Trees and Construction

BS5837 Tree Survey, AIA & AMS

Site: 15 Wedderburn Road, London, NW3 5QS

Ref: 17238/A2_AIA_Rev.A

Client: Mr Dan Wagner

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- August 2017 -

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Revision	Description	Date
_Survey	BS5837:2012 Tree Survey Advice	24/07/2013
_AIA	Proposed garden room review & report release	31/07/2013
_Survey	Update to BS5837:2012 Tree Survey Advice	01/12/2016
_AIA_Rev.A	Proposed garden room review & report release	29/08 /2017

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1. INTRODUCTION

1.1 **Instruction:** This advice is prepared for Mr Dan Wagner (hereafter; client) and Clive Sall Architecture Ltd (hereafter; architect). It is in respect of tree (arboricultural) related planning considerations at 15 Wedderburn Road, London, NW3 5QS (hereafter; site).

As the proposal relates to development works at site, the advice herein is produced in accordance with the British Standard 5837 : 2012 '*Trees in Relation to Design, Demolition and Construction - Recommendations'* (hereafter; BS5837).

1.2 **BS5837:** The scope of BS5837 is to provide guidance on how trees and other vegetation can be integrated into construction and development design schemes. The overall aim is to ensure the protection of amenity by trees which are appropriate for retention.

1.3 **Scope of this advice:** This assessment is produced in accordance with BS5837. This objective is to systematically assess the proposed scheme and provide suitable recommendations regarding the potential impact on trees and vice versa with associated tree protection recommendations.

1.4 Following the initial instruction the consultant surveyed the site on the 24th July 2013. A site assessment and BS5837 tree survey were carried out; all relevant trees were surveyed from ground level and plotted as either an individual or a tree group, i.e. those contained on and around the application boundary; this has since been reviewed and updated to maintain accuracy as per a site survey on the 1st December 2016.

The tree survey and subsequent advice, specifically '*Considerations for Tree Retention / Removal*' section within this advice, were provided to the client and architect for their consideration in July 2013. This was supported by a site meeting with the council's Arboricultural Officer (Tom Little - hereafter; Tree Officer) on the 23rd October 2013, and has since been updated based on the most recent tree survey details (as above); the associated details are included herein in relation to the site and proposed scheme.

1.5 This advice is subject to caveat at Appendix I, outlines relevant terms and definitions at Appendix II and constitutes the findings of the preliminary site assessment and associated arboricultural recommendations.

1.6 The survey data and site observations used the supplied site plan to illustrate the surveyed trees in plan format as a 'Tree Constraints Plan' (hereafter; TCP). The TCP illustrates the surveyed trees and has an overlay of the proposed scheme for review. The TCP is then used as a base layer for the appended 'Tree Protection Plan' (hereafter; TPP); the TCP, TPP and tree survey data table are at Appendix III.

2. SITE INFORMATION & TREE ASSESSMENT

2.1 The site has a detached building which is currently subdivided into three residences. It is on the corner of Wedderburn Road and Akenside Road and is bound thereafter by residential property gardens.

The site has an openly accessible driveway off Wedderburn Road which links to a gated front and rear garden walkways. The front garden sits mostly at the street level whilst the gardens at the rear are at differing lower levels and are accessed via stairways and patio sections; these are mostly hard surfaced.

The surveyed trees are within the front, side and rear gardens at site, and within the highway to the North off Wedderburn Road as T1 - T18, G1, G2 and G3.

2.2 **Proposal:** At the time of the survey(s) and provision of the baseline tree survey advice, it was understood that the client proposed a scheme for the renovation of the existing ground and lower ground floor property. This was to include lower level/basement extension, access improvements and a scheme of landscape enhancement throughout.

Since the most recent revisions and council discussions with the Architect, this is confirmed as per the client's supplied plans via the Architect. The proposed site plan is considered herein, ref: 276_004_P3 as is illustrated atop the TCP.

2.3 Trees -

2.3.1 The site requires consideration from an arboricultural perspective due to the presence of trees on and offsite; these trees are within impacting distance of the property and the potential construction workers' accessible area. Further, offsite trees (T15 - T18) are to the highway, some overhang the boundary and are therefore considered herein.

2.3.2 The tree survey and assessment resulted in the BS5837 quality/retention categories for onsite trees/tree groups of 'C - low' as well as those categorised as 'U' for either small scale trees, hedge growth or those dead, dying of dangerous trees needing to be removed. Thereafter, the highways trees included both 'A - high' and 'C - low' quality categorisations due to their large scale and contribution, and limited current contribution due to scale but good future potential, respectively.

