

Project Environmental Plan - Full



Bicester Eco Village

SH20011

**For projects that are
Notifiable (under CDM Regulations)**

Project Environmental Plan – Full



CONTRACT:	Bicester Eco Village
------------------	----------------------

CONTRACT No:	SH20011
---------------------	---------

PRE CONSTRUCTION PREPARED BY	Eilean Appleton	DATE	
TITLE	Pre Construction Manager		
PRE CONSTRUCTION APPROVED BY		DATE	NOT APPROVED
TITLE	ENVIRONMENTAL MANAGER		
CONSTRUCTION PREPARED BY	Kevin Lambert	DATE	
TITLE	Construction Manager		
CONSTRUCTION APPROVED BY		DATE	NOT APPROVED
TITLE	ENVIRONMENTAL MANAGER		

DISTRIBUTION	<p>A hard copy will be held on site.</p> <p>Further copies are available on request.</p>
---------------------	--

CONTENTS:
INTRODUCTION
REVISION RECORD
1.0 PROJECT DETAILS AND DESCRIPTION
2.0 CLIENT OR PROJECT SPECIFIC CONTRACTUAL REQUIREMENTS
3.0 ORGANISATION AND ENVIRONMENTAL RESPONSIBILITIES
4.0 ENVIRONMENTAL POLICY AND PROCEDURES
5.0 PROJECT ENVIRONMENTAL ASPECTS AND IMPACTS
6.0 ENVIRONMENTAL PERMITS
7.0 eKPI's AND ENVIRONMENTAL OBJECTIVES AND TARGETS
8.0 ENVIRONMENTAL AWARENESS AND TRAINING
9.0 ENVIRONMENTAL GUIDANCE AND SITE PROCEDURES
10.0 CLIENT SPECIFIED PROCEDURES
11.0 ENVIRONMENTAL EMERGENCY PLANNING ARRANGEMENTS
12.0 SITE WASTE MANAGEMENT PLANNING
13.0 WEEKLY SITE INSPECTIONS
14.0 ENVIRONMENTAL INCIDENTS AND COMPLAINTS
15.0 ENVIRONMENTAL SITE VISITS AND AUDITS
16.0 SPECIFIC PRECAUTIONS AND MEASURES REQUIRED WHEN WORKING NEAR OR ON THE WATER COURSES.
17.0 PROTECTION OF THE BANKS OF WATER COURSES
18.0 APPENDICES

Project Environmental Plan – Full

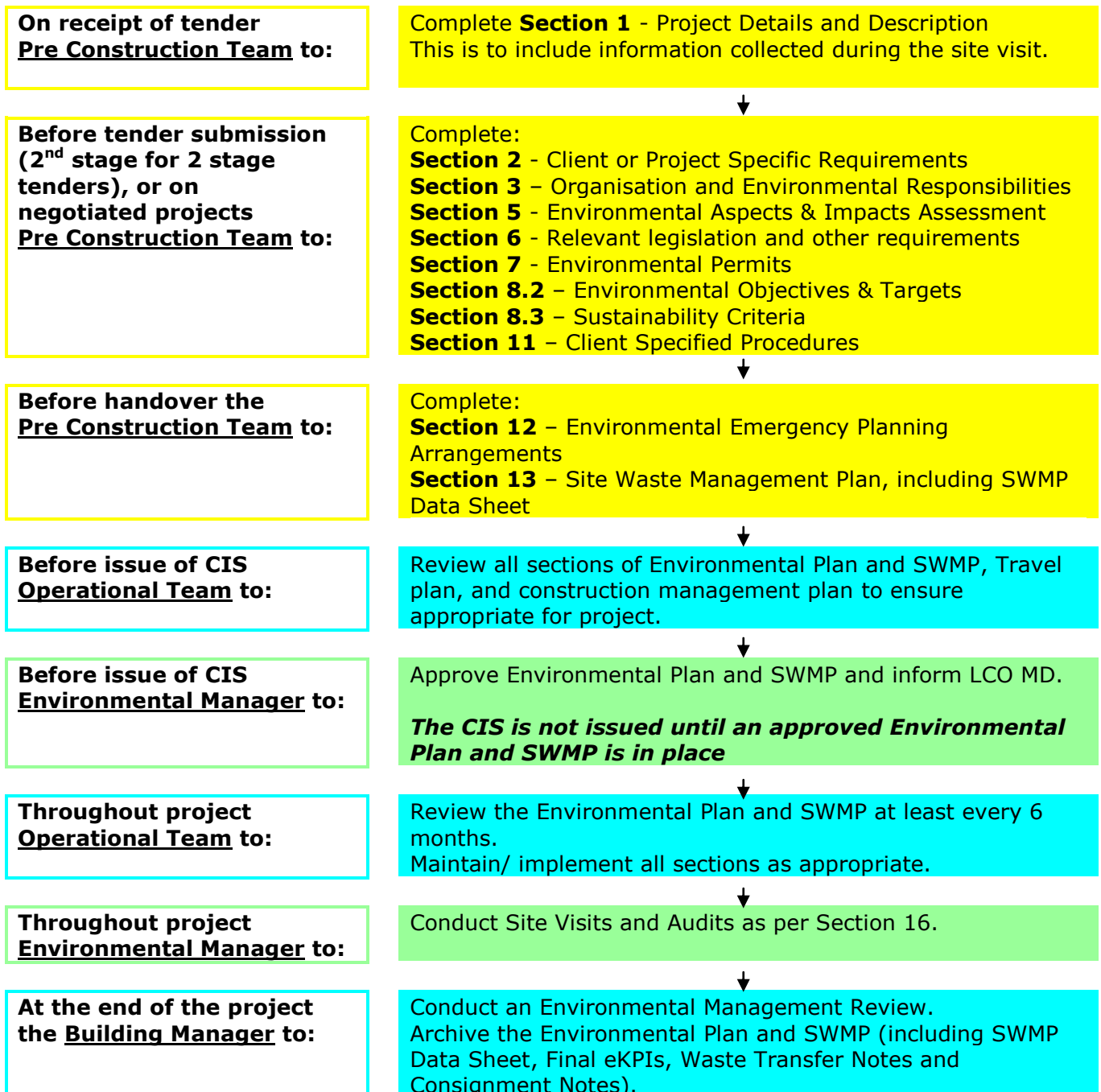


INTRODUCTION

This Project Environmental Plan details the approach and actions we will be undertaking to manage the environmental aspects on this project. The Environmental Management System will be implemented on this project by the Operations team, supported by the Local Company Office (LCO) Environmental Manager and the Divisional Management team.

In Section 5.0, we have reviewed the environmental aspects of all the construction work we will be undertaking on the project. Resulting from this, a number of project specific Action Notes have been developed, which will be managed through the Environmental Management System.

ENVIRONMENTAL PLAN PREPARATION PROCESS



Project Environmental Plan – Full



1.0 PROJECT DETAILS & DESCRIPTION

Project Title - Bicester Eco Village

Location – Land off B4100, Bicester

Client – A2 Dominion Group

Commencement Date – November 2012

Completion Date - December 2017

1.1 PROJECT DESCRIPTION

The project is to comprise of the construction of 393no residential units made up of a mixture of 1, 2, 3, 4 & 5 bed flats and houses complete with associated garaging and car parking. Infrastructure works to provide an energy centre to serve to entire development, new road junctions on to the existing B4100, Development roads complete with bridges.

Associated landscaping works to provide environmental enhancement to the scheme

A new school and Commercial areas for future premises

1.2 SITE LOCATION

The site is located off of the existing B4100 and is currently used for agricultural use with existing water course running across.

The site is currently used for livestock grazing with the ground currently covered in meadow grass primarily. The field are surrounded with mature native hedgerows interspersed with various mature and semi mature trees. The site is cut in the valley area by two watercourses one of which constantly flows whilst the second route is primarily dry under normal conditions but does run in periods of high rainfall

The underlying strata consists topsoils over clay/gravel mix on a chalk and rock bed
The existing site has several existing hedgerows, trees and wild planting. An area of the site shown on the attached ecology report also indicates the existence of Badger sets with the area of the site.

Document Reference: FM-EM-03	Issue Number: 1	Effective Date: 01/10/2011
Uncontrolled copy if printed		Page 6 of 29

2.0 CLIENT OR PROJECT SPECIFIC CONTRACTUAL REQUIREMENTS

All units are to be constructed in accordance with lifetime homes standards and to code level 5.

Housing Quality Indicators
Air tightness of <3ach
Secured by Design (Part2)

2.1 Section 106 Monitoring requirements. See table on following page for responsibility of actions.

2.2 Planning Condition 58 "BICESTER ECO-TOWN - Minimising CO2 Emissions from the Construction Process and Embodied Carbon.

The implementation of the requirements of this document will be by the Environmental Champion.

2.3 CEEQUAL Excellent - The Environmental Champion will be collecting all the data required and sending on to the code assessor.

2.4 Responsible sourcing requirements - will be obtained by the site QS and site Buyer who will report regularly to the Operations Manager.

2.5 FSC Provenance or other timber provenance targets - will be implemented by the site QS and site Buyer.

S106 Monitoring Requirements – Allocation to Site Team.

ET9 Homes		Need to	Nice to	Monitoring method	Units	By who
ET9-1	Post construction Code assessment	✓		Contractor reporting		Data collected by Environmental Champion who issues to the Code assessor
ET9-2	Post construction air tightness testing meet specified standard	✓		Contractor reporting	Air changes per hour	Build Manager organises, obtains data to forward to relevant bodies.
ET9-3	Post construction co-heating tests deliver satisfactory results		✓	Contractor reporting		Build Manager organises, obtains data to forward to relevant bodies.
ET10 Employment		Need to	Nice to	Monitoring method	Units	By who
ET10-1	Construction related jobs	✓		Contractor reporting	FTE each year	Community Manager organises, obtains data for compilation in team reports.
ET10-2	Construction skills strategy implemented	✓		Contractor reporting		Community Manager organises, obtains data for compilation in team reports.
ET10-3	Number of apprenticeships and training placements	✓		Contractor reporting		Community Manager organises, obtains data for compilation in team reports.
ET10-4	Number of local businesses benefitting from construction process		✓	Contractor reporting		Community Manager organises, obtains data for compilation in team reports.
ET10-5	Other local jobs due to construction process eg. Product suppliers, catering services etc		✓	Contractor reporting		Community Manager organises, obtains data for compilation in team reports.
ET11 Transport		Need to	Nice to	Monitoring method	Units	By who
ET11-1	Construction site travel plan in place and delivered	✓		Contractor reporting		Community Manager implements plan through build managers , records data, takes action as required, reports monthly to Operations Manger
ET11-2	Modal share of construction work force	✓		Contractor reporting		Community Manager implements plan through build managers , records data, takes action as required, reports monthly to Operations Manger
ET11-3	Average commuting distance for construction workers	✓		Contractor reporting	Km	Community Manager implements plan through build managers , records data, takes action as required, reports monthly to Operations Manger
ET11-4	Average sourcing distance of construction materials		✓	Contractor reporting	Km	Community Manager implements plan through build managers , records data, takes action as required, reports monthly to Operations Manger

Project Environmental Plan – Full



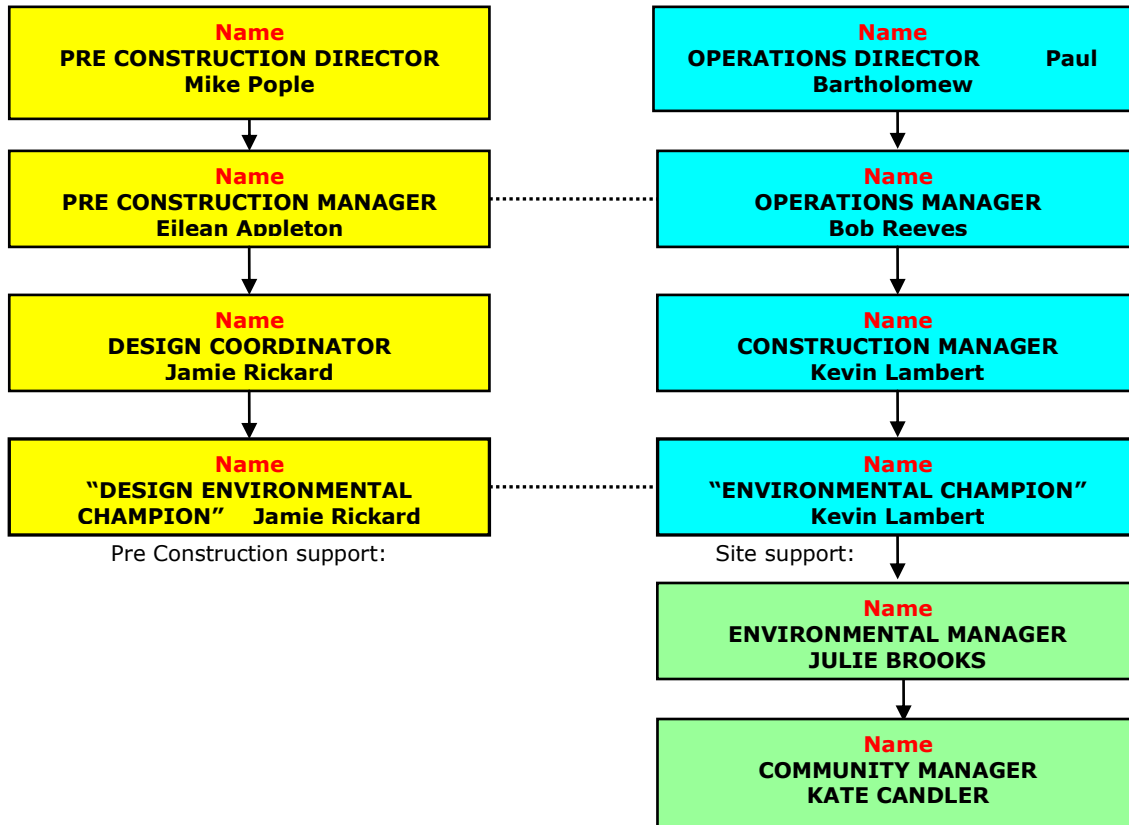
ET16 Biodiversity		Need to	Nice to	Monitoring method	Units	By who
ET16-1	Construction Environmental Management Plan delivered	✓		Contractor reporting		Operations Manager has overall responsibility for delivery ,through implementation by relevant build managers
ET16-2	Out of bounds areas enforced	✓		Contractor reporting		Operations Manager has overall responsibility for delivery ,through implementation by relevant build managers
ET16-3	Trans location measures successful	✓		Contractor reporting		Operations Manager has overall responsibility for delivery ,through implementation by relevant build managers
ET16-4	Key species and habitats successfully protected	✓		Contractor reporting		Operations Manager has overall responsibility for delivery ,through implementation by relevant build managers
ET17 Water		Need to	Nice to	Monitoring method	Units	By who
ET17-1	Construction related water consumption	✓		Contractor reporting	litres / year	Site Based QS to monitor site usage, record and report on a monthly basis to Operations Manager.
ET17-7	Water quality in run off streams	✓		Contractor reporting		Water Quality monitoring covered in ECMP
ET19 Waste		Need to	Nice to	Monitoring method	Units	By who
ET19-1	Assessment of waste management practice	✓		Assessed on basis of indices below		Enviromental Champion to action
ET19-2	SWMP in place and delivered	✓		Contractor reporting		Enviromental Champion to implement and report to Operations Manager
ET19-3	Total construction waste (including recycling) as a % of total construction materials bought	✓		Contractor reporting	%	Enviromental Champion to implement and report to Operations Manager
ET19-4	Total construction waste (including recycling)	✓		Contractor reporting	Tonnes / month	Enviromental Champion to implement and report to Operations Manager
ET19-5	Total construction waste to landfill	✓		Contractor reporting	Tonnes / month	Enviromental Champion to implement and report to Operations Manager
ET19-6	Total hazardous waste	✓		Contractor reporting	Tonnes / month	Enviromental Champion to implement and report to Operations Manager
ET19-7	Breakdown of construction waste recycled	✓		Contractor reporting	Tonnes / month	Enviromental Champion to implement and report to Operations Manager
ET19-8	Construction materials reused	✓		Contractor reporting	Tonnes /	Enviromental Champion to implement and report to Operations Manager

Project Environmental Plan – Full



ET21 Transition	Need to	Nice to	Monitoring method	Units	By who	
ET19-9	Earth / fill movements on or off site	✓		Contractor reporting	Tonnes / month	Environmental Champion to implement and report to Operations Manager
ET21-1	CEEQUAL Award achieved	✓		Contractor reporting		Environmental Champion to record data to forward to assessor.
ET21-2	BREEAM ratings achieved		✓	Contractor reporting		Environmental Champion to record data to forward to assessor.
ET21-3	Code for Sustainable Homes assessments achieved	✓		Contractor reporting		Environmental Champion to record data to forward to assessor.
ET21-4	Carbon emissions from construction activities	✓		Contractor reporting	tCO2 /month	Environmental Manager to record in conjunction with subcontractors
ET21-5	Considerate Contractors standard met		✓	Contractor reporting		Operation Manager has overall responsibility ,implementation via build managers
ET21-6	Environmental reporting (ref CEMP)	✓		Contractor reporting		Environmental Champion to record data and report to Operations manager
ET21-7	Embodied carbon impacts of construction	✓		Contractor reporting	tCO2	Design Manager to assess with design Team .
ET21-8	% Timber products sustainably sourced		✓	Contractor reporting	%	Site Buyer and QS to implement ,monitor ,record data and report to operations manager.
ET21-9	Sustainable materials sourcing policy met		✓	Contractor reporting	%	Site Buyer and QS to implement ,monitor ,record data and report to operations manager.

3.0 ORGANISATION AND ENVIRONMENTAL RESPONSIBILITIES



Bid Manager

The Bid Manager is responsible for co-ordinating and ensuring that the Project Environmental Plan is completed during the pre construction stages and signed off before hand over to the construction team. Eilean Appleton can obtain environmental advice and information Philip Harker Hyder

Design Environmental Champion

Jamie Rickard is responsible for ensuring that the design team fully consider waste minimisation throughout design development, and is responsible for completing the 'Design Out Waste Decision Record' in section 2 of the SWMP (FM-EM-10) and the Design Section of the SWMP checklist (section 6 of the SWMP).

Operations Manager

The Operations Manager maintains operational control of project activities ensuring that time and quality demands are met in line with budgetary constraints and contract requirements. Kevin Lambert will be checking that the project management team are managing the EMS effectively by monitoring the close out of any issues raised during audits, the production and reporting of project eKPIs and reporting progress to the client/ clients agent on a monthly basis. Kevin Lambert can obtain environmental advice and information from Philip Harker (Hyder Consulting) during the project

"Environmental Champion"

Kevin Lambert is responsible for ensuring that the Site Waste Management Plan is followed on site and that site operatives correctly segregate and store wastes. They also ensure that the correct documentation is held for waste contractors using the site and controlled waste transfer notes for waste removed from site are correctly filled in and kept in the SWMP file. Will have responsibilities for delivering CEEQUAL requirements and the Planning Condition 58 - Embodied CO2 requirements in addition to the above.

Project Environmental Plan – Full



Local Authority notification

Under the Environmental Damage (Prevention and Remediation 2009) the Local Authority must be notified of any incident that involves damage to the land.

Document Reference: FM-EM-03	Issue Number: 1	Effective Date: 01/10/2011
Uncontrolled copy if printed		Page 12 of 29

Project Environmental Plan – Full



4.0 ENVIRONMENTAL POLICY AND PROCEDURES

The Chief Executive Officer of WDCW has produced an Environmental Policy, which meets the requirements of ISO 14001.

A copy of this policy is included in this file and should be displayed on the site Environmental Noticeboard. All members of staff employed on site should be made aware of the policy and their individual responsibilities.

The policy can be found on the Willmott Dixon Capital Works Intranet. The policy should also be made available to members of the public if requested.

Document Reference: FM-EM-03	Issue Number: 1	Effective Date: 01/10/2011
Uncontrolled copy if printed		Page 13 of 29

5.0 PROJECT ENVIRONMENTAL ASPECTS AND IMPACTS (FM-EM-23)

Within the Environmental Aspects and Impacts Assessment form (FM-EM-23) you need to identify the aspects of the operations and activities that have an impact upon the environment and their significance. The environmental aspects assessed include both the activities and operations over which we have direct control and also those supply chain impacts over which we can have a significant influence.

When all environmental aspects and their related impacts have been identified, their significances are summarised within the 'Risk Summary' sheet of FM-EM-23.

Those activities that remain to have a HIGH residual risk should be discussed further and appropriate management should be considered. This information should be communicated to the Pre Construction Project Manager and inserted into PC-FM-07 Project Risk Profile for further review.

Site specific actions (within FM-EM-23) should be completed and amended for any aspects that are rated as significant and detail any preventative and control measures needed.

This document should be regularly reviewed and updated.

INITIAL ENVIRONMENTAL RISK IDENTIFICATION



Project Name	Bicester Eco Town	Project Ref	SH11-010
Completed by	Kevin Lambert	Date	Aug 12

Project Summary
Construction of 393 no units + associated infrastructure and commercial buildings and school site.

Ground Conditions				
Land type	Greenfield	X	Brownfield	
Known contamination of ground	No	X	Yes	
Underlying ground/soil type	Clay with Chalk and Limestone Shale			

Site Location				
Within a Groundwater Protection Zone	No		Yes	X
Located near a watercourse	No		Yes	X
Located near residents or neighbours	No		Yes	X
Located near sensitive receptors <i>(i.e. nature reserves, SSSIs, SPAs, etc)</i>	No		Yes	X

Project Specifics								
Site location	Residential	X	Industrial		Rural	X	Other	
Planned works	Demolition		New Build	X	Fit Out		Refurb	
Working on a listed building or archaeology on site	No		X		Yes			
Removal of hazardous waste (i.e. asbestos)	No		X		Yes			
Re-use of materials and/or waste planned <i>(i.e. demolition or excavation material)</i>	No				Yes			X

Ecology				
Presence of protected species	No		Yes	X
Presence of invasive species	No	X	Yes	

Surveys (Carried out or required plus list key actions/recommendation identified in reports)
Ecology survey carried out along with Soil survey Site Waste Management Plan Construction Management Travel Plan Ecological Construction Method statement: These matters are referred to and addressed in the appropriate Plans and Method Statements

Contact your Environmental Manager if any sections have been marked 'Yes'

Any environmental risks identified must be transferred to the Project Risk Profile for this Project

6.0 ENVIRONMENTAL PERMITS

The project will require the following environmental permits/ licences/consents/ permissions for its operations: (delete/add where necessary)

Environmental Permit - for concrete / Stone crushing previously known as a Part B permit.

Water discharge consent – required to discharge to either groundwater or surface water i.e. discharging back to a borehole following abstraction, pumping dewatering water to a river/ stream. Requires an application to be made to the Environment Agency and the application process can take 4 months.

Section 61 consent – required when noisy works are likely to occur. Requires an application to be made to the local authority giving details of the methods to be used and anticipated noise levels. Can take a number of weeks to be granted.

Headwall agreements – Consent is required from the Environment Agency for headwalls to be altered or built. Consent may take a number of months and the Environment Agency should be consulted during the design of the Headwall.

Water Course Diversion – Consent is required from the Environmental Agency to divert a water course temporarily or permanently. Consent may take a number of months and the Environmental Agency should be consulted within the design of the works

Wildlife – There are numerous wildlife permits and will be determined by what wildlife is on the site e.g. badgers, bats etc. For further information please refer to the ecology report and consult with your environmental manager.

Project Environmental Plan – Full



7.0 eKPI's AND ENVIRONMENTAL OBJECTIVES AND TARGETS

7.1 eKPI's

The Operations Team are required to collect data on the Constructing Excellence Key Performance Indicators in line with WDCW's environmental objectives. The Operations Team must complete the Project eKPI Performance Log (FM-EM-04) on a monthly basis and forward to the LCO Environmental Manager by the 5th of each month.

7.2 ENVIRONMENTAL OBJECTIVES AND TARGETS

Any project specific environmental objectives identified during the pre construction stage must be recorded within section 2.0 of this Plan. Project specific objectives may reflect the particulars of a project. E.g. A project located in the centre of a residential area may set the objective of eliminating inconsiderate/ nuisance parking. The target may be to have no more than 1 parking related complaint every 6 months. In order to achieve this suitable parking facilities will be identified, communicated to the supply chain during procurement and reiterated in the site induction.

7.3 SUSTAINABILITY CRITERIA

Both during pre construction (Bid Manager) and construction (Building Manager) all projects must identify performance against WDCW's 10-Point Plan for a sustainable project on a monthly basis.

For each criterion, how it will be/ has been satisfied must be recorded using the table on the following page. The 10-Point Plan Satisfaction Criteria identify the compliance criteria for each of the ten points.

A copy of the table must be sent to the LCO Sustainability Manager each month.

Due to the targets changing annually, the project must achieve the targets for the year in which the project CIS will be issued for the main contract works.

Document Reference: FM-EM-03	Issue Number: 1	Effective Date: 01/10/2011
Uncontrolled copy if printed		Page 16 of 29

Project Environmental Plan – Full



(Project Name) 10-POINT PLAN CRITERIA	COST	PRELIM'S / CLIENT
Client Commitment		
BREEAM / Code for Sustainable Homes		
Sustainability Workshop		
EPC Rating		
Recycled Content by Value		
Waste Diverted from Landfill		
Sustainability health checks and POE		
WLC and LCA		
CCS score		
Community Engagement Plan		

Prepared by: Kevin Lambert
Title: Construction Manager

Last Reviewed:
Signature: *K A Lambert*

Checked by:
Title:

Signature:
Date:

Approved by:
Title: Sustainability Manager

Signature:
Date:


8.0 ENVIRONMENTAL AWARENESS AND TRAINING

Please specify if the project will require specific roles, training or toolbox talks.

Examples may include:

- Environmental Champion
- Biodiversity Champion
- Specific Wildlife toolbox talks (dependent on Ecology Survey)
- Invasive Species toolbox talks
- Site specific induction e.g. to cover community issues picked up during planning or maybe as a result of sensitive receptors nearby, such as a wildlife habitat
- Overall induction to put across how special this scheme is
- Energy and water use on site
- Options for travel to work - incentives for car sharing, cycling, public transport
- Reducing embodied CO2 through choice of materials
- Ensuring FSC certification and timber provenance
- Waste minimisation, waste recycling, opportunities and facilities for reuse
- Air tightness targets.

Please also specify any new sustainable materials/ systems you have investigated as part of this project that should be shared within the Pre Construction Department.

 <p>WILLMOTT DIXON HOUSING</p>	CONTRACT TITLE:	
	Bicester Eco Village,	
	METHOD STATEMENT No: Working around Water Courses 001	Rev :
PREPARED BY: Kevin Lambert		DATE: August 2012

1.0 Introduction

The purpose of this document is to identify and confirm the general methodology by which Willmott Dixon Homes Limited (Through their contractors) will carry out the work over and around the water courses on the development.

WDH recognise the importance of carrying out the work in a safe and controlled manner ensuring that strict supervision and control measures are maintained throughout the work. WDH will therefore provide the necessary project management and site supervision to ensure that the highest quality health and safety standards are implemented and maintained throughout the work. The nature of the work is such that certain specialist activities and operations will be carried out by WDH and their sub contractors. Sub contractors' detailed method statement(s) will be incorporated as required into this document

All WDH and subcontract personnel will be competent to carryout their designated tasks during the work. Before commencing work on site, all personnel will receive a site induction, which will include a briefing on all relevant health, safety and welfare matters

2.0 Scope of Works

The Scope of Work (SoW) covered by this document includes all safety, preparation, planning, task implementation, reporting and close-out to complete the works detailed in the Contract documents.

In general the SoW will involve civil construction works, design and build including associated M&E. When required, this may also include input to all stages of a project, from feasibility, through design and construction.

The range of activities that may be included within this general SoW include:

- Earth embankments for flood defence
- Concrete structures i.e. outfalls, abutments, hard flood banks, retaining walls.
- Revetment works – stone and natural products, channel excavation and geotextile solutions.
- Culverts and drainage
- Bridge construction.
- Minor building works such as telemetry kiosks and building maintenance works.
- Demolition
- Creating habitats for wildlife.
- Detailed design, bending schedules, drawings, etc., for civil works and building services.
- Design of temporary works.

The particular SoW for this development are:

Installation of 4no new bridges (2no Vehicular and 2no Pedestrian) associated diversion of watercourse to enable construction, together with protection to prevent scouring of the embankment and landscaping.

A number of trees will be removed to enable construction to take place.

Method Statement - Working around water Courses & Other Environmentally Sensitive Areas

Re-shaping of flood plain and embankments to suit

Landscaping to create additional habitats for wildlife

3.0 References

This document should be referenced with the following:

3.1 Contract Documents

The following Contract Documents applies to work being undertaken within this General Methodology:

Bicester Eco Development – Exemplar Environmental Statement

Bicester Eco Town – Sustainability Statement – Exemplar Site

Drawing Nos:

Site Clearance Sheet 1 of 4	7230	3
Site Clearance Sheet 2 of 4	7231	3
Site Clearance Sheet 3 of 4	7232	3
Site Clearance Sheet 4 of 4	7233	3
Existing Services Sheet 1 of 4	7234	3
Existing Services Sheet 2 of 4	7235	3
Existing Services Sheet 3 of 4	7236	3
Existing Services Sheet 4 of 4	7237	3
General Arrangement Sheet 1 of 4	7238	6
General Arrangement Sheet 2 of 4	7239	6
General Arrangement Sheet 3 of 4	7240	6
General Arrangement Sheet 4 of 4	7241	6
Access Long Sections Sheet 1 of 2	7243	3
Access Long Sections Sheet 2 of 2	7244	2
Cross Section Sheet 1 of 2	7245	5
Cross Section Sheet 2 of 2	7246	5
Surfacing and Kerbing Sheet 1 of 4	7247	3
Surfacing and Kerbing Sheet 2 of 4	7248	3
Surfacing and Kerbing Sheet 3 of 4	7249	3
Surfacing and Kerbing Sheet 4 of 4	7250	3
Foul and Surface Water Drainage Sheet 1 of 4	7253	5
Foul and Surface Water Drainage Sheet 2 of 4	7254	5
Foul and Surface Water Drainage Sheet 3 of 4	7255	7
Foul and Surface Water Drainage Sheet 4 of 4	7256	5
Proposed Services Sheet 1 of 4	7257	3
Proposed Services Sheet 2 of 4	7258	3
Proposed Services Sheet 3 of 4	7259	3
Proposed Services Sheet 4 of 4	7260	3
Typical Drainage Details	7265	1
Road Layout Details Sheet 1 of 4	7267	1
Road Layout Details Sheet 2 of 4	7268	1
Road Layout Details Sheet 3 of 4	7269	1
Road Layout Details Sheet 4 of 4	7270	1
Construction Details Sheet 1 of 2	7271	2
Construction Details Sheet 2 of 2	7272	1

Method Statement - Working around water Courses & Other Environmentally Sensitive Areas

Road Markings and Signs Sheet 1 of 4	7273	4
Road Markings and Signs Sheet 2 of 4	7274	4
Road Markings and Signs Sheet 3 of 4	7275	4
Road Markings and Signs Sheet 4 of 4	7276	4
S38 Suds Type Details Sheet 1 of 2	7277	3
S38 Suds Type Details Sheet 2 of 2	7278	2
Exemplar Site (S38) CS and GL construction details	7279	1
Community streets construction details sheet 2	7280	1
Water Course Crossing 1 General Arrangement	7290	1
Water Course Crossing 2 General Arrangement	7292	1
Proposed Earthworks Strategy Sheet 1 of 2	7315	3
Proposed Earthworks Strategy Sheet 2 of 2	7316	3
Foul and Surface Water Drainage Sheet 1 of 6	7320	1
Foul and Surface Water Drainage Sheet 2 of 6	7321	1
Foul and Surface Water Drainage Sheet 3 of 6	7322	1
Foul and Surface Water Drainage Sheet 4 of 6	7323	2
Foul and Surface Water Drainage Sheet 5 of 6	7324	2
Foul and Surface Water Drainage Sheet 6 of 6	7325	2
Plot Levels Sheet 1 of 2	SK7026A	1
Plot Levels Sheet 2 of 2	SK7026B	1
Foundation Options	SK7027	1
Construction Finishes Sheet 1 of 2	SK7028A	1
Construction Finishes Sheet 2 of 2	SK7028B	1
Typical Drainage Details	SK7029	1
Depth To Rock Level	SK7031	1
Drainage Sheet 1 of 2	SK7033A	1
Drainage Sheet 2 of 2	SK7033B	1
Average Plot Levels	SK7038	2
Typical Gabion Wall Layout Plan	SK7040B	1
Storm Water Storage Phasing	SK7043	2
Offsite Rising Main General Arrangement	SK7055	1
Foul Drainage Option 1 Longitudinal Sections	SK7056	1
Foul Drainage Option 2 Pump Over Northern Bridge Longitudinal Sections	SK7057	1
Pumping Station General Arrangement	SK7058	-
Hyder Street Lighting Cabling Routes Sheet 1 of 4	SK7061	-
Hyder Street Lighting Cabling Routes Sheet 2 of 4	SK7062	-
Hyder Street Lighting Cabling Routes Sheet 3 of 4	SK7063	-
Hyder Street Lighting Cabling Routes Sheet 4 of 4	SK7064	-
Street Hierarchy & General Arrangement Sheet 1 of 2	7154	3
Street Hierarchy & General Arrangement Sheet 2 of 2	7155	3
Junction Details	7156	3
Off Site High Way Improvements	7157	2
Access Long Sections	7158	3
Access Cross Sections	7159	3
Proposed Development Surface Water Drainage Layout Sheet 1 of 2	7160	3
Proposed Development Surface Water Drainage Layout Sheet 2 of 2	7161	3
Typical Drainage Details	7163	3
Planning Application Boundary	7165	3
Existing Topography Sheet 1 of 2	7166A	2
Existing Topography Sheet 2 of 2	7166B	2
Proposed Site Levels - School Area	7170	3
Water Course Crossing 2 Typical Street Lighting Details	7171	1
Hedge Translocation Sitting Out Information	7280	1
Community Street Layout Sheet 1 of 2	7280	2

Method Statement - Working around water Courses & Other Environmentally Sensitive Areas

Community Street Layout Sheet 2 of 2	7281	2
Proposed and Existing Contours Sheet 1 of 2	7308	2
Proposed and Existing Contours Sheet 2 of 2	7309	2
Public Realm Design and Legibility Strategy - Bus Routes and Stops		1
Public Realm Design and Legibility Strategy - Boundary Treatments		1
Public Realm Design and Legibility Strategy - Signage		1
Hardscape - Recycled Glass Aggregate Paving		1
Sketch - Boundary Tree Pits		5.4.12
Materials Palette Tracker - Materials		30.4.2
Materials Palette Tracker - Furniture		30.4.2
Email from Addagrip		1
Email from Hyder Cresswell, re bird, bat and invertebrate boxes (28 06 12)		1
Hyder Highway Details & Specifications	7512	-
Primary Road Design Principles - minimum dimensions	701-001	1
Vial Energi DH Layout	P-139-C-01	D
Siemens Toucan Crossing Layout - A4095	854085479_a	A
Siemens Toucan Crossing Layout - B3100	854085479_b	B
Siemens Toucan Technical Proposals	854085479	A
Energy Centre Steel Frame Arrangement		-
Energy Centre Steel Estimate		-
Landscape Masterplan	8001	4
Biodiversity Net Gain	8002	4
Planning Scheme Sheet 1 of 3	8003	4
Planning Scheme Sheet 2 of 3	8004	4
Planning Scheme Sheet 3 of 3	8005	4
Lighting Strategy	8006	3
Green Infrastructure Typology	8045	2
Primary Road Design Principles - minimum dimensions	701-001	1
Community Streets 1&5	701-202	2
Community Streets 2&4	701-203	1
Community Streets 3	701-204	1
Play Provision Strategy		06-11
River Corridor NEAP	8010	3
Bure Bridge and River Corridor Section (View North from NEAP)	8011	3
Bure Bridge and River Corridor Section (View North from NEAP) Sections Wider Span	8011	3
Sustainable Drainage System : Detail and Precedent Images	8024	2
Streetscape Proposals Exemplar Sections	8026	2
Streetscape Proposals South Boulevard	8028	2
Streetscape Proposals East of Energy Centre	8029	2
River Corridor Proposals	8043	3

3.3 Project Quality Plan

In accordance with the WDH Operating Procedures a WDH Project Quality Plan will be operated on this project.

3.4 WDH Health & Safety Policy

WDH Health and Safety Policy.

This document is included within the WDH Project Quality Plan. Also it has been issued to every Company Employee. Copies are made available to all subcontractors and copies will be available on site.

4.0 Health & Safety / Environmental

4.1 Supervision and management of the Works.

We will be appointing an experienced and competent team to undertake this project. We have built up a team of experienced and competent staff and management who are well versed in the standards,, requirements, expectations and policies of the Environment Agency.

This project will be overseen by our Construction Manager, Mr Kevin Lambert who will report to our Project Director – Mr Bob Reeves.

Kevin Lambert will be appointed to administer these works. He has previous experience on environmentally sensitive schemes at Romsey, Hampshire, Warwick, Warwickshire and Anchor Quay, Lincoln, Lincolnshire

A dedicated, experienced Engineer TBA will also be appointed.

This work will be administered from our office based on site.

4.2 General

WDH takes health, safety and the environment extremely seriously, recognising that it is the primary responsibility of the Company to maintain the health and well being of its employees, subcontractors and others who may be affected by its operations, as well as protecting the environment from undue damage or degradation.

All Company employees receive a Company Induction on joining, which encompasses the requirements of the Health and Safety at Work etc Act 1974 and other relevant legislation.

All personnel employed on this project will hold CSCS or equivalent qualification cards before being permitted to work on site.

All personnel (employees, subcontractors and visitors) will undergo a site induction prior to accessing the works.

All operatives engaged on these works will have already received or will receive 'Working Near Water' and Manual Handling' Training at the commencement of this project.

WDH has determined the minimum level of safety equipment and PPE required for these types of works. This ensures that the operatives have the necessary equipment, tools, first aid provisions and other facilities on site at all times to meet the operational requirements of their tasks.

The Company H&S Department will be carrying out regular site inspections and monitoring of the workforce and their works to ensure compliance with current legislation, the WDH Health and Safety Policy, Operating Procedures, Health & Safety Plan and Quality Plan. They will also offer advice and best practice suggestions as well as carrying out specific training.

Copies of HASLE Notices received from the EA, together with other relevant industry Safety Alerts will be circulated to Site Supervisors and Team Leaders.

4.3 Lifting Operations

There are a number of lifts required for this contract. The majority of these will be repetitive routine lifts. The main items to be lifted include:

- Reinforcement
- Pipes

Method Statement - Working around water Courses & Other Environmentally Sensitive Areas

- Other Plant and equipment

Generally we will be using tracked excavators for lifting operations. The excavator operators will all be trained in lifting operations and the appropriate chains, slings and lifting devices will be on site, together with valid calibration and test certificates.

A Mechanical Lifting Assessment will be undertaken and the lift plans produced accordingly. Use will be made of the Sub contractors Method statement and risk assessments to ensure compliance on all lifts

There will be some minor manual lifting operations. The weight of these items will be maintained below 20kg wherever possible. A Manual Handling Risk Assessments will be undertaken for non-routine lifts. All the operatives engaged on this project will be given or will have successfully completed a Manual Handling training course.

4.4 COSHH

The WDH COSHH Assessments are to be included in the Health & Safety Plan. These cover the normal substances that will be used on this project, i.e. Petrol and Diesel. Oil, Hydraulic Fluid.

Substances, such as herbicides, will be subject to site specific COSHH Assessments

4.5 First Aid

There will be a qualified First Aider on site at all times.

A First Aid Kit will be provided in the welfare facilities on site at all times.

The site will also be provided with Emergency Plans detailing who to contact in an emergency. This plan will detail the emergency access points together with the route to the nearest A&E Hospital.

4.6 Fire

A Fire Risk Assessment and Plan will be undertaken for the site. This will include the site accommodation, storage and compound areas as well as the work area.

The Fire Plan will highlight any particular fire risks, identify the trained Fire Marshall, detail the position and type of fire extinguishers, and contain any emergency evacuation procedures as well as detailing the position of the Assembly Point.

4.7 Accident / Incident Reporting including RIDDOR

All reporting of accidents and incidents will be in accordance with WDH Company procedures. A copy of the Incident Reporting Procedure will be available in on site.

All Accidents and Incidents, including Near Miss Events are to be reported immediately to the WDH Site Supervisor, who will report these to the EA Project Manager..

Where appropriate, the H&S Department will carry out an investigation into the incident and produce a written report which will identify the causes of the incident (immediate, base and root), make recommendations or implement revisions to practices and procedures to prevent re-occurrence. The H&S Department will also communicate the facts and recommendations throughout WDH and provide information to the EA for use in their HASLE Notices,

4.8 Welfare

Welfare facilities will be provided in the designated compound area. This will be in the form of steel security cabins consisting of an office, canteen, toilet and drying units. There will be a supply of both drinking and washing water, a means for heating food and water and washing and drying facilities.



4.9 Training

All personnel employed on this project will hold CSCS or equivalent qualification cards. A Training Register is maintained and each operative will be referenced against this Register to ascertain that the correct and appropriate qualifications have been achieved for the tasks to be assigned

All plant operators working on site will be required to hold valid industry standard training certificates for the plant and equipment they are required to operate on site. WDH will inspect all operators' original training certificates prior to operators commencing work on site. Copies of operators certificates will be held in a site register for independent inspection

4.10 PPE

All personnel (employees, subcontractors and visitors) will be required to wear eye protection, steel toe and mid-sole cap safety boots, high visibility jacket or high visibility vest. The wearing of protective headwear will be mandatory. Gloves will be required for certain operations and ear protection will be required when the piling operation is on-going.

Self inflating life jackets will be available for working near or over water if required, however in normal conditions it has been risk assessed that this will not be required

Specific PPE requirements will also apply for certain tasks – e.g. use of chainsaw, herbicide spraying, etc. Specific Risk Assessments and Method Statements will detail the specific PPE that must be worn when carrying out these tasks.

4.11 Access

Access to the works will be via the designated access, then onto designated haul routes across the site.

Trackway may be laid along the access route to distribute the load and to minimise damage to the existing surface.

Segregation of pedestrians from plant and machinery will be in place on haul routes and within the

Method Statement - Working around water Courses & Other Environmentally Sensitive Areas compound. All visitors, workforce and delivery drivers will report to the site office upon arrival.

4.12 General Public and other site users

The works entail minimal interface with the general public, however all operatives are instructed at induction to ensure if there is any interface then they are to behave in a polite and courteous manner at all times. They are not allowed to swear, whistle or make antagonising comments to any member of the public.

Access arrangements will be agreed with EA so that they can access and attend to their assets and facilities.

Any hostile comments or actions from a member of the public must be immediately reported to the WDH Site Supervisor.

4.13 Hazards & Risk Assessments

Various hazards have been identified as associated with the works and risk assessments have been carried out to determine the control measures required reduce the risk to an acceptable level.

A Risk Register (WDH002) has been prepared for this project. The principal risks identified for this project include:

- Working near water
- Slips, trips and falls,
- Lifting operations
- Failure of the reservoir embankment or adjacent structures
- Cuts, scratches, bites, stings, etc from insects and plants
- Working with plant and equipment, especially piling and cutting equipment
- Leptosprosis –(Weils Disease), Lyme's Disease and other infections
- Working with the general public
- Manual Handling
- Existing overhead and underground services, including land drains, electricity and gas services
- Lone working
- Effects of weather (sun, wind and temperature)

Detailed Risk Assessments are produced by the sub contractor for the specific works they are to undertake

4.14 Environmental Issues

A number of Environmental risks have been identified for this project and these are included in the Risk Register (WDH 002) The principal risks identified for this project include:

- Contamination of land or watercourse by oils or hydraulic fluids
- Disturbance to wildlife
- Damage to flora and fauna, including nesting birds and water voles
- Noise
- Spread of invasive species / cross contamination
- Vandalism, resulting in fire, contamination or damage

Detailed Environmental Risk Assessments are produced for specific tasks and are an integral part of each Method Statement.

5.0 Resources

5.1 People

Willmott Dixon Homes Limited employs a large directly employed labour force which is supplemented by local or specialist subcontractors.

The operatives proposed for these works are all long term employees and subcontractors to WDH. They have been employed on previous contracts for the EA, so they are experienced and competent.

Operatives will be trained and qualified for specific tasks.

General training will be given for:

- Working near Water
- Manual Handling.
- Environmental Awareness

Specific task trained operatives will be deployed for:

- Banking and slinging, crane supervision and preparation of Lift Plans
- Excavations
- Temporary works
- Tree works – surgery and felling

5.2 Plant

- 360 tracked excavator
- 360 tracked excavator complete with piling attachment
- Tracked dumpers
- Track way

5.3 Materials

- Concrete Pre cast and Ready mix
- Steel Re bar
- Natural / Re constituted stone
- Tarmac

6.0 Methodology

6.1 Programme Narrative

The programmed start date has been initially set for commencement mid January 21013

Upon Contract Award we will develop the Construction Phase Health & Safety Plan and submit this to the CDM Co-ordinator for recommendation of approval by the Client, as required by the CDM 2007 Regulations.

Prior to commencement of works full MS and RA will be submitted to the EA for approval prior to commencement of works on site

The initial period programmed for the works relating to the infrastructure and associated landscaping works is 52 weeks. An overall programme for infrastructure and phases 1 – 4 inclusive is envisaged to be 200 weeks

6.2 Pre- Contract

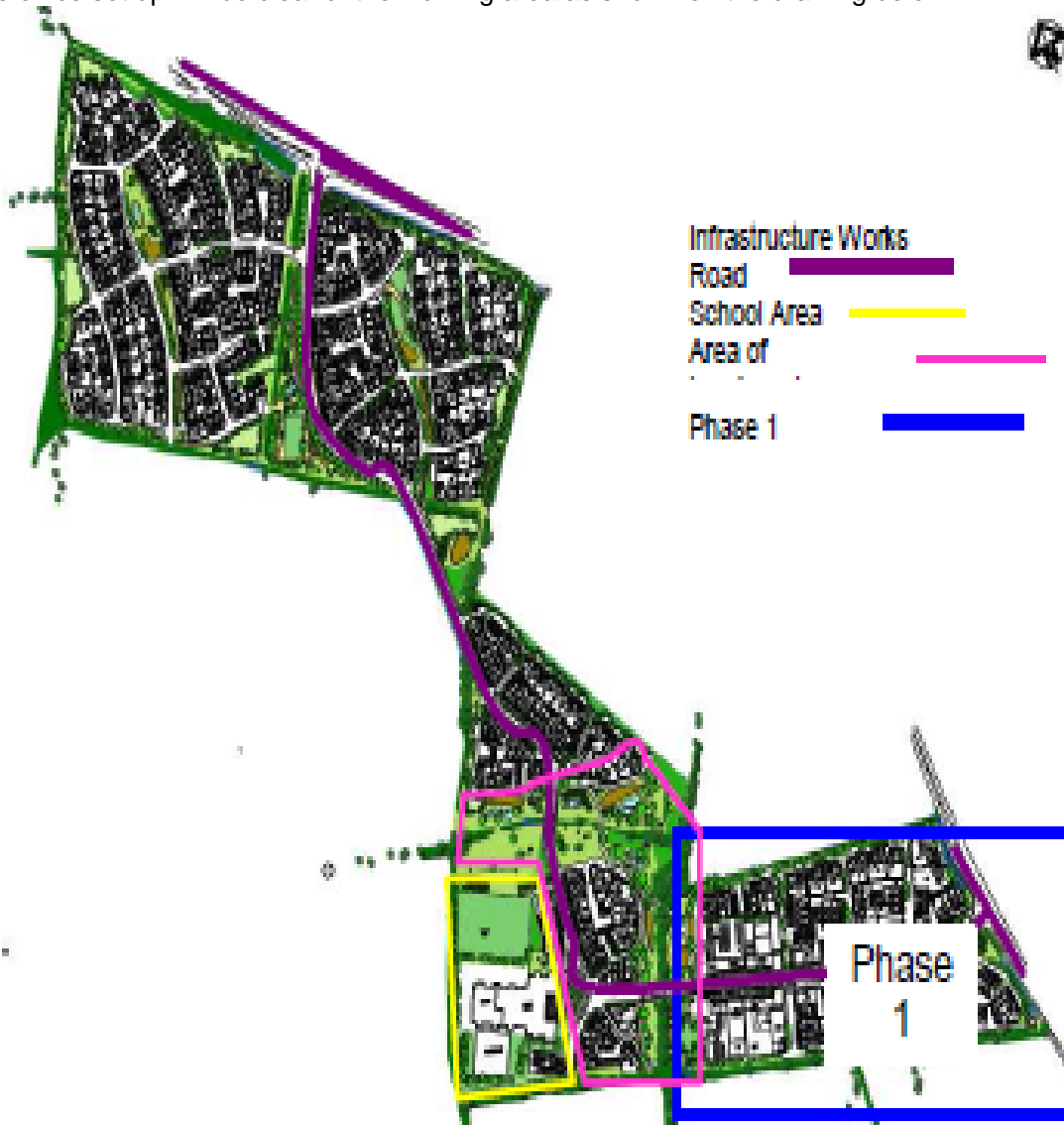
A meeting is to be held on site with the EA and all parties associated with carrying out the works to introduce all parties and fully ensure that all parties are clear on the requirements within the works

Following this meeting, a period of mobilisation will then commence, during which time the necessary contract documentation, health, safety, environmental and quality information will be produced and submitted to the Project Manager for acceptance. Once this information is accepted works on site will commence.

Prior to undertaking any task on site, a joint condition survey will be undertaken between the EA Project Manager and Kevin Lambert of the site, the access thereto and any areas that may be used or affected by the works. This survey is to provide a permanent record of the condition of the site and surrounding area before works commenced and will be in the form of a photographic survey.

6.3 Site Set up

The site office set up will be clear of the working area as shown on the drawing below





Local residents will be issued with a contact name and number with whom they can discuss any issues/concerns with site vehicles and deliveries or make specific agreements and this will also be displayed at all site entrance points

After establishment of the compound area, the office/welfare units will then be delivered to site on lorries fitted with hiab-cranes for unloading. Following a site dynamic risk assessment, the units will be lifted into place and positioned by an experienced lorry driver/crane operator and trained banksman.

A protective oil absorbent boom will be placed across the stream to contain any spill of fuel or hydraulic oil.

6.4 Pre-commencement

Any access points onto and into the site or parts thereof that may be accessed by the general public will be securely fenced off using 2m high Herras type fence. The fence panels will be clipped together with locking clips, preventing unauthorised removal. The fence will sit on the proprietary bases and will be braced with raking supports every third panel on long runs, to prevent the fence being blown or pushed over. At certain points within the fence line, designated access points will be created, by the insertion of a fully lockable gate.

Once the fence is in place, signs warning of the site dangers will be erected and will be kept clean throughout the duration of the contract.

The locations of all services within the site confines will then be sought. In the first instance, the existing utility drawings obtained from the relevant utility company will be obtained and checked. This information

Method Statement - Working around water Courses & Other Environmentally Sensitive Areas will then be transferred onto the ground, by spraying the indicated position using a line marking paint. Where possible, contact will be made with the utility company and their representative will be requested to attend site to confirm the positions shown on their drawing.

Once these the known services are marked, a full scan with a cable detecting device (CAT and Genny) will be undertaken by a trained operative to prove the positions already known and locate any uncharted devices. Finally, trial holes will then be dug by hand on the known services to verify the depth, position and condition of the service.

Once the service is located or its location verified, it will be recorded on a drawing before the trial hole is backfilled and marked with an identifying peg. The results of this process will also confirm whether the installation of the temporary or permanent works will interfere with the service

The WDH permit system will be employed at times when working in sensitive areas as a permit to work system in order that tight controls are maintained when works are to be carried out where there is a risk associated environmentally.

In respect to overhead services, the utility company will be contacted and the safe lateral and vertical clearances sought. With these known, fencing to prevent access by plant and machinery to the specific distance will be erected or where passage underneath the service is required, designated crossing points with full goal posts and warning signs will be erected.

The site will be inspected for signs of wild-life. In particular we will be looking for nesting birds or water vole activity. If nests or voles are observed, we will discuss this with the EA Project Manager and either suspend operations until the young have fledged or agree other courses of action.

All operatives, whether directly employed WDH or subcontractors' personnel will be suitable trained and experienced. PPE, will be worn at all times and anyone not complying with the requirements will be removed from site.

The haul roads around the site will need to be upgraded to cater for vehicle movements. Either temporary trackway will be laid, or where this is inappropriate due to the angle of slopes, etc a temporary surface will be created by stripping the topsoil and stock-piling for reinstatement on completion of the works. Geotextile will be laid on the excavated surface before a layer of recycled crushed type 1 material is laid down.

In areas where there are trees that need protecting and there is evidence of plant/tree roots that may be damaged, these will be protected in accordance with the Hyder Arboricultural Method statement (Ref 0516-UA001881-UE21R-05-ArbMS).

Trees identified to be removed on Hyder Drawing No. TPP1-UA001881-2 will be felled in accordance with Hyder Arboricultural method statement 0516-UA001881-UE21R-05-ArbMS. The roots will then be ground out using a root grinder and the root voids carefully and thoroughly filled with suitable fill material so as not to weaken the embankment structure. Trees that are to remain, but will be within the works, will be trimmed where necessary and protected with tree protection fences in accordance with Hyder Arboricultural method statement.

A Site Hazard Board will be displayed outside the site office which will state the main health and safety risks present on site for each day. This will be reinforced at the Daily Briefings and Task Instructions. All visitors must report to site and be escorted at all times.

6.8 Completion.

Upon completion but before demobilisation of the site, a joint final inspection of the works will be undertaken with the EA Project Manager to ensure that all works are complete, any defects have been rectified and that the works comply with all requirements set out initially. Any additional works or defects will be addressed immediately or at an agreed time.

9.0 ENVIRONMENTAL GUIDANCE AND SITE PROCEDURES

Please be aware that there are a number of guidance notes and site procedures that must be considered and implemented during the planning of the project. In addition to the Willmott Dixon Guidance, the Environment Agency has also produced a number of Pollution Prevention Guidelines (PPG's) that can be found at:

In addition to the willmott Dixon guidance ,the Enviroment Agency has produced a number of Pollution Prevention guide lines (PPG's),including PPG 5,PPG 6,and PPG 21 ,that can be found at the following address.

<http://www.environment-agency.gov.uk/business/topics/pollution/39083.aspx>

11.0 ENVIRONMENTAL EMERGENCY PLANNING

Pollution prevention planning is the key to avoiding environmental incidents on site and the following actions should be taken to ensure risks are minimised:

- Prepare a good site layout plan
- Identify all drains and watercourses
- Ensure best practice in storage of diesel, oils, chemicals and cement based materials
- Locate polluting materials and skips AWAY from receptors
- Plan for control of concrete wash out water
- Plan to prevent silt run off
- Obtain appropriate spill kits for the site
- Maintain site security

Regular training will also increase awareness and encourage best practice in every day environmental management on site.

All sites are required to complete Environmental Emergency Plans using FM-EM-05.

PRE CONSTRUCTION - To assist the site teams in completing the emergency plans the pre construction team are required to provide the following:

Site Layout plan including the following:

- Site drainage arrangements, including surface water drains, foul sewers, soakaways and oil interceptors if present
- The location and contents of any storage tanks, including underground tanks
- The location of any adjacent watercourses or ditches

Name and Contact numbers for:

- Local Authority – including out of hours
- Gas provider
- Water provider
- Sewage provider
- Electric provider

CONSTRUCTION – The site team must ensure that the plan FM-EM-05 is completed and stored within a separate section at the back of the red H&S emergency procedures folder.

The list of emergency contact telephone numbers should be displayed on the environmental noticeboard in the site offices along with a site plan showing:

- Site drainage arrangements, including surface drains, foul sewers, oil interceptors and soakaways, if present
- Any fire hydrants present on site
- The location and contents of any storage tanks
- The location of any designated drum storage areas
- The locations of any adjacent watercourses or ditches
- The location of spill kits

The Environmental Emergency Planning Arrangements are to be tested annually on each site. The test may take the form of a desktop exercise or a mock spillage and the format should be agreed with your Environmental Manager. A record of the test should be kept at the back of the Environmental Emergency Planning Arrangements file.

Project Environmental Plan – Full



Whilst the provision of environmental control procedures is expected to avoid environmental emergency incidents arising, the following precautions should be taken to minimise the impacts of any environmental emergency situations that do occur:

- As part of their initial site induction, all staff will be briefed on actions to be taken in the event of an environmental emergency.
- Spill kits will be provided adjacent to any oil or diesel storage tank or any drum storage areas where a significant spill risk exists. The spill kit materials provided will be of an appropriate amount, bearing in mind the potential quantity of the stored material that might be spilled, and of a suitable nature for the type of oil or chemical to be contained.
- Spill kits will be removed from site by a registered licenced waste contractor.
- Where environmental emergencies occur with the potential for pollution to escape from site, the Environmental Manager will be informed immediately to allow them to notify the appropriate regulatory body so that additional preventive action can be taken if possible.
- Any environmental incidents of a serious nature will be reported to the Environmental Manager and Group Safety Inspectors by the quickest possible means, following the procedure documented in **Section 3.01** of the **H&S Policy**. Appendix 15.3

- **THE ENVIROMENT AGENCY HOTINE TELEPHONE NUMBER IS**

0800 807060

Further guidance on emergency planning can be found in the Environment Agency Pollution Prevention Guidance Note PPG 21.

Document Reference: FM-EM-03	Issue Number: 1	Effective Date: 01/10/2011
Uncontrolled copy if printed		Page 22 of 29

12.0 SITE WASTE MANAGEMENT PLANNING

PRE CONSTRUCTION

A Site Waste Management Plan (SWMP) Wrap SWMP template and SWMP Data Collection (FM-EM-09) must be produced for the project during the pre construction stages. The SWMP must predict the potential waste from the project, consider the options for reducing this waste (especially through design), and determine the best waste management options in accordance with the waste hierarchy (eliminate, reduce, reuse, recycle, recover energy, landfill responsibly). The SWMP must also include a Site Plan, and the Policy, Design Stage and Planning Stage of the SWMP Checklist is to be completed.

A record of design decisions made (from the point of project inception) which will influence the potential waste created on site is to be maintained. This record includes any such decisions made before WDCW became involved in the project.

The SWMP is a legal requirement. It must be signed up to by the client and Willmott Dixon.

CONSTRUCTION

Prior to starting on site the Operations Team must:

- Review the SWMP and SWMP Data Sheet to ensure they are appropriate for the works. This will include completing the Procurement section of the SWMP Checklist in the SWMP
- Obtain approval sign-off of the SWMP and SWMP Data Sheet by the LCO Environmental Manager
- As the project progress the Operations Team must:
- Complete the Construction section of the SWMP Checklist in the SWMP
- Obtain and validate licenses for all waste carriers and management centres being used by WDCW or our sub-contractors, and maintain the 'Duty of Care' section of the SWMP Data Sheet
- Maintain records of materials reused/ recycled on and off site in the 'Re-Used Materials' section of the SWMP Data Sheet
- Obtain details of waste diverted from landfill from the waste management centres being used and maintain the 'Waste Contractor Details' section of the SWMP Data Sheet
- Check all Waste Transfer Notes and Consignment Notes and enter the details onto the 'Waste Data Sheet' section of the SWMP Data Sheet
- 'Refresh' the data on the 'Output' section of the SWMP Data Sheet and transfer the 'Waste eKPI Data' to the Project eKPI Performance Log (FM-EM-04) on a monthly basis
- At the end of the project the Building Manager must complete the final 'Report & Review' of the SWMP.

•

Document Reference: FM-EM-03	Issue Number: 1	Effective Date: 01/10/2011
Uncontrolled copy if printed		Page 23 of 29

Project Environmental Plan – Full



13.0 WEEKLY SITE INSPECTIONS (FM-EM-13)

Day to day compliance with environmental legislation and best practice on site should be maintained at all times and will be audited by the Environmental Manager, or trained auditors, at regular intervals.

Weekly checks should also be carried out by WDCW site staff using the Site Inspection Checklist (FM-EM-13) included in this section. This should be completed and retained in the file or on the Environmental Noticeboard.

If applicable:

Due to the proximity of the site to residential/ sensitive properties and the potential for dusty conditions to arise on site, the Daily Diary sheet (FM-OP-09) should also be completed to demonstrate that dust levels on site are being checked and actions taken to reduce levels when necessary.

Document Reference: FM-EM-03	Issue Number: 1	Effective Date: 01/10/2011
Uncontrolled copy if printed		Page 24 of 29

14.0 ENVIRONMENTAL INCIDENTS AND COMPLAINTS (FM-EM-15)

Any environmental incidents occurring on site such as spillages, adverse effects on wildlife or significant dust emissions should be recorded on the Environmental Incident Report form (FM-EM-15) in this section. Actions taken to prevent a reoccurrence should also be completed. A copy of the form should be forwarded to the Environmental Manager and the Operations Manager.

The Environmental Emergency Planning Arrangements (FM-EM-05) should be followed when serious incidents occur.

Where complaints are received regarding statutory nuisances such as noise and dust or possible pollution incidents, the Environment Manager must be informed as these could result in enforcement action being taken against the company. All other complaints from external parties about the site should be addressed through the Considerate Constructors Scheme and recorded on a log sheet displayed in the site offices.

Any communications from regulatory bodies regarding complaints about the site or possible enforcement action should be copied to the Business Unit Environment Manager. The Environmental Manager should immediately convey the details of the incident to the Divisional Systems Manager who will maintain the central Environmental Incident Log (FM-EM-22) on behalf of the whole company. The log is published on the Willmott Dixon Intranet.

Project Environmental Plan – Full



15.0 ENVIRONMENTAL SITE VISITS AND AUDITS (FM-EM-17)

Site Visits and Audits of the environmental management system, including annual environmental legal compliance audits, are carried out by the Environmental Manager, or trained auditors, at each site.

Environmental Site Audit Reports (FM-EM-17) are issued to the site with details of any corrective actions, which need to be carried out and any observations noted. Unless otherwise specified, actions should be completed before the next visit (usually one month) and each action signed off and dated when complete.

Copies of completed audit forms should be kept in this section. A blank form is included for information on what will be checked during an audit.

Document Reference: FM-EM-03	Issue Number: 1	Effective Date: 01/10/2011
Uncontrolled copy if printed		Page 26 of 29

16.0 SPECIFIC PRECAUTIONS AND MEASURES REQUIRED WHEN WORKING NEAR OR ON THE WATER COURSES.

The prevention of any pollution to the naturally occurring water courses on this scheme is recognised as a significant risk. We plan to build on the measures outlined below. The detail of specific measures including equipment and proprietary installations to be implemented will be addressed in method statements from our specialist subcontractors.

Outline Method Statement

A high visibility temporary protective fence (at least 1.25m in height) will be installed on the construction side of the River Bure and tributary, around retained habitats, prior to any site clearance activities in accordance with the requirements of Planning Condition number 73 of the Decision Notice.

This fence will protect the circa 60m-wide corridors of semi-natural vegetation associated with the River Bure and tributary, and include the 50m buffer around the badger sett adjacent to the tributary. A gap beneath the fencing will ensure that the habitats are protected from machinery and personnel but allow badgers to move freely across the site.

During the Infrastructure Phase, a road will be constructed over both the River Bure and its tributary. Sustainable Drainage Systems (SuDS) features will also be installed at this early stage. To prevent sediment and pollution run-off to the watercourses, construction site drainage will be carefully designed and controlled, with silt traps established at the outset of the works.

All works will incorporate relevant legislation for the protection of surface and groundwater and implement codes of good practice, and best practice guidelines for works within or near water. Relevant guidance including Pollution Prevention Guidelines (PPGs) prepared by the Environment Agency and literature produced by CIRIA would form the basis for pollution control measures.

Once the remodelling earthworks have been completed, no excavations or site works shall take place, and no soil, waste, materials or equipment shall be located within the buffer zone throughout construction (other than continued landscaping works to the river corridor as part of the habitat and landscape plans).

All temporary protective fencing will be removed following completion of the construction Phases 1 and 2, since neither Phase 3 nor 4 will directly affect the river corridors.

To prevent pollution during construction, specific risk and method statements will be provided by the specialist subcontractors involved. As an outline guide the measures below are likely to be applied:

- Drainage water from the site will not be allowed to discharge into the River Bure and tributary before appropriate treatment
- Settlement control systems will be used to remove sediment from drainage water before any discharge into the watercourses
- Any fuel tanks will be kept in a bunded area with a storage capacity of 110% and away from waterbodies
- Refuelling will take place in designated areas away from the newly created waterbodies and retained and newly created watercourses
- Suitable spill kits will be available on site and all staff will be trained in their use
- Any pumping of water will be stopped as soon as there is a pollution spill that could affect the quality of discharge
- All oil spills will be cleared up immediately and the Environment Agency informed
- Emergency procedures will be put in place to deal with pollution incidents. In the event of spillage, works will be ceased immediately, containment measures implemented and the appropriate services notified. A list of contact names and numbers of services will be prepared before works commence
- Reminder posters will be used on site to identify the key essential elements of the spill response procedure and spill kits will be kept where spills may occur
- Toolbox talks will be provided to contractors and sub-contractors to raise the awareness of the ecological receptors on site.

Document Reference: FM-EM-03	Issue Number: 1	Effective Date: 01/10/2011
Uncontrolled copy if printed		Page 27 of 29

17.0 PROTECTION OF THE BANKS OF WATER COURSES

Protection of the Water course banks is specified in the attached report
"Ecological Construction Method Statement " Dated 17/12/12.
ref -0516-UA001881/UE21/UE21/R04EcoMS produced by Hyder Consulting Ltd.
The strategy briefing is one of intail fence protection and then the early planting
of soft landscaping to form a natural buffer or break from the development.

Copy is attached in appendix 18.12

Project Environmental Plan – Full



Appendices Section 18 .

Document Reference: FM-EM-03	Issue Number: 1	Effective Date: 01/10/2011
Uncontrolled copy if printed		Page 29 of 29

Appendices

- 18.1 Hyder Supplementary Combined Ground Investigation Factual & Interpretative Report Bridges & Pumping station
- 18.2 Environmental Policy
- 18.3 FM-EM-04 Project eKPI Performance Log
- 18.4 FM-EM-05 Environmental Emergency Planning Arrangements
- 18.5 FM-EM-10 Site Waste Data Record
- 18.6 FM-EM-13 Weekly Site Inspection Checklist
- 18.7 FM-EM-15 Environmental Incident and Complaint Report
- 18.8 FM-EM-17 Environmental Site Visit Report
- 18.9 FM-EM-22 CIS Approval environmental Documentation
- 18.10 FM-EM-23 Environmental Aspects & Impacts Assessment
- 18.11 Environment Agency Hot List No **0800 807060**
- 18.12 "Ecological Construction Method Statement 17/12/12"
- 18.13 Arboricultural Protection Requirement
 - Drawings Numbers TPP1-UA001881-3 (Sheet 1 of 2)
 - TPP1-UA001881-3 (Sheet 2 of 2)

NW Bicester Eco-Town - Exemplar Site

Supplementary Combined Ground Investigation
Factual & Interpretative Report Bridges & Pumping
Station



Hyder Consulting (UK) Limited

2212959

HCL House
Fortran Road
St Mellons Business Park
St Mellons
Cardiff CF3 0EY
United Kingdom

Tel: +44 (0)29 2092 6700

Fax: +44 (0)29 20

www.hyderconsulting.com



A2Dominion Housing Group Ltd & P3 Eco Ltd

NW Bicester Eco-Town - Exemplar Site

Supplementary Combined Ground Investigation Factual & Interpretative Report Bridges & Pumping Station

Author R.Scammell

A handwritten signature in black ink, appearing to read "R. Scammell", positioned above a horizontal line.

Checker M. Lundie

A handwritten signature in black ink, appearing to read "M. Lundie", positioned above a horizontal line.

Approver C. Plumb

A handwritten signature in black ink, appearing to read "C. Plumb", positioned above a horizontal line.

Report No 5005-UA003072-UP33R-01

Date October 2011

This report has been prepared for A2Dominion Housing Group Ltd & P3 Eco Ltd in accordance with the terms and conditions of appointment for the Supplementary Combined Ground Investigation Factual & Interpretative Report Bridges & Pumping Station dated July 2011. Hyder Consulting (UK) Limited (2212959) cannot accept any responsibility for any use of or reliance on the contents of this report by any third party.



CONTENTS

1	INTRODUCTION.....	1
1.1	Previously Available Information.....	1
1.2	Proposed Development.....	1
1.3	Consultants and Sub-Contractors.....	1
1.4	Site Location and Description.....	2
1.5	Geology.....	2
2	FIELDWORK.....	3
2.1	Site Works.....	3
2.2	Investigative Procedures.....	4
2.3	Routine Sampling.....	4
2.4	In-Situ Testing.....	5
2.5	Groundwater.....	5
2.6	Buried Services.....	5
2.7	Exploratory Hole Locations.....	5
3	LABORATORY TESTING.....	6
3.1	Geotechnical Laboratory Testing.....	6
3.2	Geo-Environmental Laboratory Testing.....	6
4	GROUND CONDITIONS.....	7
4.1	Introduction.....	7
4.2	General.....	8
5	GROUND ENGINEERING.....	2
5.1	Proposed Access Road.....	2
5.2	Pumping Station.....	2
5.3	Bearing Pressures.....	2
5.4	Foundations.....	3
5.5	Settlement.....	3
5.6	Swelling.....	3
5.7	Buoyancy.....	3
5.8	Excavations.....	4
5.9	Bridges.....	5
5.10	General Construction Issues.....	7
6	CONTAMINATION ASSESSMENT.....	9
6.2	Soil Quality.....	9
6.3	Hazard Assessment – Choice of Pipeline Material.....	10
6.4	Protection of Workers.....	12

7	WASTE MANAGEMENT	13
7.1	Background	13
7.2	CATWASTE ^{SOIL}	14
	Waste Assessment & Disposal.....	14

Figures and Appendices

Figures

Figure 1 – Site Location Plan

Figures

Figure 2 – Exploratory Hole Location Plan

Figures

Figure 3 – Bridge 1 & 2 Design Drawings

Appendix A

Rotary Cored Borehole Logs

Appendix B

Rotary Core Photographs

Appendix C

Geotechnical Laboratory Test Results

Appendix D

Chemical Laboratory Test Results

1 INTRODUCTION

Hyder Consulting (UK) Limited (HCL) has been instructed by A2Dominion Housing Group Ltd. (A2Dominion) and P3Eco Ltd. (P3Eco) in August 2011 to undertake a supplementary ground investigation at a site on the north western periphery of the town of Bicester, Oxfordshire. The purpose of which was to provide supplementary factual and interpretative information at the proposed NW Eco development know as the Exemplar site.

The predominant use of the site is currently agricultural, principally arable cropping and rotational grassland. This report discusses the Exemplar site only, which is solely owned by Mr. Phipps. The aim of the supplementary ground investigation was to target the ground conditions at the proposed access road, pumping station and bridges. This will provide information for the future foundations, excavations, drainage and contamination issues regarding development at the Exemplar site.

1.1 Previously Available Information

Background information to the site comprises of a HCL desk study dated July 2010 (Ref. 1), a HCL Factual Report dated September 2010 (Ref.2) and a HCL Geotechnical Interpretative Report dated November 2010 (Ref.3.) all of which should be read in conjunction with this report.

1.2 Proposed Development

The proposed development at the Exemplar site is part of a larger 345 ha Eco-Town project for a proposed 5,000 new homes with associated infrastructure.

The purpose of the supplementary ground investigation (during August 2011) was as outlined below:

- To provide geotechnical parameters of the superficial deposits and solid geology for the construction of a proposed access route, pumping station and bridges; and
- To provide an indication of potential contamination on-site.

1.3 Consultants and Sub-Contractors

Table 1.1 details all parties involved with the completion of the supplementary ground investigation at the Bicester Eco Town, Exemplar Site.

Table 1.1: Ground Investigation Parties

Consultants	Hyder Consulting (UK) Ltd Fortran Road St Mellons Business Park Cardiff CF3 0EY
Contractors	Hyder Consulting (UK) Ltd Fortran Road St Mellons Business Park Cardiff CF3 0EY
Sub-Contractors (where applicable)	CJ Associates King Road Avenue Avonmouth, Bristol, Avon BS11 9HF 0117 982 1473

1.4 Site Location and Description

The town of Bicester lies approximately 24 km to the north / east of Oxford and 28 km to the south / east of Banbury.

The Exemplar site is located within the north / west of Bicester approximately 1.5km from the town centre and 130m north of the A4095 main road. The M40 motorway lies 2km to the south / west, with ready access to the town from Junction 9.

The National Grid Reference (NGR) for the centre of the site is 457816,225127.

The site is primarily comprised of agricultural land and grazing fields within a rural area of Oxfordshire. The site boundaries are identified as Caversfield village to the north and north-east, agricultural land to the east and west with residential properties associated with the fringes of Bicester town to the south.

A site location plan of the site is presented in Figure 1.

1.5 Geology

The published 1:50,000 scale British Geological Survey map (BGS) Sheet 85 of Buckingham (Drift 1970, Solid 1975) (Ref. 4), and information provided as part of the BGS borehole logs obtained as part of the phase 1 desk study (Ref 1) as well as the previous ground investigation data obtained within the geotechnical Factual and interpretative reports (Ref 2 and Ref 3) indicates that the site is underlain by Drift deposits comprising Alluvium typically with sandy, calcareous clay overlying gravelly clay. Head deposits are also expected near the streams.

The solid geology was shown to comprise of the Cornbrash Formation (CB) overlying the Forest Marble Formation (FMB) and the White Limestone Formation (WHL).

2 FIELDWORK

2.1 Site Works

The scope of the ground investigation, location and depth of boreholes, site supervision and geotechnical logging of the samples was carried out by the HCL geotechnical engineer.

The site works were undertaken between the 5th September and 7th September 2011 with the scope of works as followed:

- 5 no. rotary boreholes to a maximum depth of 8.0 m bgl; and
- 6 California Bearing Ratios (CBR) tests.

An exploratory hole location plan is presented in Figure 2.

2.1.1 Rotary Boreholes

Five rotary boreholes were completed across the site at locations shown within the exploratory hole plan (Figure 2) for the proposed development. BH01 was undertaken to provide information relating to the proposed pumping station whereas BH02 and BH03 provided information for bridge 2 and BH04 and BH05 for bridge 1.

Boreholes were commenced with dynamic sampling techniques within superficial deposits between GL and 1.0 m bgl, and then followed by alternating rotary core and open hole drilling techniques with in-situ standard penetration testing every metre until the hole was terminated.

Table 2.1 details the final depths achieved within the boreholes, with the geotechnical engineering logs presented in Appendix A.

All boreholes were sampled and logged as per the Standard Procedures described in Section 2.2. Upon completion of the drilling works, the exploratory hole locations were reinstated to match existing ground conditions using approved materials.

Table 2.1: Boreholes Termination Depths

Exploratory Hole ID	Termination Depth (m bgl)
BH01	8.00
BH02	4.00
BH03	4.00
BH04	4.00
BH05	4.30

Photography

Photographs of the recovered cores during the investigation are included within Appendix B.

2.1.2 California Bearing Ratio (CBR)

Six CBR tests were completed at the locations shown within the exploratory h

ole location plan (Figure 2). Table 2.2 outlines the recorded CBR readings and average results as well as test termination depths.

The CBR tests were undertaken using a hand held mexi probe from surface to 0.10m bgl. The probe is pushed through the soil using a constant force enabling the technician to read the estimate CBR value from the dial.

This variant of the CBR test is only used for cohesive or sandy materials and reads CBR values up to 15% only.

The tests were undertaken in accordance with BS 5930 (1999) A2 (2010) "Code of Practice for Site Investigations" (Ref.5).

Table 2.2: CBR Results and Termination Depths

Exploratory Hole ID	Minimum CBR Value %	Maximum CBR Value %	Average CBR Value %	Termination Depth (m bgl)
CBR01	6	9	7.5	0.10
CBR02	4.5	9	6.75	0.10
CBR03	4.5	7	5.75	0.10
CBR04	5	8	6.5	0.10
CBR05	5	6	5.5	0.10
CBR06	5	7	6	0.10

2.2 Investigative Procedures

All ground investigation field work was carried out in general accordance with the recommendations of EN-1997-2 'Geotechnical Design Part 2' (Ref.6) and its related standards, together with the relevant sections of BS5930:1999 'Code of Practice for Site Investigation' (Ref.5) and BS10175 'Investigation of Potentially Contaminated Sites: Code of Practice' (Ref.7).

2.3 Routine Sampling

Representative bulk samples of differing strata encountered were taken as part of the site works. These samples were taken in accordance with the recommendations set out in BS5930-A2 'Code of Practice for Site Investigation' (Ref.5) and BS EN ISO 22475-1:2006 Geotechnical investigation and testing - Sampling methods and groundwater measurements (Ref. 8). The samples were stored in sealed plastic bags and tubs for logging and laboratory testing.

A Hyder Consulting Ltd (HCL) Geotechnical Engineer logged all exploratory holes in accordance with the recommended procedures provided within:

- EN-1997-2 'Geotechnical Design Part 2' (Ref.6).
This International Standard partially supersedes document BS5930-A2 'Code of Practice for Site Investigation' (Ref.5).
- BS EN ISO 14688-1:2002 Geotechnical investigation and testing – Identification and Classification of soil – Part 1: Identification and Description (Ref. 9);

- BS EN ISO 14688-2:2004 Geotechnical investigation and testing – Identification and Classification of soil – Part 2: Principles for a classification (Ref. 10).

2.4 In-Situ Testing

All in-situ testing was carried out in accordance with BS EN ISO22475-1:2006 Geotechnical investigation and testing - Sampling methods and groundwater measurements (Ref. 8) and EN ISO22476-2:2005 Geotechnical Investigation and Testing – Field Testing (Ref. 11).

2.4.1 California Bearing Ratio

In situ CBR testing was conducted in soils commencing from ground level to 0.10m bgl using a hand held mexi probe as instructed by the Engineer. The tests were undertaken in accordance with BS 5930: 1999 -A2: (2010) “Code of Practice for Ground Investigations” (Ref.5).

