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ENVIROPARKS

HIRWAUN

Arboricultural Survey

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Submitted by Pell Frischmann

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1. INTRODUCTION

Pell Frischmann has been commissioned by Enviroparks (Hirwaun) Ltd (EHL) to undertake an Arboricultural Survey for the Enviroparks site at Hirwaun Industrial Park to the west of Hirwaun, South Wales.

Permission has been granted to construct a waste to energy plant at the Hirwaun site (Brecon Beacons National Park Authority reference 08/02488/FUL and Rhondda Cynon Taf County Borough Council reference 08/1735/10). Construction work will remove vegetation from a large proportion of the site and measures will be taken to protect trees which will be retained around the north and western edge of the site.

This report has been produced in order to satisfy the planning conditions BB11, BB20, BB21, RCT 13 and RCT 15

The site was a former industrial site and currently comprises grazed pasture with areas of landscape planting along the boundaries. A draft Tree Constraints Plan (TCP) has been produced showing the indicative position of groups of trees along the existing boundaries. Root Protection Areas (RPA's) have been calculated, taking into consideration aspects of drainage and exposure.

The impacts of the proposed development on the trees have been assessed, and recommendations made for suitable mitigation.

This report has been updated to reflect changes in the proposed phasing of construction and the subsequent variations to arboricultural impacts.

1.1 SCOPE

The survey aims to assess the overall condition of all the trees on and adjacent to the site including:

- the trees' suitability for retention as categorised in accordance with BS 5837: 2012 'Trees in relation to design, demolition and construction – Recommendations';
- the constraints presented by the trees;
- outline considerations on development of site in relation to any retained trees;
- the Arboricultural Implications Assessment; and
- recommendations for tree management where appropriate.

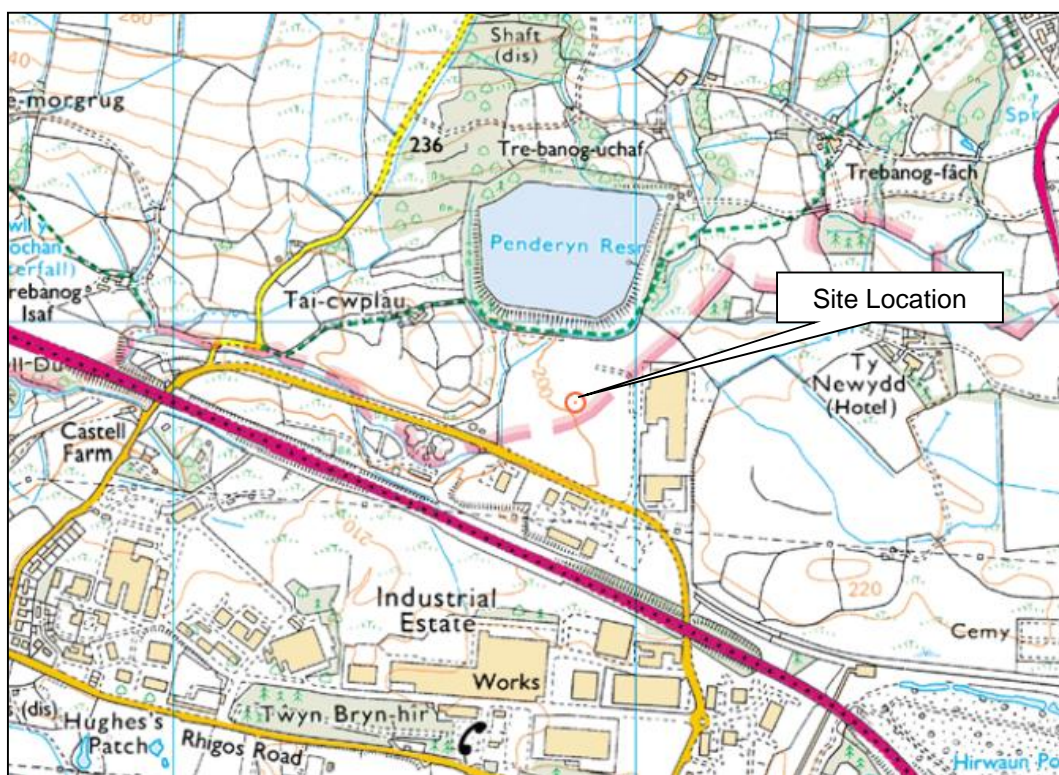
British Standard (BS) 5837: 2012 'Trees in relation to design, demolition and construction – Recommendations' requires that information on the constraints associated with retained trees be sent to the project designers. This information is

detailed in the Tree Constraints Plan (see Appendix B). The information has been used to inform the layout design of the development proposals. The constraints, which are covered by BS 5837, are associated with issues relating to retained trees both above and below ground, and the necessary measures to ensure their safe retention.

1.2 SITE LOCATION AND DESCRIPTION

The development site is located on level reclaimed land situated to the west of Hirwaun and to the south of Penderyn Reservoir at OS grid reference SN 938 068. The site location is shown in Figure 1.

Figure 1: Site Location



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The site covers an area of approximately 8.5 ha, comprising marshy grassland with woodland fringes on three sides. An extended phase 1 habitat survey was undertaken by Middlemarch Environmental Consultants in 2008 which details all the habitat types on site. (Extended phase 1 survey. Hirwaun Industrial Estate, Report to Envisage September 2008)

A detailed survey was carried out of the trees within the area shown in Figure 2. Trees in adjoining properties which might be affected by the proposals were also considered.

The approved layout for the development is shown in figure 3 below.

Figure 2: Site outline (in red)



Figure 3: Approved Layout



2. METHODOLOGY

The tree survey was undertaken by S Humphreys MSc CEnv MIEEM from Pell Frischmann on 30th August 2012. The weather was fair and visibility was good. The survey was updated in March 2013 (see section 4.1) and additional site observations made in January 2015.

Where possible, trees were measured for height, crown spread, crown clearance and stem diameter. The majority of trees on site are even aged specimens planted in landscape blocks approximately 20 years ago. The physical and structural condition of each tree and each tree group has been assessed and recommendations made for tree work or ongoing maintenance requirements. These are detailed in the Tree Survey Schedule presented as Appendix A.

A number of trees which are located beyond the boundary of the site have been included within the Tree Survey Schedule (see Appendix A). These are trees whose roots and branches extend into the site and may be affected by the proposed development. This includes trees within the demise of Penderyn Reservoir.

