METHOD STATEMENT

MVV O&M GmBH,
South West Devon Waste Partnership
&
Kier Construction Limited

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FOR

Energy from Waste CHP Facility
ACC Foundations

DOCUMENT HISTORY

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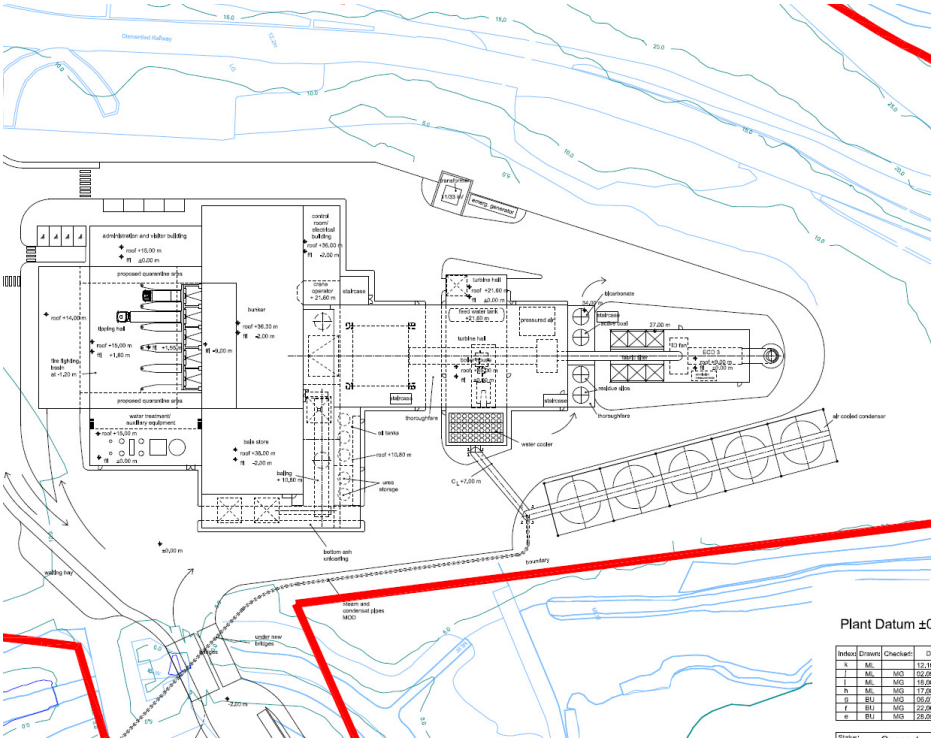
CONTENTS

Scope

This document describes the procedures and method of work for carrying out the installation of the foundations for the Air Cooled Condenser (ACC) for the new Energy from Waste (EfW) CHP Facility at Devonport. This ACC comprises 5 individual units arranged in-line. Given the proximity of the structures to the existing tidal watercourse known as Weston Mill Creek, environmental considerations are of a high priority. This is to ensure that the ecology of the area is not unduly disturbed and that the risk of contamination and pollution to the watercourse is managed and minimised.

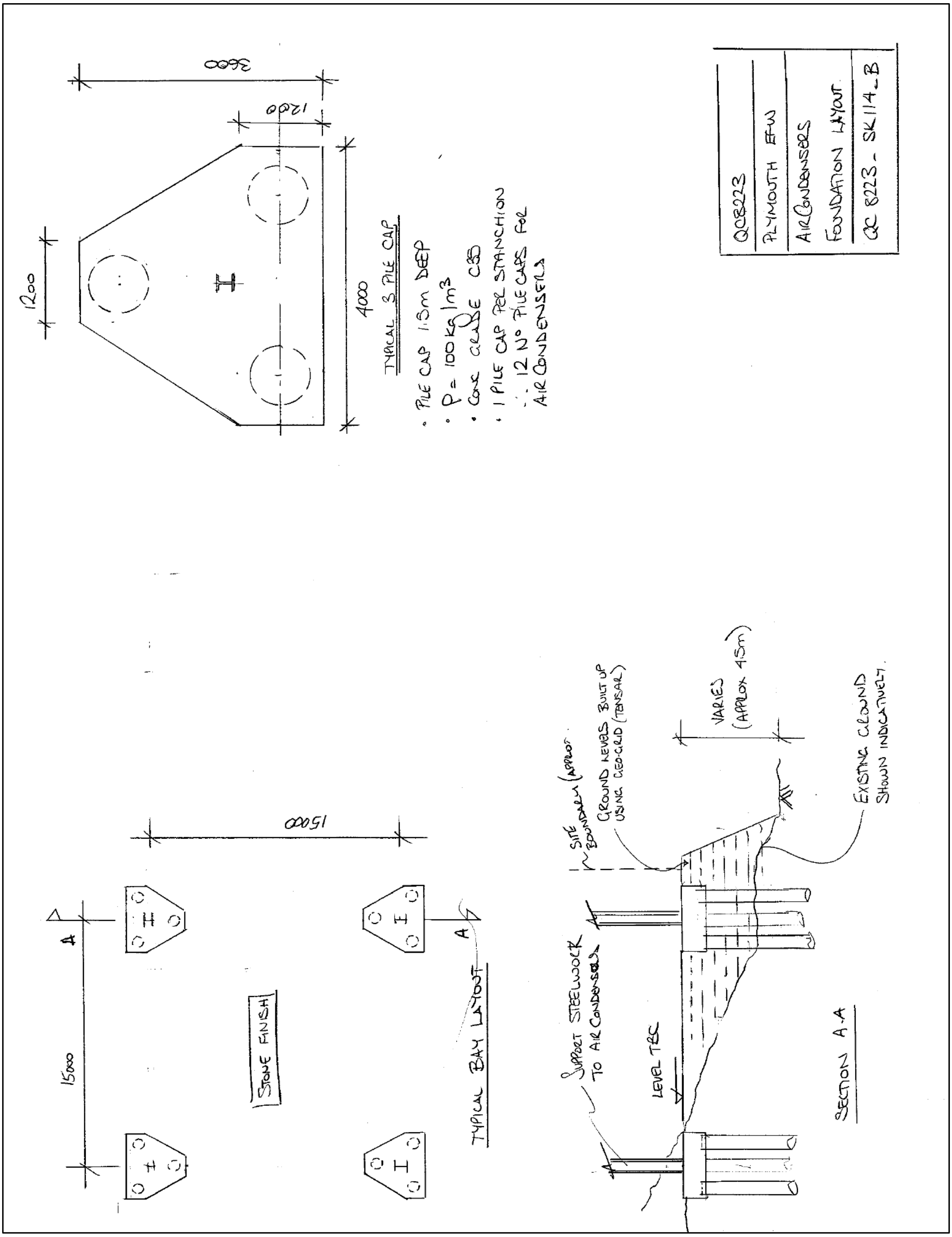
Introduction

The ACC is to be constructed to the east of the main EfW building, alongside the current site boundary fencing, to the north of the proposed site. Although not evident from the aerial photo below, this location is currently a steep slope leading down to the Creek. This means it will firstly be necessary to build up to level of the ground in order to create a stable embankment in which to be able to construct the foundations.



A plan of this area can be seen in the figure above.

Each of the ACC units is supported by steelwork which in turn rests on piled reinforced concrete foundations. A sketch showing a typical pile layout and dimensions can be seen on the next page.


3600
1200
1200
4000
TYPICAL 3 PILE CAP
• PILE CAP 1.5m DEEP
• P = 100 kg/m3
• CONC GRADE C35
• 1 PILE CAP PER STANCHION
∴ 12 No PILE CAPS FOR AIR CONDENSERS
QC8223
PLYMOUTH EFW
AIR CONDENSERS
FOUNDATION LAYOUT
QC 8223_SK114_B
15000
15000
A
A
STONE FINISH
TYPICAL BAY LAYOUT
SITE BOUNDARY (APPROX)
GROUND LEVELS BUILT UP USING GEO-GRID (TENSAR)
VARIES (APPROX 4.5m)
EXISTING GROUND SHOWN INDICATIVELY
SUPPORT STEELWORK TO AIR CONDENSERS
LEVEL TBC
SECTION A.A

Construction Sequence

Site Set-up

Prior to the project starting, a Site Waste Management Plan (SWMP) will be drawn up for continuous monitoring throughout the project under the Site Waste Management Plans Regulations 2008.