2.5 Groundwater

Where groundwater was encountered, measurements and samples were taken in accordance with BS EN ISO22475-1:2006 Geotechnical investigation and testing - Sampling methods and groundwater measurements (Ref. 8). Groundwater conditions observed in excavations and boreholes are those appertaining to the period of the investigation. It should be noted that groundwater levels are subject to diurnal, tidal, seasonal, and climatic variations and are solely dependent on the time the ground investigation was carried out and the weather before and during the investigation. However no groundwater was identified during the ground investigation.

2.6 Buried Services

Throughout the works the Hyder Consulting Safe Working Practice 01 – Buried Services (SWP01), (Ref 12) was adhered to. This document details the methods and safe working practices used to undertake excavations safely. Prior to breaking ground, services plans are consulted and the area scanned using a Cable Avoidance Tool (CAT) with detected signals marked. Hand excavated inspection pits are completed to 1.20mbgl prior to the use of drilling equipment.

2.7 Exploratory Hole Locations

The exploratory hole locations were set out by HCL from local ground and topographical features. The exploratory hole locations are shown on the exploratory hole location plan (Figure 2) with the corresponding borehole logs presented within Appendix A.

3 LABORATORY TESTING

Geotechnical and chemical laboratory testing was undertaken on selected samples obtained from the exploratory holes with the full results included in Appendix C and D.

Testing of all samples was scheduled by a HCL Geotechnical and Geo-environmental Engineer with testing undertaken by a HCL approved laboratory.

3.1 Geotechnical Laboratory Testing

The geotechnical tests detailed in Table 3.1 were carried out in accordance with BS1377:1990 Methods of test for soils for civil engineering purposes parts 1 to 8 (Ref. 13) and BRE Special Digest 1:2005 Concrete in Aggressive Ground (Ref. 14). Results of the geotechnical laboratory testing are presented in Appendix C.

Table 3.1: Geotechnical Testing Scheduled

Type of Test	Standard	Number of Samples
Moisture Content	BS1377:1990 Part 2	2
4 Point Liquid and Plastic Limit	BS1377:1990 Part 2	2
BRE Suite SD1	BS1377:1990 Part BRE Special Digest 2005	5
*One-dimensional Consolidation	BS1377:1990 Part 5	2
Uniaxial Compressive Strength of rock	ISRM suggested methods of rock characterization	2
*Quick Undrained Triaxial Tests	BS1377:1990 Part 7/8	2
Determination of Point Load Value	ISRM suggested methods of rock characterization	5

* No results provided for these scheduled tests. Tests could not be completed due to the gravelly nature of the material and no alternative samples could be found.

3.2 Geo-Environmental Laboratory Testing

Table 3.2 details all chemical testing undertaken on samples obtained during the ground investigation. Results of the chemical laboratory testing are presented in Appendix D.

Table 3.2: Chemical Testing Scheduled on Soils

Type of Test	Standard	Number of tests
Metals (arsenic, cadmium, chromium, nickel, lead, copper, zinc, mercury and selenium)	MCERTS Accredited	4
Total Organic Carbon	MCERTS Accredited	4
pH	MCERTS Accredited	5

4 GROUND CONDITIONS

4.1 Introduction

The general stratigraphic sequence for the Exemplar site generally comprises topsoil overlying soft to very stiff silts and clays above limestone deposits. This stratigraphy is confirmed by the results of the intrusive ground investigation. A summary of the general succession of strata encountered is presented in Table 4.1.

A summary of the general succession of strata is presented in Table 4.1 below.

Table 4.1: Summary of Ground Conditions

Stratum	Average Depth to Top of Stratum m.bgl	Maximum Stratum Thickness (m)	Average Stratum Thickness (m)
Topsoil	GL	0.60	0.37
Drift Deposits Alluvium (Soft very Stiff gravely silt/ clays)	0.34	3.80 (not proved in locations BH02 & BH03)	2.02
Bedrock Cornbrash Formation (Limestone)	3.13	4m proven (8m bgl within BH01)	Not proven

4.1.1 Topsoil

Topsoil was encountered within all borehole locations and was recovered between ground level and a maximum depth of 0.60m bgl, being comprised of soft slightly gravely, silt / clay.

4.1.2 Alluvium

Soft to very stiff clays were recovered from all boreholes and was soft to very stiff, noted between 0.30m bgl to 0.60m bgl. Standard penetration tests were undertaken within this stratum returned N value readings increasing with depths ranging from 6 to >50 (refusal) which are indicative of soft to Very stiff clays. It was noted from the exploratory hole logs that the clays were notably within BH02 and BH03 located within the western locations and was not proved past 4.00m bgl.

Atterberg limits and moisture content testing were undertaken on two samples recovered from within the clays. The results indicated that the clays have an intermediate to high plasticity and a low to medium volume change potential, with natural moisture content of between 28% and 33%.

4.1.3 Cornbrash Formation

The Cornbrash Formation was recovered from the majority of exploratory holes locations within the site from an average depth of 3.13m bgl to a depth of 8.00m bgl, though the full extent of this stratum was not proven.

The stratum was recorded as strong light grey limestone with closely spaced sub horizontal rough clean fractures with intermittent bands of silt /clay material. Standard penetration testing undertaken within this strata was returned with > 50 (refusal).

Limestone was also recovered from BH05 as non intact sandy gravels and cobbles which maybe a weathered horizon. Standard Penetration Tests (SPT) undertaken within this returned N values of refusal, indicative of a very dense, granular material.

The amount of total core recovery and solid core recovery within BH04 and BH05 was noted as low and maybe attributed to the fractured nature of the material and the amount of weaker clay bands.

Two core samples were sent for uniaxial compressive strength (UCS) testing at depths between 5.75 – 6.00m bgl and 3.16 – 3.35m bgl. Ten samples were also sent for point load testing at depths ranging between 2.80mbgl and 7.70m bgl.

The point load tests indicate the I_s (50) strength range from 0.3 MPa to 6.4MPa within the competent limestone, recorded with an I_s (50) value between 4.1 and 4.4 MPa within the limestone gravels.

Using a standard conversion of 21.9 multiplied by the I_s (50) value for limestone rocks as indicated within “Using the point load test to determine the uniaxial compressive strength of coal measure rock” (Ref 15) the results can be correlated to a UCS strength range of between 6.57MPa and 140.16 MPa with an average of 54 MPa within the banded limestone. The UCS testing undertaken within the banded limestone returned a UCS strength range between 21.6 MPa and 88 MPa.

Point load tests were converted for the limestone gravels with results of between 89 MPa and 96 MPa recorded. No UCS testing was undertaken within the limestone gravels for comparison purposes.

Groundwater

No groundwater was encountered during the ground investigation.

4.2 General

Geotechnical Parameters for each principal stratum type encountered within the boreholes are summarized in Table 4.2. These are based on available test results or published data. It is important that the accompanying notes and previous reports are read in detail when using this data for design and the construction process.

Table 4.2 – Summary of geotechnical properties

	Plasticity Indices			Natural Moisture Content	Undrained Cohesion	Effective angle of Shearing Resistance	Unconfined Compressive Strength	Standard Penetration Test	Concrete Class	Coefficient of volume compressibility/Coefficient of Consolidation
	LL (%)	PL (%)	PI (%)							
Superficial deposits cohesive	81 -63	54-38	25- 27	28 -33	130 -150 based on description	23 based on PI value	-	6 - >50	AC-1	N/A
Inter-bedded Limestone Rock	-	-	-	-	N/A	40 (based on values published by Hoek and Bray)	21.6 - 88	>50	AC-1	N/A

5 GROUND ENGINEERING

5.1 Proposed Access Road

At the time of writing this report no information was made available relating to the approximate levels of the access road, however the proposed route of the access road was provided.

In situ mexi probe results within natural soils across the proposed access route ranged from an average of 5.5% to 7.5% at a depth of 0.10m bgl within the topsoil material.

Should the topsoil material be stripped during construction an assumed CBR value of 5% should be achievable within the natural clay material, although this is to be confirmed during construction. Removal of soft spots and proof rolling maybe necessary in isolated areas.

The roads on site should be constructed in accordance with Design Manual for Roads and Bridges (DMRB) Volume 4, Section 1, Part 1 (HA44/91), (Ref 16) and Volume 7, Section 2, Part 2 (HD25/94).

Particular care should be taken to avoid excessive trafficking in areas of proposed roads, and pavements should be constructed soon after excavation in order to limit deterioration and softening of the formation.

5.2 Pumping Station

At the time of writing this report it is understood that the location of the pumping station will be within the area surrounding BH01 as shown within Figure 2. No further information relating to the size, approximate loadings of foundation levels have been confirmed at the time of writing this report.

5.3 Bearing Pressures

With reference to log descriptions, SPT values and laboratory tests results, the following bearing pressures for static loading are proposed as summarized in Table 5.1.

The bearing pressure for the bedrock has been calculated with reference to point load tests, UCS tests and using descriptions of logs, fracture spacing and reference to BS8004:1986 "Code of Practice for Foundations" (Ref 17).

For the clays, reference has been made to Stroud's correlation between SPT N value and cohesive strength for clays as outlined in CIRIA 143 "SPT: Methods and Use" and to Table 2.1 of Tomlinson Foundation Design and Construction", fifth edition for correlation of cohesive strength to bearing pressure.

Table 5.1 - Net Allowable Bearing Pressure at borehole BH01

Stratum	Average Depth to top of stratum (m bgl)	Net Allowable Bearing Pressure
Firm to very Stiff silt /clay	0.34	150 - 300 KN/m2
Inter-bedded Limestone	3.13	*2500 KN/m2

*Assumes a square pad with settlement not exceeding 0.5% of foundation width.

5.4 Foundations

Based upon exploratory hole logs it is considered that mass excavation at depth would be suitable for the proposed development.

As stated within section 4.1.2 atterberg testing generally returned results with low and medium volume change potential. It is recommended that the foundation design should be carried out in accordance with the guidance provided in NHBC chapter 4.2 (Ref. 18) to ensure that no damage to foundations results from shrinkage/swelling of clays.

Due to the potential presence of medium volume change potential Clay beneath the Superficial Deposits, it is recommended based on NHBC chapter 4.2 that foundations are located at a minimum of 0.9m below ground level (where roots are noted / present then foundations should be extended below the level of the roots). However it is recommended that the pumping station be founded within consistent strata to reduce the effect of differential settlement. It is therefore considered that foundations are founded upon the limestone bedrock encountered in excess of 4m bgl.

Inter-bedded limestones found across the site containing bands of silt / clay material, when considering foundation types and loadings, consideration of differential settlement should be taken between those areas where limestone might lie directly beneath the foundation and where foundations are underlain by cohesive weathered limestone or Clays.

No made ground was recorded in any of the exploratory holes, however if made ground or soft material is encountered in any of the excavations for foundations then this material should be excavated and replaced with suitably compacted, granular fill. All shallow foundations should be inspected by a suitably qualified Geotechnical Engineer, to confirm that a suitable founding stratum is available.

5.5 Settlement

Differential settlement is not considered to be an issue provided the structure is founded entirely on competent Cornbrash Limestone bedrock at depths of between 4 to 6m bgl. In the event of any soft spots being identified during the excavation at the proposed founding depth, these soft areas must be removed down to the rock and replaced with compacted granular material. In order to minimise the potential for differential settlement across the pumping station base, it is recommended that any irregularities within the rock are removed and a blinding layer is laid to obtain the flattest surface possible for the pumping station base.

5.6 Swelling

In order to ensure that the structures are not affected by swelling of any clay / alluvium material, it is recommended that this material is removed and replaced where necessary to ensure that the founding material is within the Limestone bedrock, and where necessary the ground founding levels built back up and replaced with granular fill. Elastic rebound of the limestone will occur immediately upon removal of the overburden via the release of pressure and subsequent expansion of fracture planes, and will not impart post-construction upward pressure on the finished base of the structures.

5.7 Buoyancy

At present the founding depth of the pumping station is not known. However no groundwater was encountered within any of the exploratory holes during the ground investigation to a maximum depth of 8.00 m bgl. It is therefore considered that the effect of buoyancy upon the

proposed structure is unlikely to pose a significant effect. However if the founding depth of the pumping station is greater than 8.00m bgl then the risk of groundwater and buoyancy will be proportionally increased.

5.8 Excavations

The foundations for the proposed pumping station are expected to be entirely within Cornbrash Limestone bedrock at 4 to 6m bgl. Overlying the bedrock is a thick layer of alluvium (typically 4m in thickness) and this will be easily excavatable by a conventional backhoe excavator. Laboratory UCS and point load strength testing on the Cornbrash Limestone rock at 5 to 8mbgl provided strength values ranging from 20 to 59 MPa. The fracture and discontinuity spacing of the limestone in borehole BH01 at 4 to 5m bgl ranged from 30, 100 and 180mm.

During excavations it is expected that once the Cornbrash Limestone rock is encountered, advancement through the rock mass can be facilitated by exploiting natural fractures and will require ripping with and hydraulic breaking prior to excavation by conventional means.

The sides of the excavation within the alluvial overburden will be unstable and it is considered that sheet piles or similar will be required for excavation support during the construction works, or alternatively if there is sufficient space available, the side slopes within the alluvium could be battered back to a safe angle (less than a 45° vertical: horizontal slope).

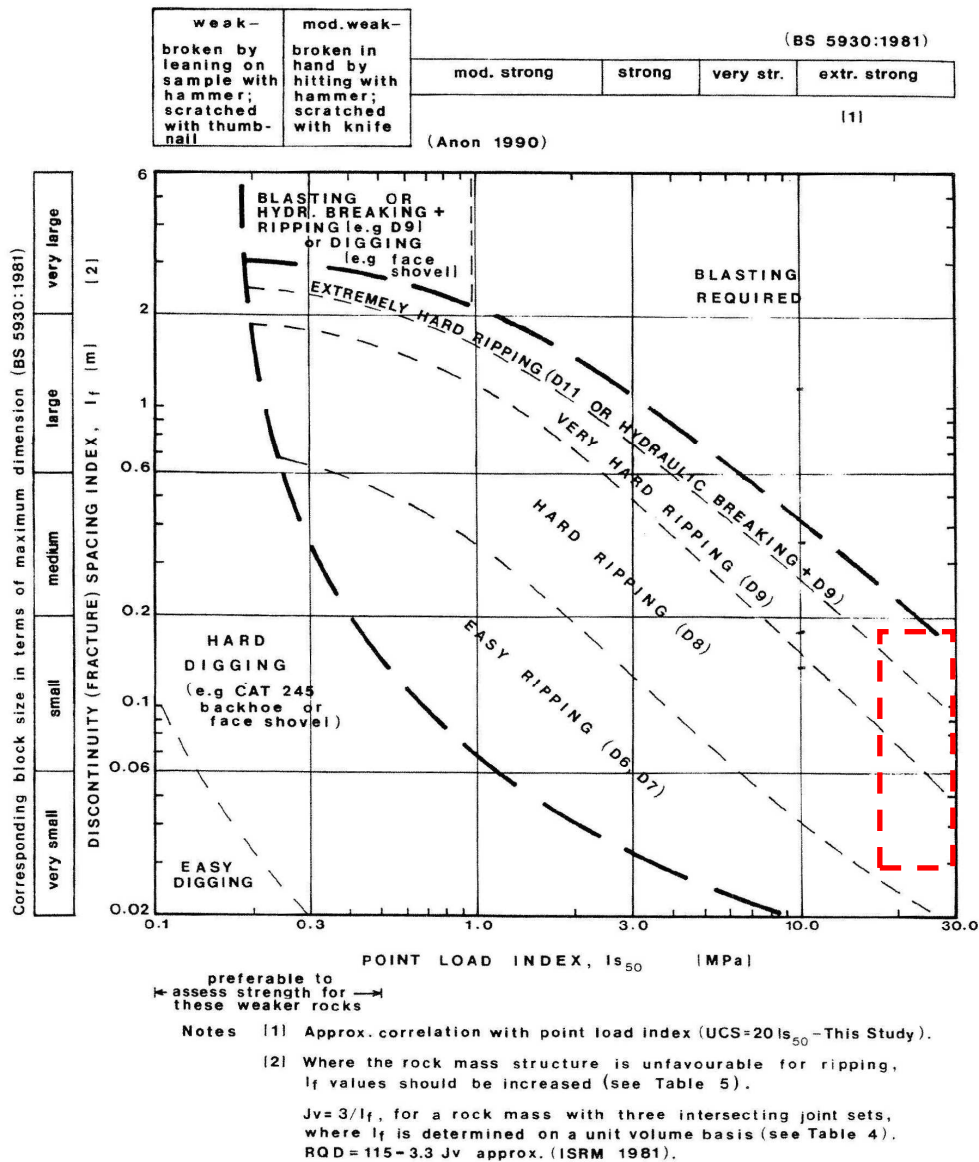
Based on information gained from the ground investigation, an assessment of the excavatability of the bedrock found on site has been made utilising the paper by Pettifer and Fookes (Ref. 19). Refer to the red dashed square in Table 5.2 for an expected range of rock excavatability.

The discontinuity spacing index of the Cornbrash Limestone bedrock ranges from 0.03mm to 0.18m. It should be noted that the assessment of discontinuity spacing, which to a large extent controls excavation, is difficult to assess from vertical boreholes. Excavatability assessments based on boreholes tend to underestimate the spacing of discontinuities or fractures in rock as fracture spacing in the vertical plane only is measured.

As a precaution, an excavator with a diamond rotating bit attachment or other alternative rock grinding or breaking equipment will be required to excavate the competent Cornbrash Limestone bedrock. Due to the sensitive nature of the site setting and close proximity with the road and residential properties, care must be taken by the contractor to keep the noise and dust levels to a minimum during the rock excavation.

No groundwater was encountered during the ground investigation. Although unexpected, if groundwater ingress occurs, together with any rainwater infiltrations, dewatering may be required and should be dealt with by conventional methods.

Table 5.2: Excavation methods, based on Qualitative Rock Strength and Fracture Properties (Ref. 19)



5.9 Bridges

At the time of writing this report the proposed development contains the construction of two bridges in the locations of BH02, BH03 and BH04 and BH05 as shown within Figure 2 with current design plans attached as Figure 3.

The proposed details for construction of the bridges are to comprise the following;

- Foundation arrangement to be a strip footing of width 2.2m (1.5m deep);
- Nominal Bearing Pressures 230kN/m²; and
- Retaining walls likely to be reinforced earth so bearing pressures will be those resulting from the embankment vertical loads.

5.9.1 Bearing Capacity

With reference to log descriptions, SPT values and laboratory tests results, the following bearing pressures for static loading are proposed as summarized in Table 5.3.

The bearing pressure for the bedrock has been calculated with reference to point load tests, UCS tests and using descriptions of logs, fracture spacing and reference to BS8004:1986 "Code of Practice for Foundations".

For the clays, reference has been made to Stroud's correlation between SPT N value and cohesive strength for clays as outlined in CIRIA 143 "SPT: Methods and Use" and to Table 2.1 of Tomlinson Foundation Design and Construction", fifth edition for correlation of cohesive strength to bearing pressure.

Table 5.3 - Net Allowable Bearing Pressure

Stratum	Average Depth to top of stratum (m bgl)	Net Allowable Bearing Pressure
Soft silt / clay	0.60	<75KN/m ²
Firm to very Stiff silt /clay	0.34	150 - 300 KN/m ²
Inter-bedded Limestone	3.13	*2500 KN/m ²

*Assumes a square pad with settlement not exceeding 0.5% of foundation width.

A review of the ground investigation borehole data has shown for bridge 2 (BH02 and BH03) that at current proposed foundation depths of 1.50m bgl the bridge would be founded within the soft clays which will have a bearing capacity of <75kN/m² which would be insufficient to support the structure.

It is therefore recommended that this material be excavated to a maximum of 3.20m bgl and replaced with a suitable granular fill material so the proposed bridge maybe founded at current design levels.

A review of the borehole information related to bridge 1 (BH04 and BH05) indicates that foundation levels would be suitable at 2.80m bgl founded within limestone with anticipated bearing capacity in excess of 2500kN/m² based upon UCS results.

Current design drawings for both bridge 1 and 2 are attached as Figure 3.

5.9.2 Settlement

As stated within section 5.7.1 above there is not sufficient bearing capacity of the soils at 1.50m bgl to support the imposed loading of bridge 2 of 230KN/m². Therefore the soft clay material should be replaced with a suitable granular fill. Once this has been completed the following settlements for the proposed structure are anticipated:

At the location of bridge 2 no suitable laboratory testing was undertaken to provide an approximate mv value for compressible soils at the founding depth. Therefore an assumed mv value of 0.1 M²/MN has been calculated based upon log descriptions, standard penetration results and plasticity index of the soils for moderate compressible soils.

Assuming an mv of 0.1 M²/MN for a bridge with the loading of 230KN founded at a depth of 1.50m bgl with a compressible layer below terminating at 4.00m bgl, an expected settlement of less than 25mm is anticipated with a differential settlement of approximately 10mm.

However it should be stated that should the compressible layer extend past 4.00m bgl then a higher amount of settlement should be expected.

It is recommended that foundations are inspected by an experience Geotechnical Engineer to confirm suitable ground conditions.

5.10 General Construction Issues

5.10.1 Excavations

Should significant changes in ground level be required as part of the proposed development, the excavatability of the limestone must be considered, as the ground investigation proved that this material can be strong and relatively difficult to dig by conventional means.

Excavations using conventional plant equipment should be achievable. Where foundations are based at shallow level on top of the limestone, some water inflow may be expected following heavy rain where the water is perched above the limestone, and some form of dewatering during temporary works may be required.

If any excavations for other infrastructure are required to greater depth then ripping and breaking of the limestone rock will be required, plus there is an increased possibility of encountering groundwater and shoring and dewatering processes may then be required.

5.10.2 Re-Use of material

Any gravel encountered should be appropriate for re-use subject to the conformation of grading of compaction characteristics as a general granular fill.

5.10.3 Ecology

Badger setts were identified within the adjacent land areas and therefore any badger setts found in close proximity to the development must follow current guidelines, and the recommendations of the appointed ecologist when constructing in the vicinity of this habitat.

5.10.4 Building Near Trees

Where the development is proposed adjacent to existing or proposed planting, foundations should comply with the requirements of NHBC Guidelines Chapter 4.2 (Ref. 18). In which case, it may be necessary to extend the foundation depths quoted in Section 5.

5.10.5 Solution Cavities/Swallow Holes

Although no evidence of solution cavities or swallow holes were recorded during the supplementary ground investigation, these features may be present within the site, particularly in the limestone deposits. Any evidence of such features discovered during excavations should be investigated further by an experienced Geotechnical Engineer, and an appropriate remediation scheme adopted if deemed necessary.

5.10.6 Radon Protection

As part of a Desk Study Report undertaken for the adjacent Exemplar site area (Ref. 1), a detailed BR 211 Radon Report was obtained from the British Geological Survey (BGS), which states that basic radon protection measures are required for the site area as the estimated probability of a property being above the Action Level for radon is 3-5%.

Details on the technical specifications for basic radon protection measures are given in document BRE Report BR211 (Ref.1 9).

5.10.7 Protection of Buried Concrete

Substances often involved in the attack on building structures and foundations are present on the site, primarily sulphate bearing strata.

Consideration should be given to the presence of sulphates in the selection of building materials and services. The presence of sulphate can have a damaging effect on concrete. Sulphate and pH testing was undertaken upon five samples recovered at depths ranging from 1.00m bgl to 3.00m bgl within alluvium material. The sulphate concentrations returned ranged from 18 mg/l to 21mg/l, and corresponding pH values were returned between 7.8 and 8.3 corresponding to neutral to alkaline ground conditions.

With reference to guidance outlined within BRE document SD1” Concrete in aggressive ground”(2005), the test values correspond to a Design Sulphate Class of DS-1 and an Aggressive Chemical Environment for concrete class of AC -1.

6 CONTAMINATION ASSESSMENT

The contamination assessment sets out an appraisal of the results of the soil analyses undertaken on samples obtained during the ground investigation. A Tier 1 (comparative) approach has been applied to the results, which uses site-specific data compared to available CLEA SSVs (soil screening values). Where these are not available, HCL in-house generic assessment criteria, derived using the CLEA model, have been used.

The current philosophy to the assessment and remediation of contaminated land in the UK is to adopt an 'end use' approach whereby the significance of contamination at a site is evaluated according to either the existing use or a proposed development. The relevant scientifically based authoritative criteria to assess soils against are the Soil Guideline Values (SGVs) which were derived using the Contaminated Land Exposure Assessment (CLEA). To date, SGVs for eleven contaminants (arsenic, nickel, mercury, selenium, cadmium, benzene, toluene, ethylbenzene, xylene, polychlorinated biphenyls, and phenol) have been published.

Where SGVs are not available Hyder have utilised the LQM/CIEH Generic Assessment Criteria (GAC) for Human Health (2009), derived in accordance with UK legislation. These values have been derived using the Environment Agency software 'CLEA 1.06' which allows generic assessment criteria to be derived that are consistent with current government policy on contaminated land. The reader is referred to the LQM/CIEH document for full details on the derivation of each GAC.

SGVs and LQM/CIEH GACs have been derived for three generic land uses, namely; Residential, Allotments and Commercial/Industrial. The reader is referred to the Environment Agency's Updated Technical Background to the CLEA Model (2008) for full details on the various land uses scenarios. The commercial/industrial land use scenario is considered to be relevant to the land use at Bicester for the proposed pumping station. Therefore, for the purposes of the assessments at the site, SGVs and GACs for a commercial/industrial land use have been adopted as the Tier 1 screening values

The LQM/CIEH GACs have been derived for three Soil Organic Matter (SOM) contents (1%, 2.5% and 6%) for organic contaminants including petroleum hydrocarbons. The SOM of the soils underlying the site range from <0.1% to 0.8% therefore the most stringent GACs (1% SOM) have been used as a precautionary approach.

6.1.1 General

This report a soil quality assessment has been undertaken for the areas associated with the pumping station and location of bridges only based upon the targeted ground investigation of these areas. For a full site wide human health risk assessment reference is made to section 6 within the Geotechnical Interpretative Report undertaken by Hyder Consulting Limited, titled "NW Bicester Eco Development Geotechnical Interpretative Report - Exemplar site" dated November 2010 (Ref:3).

6.2 Soil Quality

In total, four samples were taken from natural clay soils between 1.00m bgl and 3.00m bgl across the site and analysed for organic and inorganic contaminants, with the results compared to the SSVs for the 'Commercial/Industrial' land use scenario. For organic contaminants, where relevant, a Soil Organic Matter of 3% has been used to derive the SSVs as this is considered a conservative value. A summary of the results is included within Tables 6.1 to 6.2 with the full laboratory test results included within Appendix D.

Table 6.1 Summary of Analytical Chemical Testing Results (Inorganic)

Determinand	Number of Samples Tested	Minimum Concentration (mg/kg)	Maximum Concentration (mg/kg)	SSV (mg/kg) Commercial/ Industrial	No. of Exceedances
Arsenic	4	<5	8.4	640 ⁽¹⁾	0
Barium	4	15	47	22000 ⁽²⁾	0
Beryllium	4	<5	<5	420 ⁽²⁾	0
Boron (H ₂ O Sol.)	4	<5	1.4	192000 ⁽²⁾	0
Cadmium	4	<0.5	<0.5	230 ⁽¹⁾	0
Chromium	4	9	13	30400 ⁽²⁾	0
Copper	4	5	10	71700 ⁽²⁾	0
Lead	4	7	11	750 ⁽³⁾	0
Mercury	4	<0.5	<0.5	3600 ⁽¹⁾	0
Nickel	4	10	18	1800 ⁽¹⁾	0
Selenium	4	0.6	2.1	13000 ⁽¹⁾	0
Vanadium	4	13.9	26.7	3160 ⁽²⁾	0
Zinc	4	19	45	665000 ⁽²⁾	0
Cyanide (Total)	4	<0.1	0.8	53 ⁽²⁾	0

- 1) EA published Soil Guideline Values
- 2) LQM/CIEH published values (2nd Edition)
- 3) Previous EA published Soil Guideline Value (currently withdrawn)

6.3 Hazard Assessment – Choice of Pipeline Material

A summary of test results for soils encountered on the site versus the threshold limits published by the Water Regulations Advisory Scheme (WRAS 2002) (Ref 20) is provided in Table 6.2 below.

Table 6.2: Zone 2 Effect of Contaminants on Choice of Pipeline Material

Contaminant	Threshold (mg/kg)	Concentrations (mg/kg)	Threshold Exceeded?
		Range (mg/kg)	Yes/No
Corrosion			
Sulphate (SO ₄)	2000	18 - 28	No
Sulphur	5000	N/A	-
Sulphide	250	N/A	No

Contaminant	Threshold (mg/kg)	Concentrations (mg/kg)	Threshold Exceeded?
		Range (mg/kg)	Yes/No
pH	5 – 8	7.8 – 8.3	Yes
Toxic Substances			
Antimony	10	N/A	-
Arsenic ³	10	<5 - 9.5	No
Cadmium	3	<0.5 – 0.5	No
Chromium (VI)	25	9 – 13	No
Chromium (Total)	600	N/A	-
Cyanide (free) ^{3, 4}	25	N/A	-
Cyanide (complex) ³	250	N/A	-
Lead	500	7 – 11	No
Mercury	1	<0.5	No
Selenium	3	0.60 – 2.1	No
Thiocyanate	50	N/A	-
Organics			
Coal Tar ⁵	50	N/A	-
Cyclohexane Extractable ⁵	50	N/A	-
Phenol	5	N/A	-
PAH	50	N/A	-
Toluene Extractable	50	N/A	-
Petroleum Hydrocarbons ⁶	50	N/A	-

Notes:

- 1) Exceedances in bold
- 2) n/a – not analysed
- 3) It is recommended that water pipes should not be laid in sites where these substances are identified or suspected.
- 4) For this assessment Total Cyanide is assumed to equate to Free Cyanide.
- 5) Use specific marker compounds. See PAHs.
- 6) “Petroleum Hydrocarbons” is taken as the Aliphatics and Aromatics C12-C35.

6.3.1 Soil Quality Summary

All soil samples recorded metals and inorganics contaminant concentrations below the appropriate screening values for the ‘Commercial/Industrial’ land use scenario and therefore do not require further consideration.

Choice of Pipeline Material

Exceedances were seen for pH only when tested samples were screened against relevant WRAS thresholds for pipeline material selection for corrosive, toxic and organic compounds.

However a review of the laboratory results identified that the pH levels within the area of the proposed pumping station (BH01) were below the screening values and therefore no further action may be required. Should any services be required in the vicinity of any of the remaining borehole locations consultation with the water supplier and/or further testing and risk assessment maybe required.

6.4 Protection of Workers

Whilst construction workers are considered receptors the use of appropriate Health and Safety measures including personal protective equipment and adopting good site hygiene practices should mitigate any risks from acute exposure to a very low level. Construction workers are therefore no longer considered in this report.

For further information, it is advisable to utilise document HSG 66: "Protection of Workers and the General Public During Development of Contaminated Land" published by the HSE (1991) (Ref. 9) to ensure that a suitable health and safety scheme is adopted and all construction workers are adequately protected during all site activities. Additionally, contamination from materials brought on to site (e.g. fuel and lubricating oils for plant) during the construction phase must be considered harmful to human health as well as the environment and controlled waters. The risks posed from all imported substances and materials must be adequately addressed within a comprehensive site management plan.

7 WASTE MANAGEMENT

7.1 Background

In general, material removed from an excavation will not normally be regarded as waste if:

- It is intended to be reused on site;
- It is suitable for use as backfill; and
- It does not need to be processed before it can be reused.

In such cases, the material would not be subject, at that point in time, to the duty of care for waste and environmental permitting.

If it is not possible to reuse excavated material on site, then off-site disposal to an appropriately licensed landfill may be required. In this case, due consideration should be given to the UK Landfill Directive. Furthermore, any materials without a defined use on site can be considered as waste.

As of July 2009, the final phase of the landfill regulations from 2002 came into force and developers should be aware of the impact that it could have on their developments.

With measures already in place, the final phase of the regulations means that specified wastes can no longer be disposed off site to landfill and all wastes intended for landfill must receive prior treatment. Options for treatment (which include chemical, biological, mechanical separation and sorting) exist for most wastes and exemptions to this requirement are only limited to: inert wastes where treatment is not technically possible and wastes where viable treatment would not reduce the quality or the hazard(s) posed to human health or the environment.

The basic Government policy applies in the management of waste, and sites should adhere to the following protocol:

- I. Reduction of the waste generated by managing the development to keep the amount of 'waste soil' to a minimum;
- II. Re-use or re-distribution of soil on site (this will require the necessary authorisation);
- III. Recovery or recycling by way of treatment on site (this will require the necessary authorisation); and finally
- IV. Disposal, following pre-treatment (with necessary authorisation) to landfill.

If, having followed the above hierarchy, off-site disposal of soil is necessary; there is a requirement to determine whether the waste soil is "hazardous" or "non-hazardous". This is undertaken by means of CATWASTE^{SOIL}, as described in Section 7.2 below.

7.2 CATWASTE^{SOIL}

The results of the investigation have been input into CATWASTE^{SOIL}, which has determined from the total contaminant concentrations in the soil, that the natural clay material is not hazardous.

Waste Assessment & Disposal

An assessment of the solid analysis was undertaken and screened for concentrations over 0.1% (1000mg/kg) as a guide to the presence of hazardous levels of contamination. This assessment was undertaken according to guidance outlined in the Environment Agency document WM2 "Interpretation of the definition and classification of hazardous waste", second edition.

A screening of the solid analysis did not identify any exceedences of the 0.1% screening concentration (1000mg/kg) within any of the determinands tested indicating that the waste is likely to be classified as non hazardous.

7.2.1 General

According to the Landfill Directive, material that can undergo decomposition (e.g. topsoil) cannot be classified as inert waste and is therefore recommended that topsoil / organics are stripped and stored separately to the underlying subsoil.

It is also recommended that a screen of organic material be undertaken and checked with the selected suitably licensed landfill for confirmation of classification to comply with the Duty of Care Regulations of the Environmental Protection Act 1990 to ensure that contaminated soil and water is disposed of off-site to a suitably licensed waste management facility in a safe and approved manner.

It should be stated that information obtained is assessed on the screening assessment and thus if provided as guidance only. It should be necessary to confirm the actual classification with prospective landfill operators prior to disposal.

It is recommended that classification is confirmed with the receiving landfill which may require further specific testing to validate the material before acceptance to landfill.

REFERENCES

- 1 Hyder Consulting Ltd, Desk Study Report No: 2501-UA001881-UP33R-01: July 2010.
- 2 Hyder Consulting Ltd, Factual Ground Investigation Report No: 2504-UA001881-UP33R-01: September 2010.
- 3 Hyder Consulting Ltd, Geotechnical Interpretative Report. Report No: 2505 UA001881 UP33R -01 November 2010.
- 4 British Geological Society (BGS) (1970, 1975). Sheet 85 Manchester (Solid and Drift).
- 5 British Standards Institution (BSi). BS5930:1999 – A2 (2010) Code of Practice for Site Investigations. BSi, London.
- 6 EN-1997-2 Eurocode 7: Geotechnical Design – Part 2. Ground Investigation and Testing.
- 7 BS10175:2001 Investigation of Potentially Contaminated Sites: Code of Practice
- 8 British Standards Institution (BSi), 2006. BS EN ISO 22475-1:2006 Ground Investigation and Testing – Sampling Methods and Groundwater Measurements. BSi, London.
- 9 British Standards Institution (BSi), 2002. BS EN ISO 14688-1:2002 Geotechnical investigation and testing – Identification and Classification of soil – Part 1: Identification and description. BSi, London.
- 10 British Standards Institution (BSi), 2004. BS EN ISO 14688-2:2004 Geotechnical investigation and testing – Identification and Classification of soil – Part 2: Principles for a classification. BSi, London.
- 11 British Standards Institution (BSi), 2005. BS EN ISO 22476-2:2005 Geotechnical Investigation and Testing – Field Testing. BSi. London.
- 12 Hyder Consulting (UK) Limited, Safe Working Practice 01 – Survey Services, 2009.
- 13 British Standards Institution (BSi), (1990). BS1377:1990 Parts 1 - 8 Methods of Test for Soils for Civil Engineering Purposes. BSi, London.
- 14 BRE Special Digest (2005). Concrete in aggressive ground, Special Digest 1:2005, 3rd Edition, The Concrete Centre, BRE Construction Division.
- 15 John Rusak & Christopher Mark: Using Point Load to Determine the UCS of Coal Measure Rock.
- 16 Highways Agency (HA) Volume 4 Section 1 Part 1 HA 44/91.
- 17 British Standards: 8004 Code of Practice for Foundations: 1986.
- 18 NHBC, 2010. NHBC Standards, Part 4: Foundations and 4.2 building near trees.
- 19 BRE Report BR211: Radon – Guidance on Protective Measures for New Buildings
- 20 Water Regulations Advisory Scheme (WRAS) Selection for water supply materials to be laid in contaminated land: 2002.

Figures

Figure 1 – Site Location Plan



Figure 1: Site Location Plan



Project Name:

NW Bicester Eco-Town, Exemplar Site

Client

A2dominion Housing Ltd & P3Eco Ltd

P3Eco Ltd

Project Location:

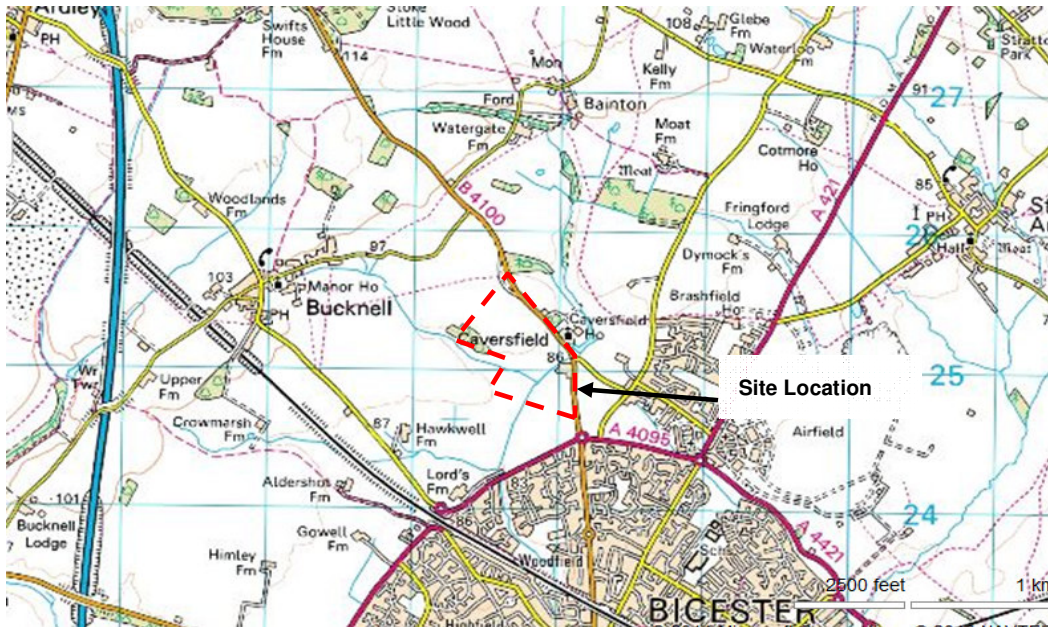
Project Code

Scale

Bicester

UA003072

NTS

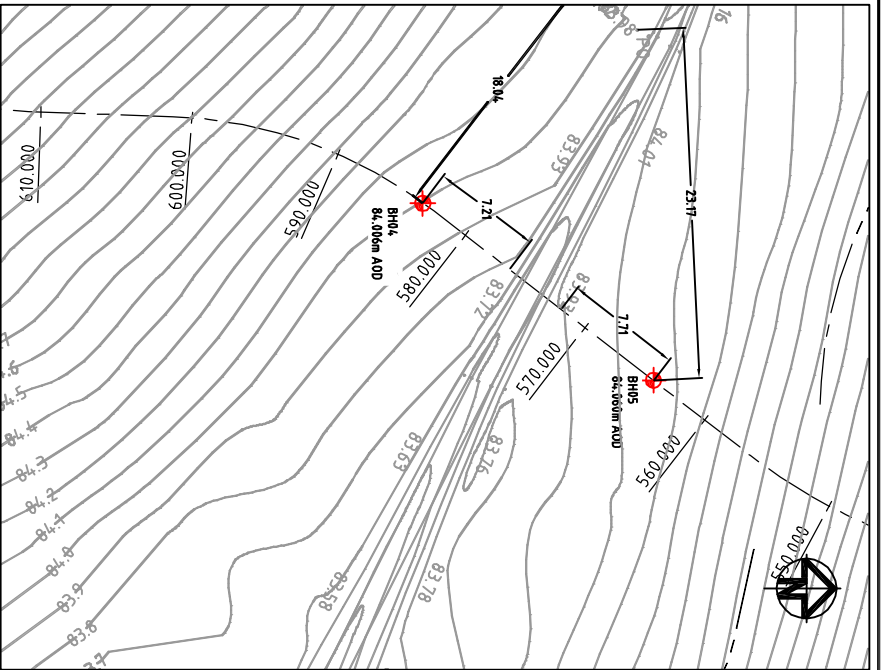


Reproduced from the Ordnance Survey Map with the permission of the Controller of Her Majesty's Stationary Office. Crown Copyright Reserved. Licence No. AL813400

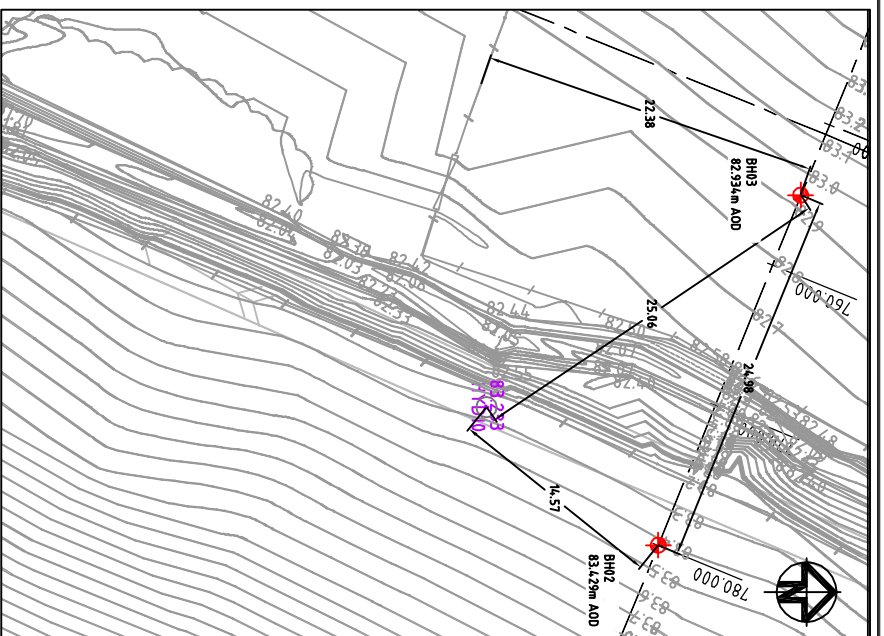
Address	Ordnance Survey Grid Coordinates	
Banbury Road Caversfield Bicester Oxfordshire OX6 9TG	OS (Eastings)	457816
	OS (Northings)	225127

Figures

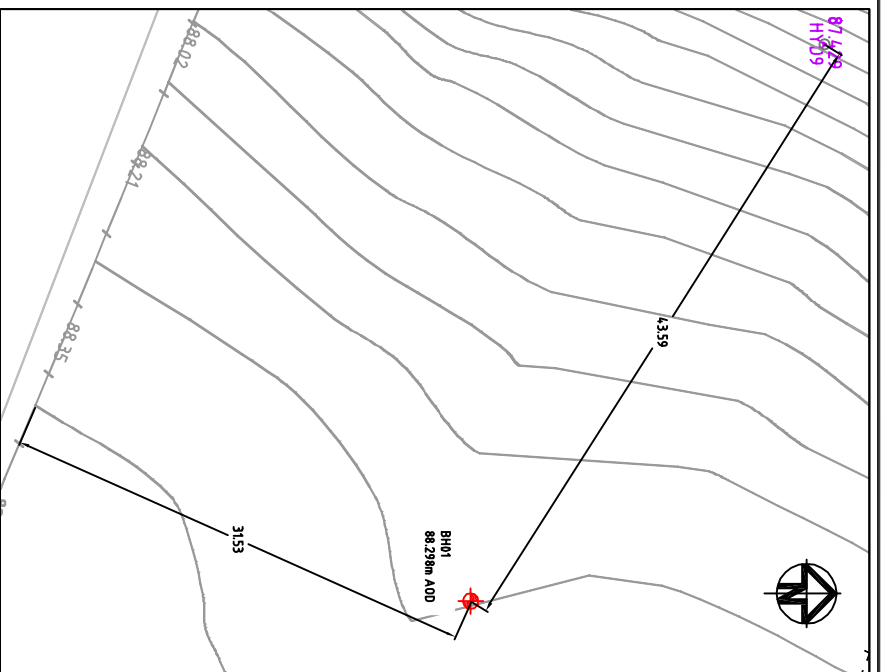
Figure 2 – Exploratory Hole Location Plan