2.1 AGE CLASSIFICATION

The following classification is employed:

1. Young: Saplings and young trees under 10 years of age
2. Middle Aged: Trees older than 10 years but less than one third of the life expectancy of their species, normally making substantial extension growth.
3. Mature: Trees between one third and two thirds of the life expectancy of their species. More or less full height and large girth, increasing only slowly over time.
4. Over Mature: Trees beyond two thirds of the life expectancy of their species. No significant extension growth. Crown starting to break up and decrease in size.
5. Veteran Trees: Trees beyond the over mature stage but because of their size and age are significant features within the landscape and which can be rejuvenated and conserved by appropriate management.

2.2 TREE SURVEY AND TREE CONDITION

The tree surveyor assessed the individual condition of all trees identified within the area. The assessment of condition is based on a visual and professional view.

Each tree was assessed by consideration of the following;

- a. the health, vigour and condition of the tree;

- b. any structural defects, and its life expectancy;
- c. the size and its form and the suitability of its position; and
- d. the location as regards the position of other relevant features.

2.3 CATEGORIES FOR TREE CONSTRAINTS PLAN

For tree numbers please refer to the appended Tree Constraints Plan. Four categories of trees were recorded in the survey, which are defined as follows:

- **Category A** (marked Light Green on the Tree Constraints Plans). Trees which are the most significant and which must be retained within the layout.
- **Category B** (marked Mid Blue on the Tree Constraints Plans). These trees should be retained where possible within any development proposals.
- **Category C** (marked in Grey on the Tree Constraints Plans). Trees which do not have sufficient Arboricultural merit to constrain development proposals (as long as proposals are included for landscape planting and mitigation).
- **Category U** (marked in Dark Red on Tree Constraints Plans). Trees which will not remain safe features beyond the short term and should be felled as part of any development proposals.

BS5837 requires that trees are further identified according to tree quality with particular merits defined as:

- Arboricultural qualities – sub division 1
- Trees of landscape qualities – sub division 2
- Trees with ecological, historical or cultural value – sub division 3

The design layout should allow for the retention of A and B category trees where possible. C category should only be retained in locations where they will not over constrain development proposals or present additional amenity issues.

Mitigation will be required for the loss of any trees particularly groups which have been classified as Category A or B.

2.4 TREE SURVEY SCHEDULE

As part of the assessment a tree survey schedule has been produced. A key of terms and definitions applied to the schedule are detailed in Table 1 below.

Table 1: Key for Tree Survey Schedule (Appendix A)

Species	Latin Genus and Species + common name
Height	Measured with clinometer in metres
Stem diameter	Diameter measured at 1.5 m from ground level with tape in mm
Spread area (N,S,E,W)	Crown spread measured in metres at the points on the compass
Height of Crown Clearance	In metres to inform on ground clearance, shading and crown to stem ratio.
Age Class	Y-Young, MA- Middle Aged, M-Mature, OM- Over mature, V-Veteran
Physiological Condition	Good, Fair, Poor Dead
Structural Condition	Detail of the presence of decay, physical defects or danger of collapse
Category Grading	A-good, B-Moderate, C-Poor, U-Dead or dangerous

3. DESKTOP STUDY

3.1 LEGAL PROTECTION

The site is not covered by any Tree Preservation Orders (TPO). The trees within the northern part of the site are located within Brecon Beacons National Park and the southern section is within Rhondda Cynon Taff County Borough. The planning condition for the development is conditional on a suitable tree protection plan (TCP) being produced.

Tree work or tree removal will give rise to ecological impacts which may be constrained by current legislation including: The Conservation Regulations (2010), the Wildlife and Countryside Act (1981), the NERC act (2006) and the Countryside and Rights of Way Act (2000). A Wildlife Protection Plan is also being produced to ensure that any clearance work does not impact on trees or habitats of ecological importance.

3.2 OTHER DESIGNATIONS

The site is located close to a number of statutory and non-statutory designated sites for wildlife. These are listed in full in the Extended Phase 1 Habitat Survey.

4. SURVEY FINDINGS

The survey results are shown in the Tree Survey Schedule in Appendix A. The layout and root protection areas are shown in the Draft Tree Constraints Plan in Appendix B.

Almost all of the trees on site are within even aged plantations or blocks and thus have been assessed as groups and not as individual trees. The term 'group' is intended to identify any trees that form cohesive arboricultural features either aerodynamically, visually or culturally (including for biodiversity). At the Hirwaun site 'group' generally refers to areas of homogenous plantation.

The draft Tree Constraints Plan (Appendix B) shows root protection areas calculated from sample diameter measurements and crown spread. Adjustments have been made to the root protection zone after considering all the aforementioned factors.

The survey identified 13 distinct groups of trees including 2 Category A Groups, no Category B Groups and 8 Category C Groups. None of the groups were classified as Category U. A single tree in Category C was also recorded.

Tree species recorded on or adjoining the site include:

- | | |
|-------------------|---------------------------|
| • Pedunculate Oak | <i>Quercus robur</i> |
| • Sessile Oak | <i>Quercus petraea</i> |
| • Ash | <i>Fraxinus excelsior</i> |
| • Alder | <i>Alnus glutinosa</i> |
| • Hawthorn | <i>Crataegus monogyna</i> |
| • Hazel | <i>Corylus avellana</i> |
| • Aspen | <i>Populus tremula</i> |
| • Blackthorn | <i>Prunus spinosa</i> |
| • Dogwood | <i>Cornus sanguinea</i> |
| • Pacific Dogwood | <i>Cornus nutalii</i> |
| • Grey Sallow | <i>Salix cinerea</i> |
| • Goat Willow | <i>Salix caprea</i> |
| • White willow | <i>Salix alba</i> |
| • Rowan | <i>Sorbus aucuparia</i> |
| • Alder Buckthorn | <i>Frangula anguis</i> |

Mitigation will be required for the loss of any trees or group particularly those which have been classified as Category A.

Ash (*Fraxinus excelsior*) is widely distributed across the site, and may become infected with Ash dieback disease (*Chalara fraxinea*). Young ash trees are likely to become susceptible in future years and may not make a long term contribution to the landscape.

4.1 SURVEY UPDATE

Due to a potential project start in 2013, tree cutting was undertaken across the south east corner of the site. Groups G1, G2 G12 and T13 Common Alder (*Alnus glutinosa*) were removed during February 2013.

There has been some partial coppice re-growth of this area, but growth has been restricted due to browsing by horses. Inspected in early 2015 the re-growth was less than 1m high within G1 and G2. These groups have been retained on the schedule as being recently felled.

4.2 TREE GROUPS

Groups of trees were assessed as either category A, C or category U.