The front garden is limited in tree cover with those surveyed being mostly small scale ornamentals which contribute to the shrub border planting. Thereafter the side walkway has congested growth which has been planted to serve a functional screen and some individual trees which protrude the collective canopy cover (including those protected by TPO although not of great individual quality). Likewise, the rear garden trees grow in close confines with hard surfaced surrounds and could be open to significant long term improvement and site enhancement.

Thereafter, the trees at the highway are noted as the largest and best quality trees of the survey. T15 has significant growth potential and together with T16 - T18 provide the initial line of Wedderburn Road's canopy cover.

2.3.3 The site requires consideration from an arboricultural perspective due to the presence of trees on and around the site (highways); these trees are deemed to be within impacting distance of both the existing property and potential construction area.

The council confirmed that the site is contained within a Conservation Area and specific tree protection is afforded to three trees from a 1950's TPO thus:

- T17 Hawthorn (not present and hence not included in this survey) - likely removed some time ago due to diminished quality;
- T18 Crab Apple (noted as T6 in this survey and on the TCP); and
- T20 Flowering Cherry (noted as T8 in this survey and the TCP).

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3. FINDINGS & RECOMMENDATIONS

3.1 The following information, as with the prior contents of this report, should be read with the appended tree data table and tree constraints plan (17238/TCP/01_Rev.A).

3.2 In addition to the initial advice provided to client, as listed below, comments are made in reference to the architect's scheme as 'NOTE'. This accounts for the potential impact on trees from the proposed layout, access and landscape works as per the proposed scheme overlay (see; TCP) and is then supplemented herein with the tree protection measures within the Arboricultural Method Statement 'considerations' (section 4).

3.3 <u>General Considerations for Tree Retention / Removal</u>

3.3.1 Due to the offsite location of T15 - T18, the large scale and established canopy cover of T16 - T18 and potential street tree cover of T15, the retention and protection of these trees is to be assumed as a default consideration of the development.

NOTE: The extents of root growth from these trees will be influences by hard surfaces, restricted sections due to wall foundations, utilities, and roadside sub-base. However, T15 is clear of the site and onsite root presence can be assumed from T16 - T18 as a cautionary measure. As such, the existing hard surfaces for T16 - T18 can be retained during construction, to be lifted and relayed manually after construction / as part of the landscape works and have the existing soil levels retained.

3.3.2 There were a number of poor quality trees identified which are therefore categorised as 'U' (T2 - T5, G2 and T14) and are recommended for removal for H&S. T2 - T5 and G2 are dead or suppressed with dieback, andT14 grows in a compromised position with structural implications for the boundary wall with a limited future; removals should be included within the scheme.

NOTE: To the rear, the scheme shows a green wall and landscaped area with terrace. Removal of T2 - T5, G2 and T14 will allow for the inclusion of pleached trees or a small/medium scale tree/pair from the location of these trees; to be seen from the Akenside Road.

3.3.3 In conjunction with the above removals and as part of landscape works it may also be desirable to remove some of the low quality 'C' category trees. This may arise due to a declining tree condition, poor form, structural defect, poor future contribution or small scale but is to be mindful of the current function of said trees. For example, removals including T7 and T9 should still include mitigation as part of landscape planting to replicate the part screen and landscape cover which they provide; new tree planting will again enhance the future amenity contribution.

NOTE: The new landscape layout, soft landscape, enhancement planting and works access will require the removal of T7, T9 and G3 and also includes the removal of T11 for the

newly landscaped front garden. Again, these are all small scale and simple landscape consideration will easily compensate with considered tree / hedge choices so as to contribute to the surrounding streetscape and screen where advantageous to do so.

3.3.4 The remaining 'C' quality trees (i.e. T1, T6 and T8) are suitable for retention providing that preventative and restorative pruning works are undertaken. As such they could be integrated into a design where they are protected by avoidance.

The retention of the hedge cover (G1) may serve as a functional screen for the new landscape layout. However, due to the limited functional amenity of G1 and the lower level of T1 (obscured and only most clearly visible from site), removal and replacement could be mitigated by considered new tree planting in a similar location.

Likewise, the pruning works required to T6 and T8 will diminish the already limited contribution and future retention. This is due to their age, multiple stem structures, conflicting branch formation, included unions and pruning wound decay on branch compression sides. Hence, it is not considered suitable for said trees to significantly constrain a scheme or hinder the viability of a development in this instance. It is worth noting that a considered approach will be required for prominent new tree planting.

NOTE: The scheme shows the rear extension, landscape levels and retaining wall design to the rear in and around T1. