

TREE SURVEY REPORT  
inc. TREE CONSTRAINTS PLANS  
ARBORICULTURAL IMPACT  
ASSESSMENT  
inc. TREE PROTECTION PLAN  
and ARB. METHOD STATEMENT  
(Heads of Terms)

subjects at

Mary Street, Port Dundas, Glasgow

for

Fig Power Ltd.  
*per* Brindley Associates

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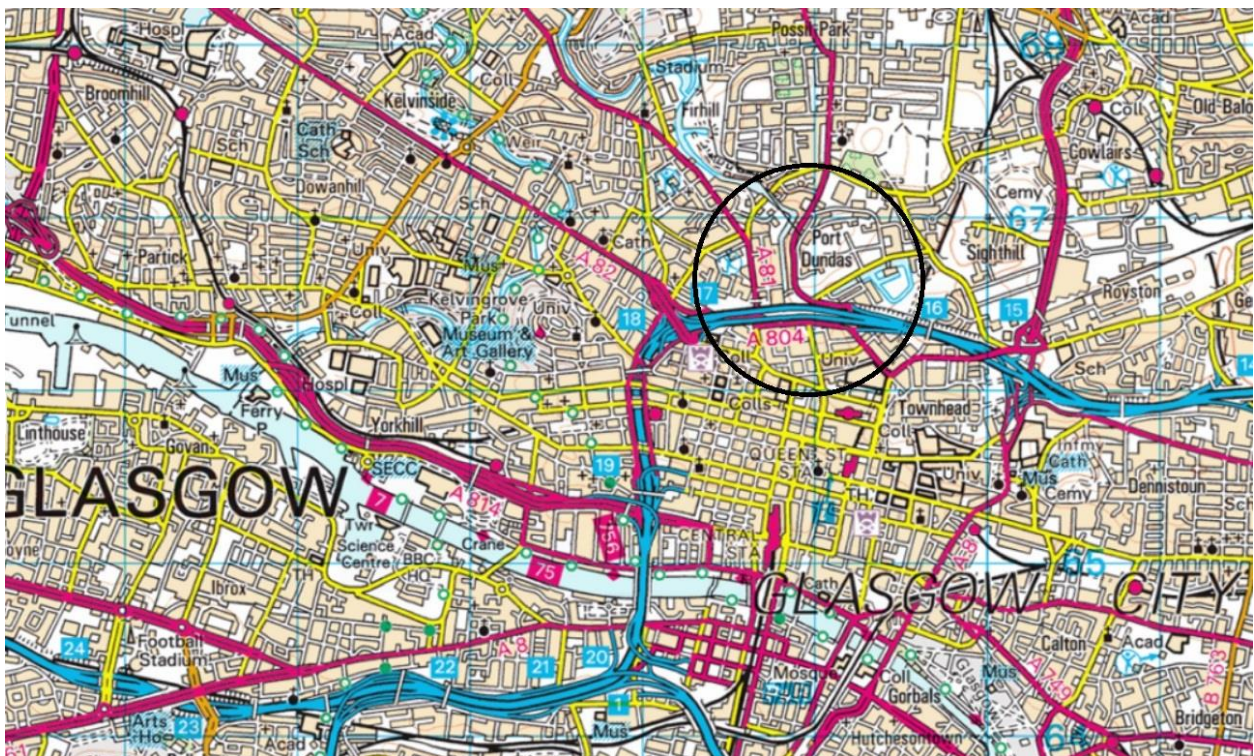
*This report is very detailed, but for good reason. For readers familiar with BS5837 and trees, the detail may seem unnecessary; the experienced or knowledgeable reader may wish to start with the summary (section 6), the data and the plans, and work backwards when detail or methodology is needed or the unusual is reported. Others are advised to start at the beginning to understand what is (and isn't provided), how and why.*

## 1. INTRODUCTION

### 1.1 Instruction

I have been instructed by Brindley Associates on behalf of Fig Power Ltd. as applicant for permission for a battery energy storage facility on a site at Mary Street, Port Dundas, Glasgow to conduct an arboricultural survey and to report on any trees on (and where present, around) the site.

The location is indicated on the following map.



This report is prepared in accordance with BS 5837:2012 “*Trees in relation to design, demolition and construction – Recommendations*”. Where it deviates from the Standard it will say so and will give a reason for the deviation.

BS5837 is clear on the process and stages that should be followed where advice is needed on whether trees merit retention in the context of development or physical works close to them, and if required how they should be protected: this report follows those stages and processes.

The principal purpose of this report is firstly to assess tree condition and relative suitability for retention in the context of development, based mainly on quality and estimated remaining amenity contribution. I am also to indicate the constraints above and below ground that trees would present (if retained) to any design and development.

This information (s.4) can be used by landowners and designers to select trees for retention and/or the juxtaposition of trees and proposed development.

I am secondly then to consider the next stage of the BS5837 process, namely to assess the impact the specific development form would have on retained trees, to catalogue the tree pruning or removals that would be necessary and the measures that would be required to protect the retained trees before, during and after construction. This assessment is known as an Arboricultural Impact Assessment ("AIA") and is covered in Section 7 of this report.

It is not a full tree risk assessment, and identifies only serious and immediate risks (s.5).

## **1.2    Reproduction, assignation and reliance**

This report has been prepared for the sole use of the client and the client's client– no other party is entitled to rely or act upon it or to reproduce all or any part of it without the express prior written consent of the author. The author cannot be held liable for any third party claim arising.

Notwithstanding, this report may be made available without the author's express consent to any future owner and developer of the site and to any statutory consultees insofar as the report may be required for Planning matters.

## **1.3    Surveyor and author relevant qualifications and experience**

The industry standard of best practice for such situations is BS 5837:2012 *Trees in relation to design, demolition and construction – Recommendations* – and it requires tree surveys and assessments to be carried out by an Arboriculturist, defined as "a person who has, through relevant education, training and experience, gained expertise in the field of trees in relation to construction".

The tree survey work and reporting has been carried out by Julian Morris, a professionally qualified and experienced Chartered Arboriculturist holding a Bachelor of

Science Degree, the Arboricultural Association Technicians Certificate, the LANTRA Professional Tree Inspectors Certificate, Certificate of Public Sector Administration and the RICS Diploma in Surveying. Being a Professional Member (MICFor) of the Institute of Chartered Foresters and a member of the Arboricultural Association he is bound by their Codes of Professional Conduct.