4.2.1 Category A Groups

- 4.2.1.1 Group G3 -3 consists of a riparian strip of trees and shrubs extending the length of the western boundary of the site. The site boundary is marked by a stream which flows from the reservoir. A small number of mature sessile oak (*Quercus petraea*) overhang from the adjoining property. On the Enviroparks side is a dense strip of common alder, grey willow and hazel. These form an important wildlife corridor. Some sections have been planted with oak, guelder rose and field maple. The group extends out from the stream for a distance of 7m inclusive of canopy overhang.

Photo 1: Group G3 riparian trees alongside western boundary. (G4 in the far distance)



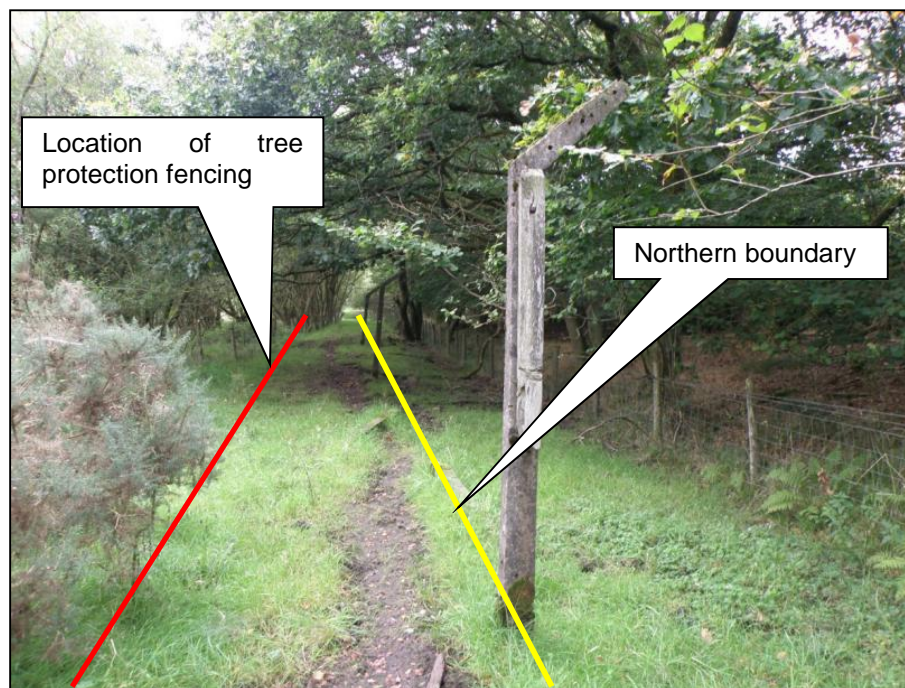
Photo 2: Group G6 Category A group showing crown spread over site boundary



- 4.2.1.2 Group G6-2 covers all the trees along the woodland edge at the base of the Penderyn Reservoir. This group is located off site and is in the ownership of Dwr Cymru (Welsh Water). The woodland strip varies in width from 15 m at the western end to over 30m at the eastern end. It consists of even aged sessile oak (*Quercus petraea*) with a small number of beech (*Fagus sylvatica*) and rowan (*Sorbus aucuparia*). The trees appear to be even aged (approximately 75 years) and of self-sown origin. They form an important landscape feature as viewed from the south and provides a wildlife corridor for a wide range of species.

Trees alongside the southern boundary of the Penderyn site show extended crown growth to the south for a distance of 7 to 7.5 m. This extends over the public footpath and up to 4.5 metres over the Enviroparks boundary. Tree protection measures must be installed beyond the crown reach of these trees.

Photo 3: Group G6 and G 7 along northern boundary



4.2.2 Category B Groups

There are no Category B groups on site.

4.2.3 Category C Groups

4.2.3.1 Groups G1, G2 and G12 were felled in January/February 2013. This cutting work was undertaken to enable future works to proceed without risk to breeding birds. Group G1 consisted of a block of broadleaf plantation which was approximately 15 years old trees which extended to 0.25ha. The plantation was dominated by common alder and goat willow. Other species included ash, oak, silver birch, willow and a range of shrubs such as dogwood, guelder rose and blackthorn. Pacific dogwood (*Cornus nutalii*) had been extensively planted along the eastern boundary.

Group G2 was a single group of multi stem grey willow (*Salix cinerea*) growing close to the Fifth Avenue boundary. Group G12 was a small poor quality block of landscape planting containing alder buckthorn and common dogwood (*Frangula Alnus & Cornus sanguinea*).

4.2.3.2 Group G4 is an area of broadleaf plantation which is approximately 15 years old. The site extended to approximately 0.32 ha and trees are planted at 2.2x 2.2 m spacing. Species include oak (*Quercus robur*), common alder, goat willow, grey willow, ash, aspen, and guelder rose. Some areas have been colonised with blackthorn. While the western section nearest to the stream has grown to an average height of 4m, growth on the eastern side has been much slower and many

trees have failed completely. The dominance of alder and willow suggests that the site is wet and the high water table has restricted the growth of many trees.

Photo 5: G4 landscape planting



- 4.2.3.3 Group G5 is an area of sparse self-sown woodland dominated by goat willow with a small number of ash and hawthorn trees. The area extends to 0.28ha and has been heavily grazed by ponies and many of the trees have suffered regular bark stripping. Grazing has also distorted tree form. The site is wet and many willow are in a state of partial collapse.

Photo 6: G5 Willow with grazed understorey (Category C group)



- 4.2.3.4 Group G7 is a strip of even aged goat willow and alder growing along the northern boundary. Many trees exhibit signs of bark stripping, as shown in photo 7 below. The trees are of low arboricultural value.

Photo 7: G7 Grazing damage on willow



4.2.3.5 Group G9 is an area extending to 0.12 ha of broadleaf plantation containing alder, ash, oak, rowan and hawthorn. Trees have been severely damaged by grazing but a sufficient number have survived to create a widely spaced plantation. G9 is of low arboricultural value and will require careful formative pruning if retained.

4.2.3.6 Group G14 - A distinct line of goat willow (*Salix caprea*) planted at the base of a low embankment alongside the boundary of Dwr Cymru. The trees have reached a height of 5 m and are close to maturity. They are unlikely to remain upright for more than 5 – 10 years on this made up ground.

4.2.4 Category U

Group G8 - An area of broadleaf plantation decimated by heavy grazing. A small number of scattered ash and alder have survived but are in poor structural and physiological condition which are not worth retaining.

Photo 8: Scattered trees in G8 (Category U) with G7 to the right



Group G10 - Similar to Group G8 but with even fewer surviving trees.

Group G11- A thin strip of dog rose planted as a hedge. Surviving plants do not appear to be suited to the site conditions and are in poor physiological condition.

4.3 ECOLOGICAL ISSUES

4.3.1 Breeding Birds

The Enviroparks Wildlife Management Plan requires that it will be necessary to undertake any proposed tree felling work outside the bird breeding season – March to September, in order to comply with the Wildlife and Countryside Act 1981 (as amended). If any tree cutting or removal is required during this period, the work should be undertaken under a watching brief of a suitably qualified and experienced ecologist. If any nesting sites are identified, no clearance work should be undertaken within 5 metres. The nest should not be disturbed until any fledglings have safely left the nest.

BBNPA Condition 11 states there should be “*No removal of trees between 1 March and 31 August inclusive in any year unless otherwise approved in writing by the Local Planning Authority*’. During a phone conversation with the BBNPA ecologist in February 2015, it was agreed that for small scale tree cutting works, it would be acceptable to proceed under an ecological watching brief, rather than undertaking wide scale precautionary clearance before the start of the bird breeding season. BBNPA should be informed in writing of any proposed tree works which require an ecological watching brief.

4.3.2 Bats

There are local records for a range of bat species on and around the site, and they have been recorded foraging within the marshy grassland area. Trees within the site itself are generally too young to provide suitable roost sites for bats, and no specific trees were identified as being likely to support roosting bats.

4.3.3 Reptiles

Timber from felled trees in G4 and G9 will be stacked within the wildlife protection zone to create suitable habitat for common reptiles including slow worms, grass snakes and common reptiles which have been identified on site.

4.3.4 Otters

There is evidence of occasional otter activity along the western boundary. G3 is therefore to be protected and retained throughout the construction and operational phases.

5. ARBORICULTURAL IMPLICATIONS ASSESSMENT

5.1 AREAS LIKELY TO AFFECTED BY SITE CLEARANCE

The approved layout for the development is shown in Figure 3. The initial phase One will only impact on a small section of G4. The access road will require approximately 50 m² of the group area to be removed. This will lead to the loss of approximately 10 young and stunted saplings.

The second construction phase will impact on groups another section of G4, part of G5, G7, G8, G9, G10 and G11 will also be removed. These have all been assessed as being Category C and the area of trees to be removed is approximately 0.8ha in total. Trees in Category A will not be affected.

It is essential that protection measures are in place before any works commence so as to minimise impacts to all retained trees. The development work will be phased, as attached in Appendix F. Initial tree clearance has been limited to the construction sections within the phase 1 and phase 2 areas. The Temporary Wildlife Protection Area has been reduced in size. The eastern section was developed in 2016 with a car park and a number of trees were removed from this section of the site. These were located within part of the phase 4 area.

Tree protection fencing will be used wherever impacts are likely to occur close to the areas of retained trees. The location of the tree protection fencing is shown in drawing D57006V102 in Appendix C. The area delineated by the fencing will become the Construction Exclusion Zone (CEZ) which is shown in Appendix D.

5.2 METHOD STATEMENT FOR TREE CLEARANCE WORK

Site clearance work will remove all of the trees from groups G9, G10, G11 and G14. Partial clearance will affect groups G4 G5, G7, G8.

Phase 1 and Phase 2 only required clearance of a small section of young trees within G4.

No tree clearance work will be undertaken during the bird breeding season (March to August inclusive). No tree clearance will be undertaken in the vicinity of the CEZ before the tree protection fencing is on place. This fencing is specified in section 5.1 and the location is shown on the draft Tree Protection Plan (see Appendix C).

To facilitate site clearance, trees should be felled and timber removed from site wherever possible. Small quantities of timber (up to 20 m³) can be used to create reptile hibernation habitat (hibernacula) within areas G3 and the western section of G8. Two metre (approximately) lengths of timber should be built into a series of stacks with a maximum height of 1 metre. See site wildlife management plan for more details.

Small arisings should be chipped and removed from site. A proportion of the woodchip arisings, up to a maximum of 10 m³, can again be left within areas G5 and G8. Individual piles should be no larger than 2 m³ in volume.

Where tree roots material is subsequently excavated, it should be removed from site.

6. TREE MANAGEMENT

No recommendations can be made for off-site trees.

Some remedial work may be required in order to install perimeter security fencing along the northern boundary. This work should be undertaken under the supervision of the project arborist to ensure that cutting work is kept to a minimum and undertaken to a high standard. See section 7.2 for details of further protection measures within the Construction Exclusion Zone.

Retained trees in G4, G5 and G7 will form part of the wildlife protection zone and will be managed in order to achieve habitat enhancement objectives. Areas of willow will be coppiced and all arisings will be retained on site. All tree work should comply with BS 3998: 2010 'Tree Work - Recommendations'. Tree management recommendations for newly planted trees will form part of the landscape maintenance schedule.

7. TREE PROTECTION MEASURES

BS 5837 specifies that a Tree Protection Plan (TPP) should then be prepared to show the impact of the proposed development on existing trees at the site.

A TPP can be found in Appendix C which shows the location of the protective fence for the retained trees.

Information from the TPP should be incorporated into subsequent drawings and method statements to ensure that all interested parties are fully aware of the areas in which access and works may and may not take place.

7.1 CONSTRUCTION EXCLUSION ZONE

Care must be taken to ensure that existing ground levels around trees are maintained as mature trees are sensitive to any changes in water level or factors which alter the aeration of the root system.

As a general guide, the full root protection area (RPA) should be observed, and BS 5837 adhered to (see the Tree Constraints Plan in Appendix B).

BS 5837 states that all retained trees or groups of trees should be protected by Root Protection Areas (RPAs) marked by the erection of a protective barrier. The

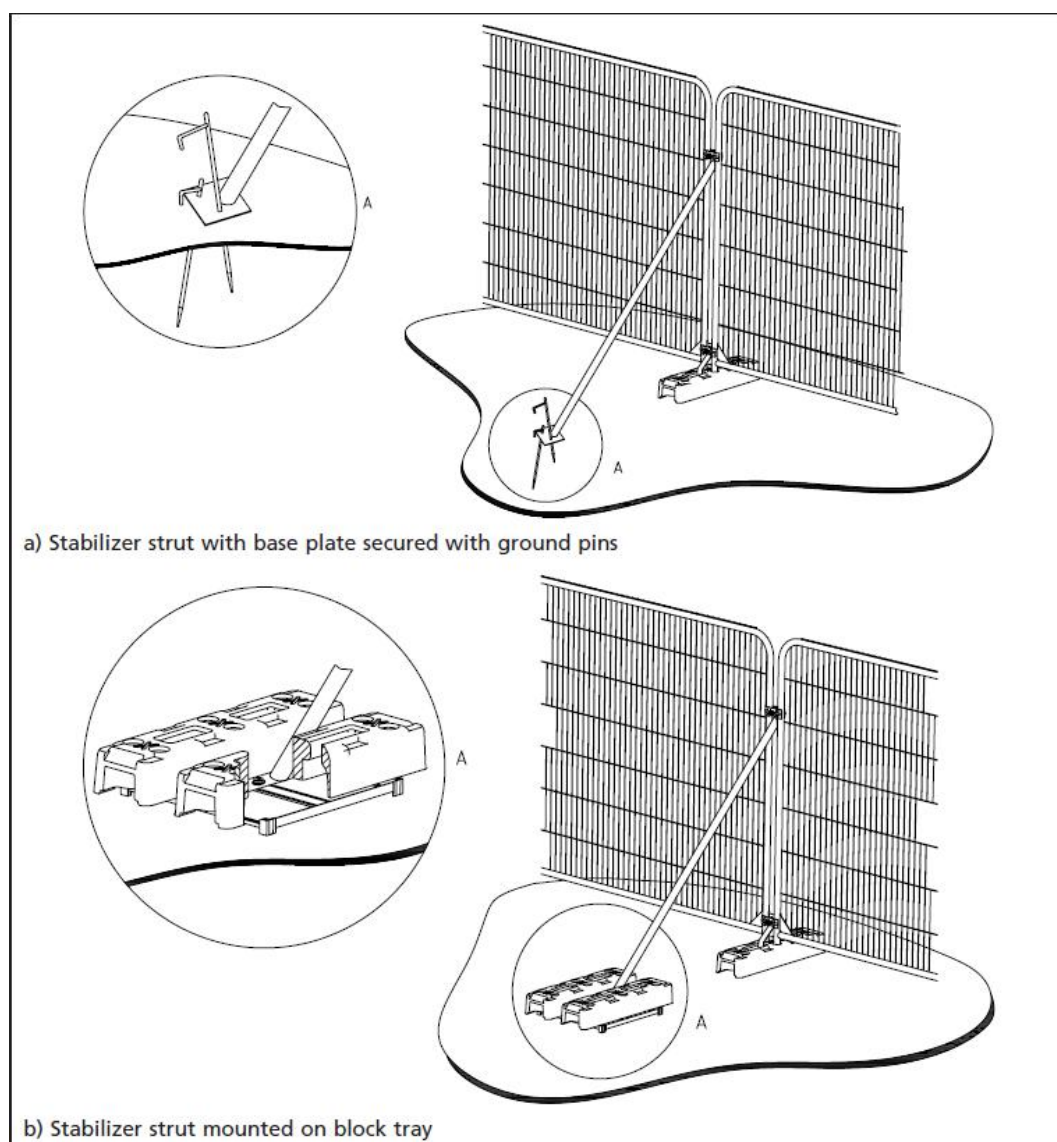
Tree Protection Plan and the Tree Survey Schedule shows the RPA for each group of trees.

BS 5837 specifies the minimum RPA in square metres rather than a radial distance; the final barrier position is shown on the Tree Protection Plan (see Appendix C).

Retained trees will require ground protection around their Root Protection Area (RPA) using a combination of barriers and ground protection.

All barriers should conform to, or exceed, the standard specified in BS 5837:2012 and are shown in Figure 4 below.

Figure 4: Protective Barrier



The protective barriers should comprise a scaffold frame from which “heras” type fencing (or similar) should be firmly attached. The barrier must be strong enough

to protect the trees from the expected level of construction activity and should be constructed so that it cannot be easily moved.

Once the exclusion zone has been protected by barriers and /or ground protection, construction work can commence. All weather notices must be erected on the barriers stating "Construction Exclusion Zone KEEP OUT" The Construction Exclusion Zone (CEZ) at this site is likely to be complex due to its topography. It is recommended that the protective fencing is erected under the supervision of an arborist to ensure that adequate protection is provided.

The location of protective barriers is shown on the draft TPP. A plan of the Construction Exclusion Zone is shown in Appendix D.

Some sections of the CEZ may be protected by steel security fencing instead of "heras" fencing. These sections will be checked by the project arborist to ensure that they exceed the BS 5837 specification for protective fencing. If the security fencing is considered to be insufficient to provide enhanced protection, additional "heras" fencing will also be erected.

7.2 REPLACEMENT SECURITY FENCING ALONG NORTHERN BOUNDARY

This will be erected within the construction exclusion zone (CEZ) which protects group G6. No wheeled or tracked plant should be operated within the CEZ. All post holes will be hand dug. For each post hole, a pilot pit must be dug to establish the presence of tree roots and no roots greater than 25 mm should be severed. If roots wider than 25mm are encountered, the position of the fence post must be adjusted. Roots must be cut cleanly with secateurs. If concrete is to be used to fill post holes, the base and sides of the holes must first be lined with plastic (e.g. used heavy duty plastic sacks). This will protect tree roots from alkali and chemical contamination. All concrete must be mixed well away from the CEZ and no washing should be tipped within the CEZ.

7.3 OTHER PROTECTION MEASURES

- Material which will contaminate the soil, such as concrete mixings, diesel and vehicle washings, should not be discharged within 10 metres of the tree stem.
- Notice boards, telephone cables or other services should not be attached to any part of the tree.
- Fires should not be lit within 5 metres of any tree trunk, branch or foliage.
- No materials or rubbish should be left within the CEZ.
- If services need to pass through the CEZ, directional drilling or thrust boring techniques must be employed at a suitable depth (≥ 1 metre) under the trees. This will ensure that tree roots are not damaged.

7.4 HARD SURFACES AND THEIR SUITABILITY IN PROXIMITY TO TREES

If required, temporary root protection for pedestrian movements within the CEZ can be provided in the form of single thickness of scaffolding boards on top of a compressible layer onto a geotextile, or alternately supported by scaffold. This may be required for drainage or security work within the CEZ.

7.5 AVOIDING DAMAGE TO STRUCTURES BY TREES

Management of the trees as recommended in section 5 will ensure that the property is not adversely affected by the trees.

7.6 REPLACEMENT PLANTING

None of the trees or tree groups due for removal were assessed as being in Category A or B and therefore requiring mitigation. The Landscape Strategy Plan for the project (ref. AJA 2341-02) shows extensive tree planting along the eastern and southern boundaries of the site. Indicative tree planting is shown on the Proposed Site Plan Appendix E. Trees will also be planted along access roads and around buildings within the site itself. The site has a generally high water table and only suitably tolerant species have been specified for replanting. The estimated area of trees which have already been felled is 0.35 ha. A further 0.05ha need to be felled for phase 1 of the construction works and 0.4 ha for phase 2. These areas will be mitigated through the Landscape Strategy Plan.