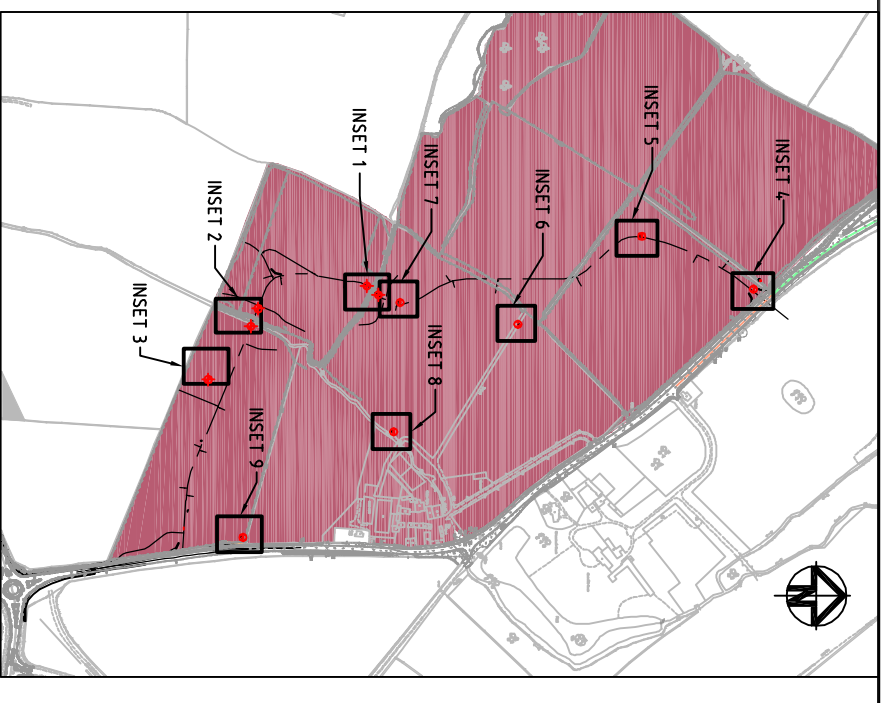
INSET 1
SCALE 1:500



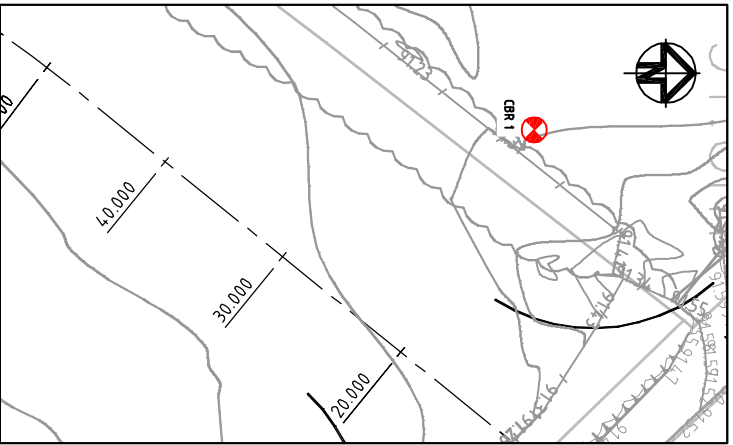
INSET 2
SCALE 1:500



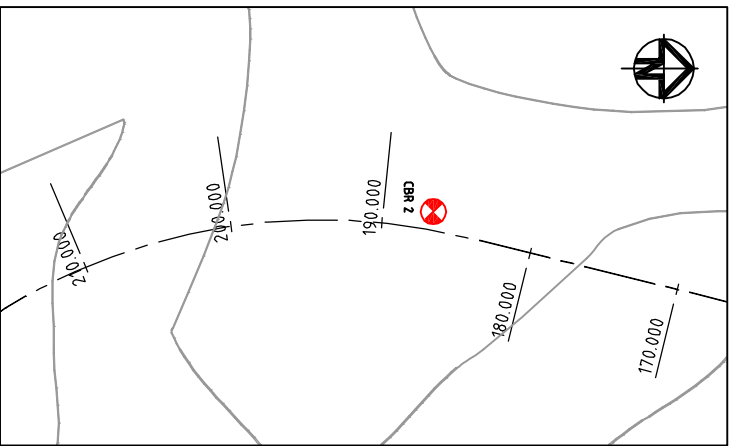
INSET 3
SCALE 1:500



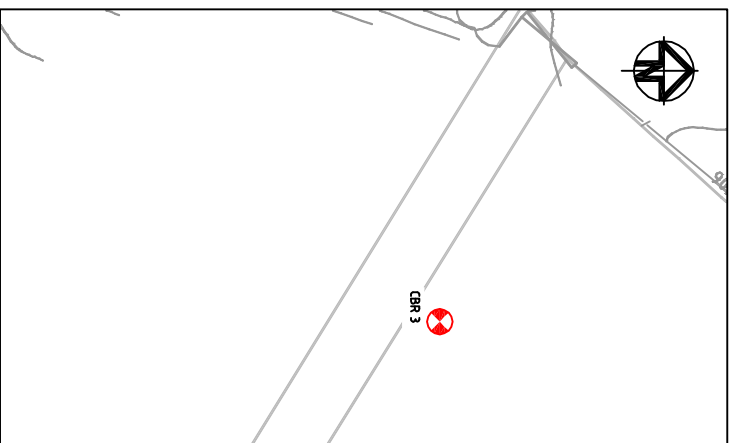
SITE PLAN
SCALE 1:10000



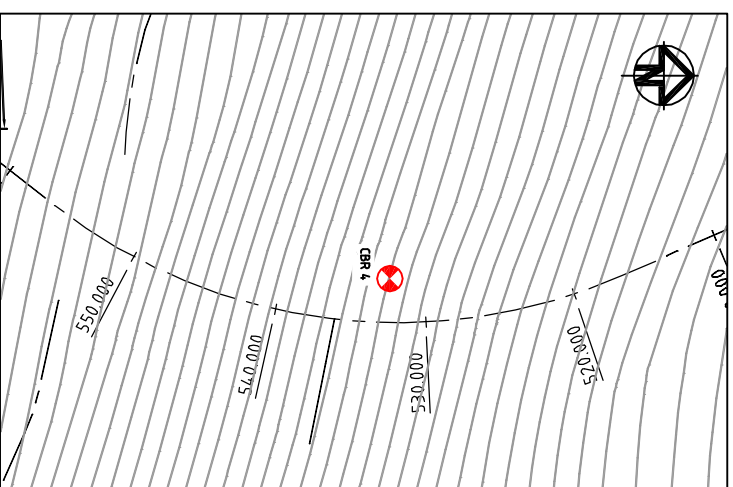
INSET 4
SCALE 1:500



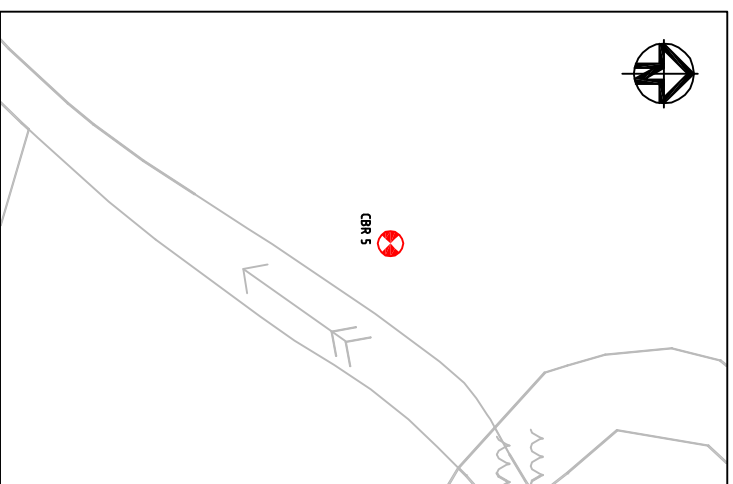
INSET 5
SCALE 1:500



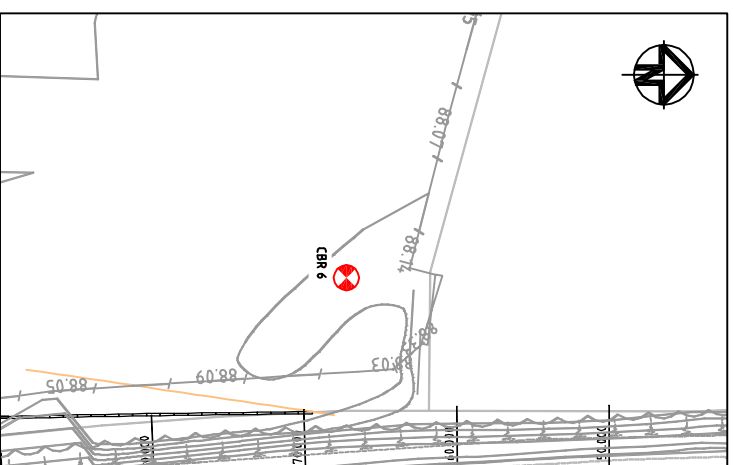
INSET 6
SCALE 1:500



INSET 7
SCALE 1:500



INSET 8
SCALE 1:500

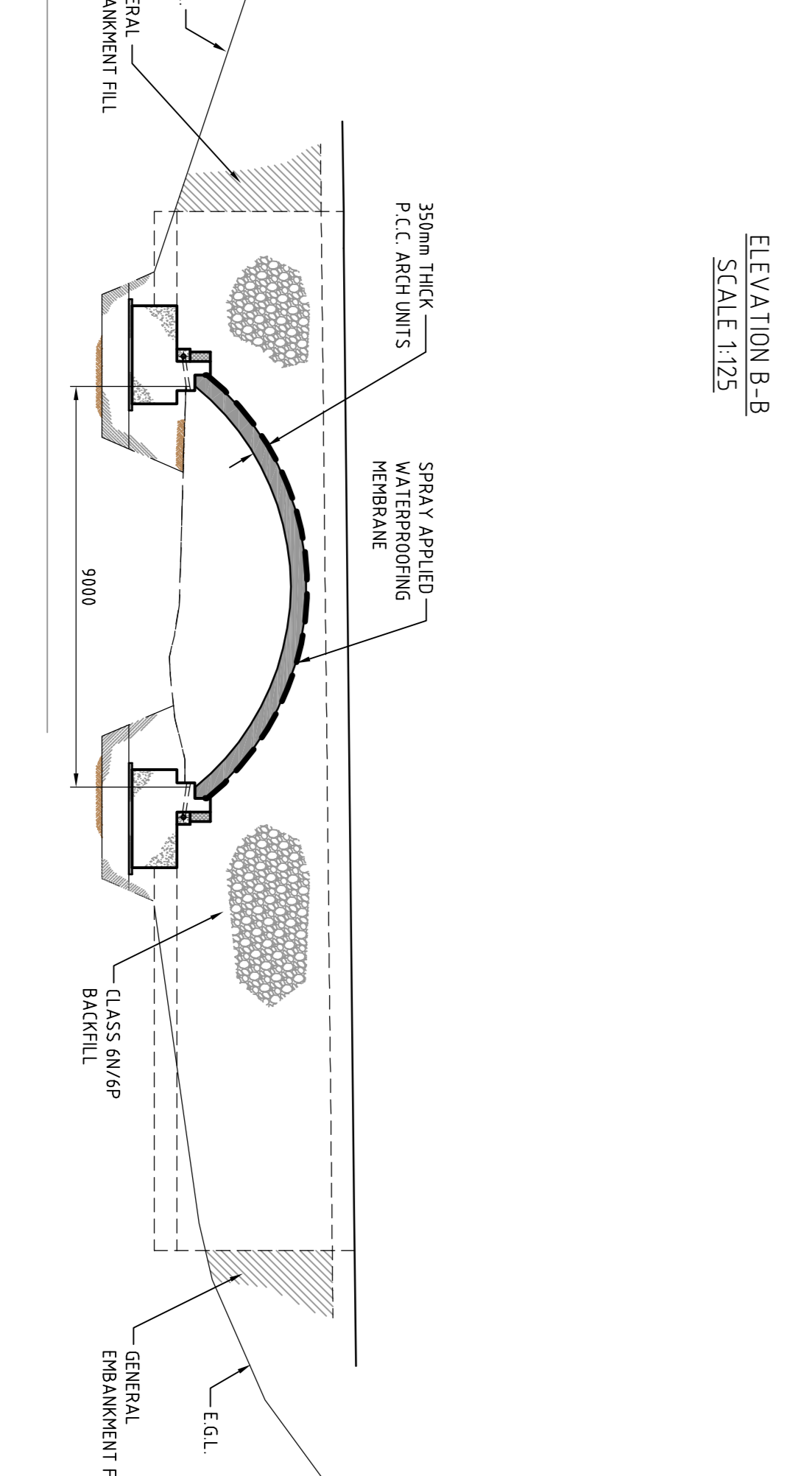
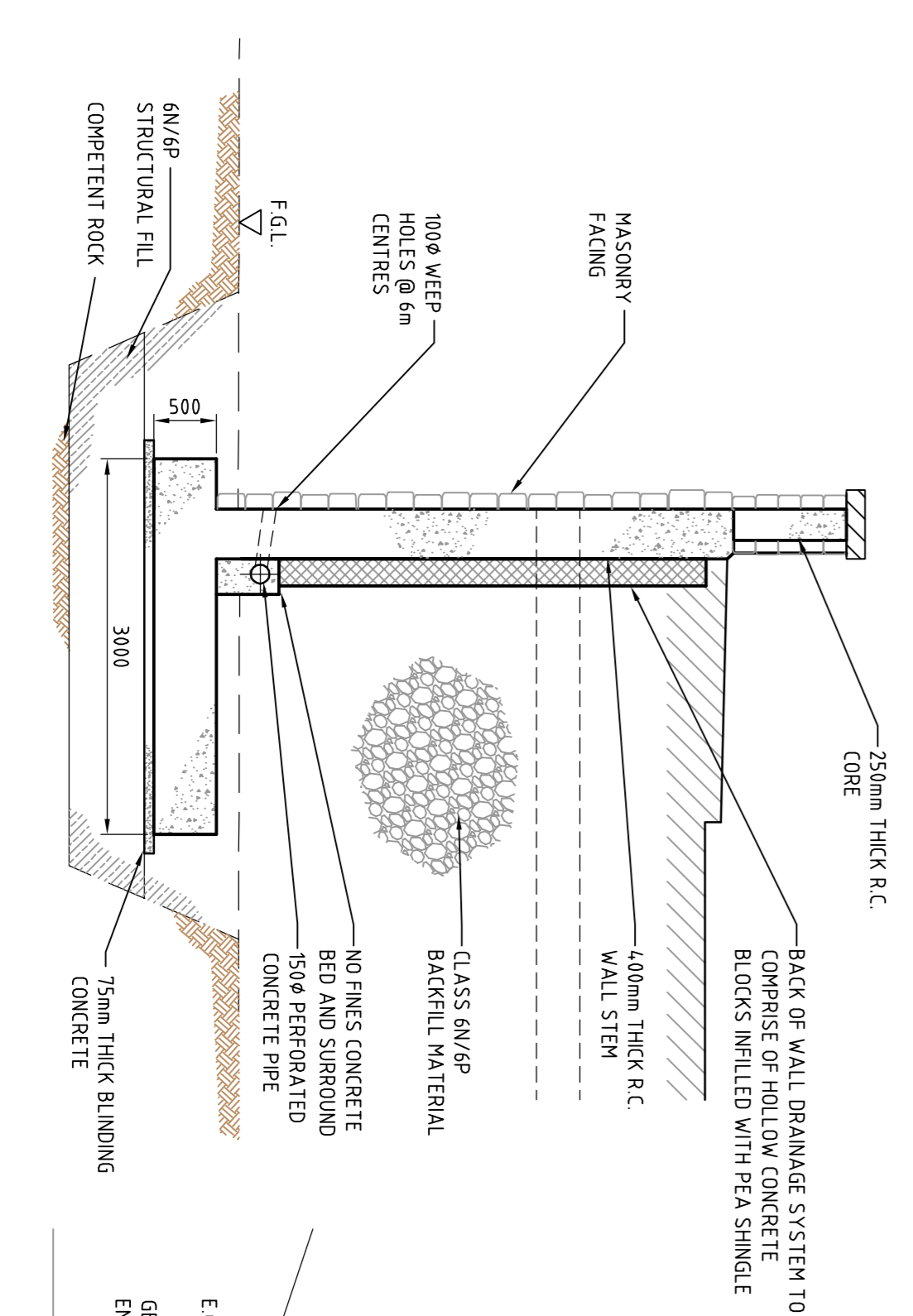
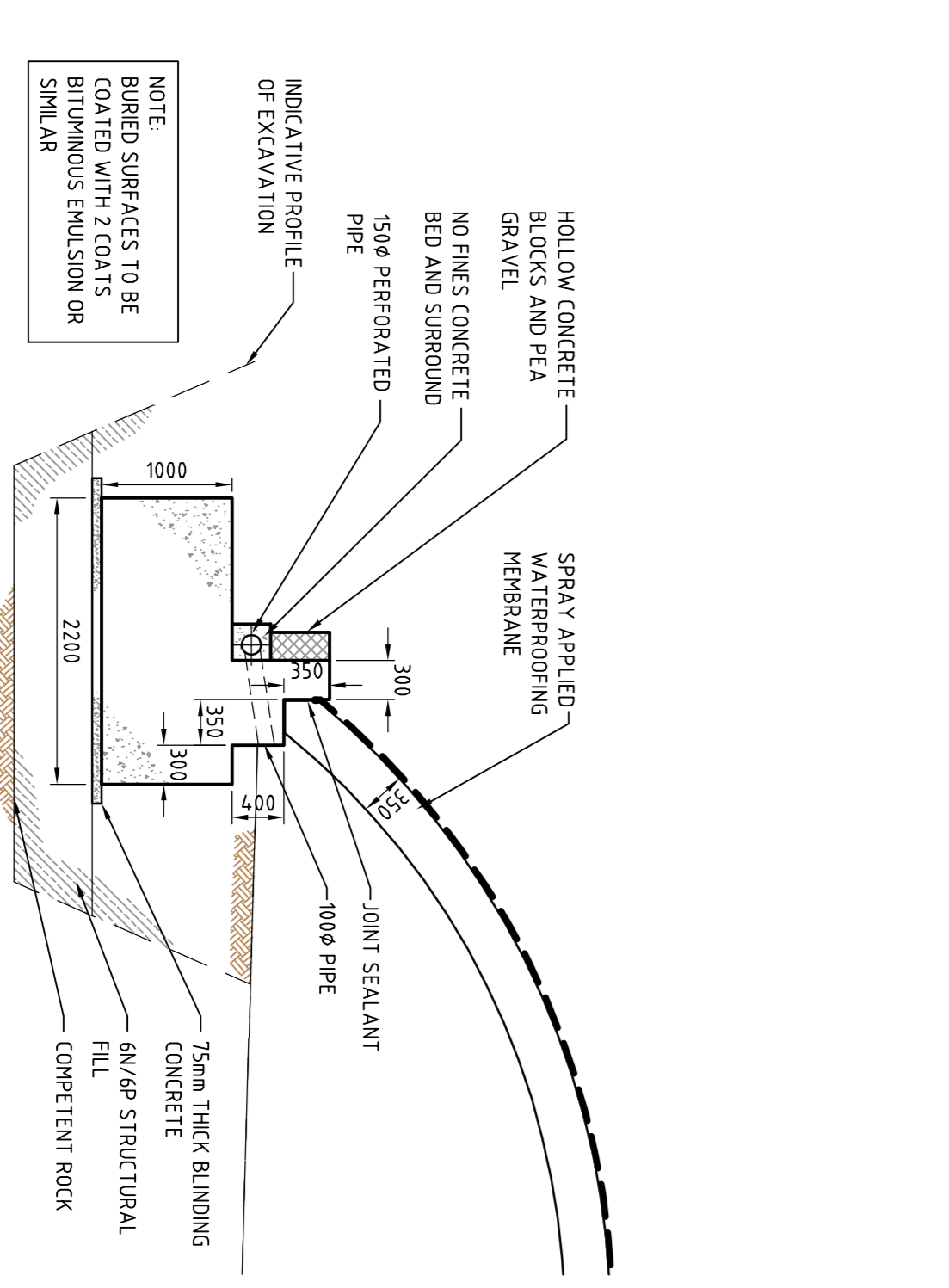
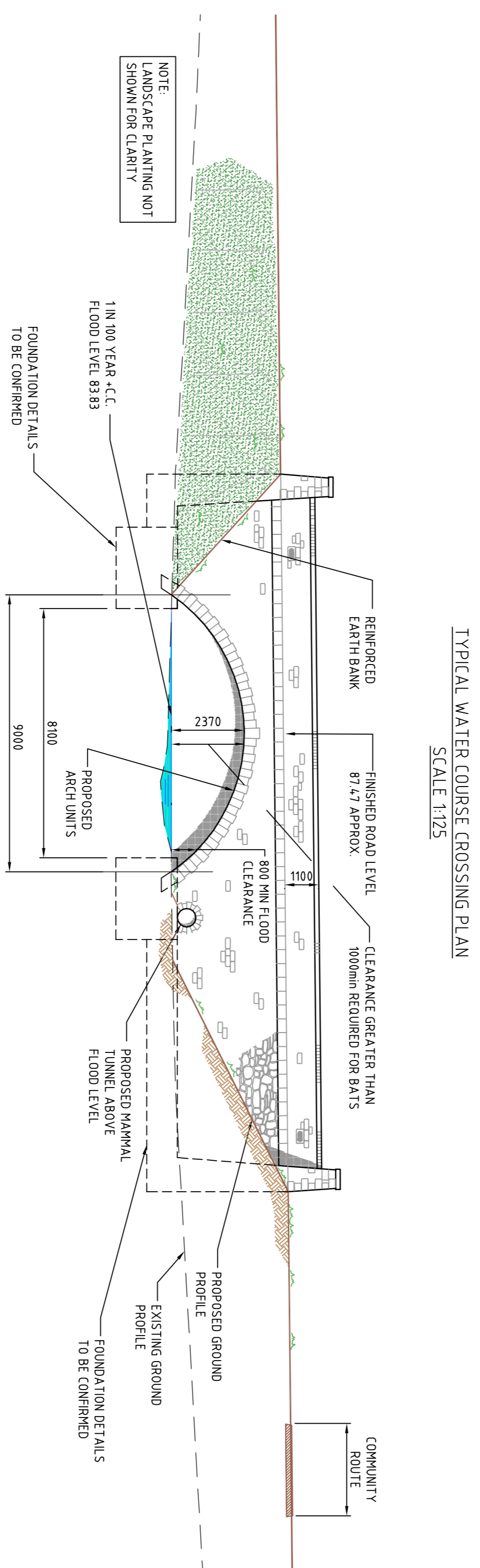
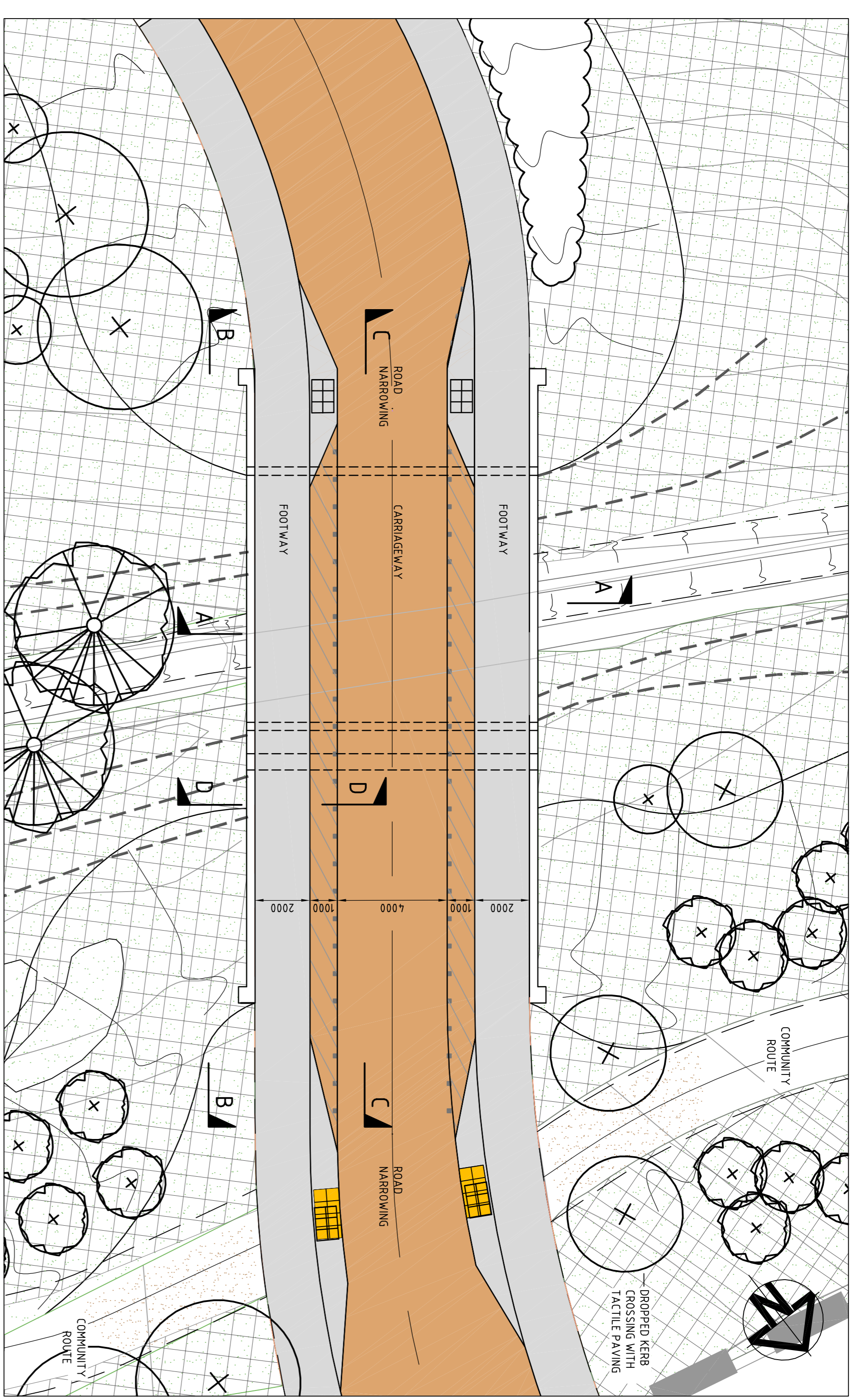
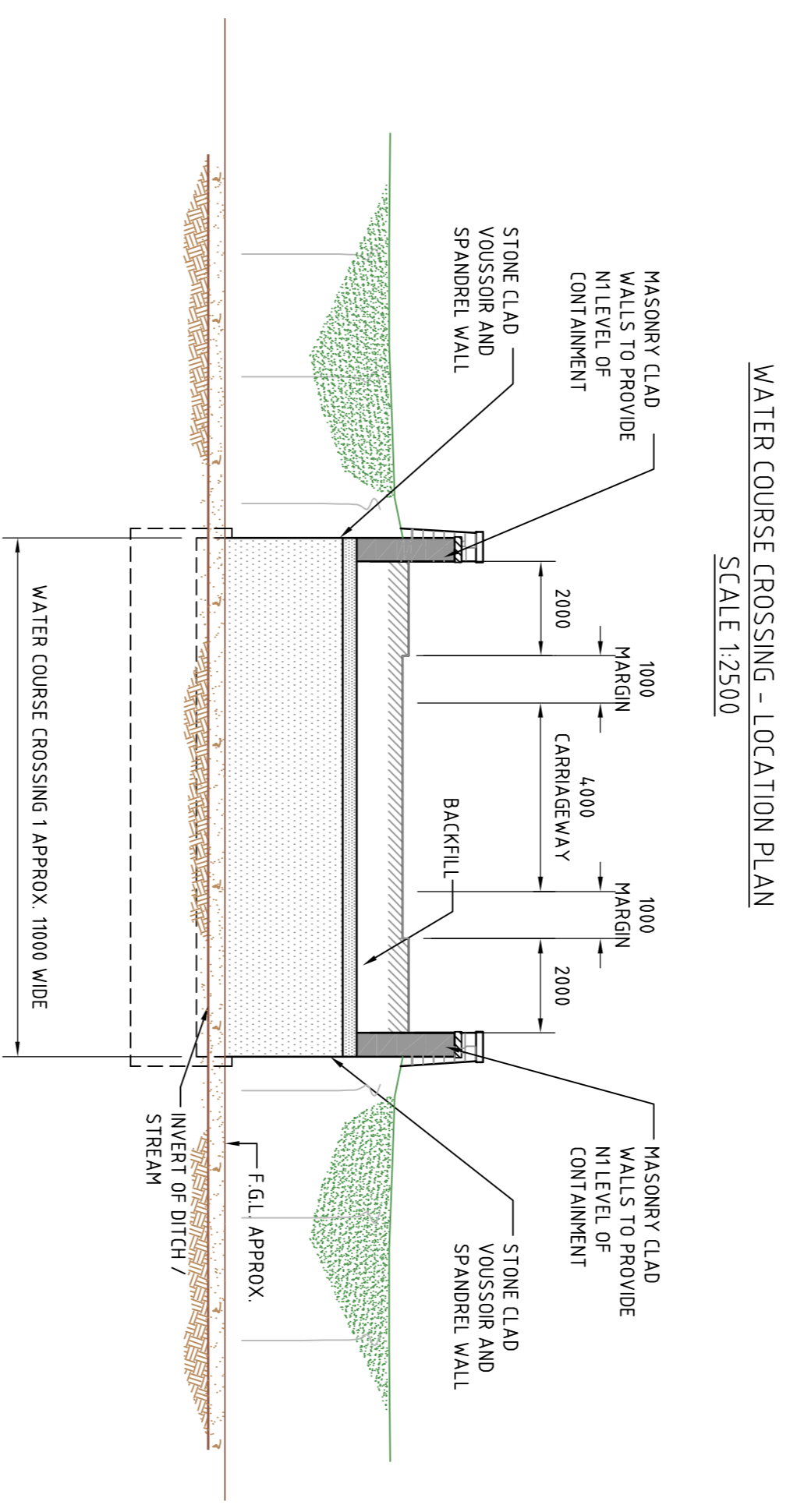
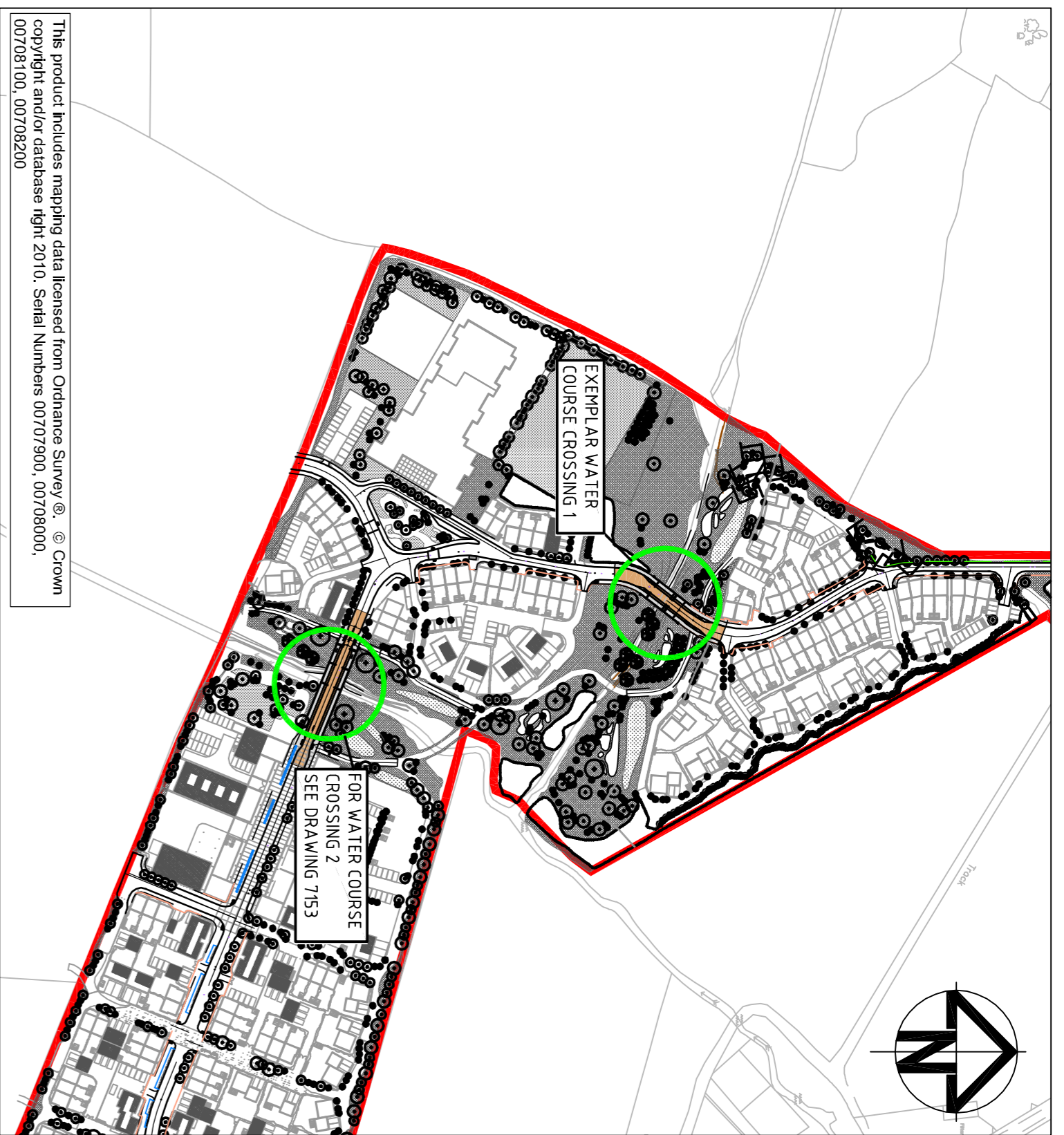


INSET 9
SCALE 1:500

KEY — SITE BOUNDARY - - - PROPOSED ROUTE CENTERLINE ● CBR1 CBR LOCATION ● BHH1 BOREHOLE LOCATION 87.429 HYD9 HYDER SURVEY STATION LOCATION MR PHIPPS LANDOWNERSHIP		Client 	
Issue 01 FIRST ISSUE 02 BOREHOLES REUMBERED AND GROUND LEVELS ADDED		Date 18/08/11 31/08/11	
Status Scales Original Size Height Datum Grid 1:10,000 1:500 A3 - OS		Project BICESTER ECO DEVELOPMENT EXEMPLAR SITE EXPLORATORY HOLE LOCATION PLAN	
Current Issue Signatures Author M. PEARSON Checker S.A. DAVIES Approver S.A. DAVIES		Title BICESTER ECO DEVELOPMENT EXEMPLAR SITE EXPLORATORY HOLE LOCATION PLAN	
Drawing No. 2006		Project No. UA003072	
Issue 02		Issue 02	

Figures

Figure 3 – Bridge 1 & 2 Design Drawings



- NOTES:
- DO NOT SCALE FROM DRAWING USE FIGURED DIMENSIONS ONLY.
 - DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE STATED.
 - STRUCTURE DETAILS ARE SUBJECT TO AGREEMENT WITH OXFORDSHIRE COUNTY COUNCIL HIGHWAYS AND STRUCTURES DIVISIONS.

KEY
 PLANNING APPLICATION BOUNDARY

Issue	Description	Date
01	FIRST ISSUE	25-08-11

Scale	AS SHOWN	Author
Original Size	A1	P. SWENNEY
Height	-	J. VYNN
Date	-	S. DAVIES

Client
 azdominion

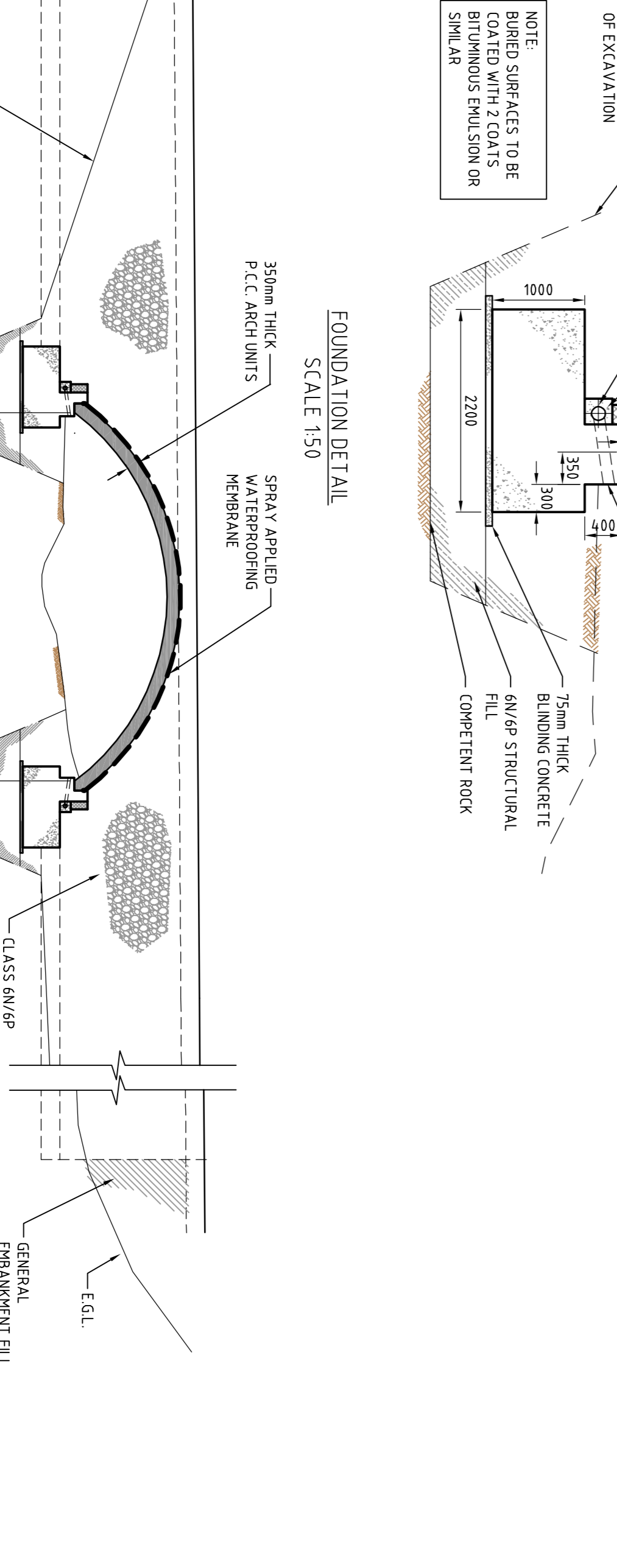
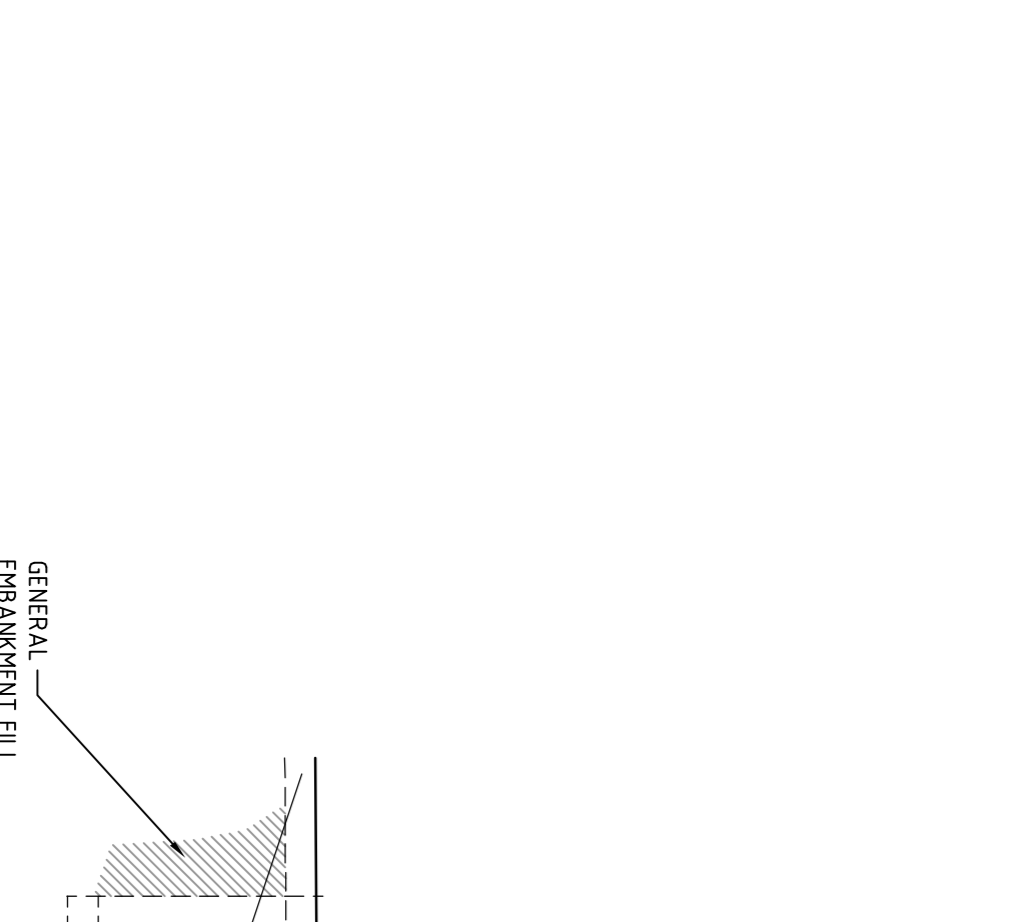
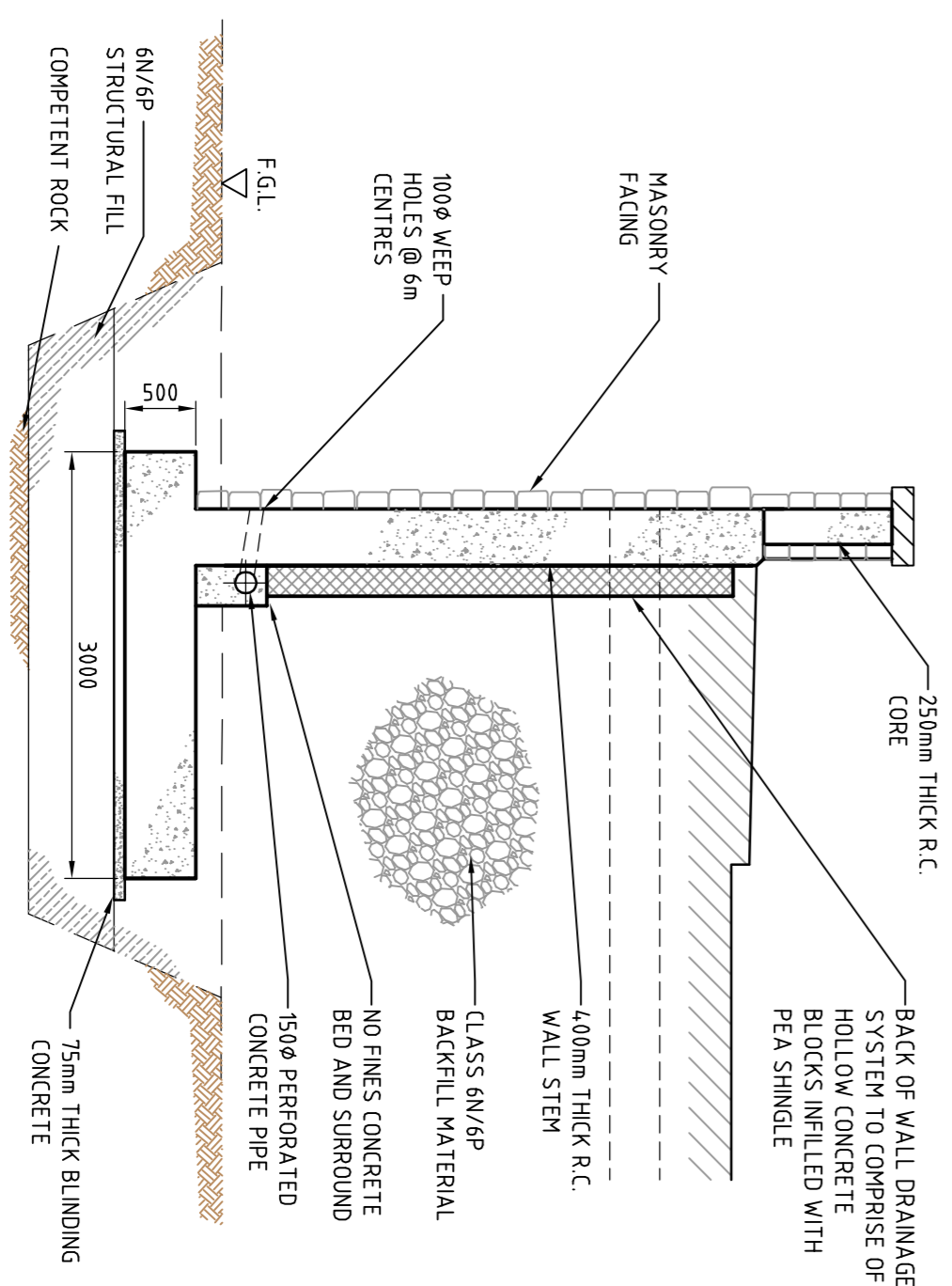
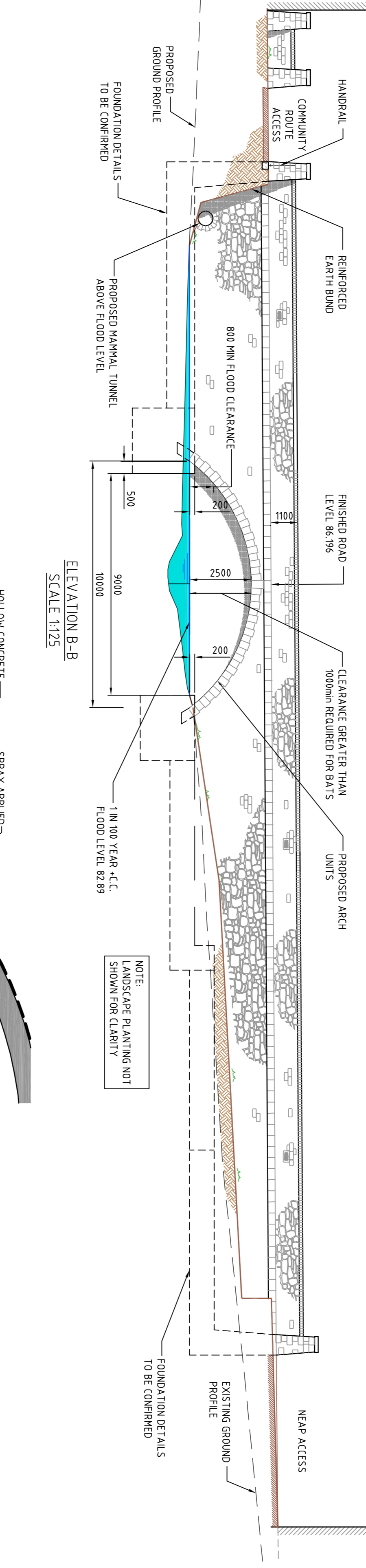
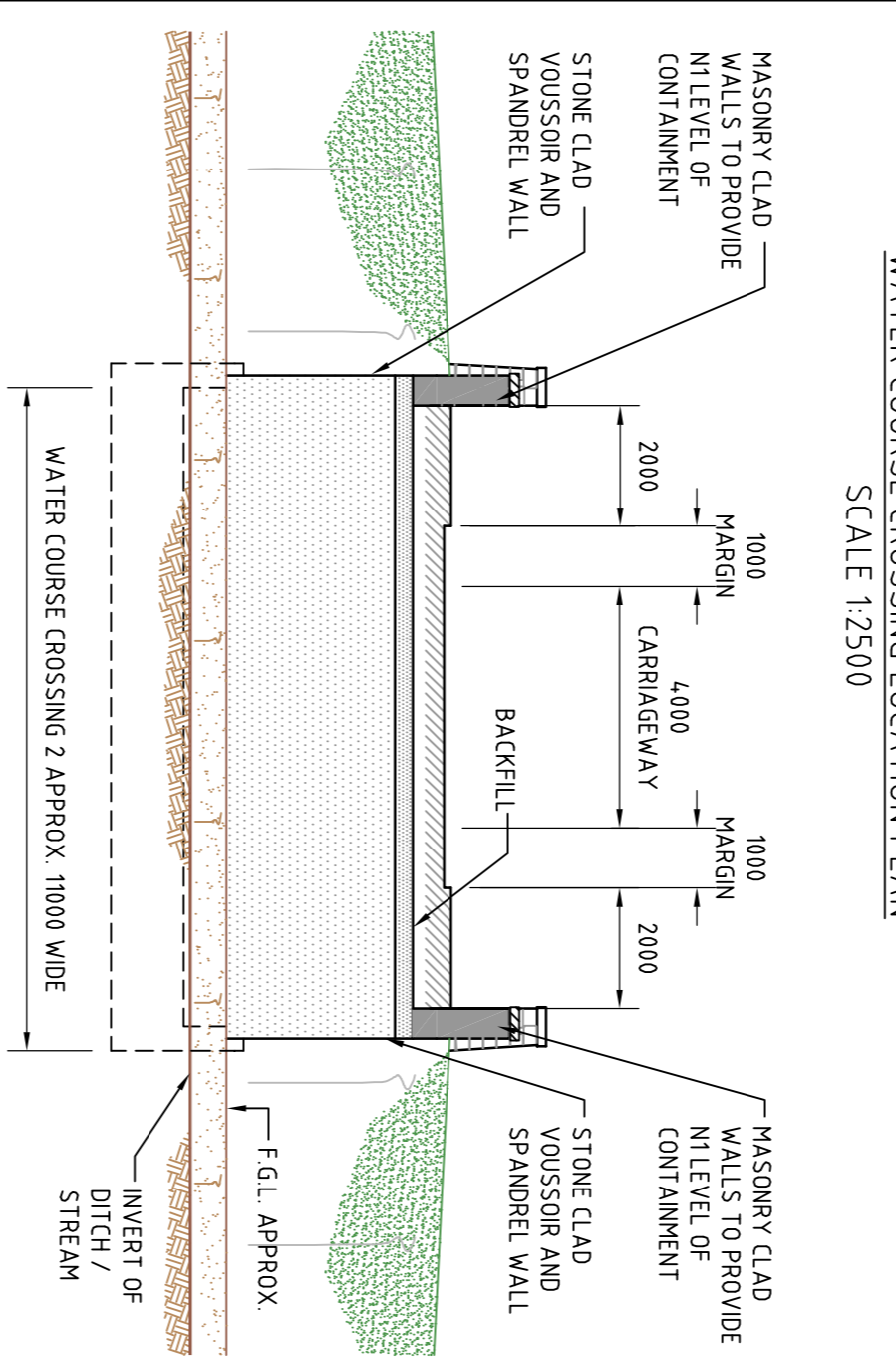
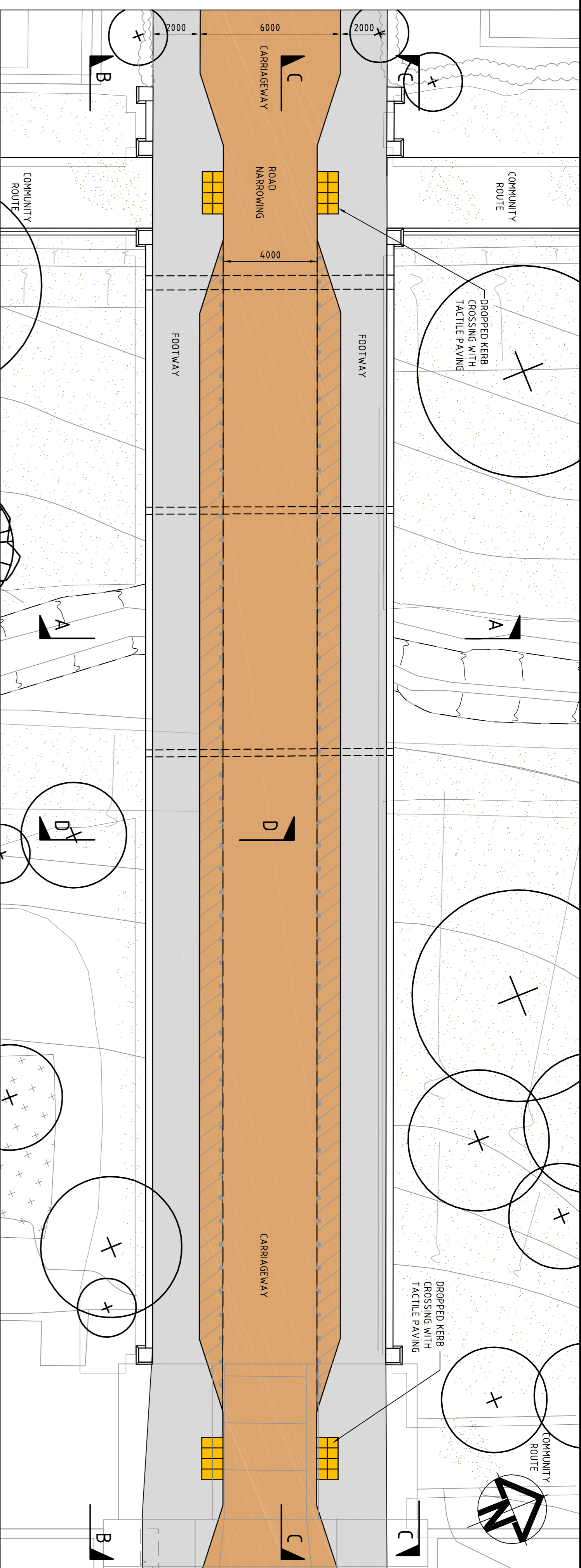
 P3Eco Ltd

Hyder Consulting (UK) Limited
 29, Bessenden Place
 London
 SW1E 5DZ
 Tel: +44 (0)870 000 3006
 Fax: +44 (0)870 000 3806

Project
 BICESTER
 ECO DEVELOPMENT

Title
 EXEMPLAR SITE
 WATER COURSE CROSSING 1
 GENERAL ARRANGEMENT

Drawing No. 7290 - UA001881 - 01
 Project No. UA001881 - 01
 Issue



- NOTES:
- DO NOT SCALE FROM DRAWING USE FIGURED DIMENSIONS ONLY.
 - DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE STATED.
 - STRUCTURE DETAILS ARE SUBJECT TO AGREEMENT WITH SUDSHIRE COUNTY COUNCIL HIGHWAYS AND STRUCTURES DIVISIONS.
- KEY
 PLANNING APPLICATION BOUNDARY

Issue	Description	Date
01	FIRST ISSUE	25-08-11

Scale	Author
AS SHOWN	P. SWENNEY
A1	J. VYNN
	S. DAVIES

Client: azdominion

Filename: 7292-UA001881-UP21D-01-WATER COURSE CROSSING 2 GA.dwg

Hyder Consulting (UK) Limited
 29, Bressenden Place
 London SW1E 5DZ
 Tel: +44 (0)870 000 3006
 Fax: +44 (0)870 000 3906

Hyder Consulting
 BICESTER
 ECO DEVELOPMENT

EXEMPLAR SITE
 WATER COURSE CROSSING 2
 GENERAL ARRANGEMENT

Drawing No. 7292 - Project No. UA001881 - Issue 01

Appendix A

Rotary Cored Borehole Logs



DRILLHOLE LOG

Project NW Bicester EcoTown, Exemplar Site				DRILLHOLE No BH01	
Job No UA003072	Date 05-09-11	Ground Level (m)	Co-Ordinates ()		
Contractor Hyder				Sheet 1 of 2	

RUN DETAILS					STRATA			Geology	Instrument/ Backfill	
Depth Date	TCR (SCR) RQD	(SPT) Fracture Spacing	Red'cd Level	Legend	Depth (Thick- ness)	DESCRIPTION				
						Discontinuities	Detail			Main
					0.20			TOPSOIL: Turf over soft brown slightly gravelly SILT/CLAY with rootlets. Gravel is subangular fine to coarse of limestone.		
1.00								Very stiff yellow brown and grey slightly sandy slightly gravelly SILT/CLAY with occasional subangular cobbles of limestone. Gravel is angular to subangular fine to coarse of limestone.		
05-09	48 (10) 10				(1.90)					
2.00		N>50						Very stiff blue grey slightly gravelly SILT/CLAY. Gravel is subangular fine to coarse of limestone.		
3.00					2.10					
05-09		1,2/ 5,8,8,26 (150/300) N=47			(1.90)			Strong light grey LIMESTONE with closely spaced (30/100/180mm) subhorizontal, rough and clean fractures. END OF BOREHOLE		
4.00	100 (80) 50				4.00					
5.00		N>50						5.30 - 5.40 : Band of yellow brown SILT/CLAY.		
05-09	90 (60) 30									
6.00		N>50			(4.00)			7.60 - 7.65 : Band of yellow brown SILT/CLAY.		
7.00										
05-09	90 (80) 40	N>50								
8.00					8.00					

Drilling Progress and Water Observations						Rotary Flush				GENERAL REMARKS
Date	Time	Depth	Casing	Core Dia mm	Water Strike	Water Standing	From	To	Type	
05-09-11	00.00	8.00	2.00	100			1	8.00	Mist	100

1. Borehole terminated at 8.00m.
2. No Grounwater encountered.
3. Dynamic Sampling between GL - 1.00m bgl.
4. Open Hole drilling techniques between 2.00 - 3.00 m bgl, 4.00 - 5.00m bgl and 6.00 - 7.00m bgl

All dimensions in metres Scale 1:50	Client a2dominion Housing Ltd & P3Eco Ltd.	Method/ Plant Used Commachio 300 Rig	Logged By T.Booth
--	--	--	----------------------

AGS3 UK DH UA003072-NW BICESTER ECOTOWN, EXEMPLAR SITE.GPJ AGS 3_1.GDT 9/16/11



DRILLHOLE LOG

Project NW Bicester EcoTown, Exemplar Site				DRILLHOLE No BH01	
Job No UA003072	Date 05-09-11	Ground Level (m)	Co-Ordinates ()		
Contractor Hyder				Sheet 2 of 2	

RUN DETAILS						STRATA			Geology	Instrument/ Backfill
Depth Date	TCR (SCR) RQD	(SPT) Fracture Spacing N>50	Red'cd Level	Legend	Depth (Thick- ness)	DESCRIPTION				
						Discontinuities	Detail	Main		

Drilling Progress and Water Observations							Rotary Flush				GENERAL REMARKS
Date	Time	Depth	Casing	Core Dia mm	Strike	Water Standing	From	To	Type	Returns	
											1. Borehole terminated at 8.00m. 2. No Grounwater encountered. 3. Dynamic Sampling between GL - 1.00m bgl. 4. Open Hole drilling techniques between 2.00 - 3.00 m bgl, 4.00 - 5.00m bgl and 6.00 - 7.00m bgl

All dimensions in metres Scale 1:50	Client a2dominion Housing Ltd & P3Eco Ltd.	Method/ Plant Used Commachio 300 Rig	Logged By T.Booth
--	--	--	----------------------

AGS3 UK DH UA003072-NW BICESTER ECOTOWN, EXEMPLAR SITE.GPJ AGS 3_1.GDT 9/16/11



DRILLHOLE LOG

Project NW Bicester EcoTown, Exemplar Site				DRILLHOLE No BH02	
Job No UA003072	Date 05-09-11	Ground Level (m)	Co-Ordinates ()		
Contractor Hyder				Sheet 1 of 1	

RUN DETAILS						STRATA			Geology	Instrument/ Backfill
Depth Date	TCR (SCR) RQD	(SPT) Fracture Spacing	Red'cd Level	Legend	Depth (Thick- ness)	DESCRIPTION				
						Discontinuities	Detail	Main		
					(0.60) 0.60			TOPSOIL: Turf over soft brown slightly gravelly SILT/CLAY with rootlets. Gravel is subangular fine to coarse of limestone.		
		1,1/ 1,1,2,2 (150/300) N=6			(2.30) 2.30			Soft becoming firm brown and grey slightly sandy slightly gravelly SILT/CLAY. Gravel is angular to subangular fine to coarse of limestone.		
		2,2/ 2,3,3,2 (150/300) N=10			2.90 (1.10) 4.00			Very stiff yellow brown and grey slightly sandy slightly gravelly SILT/CLAY with occasional subangular cobbles of limestone. Gravel is angular to subangular fine to coarse of limestone. END OF BOREHOLE		
		2,5/ 11,10,9,10 (150/300) N=40								
		3,5/ 6,6,8,13 (150/300) N=33								

AGS3 UK DH UA003072-NW BICESTER ECOTOWN, EXEMPLAR SITE.GPJ AGS 3_1.GDT 9/16/11

Drilling Progress and Water Observations							Rotary Flush				GENERAL REMARKS
Date	Time	Depth	Casing	Core Dia mm	Strike	Water Standing	From	To	Type	Returns	
05-09-11	00.00	4.00	3.00	100			0	4.00	air	100	1. Borehole terminated at 4.00m. 2. No Grounwater encountered. 3 .Dynamic Sampling between GL - 4.00 m bgl.