#### **1.4 Duration of validity of report**

Fundamentally the purpose of the survey is to record the presence, stature and quality of trees on and around the site. All of these aspects can change, suddenly or slowly as a result of growth, breakages, failures, maturation, disease etc. The data give a snapshot of the trees at the time of survey. With heights and spreads given to the nearest metre and stem diameters to the nearest 10mm, it would be several years before size increases would be significant. Size decreases are likely to be sudden and unforeseeable. Unfortunately decreases in quality are much more likely than increases but should generally already be reflected in the estimated remaining contribution and retention categorisation, except for rapid decline due to pests or diseases. Species and position do not change.

It is therefore suggested that any report would generally be valid for a period of at least 2 years but subject to refreshment and checks immediately prior to finalisation of design for rapid recent changes to any trees selected for retention.



## **2. GENERALITIES (PRE-SURVEY)**

*In this report, terms used that have Initial Capitals are proper nouns, have a recognised formal meaning or are defined in the Glossary appended to the report.*

### **2.1 Purpose and scope**

#### *2.1.1 Purpose*

A report is required in accordance with BS 5837:2012 *Trees in relation to design, demolition and construction – Recommendations* – recording the results of a tree survey, providing position, species, quality criteria and retention desirability categorisation, above-ground height and spread and giving preliminary advice on appropriate Root Protection Areas ("RPAs") for underground parts of all trees or groups of trees. It also reports on any trees that are an imminent and serious hazard to life or property.

The tree survey data, plotted on a site plan to show tree locations and constraints, may be used as a design tool to inform decisions (in terms of constraints above and below ground, quality and longevity) as to which trees are to be retained and which are to be removed, avoided or pruned to accommodate a specific form of development.

In accordance with BS5837:2012 trees have been assessed independently of any specific design layout.

Then, taking account of the specific design layout, additional guidance will be provided (section 7 onwards) to evaluate which trees are to be (or must be) removed and the impact of the proposed development on retained trees ('Arboricultural Impact Assessment'), the trees to be retained, pruned or removed, the physical extent of protection to be provided ('Tree Protection Plan') and protection issues to be addressed ('Arboricultural Impact Assessment (Heads of Terms)').

#### *2.1.2 Plans, precision and accuracy*

The site is identified on the drawings provided before the survey, and where required these drawings are adapted by me to show only the trees and groups of trees recorded during the tree survey.

I have been provided with a topographic survey plan but it does not show the position of any trees.

Where tree positions or group extents are plotted during the tree survey, this is done using a combination of GPS positions and positions relative to physical features shown on the base map or topographic survey plan.

A degree of inaccuracy is inevitable, though rarely significant, but the position of trees may have to be plotted more accurately if they are found to be in very close proximity to proposed development. Comment on the degree of positioning accuracy discovered at the time of survey is mentioned at s.3.1 below.

#### *2.1.3 Minimum sizes, grouping*

To accord with BS5837, only trees with a stem diameter of 75 mm or more (or in the case of woodlands or substantial tree groups, only individual trees with stem diameters greater than 150 mm) are to be recorded, including any offsite trees that overhang the site or are located beyond the site boundaries within a distance of up to 12 times their estimated stem diameter.

Where it is deemed appropriate, individual trees within groups (particularly homogeneous groups or trees that form cohesive arboricultural features either aerodynamically, visually, culturally or ecologically) are not identified; instead each group is delineated, measured and described collectively.

#### *2.1.4 Levels*

BS5837 suggests that in a topographic survey spot levels at the base of trees should be recorded at the base of each tree. Where this has been done the information will already be available to designers, but it cannot be captured during a tree survey. Where it is required to check for changes in soil levels around trees, it is unlikely to be useful in isolation since such changes close to the stem are better witnessed by exposure of roots or burial of root collars. It cannot adequately document levels within whole root protection areas, where even small changes may be detrimental to tree vitality.

#### *2.1.5 Risk and management (current site usage)*

This report is **not a tree hazard and risk assessment**, and any reporting on risk is restricted to instances (if any) where trees were observed that might present an imminent and serious hazard to life or property (where the risk is assessed as 'Unacceptable'). Where other trees present a lesser (but still less than 'Acceptable') risk to people or property for the existing permitted use of the site, this will be reflected in the categorisation of the tree after any recommended works have been carried out. A separate, systematic, risk assessment may be required during or after finalization of development design.

## **2.2 Generalities – limitations and statutory restrictions**

The survey was carried out in accordance with the Methodology set out in the Appendix to this report. This report is based on a visual inspection from ground level only.

The trees have been assessed only on the basis of expected endemic weather patterns for the location.

No intrusive or destructive tests were carried out, the survey did not include exhaustive foliar examination (except for purposes of identifying the species) and the inspection was primarily visual and was conducted from the ground and no climbing was done.

The trees have been assessed during a single visit in a single season, in the weather conditions noted in the 'Findings' section of the report, with the limitations that this brings, such as the opportunity to assess the reaction of the tree to a variety of wind strengths and directions, the presence of seasonal fungal Fruiting Bodies, visibility of branch structures or fruit/foliage vitality.

Dense basal epicormics and/or ivy on trees, and occasionally dense undergrowth can obstruct the full inspection of trees. Only enough to reach a preliminary or final conclusion about any such affected trees will have been removed.

I have only checked with the relevant Local Authority as to the existence of Conservation Area designation or Tree Preservation Orders to the extent that I have been instructed to do so. Such designations could have the statutory effect of prohibiting certain tree works or be indicative of the Local Authority's existing view of the importance of the trees to the amenity of the area.

### **2.3 Generalities - Soil and other ground conditions**

No sampling, examination or analysis of the soil was done as part of the tree survey. Unless otherwise stated at s.3.5 below, only general assumptions have been made in the course of the survey and reporting about likely ground conditions, related in part to observations of current tree vitality.

BS5837 suggests that a soil assessment should be undertaken by a competent person to inform any decisions relating to the root protection area (RPA), tree protection, new planting design and foundation design to take account of retained, removed and new trees. For existing trees, unless vitality is obviously being affected by ground conditions, soil testing is not always necessary. Ground conditions may be attributable to other factors, particularly hydrological ones, which may not be informed by soil tests.