8. CONCLUSION

The site covers an area of approximately 8.1 ha, comprising marshy grassland with woodland fringes on three sides. A survey of the site was undertaken following the guidelines of British Standard (BS) 5837: 2012 'Trees in relation to design, demolition and construction – Recommendations'

The survey identified 13 distinct groups of trees including 2 Category A Groups, no Category B Groups and 8 Category C Groups. None of the groups were classified as Category U. A single tree in Category C was also recorded. These have been located on a draft tree constraints plan.

Groups G1, G2, G12 and T13 were removed in 2013.

Construction work on site relating to phases 1 will only impact on a small section of G4. The second and third construction phases will impact on part of G4, part of G5, G7, G8, G9. G10 and G11 will also be removed. These have all been assessed as being category C and the area of trees to be removed is approximately 0.8ha in total. Trees in Category A will not be affected. The fourth phase will impact parts of G4, G5 and G8.

Tree protection measures have been proposed for all retained trees and a draft Tree Protection Plan has been produced.

Recommendations have been made to ensure the protection of retained trees during the construction phase, and for their long term management.

Tree planting is proposed across the site as part of the landscape plan which will mitigate for the trees lost during construction.

9. ARBORICULTURAL REPORT LIMITATIONS

The information reported is based only on the interpretation of data collected during the Survey undertaken on site.

Any discussion of soil characteristics are included only where they may affect tree or root growth.

This report has been prepared solely for the use of Enviroparks (Hirwaun) Ltd may not be relied upon by other parties without written consent from Pell Frischmann. In addition, it must be understood that this report does not constitute legal advice.

Pell Frischmann disclaims any responsibility to the client and others in respect of any matters outside the agreed scope of the work.

10. REFERENCES

BS 5837: 2012 'Trees in relation to design, demolition and construction – Recommendations'

BS 3998: 2010 'Tree Work - Recommendations'

Enviroparks Landscape Strategy Plan AJA 2341-02 (2015)

National Joint Utilities Group (NJUG) *Guidelines for the planning, installation and maintenance of utility apparatus in proximity to trees*. Volume 4, issue 2. London:

Phase 1 habitat survey, Hirwaun Industrial Estate. A report for Envisage. Middlemarch Environmental Ltd: 2008.

**APPENDIX A
TREE SCHEDULE**

Enviroparks Hirwaun Tree Schedule																				
Class	No	Species	Botanical	Ex Ht m	Crown Clr	C S: N	C S: E	C S: S	C S: W	Age	Stem Dia mm	SS/MS	RPA M²	Est Use Life	Phis Cond	Struc Cond	Notes & Hab	Cat	Tree work	Ref
G	1	Ash (self sown), Alder, Sallow, Dog wood , Pacific Dogwood ,Hawthorn, Guelder rose, white willow, Silver Birch, Oak, Hazel, Blackthorn, Rowan, Goat Willow, Field Maple.	<i>Quercus robur, Slaix caprea, Slix cinerea, Salix alba, Betula pendula, Cartaegus monogyna, Prunus spinosa, Corylus avellana, Sorbus aucuparia, Acer campestre, Cornus sanguinea, cornus nutalii, Fraxinus excelsior, Virburnum</i>	2m to max 7m. Less along eastern boundary	0					15yrs	max 220 average 125mm	SS and MS		25 years. Insuficient oak & ash to form long term woodland.	Fair some trees constricted by tree ties	Poor to fair	Even aged mixed broadleaf planting with some self sown ash and blackthorn. Dominated by Alder and Grey Sallow with extensive edge planting of Pacific Dogwood. Poorly maintained.	C	Insufficient ash and oak to form long term woodland. If retained, requires extensive selective thinning to remove 50% of alder, willow and dogwood.	G1
G	2	Grey Sallow	<i>Salix caprea</i>	3	0					10	200 x 7	MS		10 yrs	Poor	Fair	Small area of willow scrub. Only trees along southern boundary	C	Re-coppice if retained to maintain structure.	G2
G	3	Goat Willow, Field Maple Guelder Rose, alder, Ash, Dogwood, Dog rose. Sessile Oak	<i>Salix caprea, Acer campestre, Virburnum opulus, Rosa canina, Alnus glutinosa, Quercus patraea.</i>	6	0					75+	100 - 650	SS & MS		50 yrs +	Good	Good	Riparian corridor with mature alder and mature sessile oak on boundary line. Some additional recent planting at southern end.	A3	No management required	G3
G	4	Ash alder, willow, blackthorn, guelder rose, Aspen	<i>Fraxinus excelsior, Alnus glutinosa, Populus tremula, Prunus spinosa, Virburnum opulus, Salix caprea</i>	4	0						120 - 250	SS & MS		30yrs	Poor to Good	fair	Even aged broadleaf planting dominated by Alder and Goat willow. Poor growth in some areas due to high water table.	C	Poor selection of species for wet site, particularly in area away from stream	G4
G	5	Goat willow, Hawthorn, Ash	<i>Salix caprea, Fraxinus excelsior, Crataegus monogyna</i>	5	0.5					30+	250 - 500	SS & MS		20yrs	fair	poor	Open area of grazed woodland. Small number of Hawthorn and ash on drier ground	C	Some trees in state of colapse.Coppicing and replanting required if retained.	G5
G	6	Sessile Oak, Beech	<i>Quercus patraea, Fagus sylvatica</i>	7.5	3			7.5m		60+	500+	SS & MS		30+	fair	good	Oak and beech growing on adjoining property	A2	Trees may shed deadwood onto boundary	G6
G	7	Goat willow, Alder, Silver Birch	<i>Salix caprea, Alnus glutinosa, Betula pendula.</i>	4	0			7m			120 -200	SS & MS		5	Poor	Poor	Heavily grazed	C	Recommended for removal but If retained, remove stakes and formative prune.	G7
G	8	Scattered Ash, Oak and alder	<i>Fraxinus excelsior, Quercus robur, Alnus glutinosa</i>	4	1.5					8	150 - 200	SS & MS		0	Poor	poor	Scattered remains of woodland planting. Heavily grazed and damaged	U	Remove dead trees	G8
G	9	Alder, Ash, Oak, Rowan, Hawthorn.	<i>Alnus glutinosa,Quercus robur, Sorbus aucuparia, Crataegus monogyna</i>	5	0						120 -180	SS & MS		5yrs	poor	poor	Woodland planting. Heavily grazed and damaged	C	Small number of oak and ash may be suitable for retention given formative pruning.	G9
G	10	scattered ash	<i>Fraxinus excelsior</i>	4	1.5						120 -180	SS & MS		0	poor	poor	Scattered remains of woodland planting. Heavily grazed and damaged	U	Trees heavily damaged by horse grazing. Remove	G10
G	11	Dog Rose	<i>Rosa canina</i>	1	0						0	MS		5yrs	poor	poor	Partial hedgerow planted as part of landscape scheme	U	Poor growth due to poor soil conditions	G11
G	12	Dogwood, Alder Buckthorn	<i>Frangula alnus, Cornus sanguinea</i>	3	0						120 - 250	SS & MS		10	fair	fair	Landscape planting	C	No management required	G12
T	13	Alder	<i>Alnus glutinosa</i>	4.5	0.5	1.5	1.5	1.5	1.5	15	280	ss	36	10	fair	fair	Single tree	C	No management required	T13
G	14	Goat Willow	<i>Salix caprea</i>	5			3.2		2.5	15	250	ss		10 yrs	fair	poor	Row of Willow	C	Poor stability on made up slope. If retained, coppice in order to stabilise	G14

APPENDIX B
DRAFT TREE CONSTRAINTS PLAN



LOCATION PLAN
SCALE 1:1000

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NOTES:

KEY:

- SITE BOUNDARY
- T8 CATEGORY A
- T1 CATEGORY B
- T9 CATEGORY C
- T3 CATEGORY U

T = SINGLE TREE
G = GROUP OF TREES
X = TREE REMOVED

A	INITIAL ISSUE	PND	PND	SH	SH	10.12.12
REV	DESCRIPTION	DRN	DES	CHK	APP	DATE

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P.F. Project Nr: E57006
Client:



Client Project Nr: —
Client Project Title: —

Project

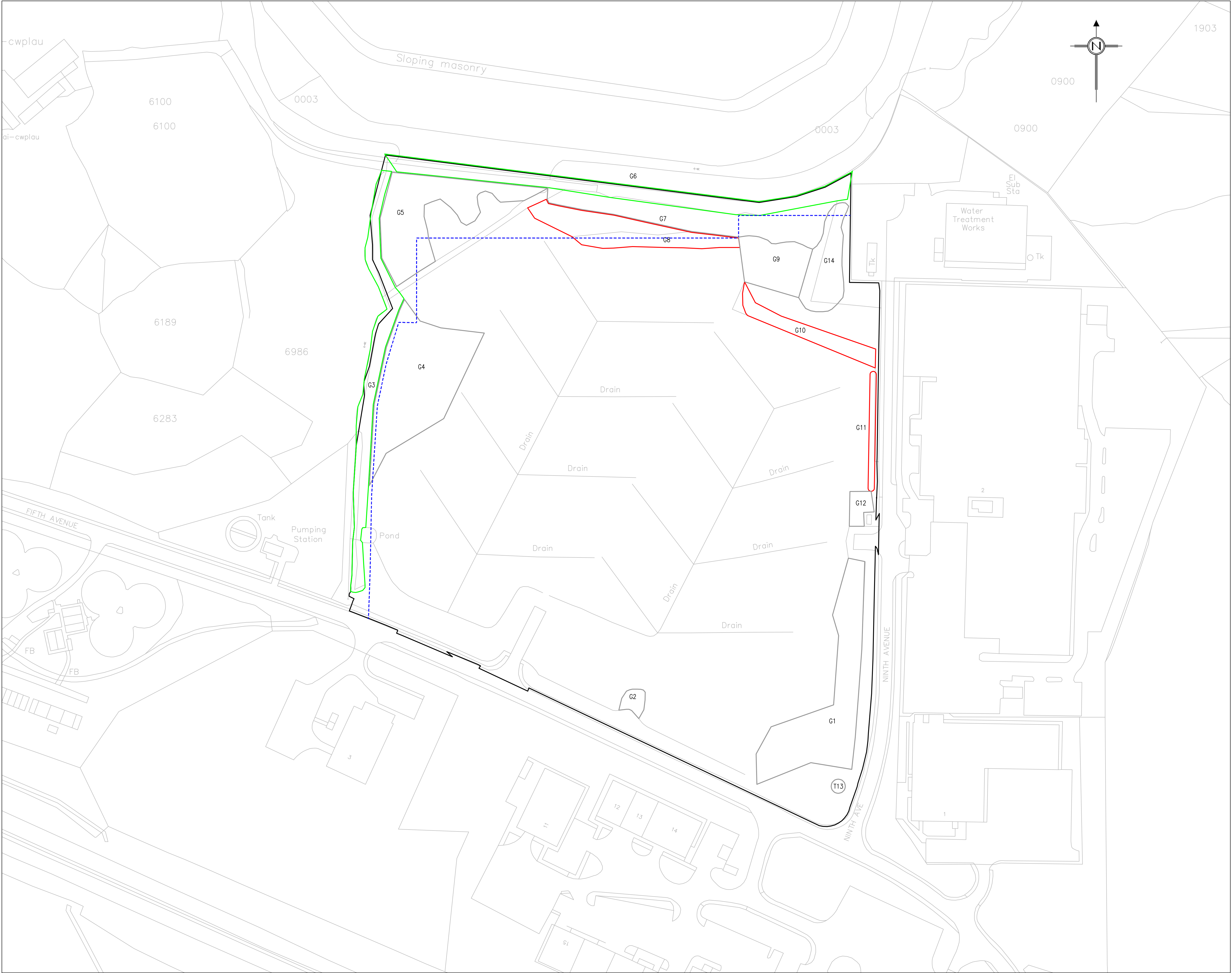
ENVIROPARKS HIRWAUN

Drawing Title
**DRAFT
TREE CONSTRAINTS
PLAN**

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Designed	PND	10.12.12	File No.	D57006V001.dwg	
Checked	SH	10.12.12	Drawing Status	PRELIMINARY	
Approved	SH	10.12.12			

Drawing No. **D57006V001** Revision **A**

APPENDIX C
TREE PROTECTION PLAN



LOCATION PLAN
SCALE 1:1000

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NOTES:

KEY:

- SITE BOUNDARY
- T8 CATEGORY A
- T1 CATEGORY B
- T9 CATEGORY C
- T3 CATEGORY U
- T = SINGLE TREE
- G = GROUP OF TREES
- X = TREE REMOVED
- PROTECTIVE FENCE

P1	INITIAL	ISSUE	PND	PND	SH	SH	10.12.12
REV		DESCRIPTION	DRN	DES	CHK	APP	DATE

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Client:



