSSI.

8 HYDROGEOLOGY/GROUNDWATER

8.1 Queensferry Cutting - Dewatering and Potential Settlement Issues

- 8.1.1 The Forth Replacement Crossing (FRC) is to be approached from the south by a new road alignment to the west of South Queensferry passing under the A904 in a cutting. The South Queensferry cutting will be constructed between chainages 3000 to 4300 at a maximum depth of 10m below ground level (mbgl) and a total length of approximately 1300m.
- 8.1.2 In addition, a temporary launch platform for the new bridge will be constructed within the northern part of the South Queensferry cutting. This is referred to as the South Launch. Between approximate chainages 4110 and 4350, the South Queensferry cutting will be deepened by up to 7m to a maximum depth of 11.5mbgl to accommodate the South Launch excavation, which will have a total length of approximately 200m.
- 8.1.3 The cutting may intercept groundwater and, therefore, dewatering may be required. In order to address concerns of subsidence and also to satisfy the Water Environment (Scotland) Controlled Activities Regulations 2011 (CAR) a Hydrogeological Assessment of the cutting was carried out (refer to section 8.1.6 below).
- 8.1.4 Under the CAR legislation, an authorisation is required from the Scottish Environment Protection Agency (SEPA) to undertake dewatering activities, either by means of a Registration (dewatering abstraction rate between 10 and 50m³/day) or CAR licence (dewatering abstraction rate greater than 50m³/day).
- 8.1.5 An application for a simple CAR licence was submitted by FCBC on 11/11/2011. SEPA issued the licence on 21/02/2012 (reference CAR/S/1098673), which permits abstraction from the excavation between National Grid Reference (NGR) NT 1143 7873 and NT 1172 7738, up to a maximum daily volume of 1,700 m³/d (+/- 10%).
- 8.1.6 FCBC commissioned a Hydrogeological Assessment of the Queensferry Cutting which has now been updated (FCBC, 2012a) to take into account the information gained from the latest ground investigation, which included permeability testing and a pumping test, as well as the groundwater level monitoring undertaken to date. The report also takes into account the profile of the South Launch excavation.

- 8.1.7 The zone of influence arising from the South Queensferry cutting and temporary South Launch excavation was estimated to be less than the distance to the nearest properties at Echline Corner, Springfield and Linn Mill as well as Linn Mill Burn, even under the worst case hydrogeological scenarios. This means that dewatering activities are likely to have a negligible impact on all receptors.
- 8.1.8 Ground elevations in the area of housing north of Society Road are below the lowest level of the proposed excavations, so dewatering activities are not expected to impact on groundwater levels in these areas.
- 8.1.9 Despite the estimated zone of influence from the cutting not extending to any properties in the area, pre-condition surveys were carried out at locations listed in Appendices A and B in 2011. These surveys will help inform any investigation if concerns are raised by residents relating to potential damage to properties from settlement.
- 8.1.10 Although the worst case scenario predicted a total inflow of 3,000m³/day to the excavation, inflows have been significantly lower than this for a number of reasons. The CAR licence excludes the abstraction of water that has accumulated in the excavation as a result of direct rainfall.
- 8.1.11 Inflows are significantly less than those predicted and this is supported both by the results of pumping tests and by observations to date during construction works. There is currently less than 10m³/day of flow in this area.
- 8.1.12 Groundwater level monitoring is carried out by the Environmental Team at locations and at periods agreed with the designers and EDT (See Appendix C and D – these include all historic monitoring locations site wide, including those required under the CAR licence: some of these boreholes will no longer be available for monitoring as the site works progress). The designers review the groundwater monitoring records monthly, or at other intervals appropriate to the results obtained, to allow potential impacts on local groundwater levels, if any, to be assessed. If there is a negative impact on the groundwater regime a detailed assessment will be carried out by the designers to inform any appropriate mitigation measures that are required to be implemented.
- 8.1.13 Since the volumes included in the CAR licence far exceed the actual volume being abstracted, as indicated in the water abstraction data which was returned as a nil return at the beginning of 2014, FCBC has agreed in principle with SEPA to surrender the licence. Therefore, no further monitoring for the CAR licence will be undertaken.
- 8.1.14 Although the assessments undertaken indicate negligible impact, should any resident report concerns with potential settlement then this will be investigated by a structural engineer. Remedial actions will be put in place (subject to consultation with the affected resident) if problems are found to be attributable to the works.

8.2 Hydrogeology- St. Margaret's Marsh Area

- 8.2.1 The northern area of the works, in the vicinity of St Margaret's Marsh, requires a number of earthworks to enable construction of the new mainline, re-aligned B981 and Public Transport Link. Earthworks include the re-aligned B981 and Ferrytoll embankments, as well as surcharging associated with the new detention basin. Both the B981 and Ferrytoll embankments require ground improvement in some sections, either by means of soil mixing or replacement with granular fill. Controlled Modulus Columns (CMCs) have been installed within all but the most southerly section of the B981 embankment, and are now complete. Full details of these and other associated earthworks are contained within the St Margaret's Marsh – Hydrogeological Assessment (Grontmij, 2012), which considers the potential impacts, of the earthworks on the local groundwater regime.
- 8.2.2 An assessment of the potential impacts of the earthworks has also been carried out and reported in Environmental Appraisal Report (Northern Ground Improvements) (FCBC, 2012b).
- 8.2.3 Although it is concluded in these documents that the impact on the groundwater regime is expected to be negligible, monitoring of groundwater levels is undertaken to provide assurance. A monitoring plan detailing the groundwater monitoring requirements for St Margaret's Marsh is provided in Appendix E. This includes additional testing for chloride and ammonia and data loggers monitoring groundwater levels continuously.

8.3 Hydrogeology/Groundwater- Drilling

- 8.3.1 Method statements for drilling activities will consider the likely impacts on groundwater, such as the creation of pathways for contaminant migration and alteration of the hydraulic continuity between strata. Where applicable, mitigation will be designed into the construction methodology in order to minimise potential effects, for example, the sealing of potentially contaminated layers and following good practice guidance on the backfilling of redundant boreholes.
- 8.3.2 Where practicable, the design of the Works will ensure that water tables shall be maintained to ensure that flora and fauna adjacent to the Works are not adversely affected.

8.4 Contaminated Groundwater

- 8.4.1 As detailed in the Contamination reports (Grontmij, 2012), several areas require an excavation watching brief by a suitably qualified expert. If these watching briefs identify any locations where there is groundwater containing elevated concentrations of contaminants a method statement for dealing with this groundwater will be written and agreed with the EDT and SEPA with advice taken from FCBC's contaminated land specialist. Methods may include measures to ensure adequate containment, collection and treatment which will be based on the anticipated volume, flow rate and degree of contamination of the intercepted groundwater.

9 MONITORING

9.1 Gas

9.1.1 Gas monitoring is not currently required. It is anticipated that any additional monitoring will only be required in specific instances, e.g. confined spaces.

9.2 Groundwater

9.2.1 Groundwater monitoring (quality and level) is on-going at all installations outlined in Appendix E. Other locations across the site are monitored at periods agreed with the designers and EDT.

9.2.2 Monitoring in the network of wells at St Margaret's Marsh is on-going in order to maintain the hydrological connectivity of this area whilst ensuring that the directional flow of groundwater is not affected. Groundwater levels continue to be monitored during construction for this purpose at periods agreed with the EDT and the designers.

9.2.3 Whilst earthworks are occurring in the area of works to the north of the Firth of Forth, water quality monitoring is undertaken quarterly, as recommended in the Contamination Assessment North (Issue 2) (Grontmij, 2012). The test results of this monitoring are also reviewed on a quarterly basis by the designers to assess whether any significant changes in water quality are occurring.

9.2.4 Due to the absence of significant contamination issues identified in the Contamination Assessment South (Issue 2) (Grontmij, 2012) to the south of the Firth of Forth, the contamination monitoring regime is not considered necessary to the south. It is noted, however, that monitoring of borehole installations is undertaken for geotechnical and hydrogeological purposes thus during this monitoring, vigilance is maintained for any evidence of potential contamination.

10 REFERENCES

- FCBC, 2012 - Network Connections, Mining Assessment
- FCBC, 2012a - Hydrogeological Assessment of the Queensferry Cutting
- FCBC, 2012b – Environmental Appraisal Report (Northern Ground Improvements)
- Grontmij- Forth Replacement Crossing – Contamination Report, 2010
- Grontmij- Contamination Assessment North, (First Version), 2011
- Grontmij- Contamination Assessment North, (Second Version), 2012
- Grontmij- Contamination Assessment South, (First Version), 2011
- Grontmij- Contamination Assessment South, (Second Version), 2012
- Grontmij- St Margaret’s Marsh – Hydrogeological Assessment, 2012
- Jacobs/ARUP, 2009 - Environmental Statement- Appendix A8.1: Land Contamination Assessment and Chapter 8: Geology, Contaminated Land and Groundwater
- Jacobs/ARUP, 2010 - Network Connections – North Contamination Information Report
- Ramboll- Environmental Appraisal Report Development No.41 (Northern Ground Improvements) (Fourth Version), 2012

APPENDIX A - PROPERTY CONDITION SURVEY LOCATIONS

- 1 Echline - South Queensferry
- 1 Clufflat Brae - South Queensferry
- 1 Echline Farm Cottage
- 1 Linn Mill - South Queensferry
- 2 Clufflat - South Queensferry
- 2 Clufflat Brae - South Queensferry
- 2 Echline - South Queensferry
- 3 Clufflat Brae - South Queensferry
- 4 Clufflat - South Queensferry
- 4 Clufflat Brae - South Queensferry
- 5 Clufflat Brae - South Queensferry
- 5 Linn Mill - South Queensferry
- 6 Clufflat Brae - South Queensferry
- 6 Dundas Home Farm - South Queensferry
- 6 Mucklehill Park - Inverkeithing
- 7 Dundas Home Farm - South Queensferry
- 7 Linn Mill - South Queensferry
- 8 Dundas Home Farm - South Queensferry
- 9 Clufflat Brae - South Queensferry
- 9 Dundas Home Farm - South Queensferry
- 9 Linn Mill - South Queensferry
- 10 Clufflat Brae - South Queensferry
- 10 Dundas Home Farm - South Queensferry
- 11 Dundas Home Farm - South Queensferry
- 11 Linn Mill - South Queensferry
- 12 Clufflat Brae - South Queensferry
- 12 Dundas Home Farm - South Queensferry
- 13 Dundas Home Farm - South Queensferry
- 14 Clufflat Brae - South Queensferry
- 14 Dundas Home Farm - South Queensferry
- 15 Clufflat Brae - South Queensferry
- 15 Dundas Home Farm - South Queensferry
- 15 Linn Mill - South Queensferry
- 16 Clufflat Brae - South Queensferry
- 17 Clufflat Brae, South Queensferry
- 17 Dundas Home Farm - South Queensferry
- 17 Linn Mill - South Queensferry
- 18 Clufflat Brae - South Queensferry
- 18 Dundas Home Farm - South Queensferry
- 19 Clufflat Brae - South Queensferry
- 19 Linn Mill - South Queensferry
- 20 Clufflat Brae - South Queensferry
- 21 Linn Mill - South Queensferry
- 24 Clufflat Brae - South Queensferry

APPENDIX A - PROPERTY CONDITION SURVEY LOCATIONS

- 26 Clufflat Brae - South Queensferry
- 34 Hillwood Terrace - Rosyth
- 48 Echline Drive - South Queensferry
- 62 Echline Drive - South Queensferry
- 64 Echline Drive - South Queensferry
- 66 Echline Drive - South Queensferry
- 68 Echline Drive - South Queensferry
- 70 Echline Drive - South Queensferry
- 72 Echline Drive - South Queensferry
- 77 Selvage Street - Rosyth Ferry Craig House, North Queensferry Flats A-K,
- Inchgarvie House
- Inchgarvie Lodge
- New Bigging Lodge - South Queensferry
- Port Edgar Barracks - South Queensferry
- Queensferry Hotel - North Queensferry
- Tigh Na Grian - North Queensferry

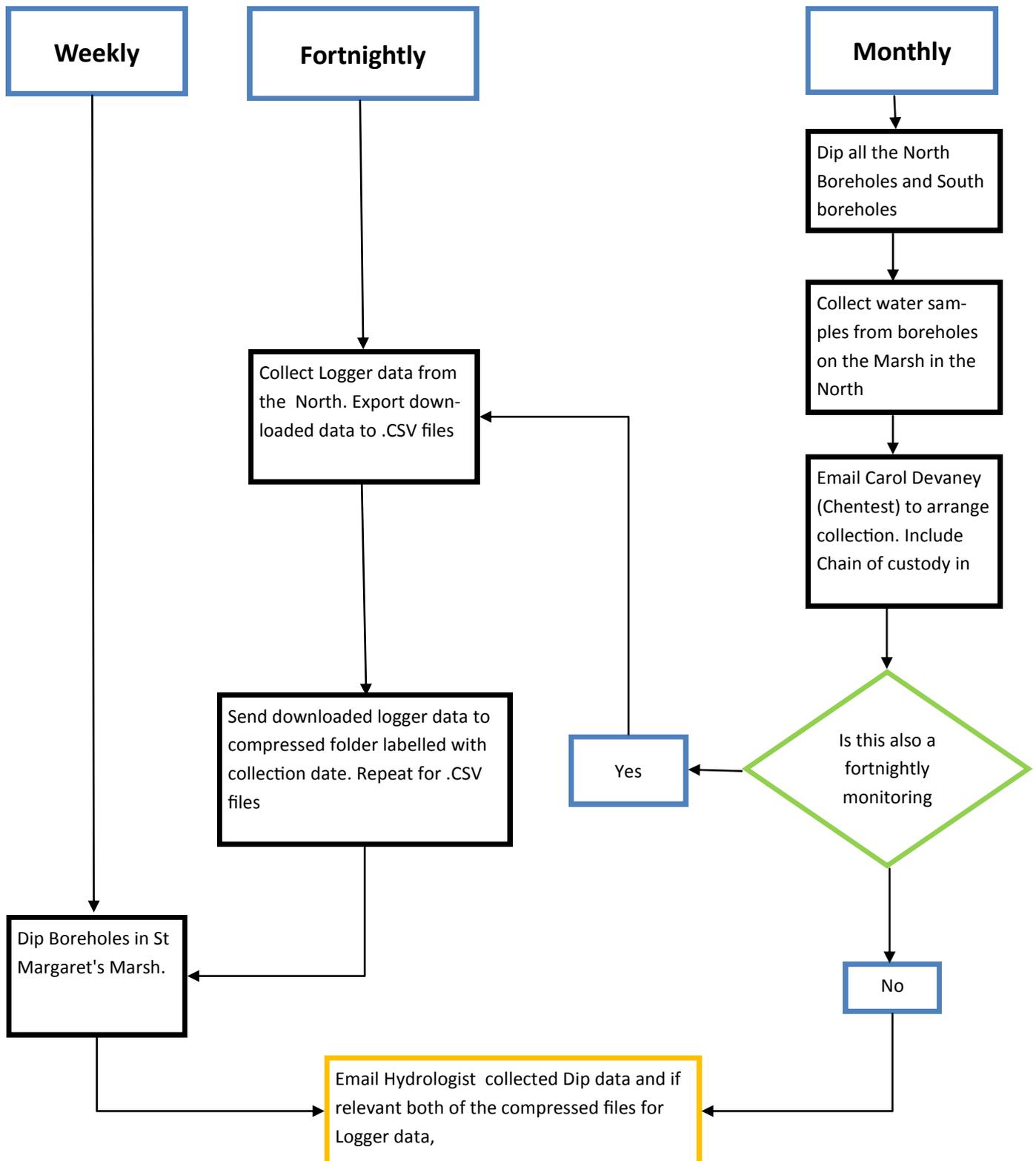
APPENDIX B - PROPERTY STRUCTURAL CONDITION SURVEY LOCATIONS

- 1 Echline, South Queensferry
- 1 Linn Mill, South Queensferry
- 2 Echline, South Queensferry
- 3 Linn Mill, South Queensferry
- 5 Linn Mill, South Queensferry
- 7 Linn Mill, South Queensferry
- 9 Linn Mill, South Queensferry
- 13 Linn Mill, South Queensferry
- 17 Linn Mill, South Queensferry
- 21 Linn Mill, South Queensferry
- 48 Echline Drive, South Queensferry
- 62 Echline Drive, South Queensferry
- 64 Echline Drive, South Queensferry
- 66 Echline Drive, South Queensferry
- 68 Echline Drive, South Queensferry
- 70 Echline Drive, South Queensferry
- 72 Echline Drive, South Queensferry
- Echline Farm House, South Queensferry

APPENDIX C - GROUNDWATER MONITORING LOCATIONS

APPENDIX D - GROUNDWATER MONITORING SCHEDULE

Groundwater monitoring schedule



APPENDIX E – MONITORING PLAN, ST MARGARETS MARSH