*Ground conditions, particularly shrinkable clays, relative to new planting design and foundation design to take account of retained, removed and new trees are beyond the scope of this report.*

## **2.4 Generalities - Tree categorisation protocols**

In assessing the merit of the trees and their retention desirability, any specific design layout must be disregarded.

The purpose of the tree categorisation method, as stated in BS5837, is to identify the quality and value (in a non-fiscal sense) of the existing tree stock, allowing informed decisions to be made concerning which trees should be removed or retained in the event of development occurring.

For a tree (or group of trees) to qualify under any given category, it should fall within the scope of that category, as defined in the British Standard. Trees are categorised (A, B, C or U) by estimated remaining amenity contribution combined with quality.

If a distinction is required for trees in categories A to C, one or more of the three subcategories (1, 2, 3) are added to reflect - arboricultural qualities (1), landscape qualities (2), or cultural (including conservation) values (3) respectively.



### **3. INVESTIGATIVE FINDINGS (DURING SURVEY)**

#### **3.1 Practicalities**

##### *Date*

The tree survey was undertaken on 5th September 2024.

##### *Conditions*

The conditions were warm, clear, dry and calm (no wind).

No access was taken to adjacent land.

##### *Accuracy and precision*

Where required the drawings provided have been adapted during or after the survey to show only the trees and groups of trees recorded during the tree survey.

Due to limitations of the base mapping or GPS, for this survey it was found that the accuracy of plotting of trees is unlikely to be adequate for detailed design work below  $\pm 2$  metres. Positioning accuracy can be improved by supplementary topographic survey. Alternatively, tree protection measures can be specified that allow for a precautionary additional buffer between trees and development.

##### *Significance, identification and grouping*

Every tree (over 75mm diameter) on-site recorded individually has been affixed with a uniquely numbered tag (see picture below), with the exception of one that was not accessible in which case a sequential number has been assigned to trees.

Where trees were found to form cohesive arboricultural features (See 2.1 above), they have been recorded as Groups. Groups on-site have been identified by tagging a prominent tree within the group (tags folded at the bottom hole, see picture below).



*Examples of individual (left) and group (right) tags*

No older tags were found on the trees.

Trees on adjacent land that are close enough to the site to qualify for recording were not tagged, and these have instead been assigned an arbitrary sequential number (1, 2 3 etc.), followed by a 'os'. Where it was not clear whether the tree was on- or off-site, its number is followed by 'unk.' Where a tree appeared to be on the site boundary it is followed by 'bdy.'

Elder and other shrub species were noted but are generally considered not to be 'trees' in the sense of the British Standard or planning legislation, and individuals would only have been recorded and categorised as trees if they had had the stature (both size and form) of what one would ordinarily call a 'tree'.

### 3.2 Site description (general)

The site is within an industrial area with increasingly mixed uses including residential development to the south east, a church to the west and a large electricity substation to the north. The approximate extent of the site is shown on the plan following this report.

The site slopes slightly down from north to south. No bodies of water or water courses on or near the site present a flooding risk materially affecting the trees.

The site is currently used as a concrete batching station. Almost all the terrain is covered by buildings or oversite concrete.

### 3.3 Trees and categorisations

A total of 13 trees on and around the site were recorded, measured (or estimated where appropriate) and categorised individually

Several more trees have been recorded in Groups, with dominant species, typical stem diameter, crown spread radius, height and clear height.

The investigative findings for the survey stage (species, description, measurements, characteristics, categorisation etc.) are summarised in **the first Appendix** to this report.

The retention desirability categorisation (quality Category) of trees follows the guidance in BS5837. Greatest consideration could be given to retaining Category A and B trees (i.e. generally those with an estimated Remaining Contribution of 20 or more years). A fuller explanation is given in **Appendix 5** to this report.

Typically designers make the assumption that the amenity contribution of Category C trees (typically, those having and Estimated Remaining Contribution of 10 to 20 years)

and Category U trees are likely to be exceeded by the design life of any proposed development, and these may be suitable for retention only in low risk or low visibility locations, as contributions to high/moderate quality tree groups or in positions where a replacement tree would be desirable in due course.

***Special notes on tree Quality Categorisations and species identification for this site***

*A number of birch have been recorded, and whilst they have been nominally identified as a specific species, there may one or more hybrids present. Hybridisation of this genus is very common, and the specific species of hybrid is unimportant to the recommendations of this report.*

### **3.4 Veteran or ancient trees and ancient woodland**

The survey did not identify the presence of individual veteran or ancient trees on or around the site. Because no woodland is present, no check has been undertaken of the Government's Ancient Woodland Inventory and other relevant woodland databases (see 4.6 below).

### **3.5 Soil and ground conditions and conclusions**

At 2.3 above the generalities of soil and other ground conditions have been stated.

During the course of the survey, no additional meaningful observations of arboricultural significance could be made about these. However, by a combination of oversite concrete and the use of the site as a concrete manufactory, it is likely that the few areas of exposed soil have been affected by the presence of concrete compounds.

## **4. TREE CONSTRAINTS (POST-SURVEY)**

*The tree constraints plan(s) referred to in the following sections are available in CAD format for use in detailed design. CAD plans will allow the constraints from each tree to be seen more clearly and for one or more trees (for example, all Category U trees) to be 'switched off' to clarify what the remaining constraints are.*

### **4.1 Above ground constraints**

The spread of the crowns of the recorded trees have generally been estimated at 4 cardinal points. Only the average spread has been given (expressed as the spread in the North direction) where crowns were found to be approximately circular in horizontal extent.

BS5837 also recognises that "it is not always practical or necessary to record branch spread for every tree in a group", and following this rationale, only the collective canopy spread has been given for trees recorded within groups. Trees on the edge of groups frequently have asymmetric spreads.

The extent of the crowns is plotted on the Tree Constraints Plan appended to this report, colour-coded to give an immediate overview of their relative retention desirability (also known as Quality Category).

For groups, the extent of the Group including the crown spreads of edge trees, is shown on the Plan.

*Within groups the spread of individual trees may overlap, such that the removal of individual trees from the group, may not allow construction in the volume that had been occupied by those trees. Importantly, removal of trees from Groups will result in loss to the remaining trees of companion shelter and may reduce the wind-firmness of remaining trees within the Group or the whole Group and/or may result in storm breakages of limbs or forks.*

Using the plan as a guide, it may be appropriate to define areas within which development may be constrained by the presence of tree crowns or canopy.