All dimensions in metres Scale 1:50	Client a2dominion Housing Ltd & P3Eco Ltd.	Method/ Plant Used Commachio 300 Rig	Logged By T.Booth
--	--	--	----------------------



DRILLHOLE LOG

Project NW Bicester EcoTown, Exemplar Site				DRILLHOLE No BH03	
Job No UA003072	Date 05-09-11	Ground Level (m)	Co-Ordinates ()		
Contractor Hyder				Sheet 1 of 1	

RUN DETAILS						STRATA			Geology	Instrument/ Backfill
Depth Date	TCR (SCR) RQD	(SPT) Fracture Spacing	Red'cd Level	Legend	Depth (Thick- ness)	DESCRIPTION				
						Discontinuities	Detail	Main		
					0.30					
		1,1/ 1,2,2,2 (150/300) N=7			(1.90)					
		4,5/ 5,5,7,7 (150/300) N=24			2.20	1.80 m: Becoming Stiff.				
		5,5/ 6,14,12,10 (150/300) N=42			(1.80)					
		N>50			4.00					

Drilling Progress and Water Observations							Rotary Flush				GENERAL REMARKS
Date	Time	Depth	Casing	Core Dia mm	Strike	Water Standing	From	To	Type	Returns	
05-09-11	00.00	4.00	3.00	100			0	4.00	Air	100	1. Borehole terminated at 4.00m. 2. No Grounwater encountered. 3. Dynamic Sampling between GL - 4.00 m bgl.

All dimensions in metres Scale 1:50	Client a2dominion Housing Ltd & P3Eco Ltd.	Method/ Plant Used Commachio 300 Rig	Logged By T.Booth
--	--	--	----------------------

AGS3 UK DH UA003072-NW BICESTER ECOTOWN, EXEMPLAR SITE.GPJ AGS 3_1.GDT 9/16/11



DRILLHOLE LOG

Project NW Bicester EcoTown, Exemplar Site				DRILLHOLE No BH04	
Job No UA003072	Date 06-09-11	Ground Level (m)	Co-Ordinates ()		
Contractor Hyder				Sheet 1 of 1	

RUN DETAILS						STRATA			Geology	Instrument/ Backfill
Depth Date	TCR (SCR) RQD	(SPT) Fracture Spacing	Red'cd Level	Legend	Depth (Thick- ness)	DESCRIPTION				
						Discontinuities	Detail	Main		
					0.30			TOPSOIL: Turf over soft brown slightly gravelly SILT/CLAY with rootlets. Gravel is subangular fine to coarse of limestone.		
		1,2/ 2,2,3,3 (150/300) N=10			(1.30)			Stiff brown and grey slightly sandy slightly gravelly SILT/CLAY. Gravel is angular to subangular fine to coarse of limestone.		
		6,8/ 7,6,5,7 (150/300) N=25			1.60			Very stiff yellow brown and grey slightly sandy gravelly SILT/CLAY with occasional subangular cobbles of limestone. Gravel is angular to subangular fine to coarse of limestone.		
					(1.10)					
2.80					2.70			Strong light grey and brown LIMESTONE with closely spaced (25/40/90mm) subhorizontal, rough and clean fractures. END OF BOREHOLE		
06-09	48 (15) 0	N>50			(1.30)					
4.00		N>50			4.00					

AGS3 UK DH UA003072-NW BICESTER ECOTOWN, EXEMPLAR SITE.GPJ AGS 3_1.GDT 9/16/11

Drilling Progress and Water Observations							Rotary Flush				GENERAL REMARKS
Date	Time	Depth	Casing	Core Dia mm	Strike	Water Standing	From	To	Type	Returns	
06-09-11	00.00	4.00	3.00	100			0 3	3.00 4.00	Air Mist	100 100	1. Borehole terminated at 4.00m. 2. No Grounwater encountered. 3. Dynamic Sampling between GL - 1.00m bgl. 4. Open Hole drilling techniques between 1.00 - 2.70 m bgl. 5. Rotary core drilling between 2.70 - 4.00m bgl.

All dimensions in metres Scale 1:50	Client a2dominion Housing Ltd & P3Eco Ltd.	Method/ Plant Used Commachio 300 Rig	Logged By T.Booth
--	--	--	----------------------



DRILLHOLE LOG

Project NW Bicester EcoTown, Exemplar Site				DRILLHOLE No BH05	
Job No UA003072	Date 06-09-11	Ground Level (m)	Co-Ordinates ()		
Contractor Hyder				Sheet 1 of 1	

RUN DETAILS						STRATA			Geology	Instrument/ Backfill	
Depth Date	TCR (SCR) RQD	(SPT) Fracture Spacing	Red'cd Level	Legend	Depth (Thick- ness)	DESCRIPTION					
						Discontinuities	Detail	Main			
2.80 06-09 3.70	78 (35) 20	1,1/ 2,2,2,1 (150/300) N=7			0.30				<p>TOPSOIL: Turf over soft brown slightly gravelly SILT/CLAY with rootlets. Gravel is subangular fine to coarse of limestone.</p> <p>Soft brown and grey slightly sandy slightly gravelly SILT/CLAY. Gravel is angular to subangular fine to coarse of limestone.</p> <p>Stiff yellow brown and grey slightly sandy gravelly SILT/CLAY with occasional subangular cobbles of limestone. Gravel is angular to subangular fine to coarse of limestone.</p> <p>Strong light grey and brown LIMESTONE with closely spaced (20/70/180mm) subhorizontal, rough and clean fractures.</p> <p>Very dense yellow brown slightly sandy clayey gravel and cobbles of non-intact LIMESTONE. Gravel is angular to subangular fine to coarse of limestone.</p> <p style="text-align: center;">END OF BOREHOLE</p>		
					(1.35)						
					1.65						
		(1.05)									
		2.70									
		(0.90)									
3.60											
(0.70)											
4.30											

AGS3 UK DH UA003072-NW BICESTER ECOTOWN, EXEMPLAR SITE.GPJ AGS 3_1.GDT 9/16/11

Drilling Progress and Water Observations							Rotary Flush				GENERAL REMARKS
Date	Time	Depth	Casing	Core Dia mm	Strike	Water Standing	From	To	Type	Returns	
06-09-11	00.00	4.30	3.00	100			0 3	3.00 4.00	Air Mist	100 100	1. Borehole terminated at 4.30m. 2. No Grounwater encountered. 3. Dynamic Sampling between GL - 1.00m bgl. 4. Open Hole drilling techniques between 1.00 - 2.70 m bgl. 5. Rotary core drilling between 2.70 - 4.00m bgl.
All dimensions in metres Scale 1:50			Client	a2dominion Housing Ltd & P3Eco Ltd.		Method/ Plant Used	Commachio 300 Rig			Logged By T.Booth	

Appendix B

Rotary Core Photographs



Plate 1: Borehole 1. Box cores from 1 to 6.00m bgl.



Plate 2: Borehole 1: Box Cores 6.0 m bgl to 8.0m bgl.



Plate 3: Borehole 4: Box core 2.80m bgl to 4.00m bgl



Plate 4: Borehole 5: Box cores between 2.80m bgl and 3.7m bgl.

Appendix C

Geotechnical Laboratory Test Results

Index Property Test Results

Site **Bicester**
 Client **Hyder Consulting**
 Job Number **Z0728**
 Lab Number

UKAS Testing Laboratory 1429

Hole	Sample	Depth (m)	Method	History	MC (%)	LL (%)	Ret (%)	PL (%)	Pa (%)	PI (%)	Class	Description
BH02	D6	3.00	1	2	28	81	69	54	31	27	MV	Refer to log sheets
BH03	D2	1.00	1	2	33	63	5	38	95	25	MH	Refer to log sheets

Key

MC - Moisture content
 LL - Liquid Limit
 Ret - Percentage retained on 425 micron test sieve
 PL - Plastic limit
 Pa - Percentage passing the 425 micron test sieve
 PI - Plasticity Index

History

(1) Sample was tested from the natural state. Particles greater than 425 microns removed by hand (BS1377:Part2:1990:4.2.3)
 (2) Sample was wet sieved through 425 micron test sieve (BS1377:Part2:1990:4.2.4)
 (3) Sample was air dried at less than 50 degrees Centigrade and passed through the 425 micron sieve
 (4) Unknown

Methods

[1] BS1377:Part2:1990: Methods 3.2/4.4/5.3 - Liquid Limit by One point Cone Penetrometer
 [2] BS1377:Part2:1990: Methods 3.2/4.4/5.3 - Liquid Limit by Four Point Cone Penetrometer

Samples were prepared in accordance with BS1377:Part1:1990

Classification is based on the plasticity chart - Fig 2.6 of Manual of Soil Laboratory Testing - Volume 1 by K.H.Head.

NOTE - 'O' is added to the symbol for soils containing a significant amount of organic material (determined by visual inspection) e.g. MHO

Checked

Approved

Point Load Test Results



Site: Bicester

Job No: Z0728

Client: Hyder Consulting

Date: 26.9.2011

BH / Sample Reference	Sample Depth (m below G.L)	Test Type (d, a, b or i - see key below)	Platen Separation (d) (mm)	Sample Width (w) (mm)	Load at Failure (P) (kN)	Equivalent Core Diameter ² (De ²) (mm ²)	Uncorrected Point Load Strength (Is) (MPa)	Corrected Point Load Strength (Is50) (MPa)*	Specimen Description
BH1	5.10	D	86	64	6.9	7396	0.9	1.2	Limestone
BH1	5.10	A	65	42	6.7	3476	1.9	2.2	Limestone
BH1	7.70	D	70	53	10.2	4900	2.1	2.4	Limestone
BH1	7.80	D	70	54	11.3	4900	2.3	2.7	Limestone
BH4	2.95	D	70	60	1.4	4900	0.3	0.3	Limestone
BH4	2.95	A	30	15	4.6	573	8.0	6.4	Limestone
BH5	2.80	A	60	47	8.6	3591	2.4	2.6	Limestone
BH5	2.85	I	50	48	6.3	3056	2.1	2.1	Limestone
BH5	4.15	A	45	20	4.9	1146	4.3	4.1	Limestone
BH5	4.10	I	50	39	11.0	2483	4.4	4.4	Limestone

Notes:
 Point load strength calculated in accordance with: E.L.E International, Point Load Apparatus, Operating Instructions.
 * Ref. Norbury D.R, in *Site Investigation Practice: Assessing BS 5930*, Geological Society, Engineering Geology Special Publication No. 2, 1986, P.58.

Key to test types: d=Diametral, a=Axial, b=Block, i=Irregular lump.



Laboratory Report



Contract Number: 13628

Client's Reference: Z0728/L9363/S3860

Report Date: 12-10-2011

Client Name: C J Associates
King Roads Avenue
Bristol
BS11 9HF

Contract Title: Bicester
For the attention of: Vince Simmonds

Date Received: 21-09-2011
Date Commenced: 21-09-2011
Date Completed: 12-10-2011

Test Description	Quantity	Checked	Approved
Part 1 - SM for Determination of the Uniaxial Compressive Strength of Rock Materials ISRM Suggested Methods for Rock Characterization	2		
Extra over items 12.4 to 12.6 for specimen preparation. ISRM / BS 1377/2/3.3	2		

Notes: **Observations and Interpretations are outside the UKAS Accreditation**
* - Denotes test included in laboratory scope of accreditation
- Denotes test carried out by approved contractor

This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced in full, without the prior written approval of the laboratory.

Approved Signatories:

D V Edwards (Managing Director), Paul Evans (Technical Manager), E Sharp (Technical Co-Ordinator).



Unit 24-26. Delta Lakes The Avenue Llanelli
 Carmarthenshire .SA15 2DS
 tel: +44 (0)1554 757734
 fax: +44 (0)1554 775107
 e-mail: vedwards@geolab.org.uk

Date: 12-Oct-11
 Contract Number: 13628-210911
 Location: Bicester
 Sample Type: Core
 Sample Preparation: Capping and Grinding
 Operator: Vincent Williams


Determination of Unconfined Compressive Strength.


ISRM Suggested Methods Vol 16, No. 2, pp. 135-140 1979..

Borehole Number	Depth (m)	Diameter (mm)	Length (mm)	Initial mass g	Bulk Density Mg/m ³	MC %	Dry Density Mg/m ³	Load Failure	MCS(MPA)	Mode OF FAILURE	Date Tested	Remarks
BH1	5.75-6.00	72.70	207.60	2051.2	2.38	2.2	2.33	89.5	21.6	Brittle	28-Sep-11	
BH5	3.16-3.35	72.70	189.10	2045.6	2.61	1.4	2.57	365.2	88.0	Explosive	28-Sep-11	

Approved Signatories:

D V Edwards (Managing Director)





Date 12/10/11

E Sharp (Laboratory Co-ordinator Processor)

.....


Date 12/10/11

Appendix D

Chemical Laboratory Test Results



Unit A2
Windmill Road
Ponswood Industrial Estate
St Leonards on Sea
East Sussex
TN38 9BY
Telephone (01424) 718618
Facsimile (01424) 729911

THE ENVIRONMENTAL LABORATORY LTD

F.A.O. Vince Simmonds
CJ Associates Geotechnical Ltd
King Road Avenue
Avonmouth
Bristol, BS11 9HF

Reporting Date: 27/09/11

ANALYTICAL REPORT No. AR34966

Samples Received By:- Courier
Samples Received:- 21/09/11
Your Job No: Z0728
Lab No: L9363
Subcontract No: S3859
Site Location: Bicester
No Samples Received:- 9

Report Checked By:-

Steve Knight
Director

Authorised By:-

Mike Varley BSc, CChem, CSci, FRSC
Chief Chemist

Any comments, opinions, or interpretations expressed herein are outside the scope of UKAS accreditation (Accreditation Number 2683)



THE ENVIRONMENTAL LABORATORY LTD

Unit A2, Windmill Road, Ponswood Industrial Estate, St Leonard's on Sea, East Sussex, TN38 9BY
 Tel: 01424 718618 Fax: 01424 729911



ANALYTICAL REPORT No. AR34966

Location: Bicester

Your Job No: Z0728
 Lab No: L9363
 Subcontract No: S3859
 Reporting Date: 27/09/11

F.A.O. Vince Simmonds
 CJ Associates Geotechnical Ltd
 King Road Avenue
 Avonmouth
 Bristol, BS11 9HF

Soils	Characteristic	Clay loam	Sandy silt loam	Sandy silt loam	Silty clay loam	Silty clay loam	Silty clay loam	Silty clay loam	Silt Loam	Silt Loam
		BH01	BH03	BH04	BH04	BH05	BH01	BH01	BH02	BH02
	TP/BH	BH01	BH03	BH04	BH04	BH05	BH01	BH01	BH02	BH02
	Depth (m)	3.00	2.00	1.00	2.00	2.00	2.00 ⁽¹⁾	3.00	1.00	2.00
	Our ref	14230	14231	14232	14233	14234	14235	14236	14237	14238
	Stone Content (%)	<1	16	15	12	12	13	<1	<1	<1
	Arsenic** (mg/kg)	n/t	n/t	n/t	n/t	n/t	8.4	<5	9.5	6.5
	Cadmium** (mg/kg)	n/t	n/t	n/t	n/t	n/t	<0.5	<0.5	<0.5	<0.5
	Chromium** (mg/kg)	n/t	n/t	n/t	n/t	n/t	11	9	13	10
	Lead** (mg/kg)	n/t	n/t	n/t	n/t	n/t	10	11	10	7
	Mercury** (mg/kg)	n/t	n/t	n/t	n/t	n/t	<0.5	<0.5	<0.5	<0.5
	Nickel** (mg/kg)	n/t	n/t	n/t	n/t	n/t	11	10	18	13
	Copper** (mg/kg)	n/t	n/t	n/t	n/t	n/t	7	5	10	9
	Zinc** (mg/kg)	n/t	n/t	n/t	n/t	n/t	19	24	42	45
	Selenium** (mg/kg)	n/t	n/t	n/t	n/t	n/t	0.6	0.8	1.4	2.1
	Barium** (mg/kg)	n/t	n/t	n/t	n/t	n/t	16	15	47	45
	Beryllium* (mg/kg)	n/t	n/t	n/t	n/t	n/t	<5	<5	<5	<5
	Vanadium** (mg/kg)	n/t	n/t	n/t	n/t	n/t	18.6	13.9	26.7	17.5
	Water Soluble Boron (mg/kg)	n/t	n/t	n/t	n/t	n/t	<0.5	<0.5	1.2	1.4
	pH Value** (Units)	7.8	8.3	8.1	8.3	8.3	n/t	n/t	n/t	n/t
	Total Cyanide (mg/kg)	n/t	n/t	n/t	n/t	n/t	<1	<1	<1	<1
	Total Organic Carbon (%)	n/t	n/t	n/t	n/t	n/t	0.1	<0.1	0.8	0.7
	Water Soluble Sulphate (mg/l as SO ₄)	18	20	28	25	21	n/t	n/t	n/t	n/t

⁽¹⁾ = Labelled @ 1.00

All results expressed on dry weight basis

** - MCERTS accredited test

* = UKAS accredited test

GM



Unit A2
 Windmill Road
 Ponswood Industrial Estate
 St Leonards on Sea
 East Sussex
 TN38 9BY
 Telephone (01424) 718618
 Facsimile (01424) 729911

THE ENVIRONMENTAL LABORATORY LTD

SAMPLE RECEIPT AND TEST DATES

Our Analytical Report Number AR34966
 Your Job No: Z0728
 Sample Receipt Date: 21/09/11
 Reporting Date: 27/09/11

Registered: 21/09/11
 Prepared: 22/09/11
 Analysis complete: 27/09/11

TEST METHOD SUMMARY

PARAMETER	Analysis Undertaken on	Date Tested	Method Number	Technique
Arsenic**	Air dried sample	26/09/11	118	ICPMS
Cadmium**	Air dried sample	26/09/11	118	ICPMS
Chromium**	Air dried sample	26/09/11	118	ICPMS
Lead**	Air dried sample	26/09/11	118	ICPMS
Mercury**	Air dried sample	26/09/11	118	ICPMS
Nickel**	Air dried sample	26/09/11	118	ICPMS
Copper**	Air dried sample	26/09/11	118	ICPMS
Zinc**	Air dried sample	26/09/11	118	ICPMS
Selenium**	Air dried sample	26/09/11	118	ICPMS
Barium**	Air dried sample	26/09/11	118	ICPMS
Beryllium*	Air dried sample	26/09/11	118	ICPMS
Vanadium**	Air dried sample	26/09/11	118	ICPMS
Water Soluble Boron	Air dried sample	23/09/11	202	Colorimetry AA3
pH Value**	Air dried sample	23/09/11	113	Probe
Total Cyanide	As submitted sample	23/09/11	204	Colorimetry
Total Organic Carbon	Air dried sample	27/09/11	210	Automated IR Adsorption
Water Soluble Sulphate	Air dried sample	26/09/11	209	Colorimetry

* = UKAS Accredited test

** - MCERTS Accredited test

Determinands not marked with * or ** are non accredited

MCERTS accreditation covers samples which are predominantly sand, clay, loam or combinations of these three soil types

Any comments, opinions, or interpretations expressed herein are outside the scope of UKAS accreditation (Accreditation Number 2683)

Environmental Policy Statement

Document Owner: WDCW CEO



Willmott Dixon Capital Works (WDCW) recognises that its operations have a direct impact on the natural and human environment. Services that we provide include major construction, building fabric maintenance, interior design and fit-out, as well as building repair/care and community regeneration. We actively consider the environmental risk and implications of all our activities and services, and commit to initiatives that lead to a positive contribution to the environment and communities we serve. We provide and actively review to continually improve our environmental systems and procedures that will fulfil the intentions of this statement; in doing so we ensure continued compliance with our ISO 14001:2004 accreditation.

We endeavour to deliver all our operations sustainably, efficiently and safely with due consideration of the environment and community, promoting beneficial activities and improvements throughout our business. In doing so, we aim to minimise any adverse impacts of our activities, as far as reasonably practicable. We are committed to actively seeking the cooperation of our clients, sub-contractors, suppliers, the community and our employees to help us to achieve our aims.

We use processes to ensure our ISO14001:2004 compliance that will support us to:

- Comply, as far as reasonably practicable, with applicable environmental legislation and industry schemes in which we participate.
- Prevent pollution through risk management and action planning to mitigate identified risks for projects and tasks.
- Protect wildlife habitats, conservation areas and archaeological sites that may be affected, aiming to leave a positive legacy.
- Reduce water use, waste creation and emissions through improved design and delivery on site.
- Improve our energy efficiency, reduce energy consumption and reduce the carbon footprint of our projects and sites.
- Liaise with our clients, partners and local community to minimise disturbance and keep them informed of our operations.
- Encourage our Supply Chain to employ sound environmental practices and behaviours.
- Work with our clients and their teams to constructively challenge for environmentally positive design and construction solutions.
- Continue environmental improvement by setting targets and regularly reviewing our progress, communicating our achievements.
- Ensure that all our employees, sub-contractors and clients are aware of this policy and our environmental risks posed by our operations, through training and briefings, actively seeking their feedback and involvement for continual improvement.

This policy applies to all WDCW Local Company Office (LCOs) and site activities, and is available on the company website.

Signed:

A handwritten signature in blue ink, appearing to read 'J. Frankiewicz', with a long horizontal line extending to the right.

JOHN FRANKIEWICZ
Chief Executive Officer
WILLMOTT DIXON CAPITAL WORKS



**PLEASE COMPLETE ALL
YELLOW BOXES BEFORE
PROCEEDING**

**EVERYBODY
PLAYS A PART**

Environmental Key Performance Indicators (eKPIs)

Contract Number
e.g. E00406, G00502, M00249, K00032, T01373, H434

Contract Name
e.g. Oasis Academy, Shenley Wood

Contract Value
Full numerical value

Local Company Office
Select from list

Business Sector
Select from list

Operations Director
Select from list or type name

1st Reporting Month
e.g. March 2011

Project Description

Gross Internal Floor Area

m²

EVERREADY PLANT WASTE			Unit	Start Reading	Jan 00	Feb 00	Mar 00	Apr 00	May 00	Jun 00	Jul 00	Aug 00	Sep 00	Oct 00	Nov 00	Dec 00	Jan 01	Feb 01	Mar 01	Apr 01	May 01	Jun 01	Jul 01	Aug 01	Sep 01	Oct 01	Nov 01	Dec 01	Jan 02	Feb 02	Mar 02	Apr 02	May 02	Jun 02	Jul 02	Aug 02	Sep 02	Oct 02	Nov 02	Dec 02	Jan 03	Feb 03	Mar 03	Apr 03	May 03	Jun 03	Jul 03	Aug 03	Sep 03	Oct 03	Nov 03	Dec 03						
CLIENT SCORES																																																										
Impact on Environment				Client Rating (1 to 10)																																																						
Impact on Biodiversity				Client Rating (1 to 10)																																																						
ENERGY USE																																																										
Electricity Meter 1				Site/Cabin/ Combined Unit Initial Reading																																																						
Other Electricity Use				Combined kWh																																																						
Gas Meter 1				Combined m³																																																						
Gas (LPG)				Combined m³																																																						
Diesel				Combined Litres																																																						
WATER USE																																																										
Water Meter 1				Site/Cabin/ Combined Unit Initial Reading																																																						
Other Water Use				Combined m³																																																						
WASTE																																																										
Total Waste				Combined m³																																																						
Waste to Landfill				Combined m³																																																						
VALUE																																																										
Cumulative Certified Value				£																																																						



WILLMOTT DIXON

0

**EVERYBODY
PLAYS A PART**

eKPI Performance January 1900

Since this site has...



Here's how the project measures up against the eKPI targets:

Meeting Target	<u>eKPI 1</u>	<u>eKPI 3</u>	<u>eKPI 5</u>	<u>eKPI 6</u>	<u>eKPI 6b</u>	<u>eKPI 8</u>
Not Meeting Target	Impact on the Environment	Energy Use (kg CO ² /£100k)	Water Use (m ³ /£100k)	Waste (m ³ /£100k)	Waste to Landfill (m ³ /£100k)	Impact on Biodiversity
SITE SCORE	N/A	N/A	N/A	N/A	N/A	N/A
Willmott Dixon Target	7.5	900	9.0	43	0.0	7.5