Client Project Nr: —
Client Project Title: —

Project

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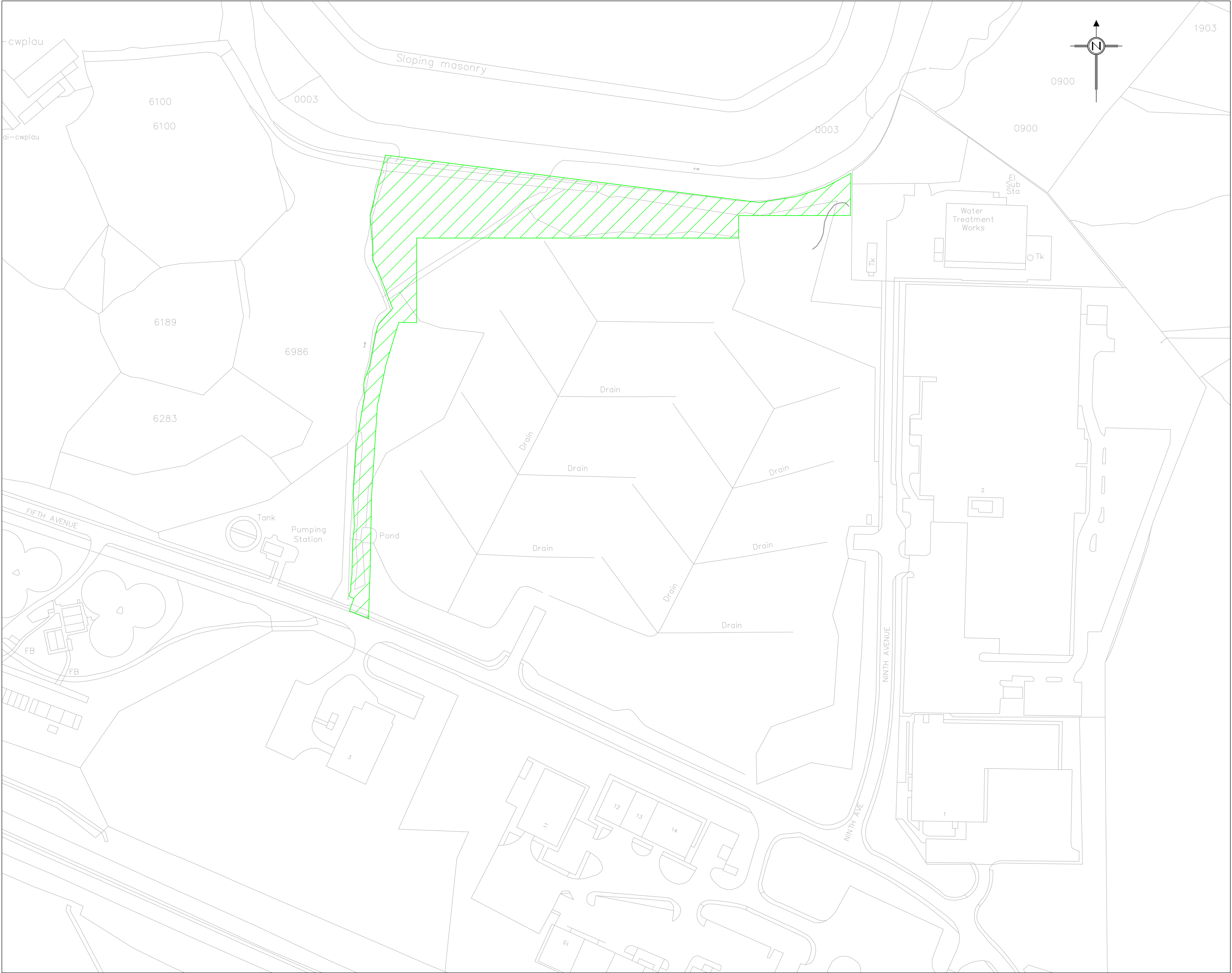
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**DRAFT
TREE PROTECTION
PLAN**

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Designed	PND	10.12.12	File No.	D57006V002.dwg	
Checked	SH	10.12.12	Drawing Status	PRELIMINARY	
Approved	SH	10.12.12			

Drawing No. **D57006V002** Revision **A**

APPENDIX D

CONSTRUCTION EXCLUSION ZONE PLAN

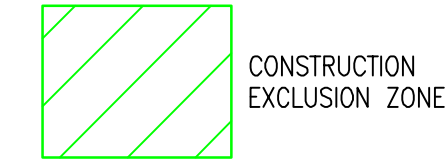


LOCATION PLAN
SCALE 1:1000

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Client:



Client Project Nr: --
Client Project Title: --

Project

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Drawing Title
**TREE CONSTRUCTION
EXCLUSION ZONE
PLAN**

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Designed	PND	23.01.13	File No.	D57006V004.dwg	
Checked	STH	23.01.13	Drawing Status	PRELIMINARY	
Approved	STH	23.01.13			

Drawing No. **D57006V004** Revision **A**

APPENDIX E

PROPOSED SITE PLAN



- [illegible]

APPENDIX F

PROPOSED DEVELOPMENT PHASING PLAN



0 5 10 15 20 25
M

PORTING SUBSTATION

EXISTING RESURFACING
IMPROVEMENT

EXISTING CURB LINE LANDSCAPING

LANDSCAPE
BUFFER

NEW 675MM CULVERT

EXISTING STREAM DIVERTED

B1

BBNPA RCT

A1

C

FIFTH AVENUE

BBNPA RCT

INDICATIVE LINE INDICATING BBNPA / RCT BOUNDARY

B

NINTH AVENUE

IA

D1

- ALL DIMENSIONS TO BE CHECKED ON SITE
BY THE SURVEYOR'S DRAWING
AND THE DIMENSIONS TO BE REPORTED IN ACCORDANCE
WITH THE ACT
- 1. VEHICLE CENTRE (V-CENTRE)
 - 2. EXISTING LANDSCAPE (LANDSCAPING)
 - 3. EXISTING LANDSCAPE (LANDSCAPING)
 - 4. HYDROLOGICAL (HYDROLOGY)
 - 5. BOUNDARY AREA (BOUNDARY AREA)
 - 6. PROPOSED VEHICLE CENTRE (V-CENTRE)
 - 7. PROPOSED LANDSCAPE (LANDSCAPING)
 - 8. WATER TREATMENT PLANT
 - 9. FILL SPACE (FILL SPACE)
 - 10. TREATMENT PLANT (TREATMENT PLANT)
 - 11. GAS PLANT (GAS PLANT)
- PHASING KEY:
- PHASE 1
 - PHASE 2
 - PHASE 3
 - PHASE 4

Rev. Revision Description Date By

enviroparks

ARTICLE 5
PENSEIRE

PROJECT
Enviroparks - Hiwawa Ind. Est
Gasification Hall

TITLE
Proposed Phasing Site Plan

Drawn: DJS Date: 22/02/17 Checked: SAT
Scale: Original sheet size: 1:500 A0

DRAWING STATUS
[] Planning
[] Tender
[] Design Development Pre-Construction
[] Construction
[] Record

Drawing No. Revision

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