To aid with this I have provided an average or representative crown or canopy height. For offsite or boundary trees this is the representative height of the on-site part of the crown.

Development below this height may be possible, or crown lifting and/or selective branch removal may be possible whilst retaining the rest of the tree in a viable condition.

## 4.2 Below ground constraints (present)

The root protection area (“RPA”) indicates the minimum area around a tree deemed to contain sufficient roots and rooting volume to maintain the tree’s viability, and where the protection of the roots and soil structure is treated as a priority.

The extents of idealised root protection areas for each tree are plotted on the Tree Constraints Plan appended to this report.

N.B. 'Root Protection Area' is a concept defined in BS5837 for optimal 2 dimensional representation of suitable and sufficient rooting volume; dependent on factors such as tree species, life-stage and condition there may be alternative 2 dimensional shapes and/or areas that would contain suitable and sufficient rooting volume that would maintain the tree's viability.

For groups, unless otherwise indicated for most practical purposes the extent of the below-ground constraints of a Group is approximately the same as the canopy spread of the Group, shown on the Plan Plans as a collective Root Protection Area.

*Within dense groups the Root Protection Areas of individual trees may overlap, such that the removal of individual trees from the group, may not allow construction in the space created without further precautions to assess and protect root and rooting volumes of remaining trees.*

Where there was no need to modify the Root Protection Areas of individual trees, the default circular RPAs suggested by BS5837 have been plotted.

If and where pre-existing site conditions or other factors indicate that a normal depth of rooting exists but is distributed asymmetrically influenced by past or existing site conditions (e.g. the presence of impermeable surfaces, underground vertical structures, permanent waterlogging or known underground apparatus), a polygon of equivalent area has been produced, based on an arboricultural assessment of likely root distribution.

It was particularly noted and assumed that the following aspects have truncated or been a constraint to radial rooting -

- The impenetrability of roots in soil or other materials below buildings or other structures
- Retaining walls
- Water-impermeable hard surfaces, particularly concrete and adjacent public roads

In due course the shape and extent of RPAs may need to be modified due to -

- a) unseen underground apparatus, structures etc.;
- b) topography and drainage;



- c) the soil type and structure;
- d) the likely tolerance of the tree to root disturbance or damage, based on factors such as species, age, condition and past management

#### **4.3 Tree shade and shadow**

BS5837 provides an optional method of trying to portray the effect of tree shade and shadow on development sites. Trees close to development can reduce the amount of sunlight and skylight to gardens, open spaces, solar panels and windows, in some cases causing light levels to fall below the recommended levels. However, the recommendations in BS5837 for portraying the shade from individual trees is not a reliable or useful design tool. Therefore, this aspect of the constraints that trees would present to development design is not being reported.

#### **4.4 Statutory constraints to tree works (current site usage)**

The client has confirmed that there are no Tree Preservation Orders or Conservation Area designations protecting trees on the site.

A 'felling permission' is usually required from Scottish Forestry for larger volumes of timber. A number of exemptions exist, including for trees with a diameter not exceeding 10 centimetres, trees in orchards, gardens, churchyards or public open spaces, felling where the aggregate cubic contents 5 m<sup>3</sup> in any quarter (except in small native woodlands of Caledonian Pinewoods), the prevention of immediate danger to persons or to property, trees badly affected by Dutch Elm Disease and dead trees.

There is also an exemption for the felling of a tree where immediately required for the purposes of carrying out development authorised by planning permission granted or deemed to be granted under the Town and Country Planning (Scotland) Act 1997. Particular care is usually needed in the use of this last exemption. I have not specifically checked whether an exemption applies or would (on granting of planning permission) apply here.

#### **4.6 Woodland removal constraints**

Woodland removal can trigger Government policies protecting against the loss of woodlands generally. For this report, because there is no woodland on the site, no check has been needed or undertaken as to whether any part of the site is covered by NatureScot's (Scottish Natural Heritage's) 'Ancient Woodland Inventory' or other woodland databases.

## 5. RISK RECOMMENDATIONS

### 5.1 Risk generalities

*As required by BS5837, this report must address only imminent serious risk.*

The risk associated with trees can be expressed in accordance with general advice from the Health & Safety Executive (2001).

In short, the magnitude of risk is a combination of *Probability of failure x Severity of harm or damage x Likelihood of someone or something being present*.

The risk is quantified and recorded for each component part within broad categories that combine to give, within an order of magnitude, overall risk categories.

**Negligible → Acceptable → Tolerable (medium) → Tolerable (high) → Unacceptable**

This report only concerns itself with risk in the last (or occasionally second-last) category.

### 5.2 Assessed risks (current usage)

No trees were found that presented an imminent and serious hazard to life or property.

## **6. SUMMARY OF SURVEY FINDINGS AND CONSTRAINTS** **(With report section numbers in brackets)**

As an aid to project design and selection of trees for retention and protection, all the trees and groups of trees on the site have been identified, measured and recorded and then categorised for relative retention desirability (Quality Category), all in accordance with BS5837 (1.1). As the Standard requires this to be done by an 'Arboriculturist', the qualifications and experience of the surveyor are stated (1.3).

BS 5837 requires trees (including groups of trees) on land adjacent to the site, (whether in the same ownership or otherwise) to be recorded if they present constraints that might be relevant to any proposals. These have been included where appropriate.

### *Mapping and precision*

Where tree positions have been plotted during the tree survey, this has been done using a combination of any available topographic survey information, GPS positions and positions relative to physical features shown on the base map (2.1).

A degree of inaccuracy is inevitable, though rarely significant, but the position of trees may have to be plotted more accurately if they are to be retained and are found to be in very close proximity to proposed development (2.1).

For this tree survey, the plotting of trees could be achieved at sufficient accuracy for detailed design work to a precision of  $\pm 2$  metres.

Where trees are being considered for retention, positioning accuracy could be improved by supplementary topographic survey.

### *Portrayal of tree constraints*

The position of the trees and groups of trees, and the extents of their crowns and combined canopies (colour coded for relative retention desirability (2.4)) are represented on the Tree Constraints Plan(s) (4.1 and below).

The trees and groups of trees have had their Root Protection Areas calculated with reference to species, growing environment and other factors and a representative proportion of these have been plotted, modified from simple circles where known or expected ground conditions require it. These are represented on the Tree Constraints Plan(s) (4.2 and below).

### *Ancient or veteran trees or woodlands*

The survey did not note the presence of any ancient or veteran trees on or around the site (3.4).

No parts of the site comprise woodland of sufficient size and density to be relevant to Government policies on woodland removal if removal were proposed (4.6).

#### *Daylighting*

The advisory method in the British Standard for indicating the shading from the trees has been omitted, as it does not provide a useable quantification of daylighting. Supplementary advice is available on request (4.4).

#### *Statutory protections (current site usage)*

The client has confirmed that there are no Conservation Area or Tree Preservation Order restrictions on tree works.

#### *Risk and management recommendations*

No trees were found that might present an imminent and serious hazard to life or property (5.1).

#### *Use of the data and mapping*

The tree survey has been done independently of any development proposal (2.1).

*BS 5837 recommends that “The constraints imposed by trees, both above and below ground (see Note to 5.2.1) should inform the site layout design, although it is recognized that the competing needs of development mean that trees are only one factor requiring consideration.” The tree data can be used to inform site layout, including during construction. Having regard to the Estimated remaining Contribution and quality of each tree or group (represented by the retention desirability category (Quality Category)) and the design life of the development proposal, factors such as shading of buildings and open spaces, privacy and screening, amenity value of trees, future pressure for removal, seasonal nuisance, servitudes and wayleaves and statutory undertaker powers and requirements, regulatory protection, soil shrinkability (subsidence or heave), known or potential tree risk and conservation benefits need to be weighed up alongside other design considerations to achieve a satisfactory juxtaposition of trees and site usage.*

This part of the report provides only a baseline for detailed design or tree retention proposals. The implication for trees and development in the context of a specific design layout will be dealt with in the following Arboricultural Impact Assessment part of this report.







## APPENDIX 1 - TREE DATA

LOCATION: Mary Street, Port Dundas

SURVEY DATE: September 2024

Tag or ID	off site ?	Species	Binomial	Stems (if >1)	Effect- ive DBH (mm)	Ht. (m)	Spread (m)				Crown ht.(m)	Observations	Cond- ition	Life- stage	ERC (yrs)	Quality category	risk (if relevant)	action
							N or mean	East	Sout h	West								
900		Downy Birch	<i>Betula pubescens</i>		80	6	1.5				0 to 1	No rooting south. Major root W	Good	Young	20 to 40	C		
910		Silver Birch	<i>Betula pendula</i>	2	110	5	2				1.5 to 2.5	Twin stemmed or 2 trees	Good	Young	> 40	C		
912.1		Silver Birch	<i>Betula pendula</i>	3	170	9	2.5				0 to 1	Multistemmed from base. Base buried in aggregate	Fair to Good	Young	20 to 40	C		
912.2		Silver Birch	<i>Betula pendula</i>	3	170	8	2.5				0 to 1	No access	Fair to Good	Young	20 to 40	C		
1	unk.	Goat Willow	<i>Salix caprea</i>		100	5	2.5	1.5	1.5	2.5	0 to 1	Behind retaining structure and fence	Fair	Young	10 to 20	C		
2	os.	Goat Willow	<i>Salix caprea</i>	2	150	5	3	3	3	2	0 to 1	Twin stemmed from base. No access. Behind fence	Fair to Good	Young	20 to 40	C		
913		Italian Alder	<i>Alnus cordata</i>		160	6.5	2.5	2.5	1.5	2.5	0 to 1		Fair to Good	Semi-mature	20 to 40	C		
914		Italian Alder	<i>Alnus cordata</i>	2	180	6	3	2	2	3	0 to 1	Twin stemmed from base	Fair to Good	Semi-mature	20 to 40	C		
915		Italian Alder	<i>Alnus cordata</i>		140	6.5	2.5	1.5	1	2	0 to 1		Fair to Good	Young	20 to 40	C		
916		Goat Willow	<i>Salix caprea</i>	4	370	8	2	5	4	5	0 to 1	Multistemmed from 9.5m. partly growing through fence.	Fair to Good	Early-mature	> 40	B		
917		Silver Birch	<i>Betula pendula</i>		290	12	4	3	2	3	2.5 to 3.5	Upright reasonably balanced	Fair to Good	Early-mature	> 40	B		
918		Group - mixed species broadleaf		5	350	8	0				0 to 1	Dense intergrown goat willows and 1 birch.	Fair to Good	Semi-mature	> 40	B		
919		Italian Alder	<i>Alnus cordata</i>	2	350	12	3	5	3	2	0 to 1	Twin stemmed from base. Initial lean NE self corrected.	Fair to Good	Early-mature	> 40	B		
920		Goat Willow	<i>Salix caprea</i>	5	260	6	4	4	2	3	0 to 1	Multistemmed from base. Decaying stubs around base	Fair	Semi-mature	10 to 20	C		

## **7. ARBORICULTURAL IMPACT ASSESSMENT**

### **7.1 Purpose and process**

The purpose of an Arboricultural Impact Assessment is to evaluate the direct and indirect effects of the proposed design on trees, and where necessary to recommend appropriate extents and types of mitigation against potential tree damage.

As required by BS 5837:2012 “*Trees in relation to design, demolition and construction – Recommendations*”, it follows a sequential process –

- Baseline of above- and below-ground constraints identified in the tree survey
- Comparison with proposed form of development to identify potential conflicts
- Documenting of unavoidable tree works (removals, pruning)
- Evaluating effect of removals on retained trees
- Documenting of other forms of potential conflict
- List of issues to be addressed and mitigation measures to protect retained trees
- Tree Protection Plan showing retentions, removals and extent of protections. ‘

A ‘Tree Protection Plan’ is a key output of the Arboricultural Impact Assessment process, and this report therefore goes through the Impact Assessment to determine, justify and define any tree protection measures and their locations and extents. The formal term ‘Tree Protection Plan ‘ is appropriate even if there are no trees to be protected.

### **7.2 Tree constraints to design and development**

In the preceding sections of this report, the constraints that would be presented by trees, above and below ground, to any design for the development of the site have been identified. As BS5837 demands, to keep this free of subjective influence this has been done without knowledge or influence of any development proposals.

The Arboricultural Impact Assessment presumes that the designers have had regard to the survey and constraints information in settling upon the development design.

### **7.3 Tree works**

A finalised design proposal has now been provided to me. It comprises demolition of the existing buildings and structures and development of a battery energy storage facility.

I conclude that the following tree works are either -

- explicit (i.e. shown in the development layout as being removed) or

- implicit (i.e. cannot reasonably be retained by virtue of being under development forms) in the design
- unavoidable (e.g. a consequence of demolitions and resultant removal of structural support or a consequence of necessary excavation techniques or the use of specialist construction components)

Trees number 900, 910 to 917, 919 and 920 are to be removed.

Group number 918 is to be removed.

No special arrangements are to be made to protect encroaching parts of Category C or U offsite trees that presently could be removed under civil law rights.

No trees are to be pruned.

On the Tree Protection Plan to follow this Arboricultural Impact Assessment the development proposal is shown. The tree works are indicated as follows –

- Whole-tree removals are shown by dashed red lines on the crown spreads of the affected trees;
- the removal of groups or parts of groups are indicated by red lines and light red shading of the canopy spreads of the affected groups;

#### **7.4 Areas designated for structural landscaping**

These are areas that would rely on the soil structure being undamaged by construction operations.

I note that no areas have been thus designated.

#### **7.5 Evaluation of impact of proposed tree losses**

This evaluation is restricted to the effect of any tree losses on the trees selected for retention and does not include the impact of any proposed tree losses on the proposed development.

Trees to be removed or retained have been identified in preceding sections of this report and on the Tree Protection Plan. In effect, all trees are to be removed and there is no residual effect on remaining trees.

Where whole groups are to be removed, there is no residual effect.

## **7.6 Direct and indirect effects (on remaining trees) of the proposed design / evaluation of tree constraints**

In the following section it is assumed that the design has taken into account the constraints presented by the retained trees and that any conflicts with the vitality of the retained trees has been recognised.

As no trees are to be retained, there are no direct or indirect effects to be assessed.

## **8. Arboricultural Method Statement (“Heads of terms”)**

### **8.1 Issues to be addressed and mitigation measures**

As no trees are to be retained, there are no issues to be addressed.

### **8.2 Tree Protection Plan**

Following the systems described in s.7.2 to s.7.5.1 above, the attached Tree Protection Plan shows the extent of any tree removals.

Because no trees are to be retained, there are no protection measures to be shown on the Tree Protection Plan.

### **8.3 Summary and role of Arboricultural Method Statement ((full))**

In the circumstances there is no role to be served by an Arboricultural Method Statement and it is recommended that none be produced.

Julian A. Morris

Signed



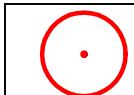



Dated

September 2024





LEGEND

-  Trees to be removed due to development
-  Tree groups to be removed due to development
-  Root protection area
-  Site boundary

General Notes

- This drawing is based on the information available to us at the time.
- All trees tagged and surveyed, dated 05 / 09 / 2024 (Refer to this survey for further details).
- Base Survey dated August 2024.
- Prior to commencement of any work on site protective fencing must be erected around existing trees to be retained in accordance with BS 5837:2012 'Trees in Relation to Design, Demolition & Construction - Recommendations'.
- All tree works to be carried out in accordance with BS 3998:2010 'Recommendations for Tree Work'.
- All tree work to be carried out by a qualified and fully insured arboricultural contractor.
- In the case of multi stemmed trees, due to variances in survey technique and stem configuration, the surveyor may make a judgement to adjust the RPA so that it more accurately reflects tree growth form.



<div>01010203040506070809101112131415161718192021222324252627282930313233343536373839404142434445464748495051525354555657585960616263646566676869707172737475767778798081828384858687888990919293949596979899100</div>	
Project: BESS Port Dundas, Glasgow	Client: Graham + Sibbald
Drawing Title: Tree Constraints Plan	
Scale: 1:200 @ A1	Date: 26 / 09 / 2024
Drawing No: 2382 / 02	Status: Planning
Drawn by: C Corbett	Checked by: G Barcroft



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## APPENDIX 2 - GLOSSARY OF TERMS

**Adaptive growth:** An increase in wood production in localised areas in response to a decrease in wood strength or external loading to maintain an even distribution of forces across the structure.

**Adventitious/epicormic growth:** New growth arising from dormant or adventitious buds directly from main branches/stems or trunks.

**Binomial:** Unless otherwise stated the Linnaean binomial name of the species is stated for the avoidance of any ambiguity arising from varying usage of common names.

**Bracing:** The installation of cables, ropes, rods and/or belts to reduce the probability of failure of parts of the tree structure due to weakened elements under excessive movement.

**Callus:** Undifferentiated tissue initiated as a result of wounding and which become specialised tissues ('Woundwood') of the repair over time.

**Cavity:** A void within the solid structure of the tree, normally associated with decay or deterioration of the woody tissues.

**Co-dominant stems:** Two or more, generally upright, stems of roughly equal size and vigour competing with each other for dominance.

**Compression fork:** an inherently weak fork in which continued radial growth of two competing substems results in pressure which tends to push the fork apart.

**Conservation Area:** A designation made under the Planning Acts in the interest of preserving or enhancing the special architectural or historic character or appearance of an area.

**Crown:** The foliage bearing section of the tree formed by its branches and not including any clear stem/trunk.

**Crown Lifting:** The removal of the lowest branches and/or preparing of lower branches for future removal.

**Crown Reduction:** The reduction in height and/or spread of the crown of a tree.

**Crown Spreads:** The extent of the live crown, measured from the centre of the base of the canopy, in each of the four cardinal points (in the order north, east, south, west)

**Crown Thinning:** The removal of a portion of smaller/tertiary branches, usually at the outer crown, to produce a uniform density of foliage around an evenly spaced branch structure.

**Condition:**

Good	Generally free from defects and in good health
Fair	Reasonably healthy but defects are present that may adversely affect Estimated Remaining Contribution but that may be addressed in the short term by minor intervention
Poor	In decline and/or defective requiring major intervention
Dead	No signs of life or so little that death is inevitable

**Construction Exclusion Zone (CEZ):** area based on the Root Protection Area (and low crown spreads) from which access is prohibited for the duration of a project

**Decurrent:** Widely spreading on several limbs

**DBH/Diameter:** Stem diameter, more fully known as Diameter at Breast Height (1.5m).

**Dieback:** No signs of life on branch tips due to age or external influences.

**Epicormic Growth:** See Adventitious Growth

**Excurrent:** Having a main stem and radiating limbs of limited length

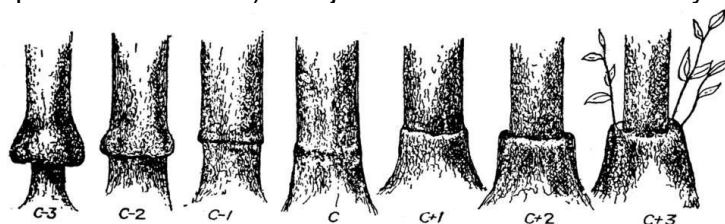
**ERC/ Estimated Remaining Contribution:** The number of years that the tree in substantially its current form (or better) is expected to continue to make an arboricultural or landscape contribution.

40+ years	corresponding with BS 5837	40+ years
20 to 40 years	corresponding with BS 5837	20+ years
10 to 20 years	corresponding with BS 5837	10+ years
0 to 10 years	corresponding with BS 5837	less than 10 years

**Fruiting bodies:** The fruiting body is the spore bearing, reproductive structure of that fungus.

**Graft:** The growing together, naturally or deliberately, of two plant parts (including from different

species or varieties) with joined vascular cambia. Varying degrees of compatibility (see below)



**Hazard beam:** Upwardly curving part of a tree prone to longitudinal splitting

**Inclusion fork:** A compression fork further weakened by the inclusion of bark from both competing substems at their interface.

**Life Stage:**

Newly planted	Not fully established and capable of being transplanted or easily replaced
Young	Establishing, usually with good vigour
Early mature	Established, usually vigorous and increasing in height
Mature	Fully established around half their species' life expectancy, generally good vigour and achieving full height potential but crown still spreading
Late mature	Moderate vigour, no additional height expected and growth rate slowing
Over-mature	Fully mature, in last quarter of life expectancy, vigour decreasing
Veteran	See Veteran definition
Ancient	Beyond maturity, old in comparison with other trees of the same species; showing Veteran (see below) values and characteristics because of age rather than past events

**Occlusion:** growth of callus and wound wood, sealing wounds.

**Planning Acts:** Primary Planning legislation in Scotland relevant to trees and their protection, principally the Town & Country Planning (Scotland) Act 1997, the Planning etc. (Scotland) Act 2006 and The Town and Country Planning (Tree Preservation Order and Trees in Conservation Areas) (Scotland) Regulations 2010.

**Pollard:** The removal of the top of a young tree at a prescribed height to encourage multi-stem branching from that point, repeated on a cyclical basis always retaining the initial pollard point.

**Quality/Value Category:** As defined and used by BS5837 -

- A Trees of high quality and value
- B Trees of moderate quality and value
- C Trees of low quality and value

Subcategories of these record the main value of the tree

- 1 Mainly Arboricultural values
- 2 Mainly landscape values
- 3 Mainly cultural values, including conservation

**Retrenchment pruning:** A form of reduction intended to encourage development of lower shoots and emulate the natural process of tree aging.

**Risk Category:** In accordance with the Health & Safety Executive's general parameters.

Lower than 1:1,000,000 'Acceptable'

Between 1:1,000,000 and 1:1,000 'Tolerable'

Higher than 1:1,000 'Unacceptable'

So low that it cannot be quantified, 'Negligible'.

**Root Protection Area (RPA)** layout design tool indicating the minimum area around a tree deemed to contain sufficient roots and rooting volume to maintain the tree's viability, and where the protection of the roots and soil structure is treated as a priority.

**Tree Preservation Order:** An Order made under the Planning Acts in the interests of the amenity of an area.

**Veteran:** A survivor that has developed some of the habitat features such as wounds or decay found on an ancient tree, not necessarily as a consequence of time, but of past events or its environment. It may look old relative to other trees of the same species.

**Vigour:** The health and resilience of a tree reflected in shoot extension, leaf size and density.

**Woundwood:** lignified and differentiated tissue produced as a response to wounding.

### **APPENDIX 3 - SURVEY METHODOLOGY & LIMITATIONS**

This methodology complements the methodology requirements of BS5837, which are not restated here.

Each tree is inspected initially from a distance to ensure closer inspection is safe.

The position of trees or the outline of groups is captured on site using a Geographic Information System ('GPS') and the trees' attributes are recorded as a map layer. These are brought into the report as an Excel spreadsheet for processing and use. The data includes a 16 digit Ordnance Survey grid reference, which may be used to plot trees or group polylines on a georeferenced plan. The strength and position of satellite signals used by GPS is variable in quantity, strength and quality, and reflections from buildings, fences or vehicles can result in aberrations. Generally 1.5 metre GPS accuracy is achieved, suitable only for indicative relative position of trees. If these are within 12 x their stem diameter of any linear features, their distance and orientation relative to those features is measured and recorded.

The height is estimated by the use of a clinometer and trigonometry. Distances are measured using calibrated paces or a laser measuring device, adjusted where necessary for the terrain.

Diameters of stem are measured at 1.5 metres above natural ground level using a diameter tape which measures circumference ('girth') and gives the equivalent average diameter. Where trees are multistemmed from below 1.5m, either the diameter below the multistemmed part or the equivalent stem diameter of the combined cross sectional area of all the stems is given. For offsite trees, stem diameters are estimated using a laser measurement device and tacheometry for large stems; distances are estimated.

Where a tree has more than one stem at a point 1.5 metres above the natural ground level its diameter shall be treated for the purposes BS5837 as exceeding 75 millimetres only if at least one stem when measured over its bark at that point exceeds 75 millimetres. The calculation of equivalent stem diameter of the combined cross sectional area (see above) will disregard any substems of diameter less than 75mm.

The tree species is identified from knowledge supported by Johnson and Moore (see Fuller Citation at Appendix 4) and other sources using bark, buds, twigs, fruit, flowers, form and habit.

Binoculars are used where appropriate to examine visible features and structures above a few metres in height. A hand lens is used to examine small features and to help narrow down the list of possible species of any pathogen growths on the tree.

Whilst it is not possible without laboratory examination and testing to confirm definitive identifications of pests, diseases and fungal infections, all reasonable attempts are made to eliminate possibilities and in most cases a species or genus or a common name can be state with a reasonable degree of confidence that the implications arising from the identification will be appropriate to the other outcomes of the report such as risk assessment, recommendations and Estimated Remaining Contribution.