The project team will be experienced in their designated areas of responsibility. The integrated project team will ensure the work is competently supervised in accordance with the detailed construction risk assessment and method statement (RAMS), and Kier Construction procedures. These will take into account environmental issues in addition to health, safety and quality.

All personnel will have attended the mandatory Kier Construction and MVV site inductions and will have been briefed on the contents of the RAMS and Control of Substances Hazardous to Health (COSHH) assessments relevant to their operations.

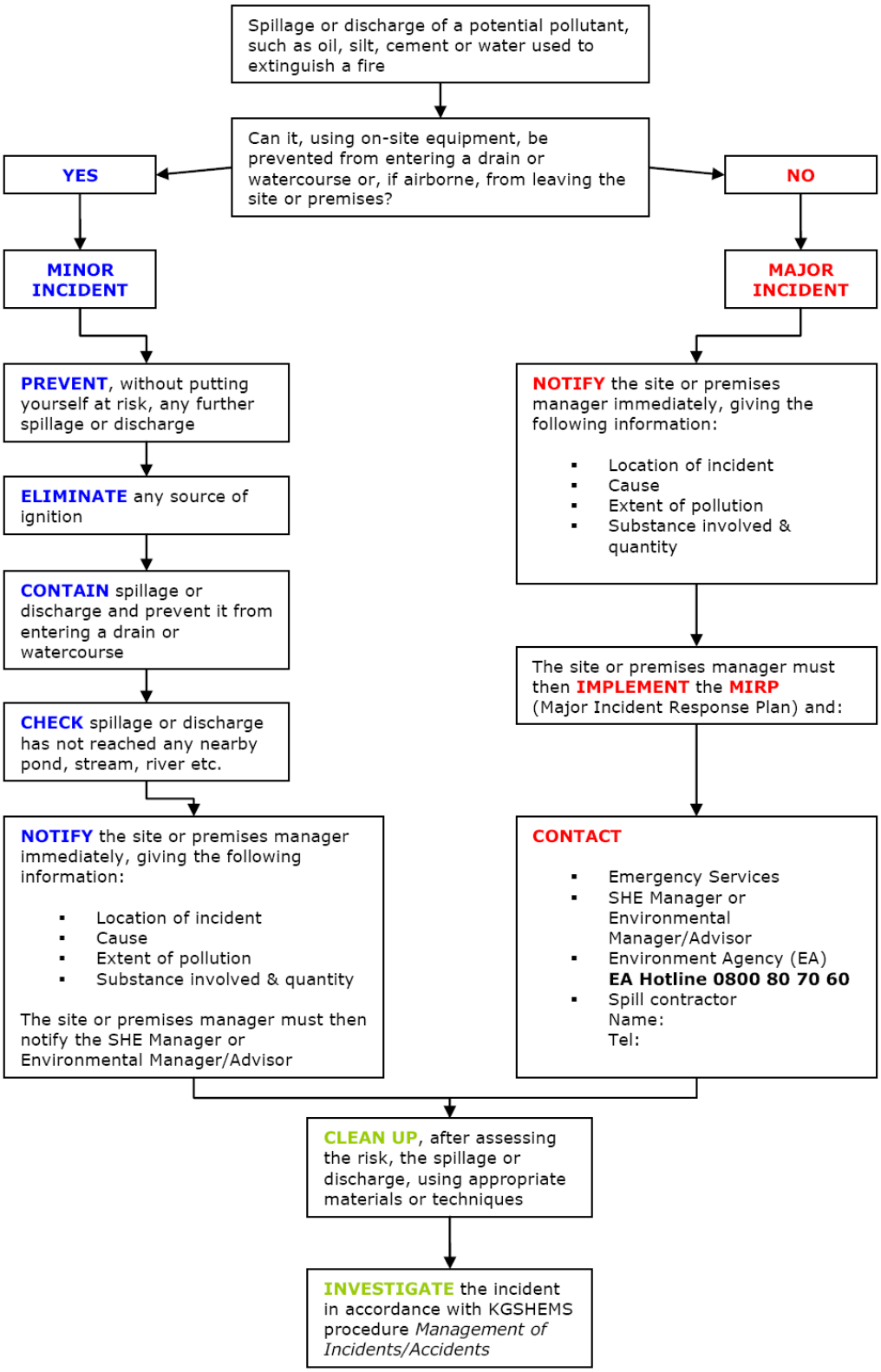
The site will be surrounded by a secure 2m high fence to prevent unauthorised access and to clearly show the area that will be under special rules owing to its proximity to the watercourse.