Soundings will be taken either with a rubber mallet or a nylon-tipped hammer to try and ascertain the existence and likely extent of cavities or other invisible decay. Cavities will be inspected visually with a torch only insofar as this is reasonably possible from the ground, removing only enough of loose material as is necessary to reach conclusions about the extent and nature of decay or defects.

Except to the extent stated in the report, the assessment is based on a visual inspection from ground level only, from publicly accessible and privately available vantage points.

Soil present around the base of trees is not removed and root collars are not examined except where, and to the extent, they are already exposed. No sampling, examination or analysis of the soil was done. No intrusive or destructive tests is carried out. The survey does not include exhaustive foliar examination (except for purposes of identifying the species).

Trees are generally assessed during a single visit, with the limitations that this brings, such as the opportunity to assess (i) the reaction of trees to a variety of wind strengths and directions, (ii) the presence of seasonal fungal Fruiting Bodies, (iii) foliage density (iv) structural elements concealed by foliage. Only a broad indication of the intensity of usage of the site and the immediately surrounding land and pedestrian/vehicle routes is gained from a single visit.

Obstacles liked dense basal epicormics and/or ivy on trees, and occasionally dense undergrowth can obstruct the full inspection of trees, including their rooting area. Only enough to reach a preliminary or final conclusion about any such affected trees will be removed.

#### **APPENDIX 4 - Fuller citation of texts, if referred to**

Arboricultural Association (2017) Guidance Note 11 *Aerial Inspections: A guide to good practice*

Arboricultural Association (2020) Guidance Note 12 *The use of cellular confinement systems near trees: A guide to good practice*

British Standards Institute (2008) – *BS8206-2: Lighting for buildings. Code of practice for daylighting*

BS EN 17037:2018 “*Daylight in buildings*”

British Standards Institute (2011) – *BS3998: Recommendations for tree work*

British Standards Institute (2012) – *BS5837: Trees in relation to design, demolition and construction - Recommendations.*

British Standards Institute (2015) *BS8596 Surveying for bats in trees and woodland – guide*

British Standards Institute (2015) *Microguide to surveying for bats in trees and woodland*

Forestry Commission Scotland (2009) – *Control of Woodland Removal Policy*

Forestry Commission Scotland (2014) - *Scotland's Native Woodlands - Results from the Native Woodland Survey of Scotland*

Health & Safety Executive (2001) - *Reducing Risk, Protecting People*

Johnson and Moore (2004) – *Collins Tree Guide*

Littlefair, Paul, BRE (2011) – *Site Layout Planning for Daylight and Sunlight*

Lonsdale, D. (ed) (2013) - *Ancient and other veteran trees: further guidance on management.*

Mattheck and Breloer (1994) – *The body language of trees*

Mynors (2022) – *The Law of Trees, Forests and Hedgerows (3<sup>rd</sup> edition)*

Roberts, Jackson and Smith (2006) – *Tree Roots in the Built Environment*

Schwartz, Engels and Mattheck (2000) - *Fungal Strategies of Wood Decay in Trees*

Scottish Government (2011) - *A guide to understanding the Scottish Ancient Woodland Inventory (AWI)*

Statutory Nature Conservation Organisations/ Bat Conservation Trust (2015) – *Method Statement for the Appropriate Use of Endoscopes by Arborists*

Strouts and Winter (1994) *Diagnosis of ill-health in trees*

White, John and Forestry Commission (1998) - *Estimating the Age of Large and Veteran Trees in Britain' - Forestry Commission Information Note*



# APPENDIX 5

Table 1 Cascade chart for tree quality assessment

Category and definition	Criteria (including subcategories where appropriate)			Identification on plan
Trees unsuitable for retention (see Note)				
<b>Category U</b> Those in such a condition that they cannot realistically be retained as living trees in the context of the current land use for longer than 10 years	<ul style="list-style-type: none"><li>Trees that have a serious, irremediable, structural defect, such that their early loss is expected due to collapse, including those that will become unviable after removal of other category U trees (e.g. where, for whatever reason, the loss of companion shelter cannot be mitigated by pruning)</li><li>Trees that are dead or are showing signs of significant, immediate, and irreversible overall decline</li><li>Trees infected with pathogens of significance to the health and/or safety of other trees nearby, or very low quality trees suppressing adjacent trees of better quality</li></ul> <p><i>NOTE Category U trees can have existing or potential conservation value which it might be desirable to preserve; see 4.5.7.</i></p>			See Table 2
	<b>1 Mainly arboricultural qualities</b>	<b>2 Mainly landscape qualities</b>	<b>3 Mainly cultural values, including conservation</b>	
Trees to be considered for retention				
<b>Category A</b> <b>Trees of high quality</b> with an estimated remaining life expectancy of at least 40 years	Trees that are particularly good examples of their species, especially if rare or unusual; or those that are essential components of groups or formal or semi-formal arboricultural features (e.g. the dominant and/or principal trees within an avenue)	Trees, groups or woodlands of particular visual importance as arboricultural and/or landscape features	Trees, groups or woodlands of significant conservation, historical, commemorative or other value (e.g. veteran trees or wood-pasture)	See Table 2
<b>Category B</b> <b>Trees of moderate quality</b> with an estimated remaining life expectancy of at least 20 years	Trees that might be included in category A, but are downgraded because of impaired condition (e.g. presence of significant though remediable defects, including unsympathetic past management and storm damage), such that they are unlikely to be suitable for retention for beyond 40 years; or trees lacking the special quality necessary to merit the category A designation	Trees present in numbers, usually growing as groups or woodlands, such that they attract a higher collective rating than they might as individuals; or trees occurring as collectives but situated so as to make little visual contribution to the wider locality	Trees with material conservation or other cultural value	See Table 2
<b>Category C</b> <b>Trees of low quality</b> with an estimated remaining life expectancy of at least 10 years, or young trees with a stem diameter below 150 mm	Unremarkable trees of very limited merit or such impaired condition that they do not qualify in higher categories	Trees present in groups or woodlands, but without this conferring on them significantly greater collective landscape value; and/or trees offering low or only temporary/transient landscape benefits	Trees with no material conservation or other cultural value	See Table 2