These rules will include:

- a designated, bunded plant refuelling area situated well away from the stream,
- use of biodegradable hydraulic fluid in machines that will work within the boundary,
- all plant must be inspected daily for fluid leaks and must not be used until any leak is rectified,
- no plant, materials, labour or debris may be allowed to enter the water,
- emergency spill kits must be made available and maintained at all times.

All site personnel will be briefed on the environmental emergency response procedure. A flow chart depicting the Kier Environmental Incident Response Procedure is show on the following page.

Typical Environmental Incident Response Procedure for Site/Premises



Consent to Discharge

In most cases, consent/permission must be obtained from the relevant enforcing authority, in this case, the Environment Agency (EA), before disposing of any water into a storm drain or controlled water course such as a ditch, stream, pond, lake, river or aquifer. However, if the works meet the criteria outlined in the EA's Regulatory Position Statement for Temporary Water Discharges from Excavations, it would be possible to discharge the water without the need for such a permit. In this case, it must be ensured that all work on site follows the advice in Pollution Prevention Guideline 6 entitles 'Working on Construction and Demolition Sites'.

The enforcing authority will require that any water discharged into a drain or controlled water course is free from pollutants, such as silts or hydrocarbons. They may, as a condition of the consent, set absolute limits on the amount of suspended solids or other pollutants the discharged water can contain. Therefore, the quality of the discharged water, for example that pumped out of an excavation and into a watercourse, must be regularly monitored. If it is suspected that the water has become polluted, the discharge must stop until the source of pollution is identified and stopped. The frequency of inspections will be agreed with the regulator. The findings of each inspection will be recorded on the SHE Monitoring Form.

Therefore temporary run-off collection bund must be constructed before any disturbance of the ground adjacent to the stream takes place and must be of a large enough volume to prevent over-topping in the event of heavy rain and/or discharge being temporarily suspended.

Preparation of Area

1. A full survey of existing services (buried or otherwise) will be carried out using a Cable Avoidance Tool, existing statutory undertakers' plans and ground-penetrating radar and all services shall be clearly marked using wooden pegs, or other marks. Before any excavation can commence, a lined run-off water collection bund will be constructed at the bottom of the existing batter to the east of the ACC location and along the full length of the interface with Weston Mill Creek. The capacity of this bund will be determined from rainfall records. Water from the bund will be pumped using a 'silent' pump through a series of settlement tanks (e.g. "Silt-Busters" – see photo) and then carefully discharged into the creek. The discharge will be regularly monitored for turbidity and other pollutants before it enters the stream. To prevent solids entering the bund a barrier will be constructed along the full length which will not impede rainwater run-off, but will stop earth or stone entering the bund (e.g. debris netting). This is to be continually monitored during excavation and filling and manually cleared of material whenever necessary.

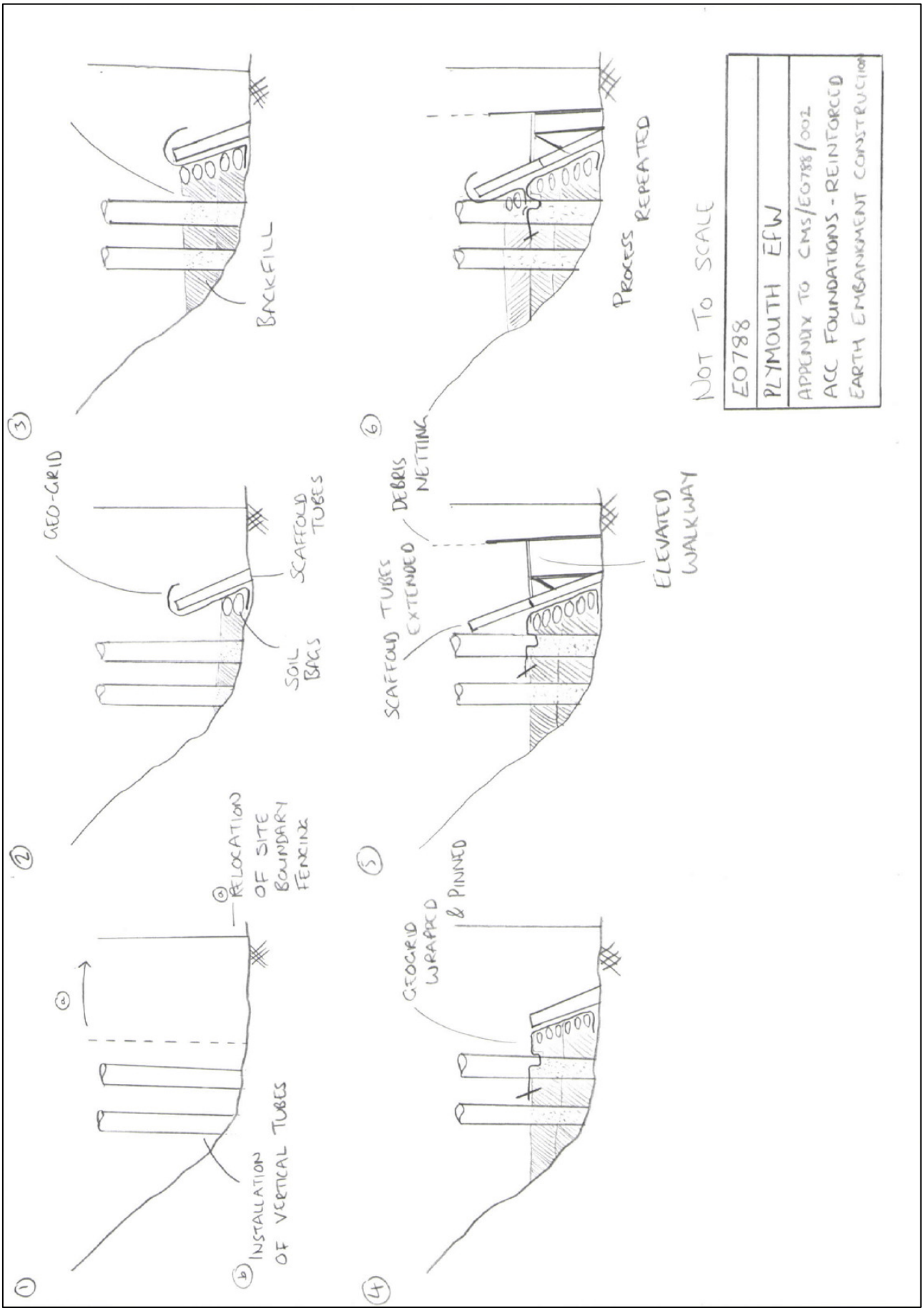
2. Relocate existing boundary fence closer to the waterway to allow space for works to be carried out within the secure site perimeter.

Creation of Embankment

1. Existing slope to be built up to required ground level for foundation construction (level TBC). This is to be done using geo-grid (Tensar) reinforced earth/backfill.
2. The ground is reduced using 360^{o} excavators in accordance with the earthworks design.
3. The pile locations are set out and 900mm diameter UPVC/concrete pipes will be set vertically to terminate at finished ground levels minus 300mm. These are to act as guide tubes for drilling into the subsoil / rockhead through the completed reinforced earth and will further reduce the risk of excess water content dissipating into the ground water.
4. Scaffold tubes are to be erected at base of proposed slope at an angle of approximately 70 degrees. Wooden boards to be erected between the poles to create the slope face. This will also provide two other functions:
    - To act as a working platform
    - To act as a preliminary line of defence (using debris netting) against soil falling into the stream.
5. Geo-grid (e.g. Tensar) will be laid along the bottom of the area to be filled and up along the inside face of the wooden boards, with the trailing end of the geo-grid hanging loose over the other side of the slope face while the slope is backfilled. Sections will be cut out of the geo-grid to facilitate the laying of the geo-grid around the guide tubes where applicable.

6. After the first layer of geo-grid has been laid, the inside face of the slope is to be lined by seeded soil bags to a height of half way up the first backfill layer in order to provide stability to the slope face. The area behind these bags will then be backfilled using materials brought in by dumpers, spread using a 360^{o} excavator and compacted using a sheep's foot roller.
7. Geo-grid is then to be wrapped over the top of the soil bags and fill, including all the edges of the trench, and held in place with pins. The length of the geo-grid used is to be determined in order to provide sufficient frictional force to maintain the slope face. The use of the geo-grid in this way minimises the amount of material that can fall into the watercourse by providing a physical barrier to large contaminants or pollutants.
8. This procedure to then be repeated until the ground level meets the required height by extending the scaffold tubes and boards to increase the height of the slope face to be backfilled.

This process is shown as a series of sketches on the following page.


1
a
b INSTALLATION OF VERTICAL TUBES
2
a RELOCATION OF SITE BOUNDARY FENCING
GEO-GRID
SCAFFOLD TUBES
SOIL BAGS
3
BACKFILL
4
GEOGRID WRAPPED & PINNED
5
SCAFFOLD TUBES EXTENDED
DEBRIS NETTING
ELEVATED WALKWAY
6
PROCESS REPEATED
NOT TO SCALE
E0788
PLYMOUTH EFW
APPENDIX TO CMS/E0788/002
ACC FOUNDATIONS - REINFORCED EARTH EMBANKMENT CONSTRUCTION

Installation of Piled Foundations

1. Before the piling rig is moved into position, a temporary piling mat must be constructed in order to create a stable platform. This will be in the form of layers of compacted stone to achieve a specified CBR value.
2. The piling rig will be set up in position and drill down to a specified depth, dependant upon bearing capacity indicated by the site investigation. In the embankment, 800mm concrete piles will be rotary-bored through the voids created in the slope by the guide tubes. In the undisturbed ground below the earthworks, the piles will be bored directly into the ground in accordance with the pile design.
3. The concrete for these in-situ piles will be delivered ready-mixed by road-truck and will be poured into the newly bored hole from a position that will not allow any concrete to spill near to the watercourse or its banks. Any concrete that does spill will be disposed of in a specially designated skip and this skip will also be used to contain the water used for washing out the mixer. The skip's contents will be disposed of as inert waste when all the cement has cured.
4. Reinforcement will be pushed into the wet concrete and the completed pile left to cure before the top is cut off to the correct level to suit the design and disposed of as inert waste at a licensed disposal facility in accordance with the SWMP.
5. Upon completion of the piling works, the piling mat will be removed for re-use elsewhere on the site.
6. A mini-excavator will then be used to excavate the areas for the concrete pile caps, which will be cast in-situ.

Monitoring

During these works, the stream and its banks will be continually monitored so prevent anything falling in and also to assess the stability of the banks.

PPE

All personnel accessing the site will be subject to KCL and MVV site rules and will wear PPE as required.

In addition to the above, all operatives will wear appropriate PPE relevant to the tasks being carried out. These include the mandatory long sleeves, long trousers, safety boots, task-specific gloves, safety helmet, and safety glasses. Other task-specific PPE may include disposable overalls, face protection, hearing protection, Wellington boots (for concreting works) or full body safety harness.

Quality

All project operations will be controlled by Kier's quality procedures, industry standards and project specific quality control plans. The quality control plans will define all project documents required including ITP's, all approvals, project hold points, records required, and verifying authorities.

Safety

The following Risk Assessments are relevant to the works and will be attached to the detailed Method Statement in accordance with the Construction Phase Plan:

Initial site setup
Manual Handling
Working at Height
Working over Water
Confined spaces and Rescue plan
Slips, trips and falls
Power tools and abrasive wheels
Working near mobile plant and plant movement
COSHH Assessment for all hazardous products
Weil's Disease
Lift Plans

All personnel will be fully briefed on the safe method of work, via the use of a site specific induction and operation specific SMART (Specific Method And Risk Training) briefings, prior to the works being carried out.

All crane movements will be controlled by the lift supervisor and SQEP banks-men.

The site safety will be continually monitored via weekly site inspections. These inspections are carried out independently of the project management and are recorded. Inspection results will be made available upon request. The Health and Safety Plan will also be continually reviewed, the results recorded and changes implemented.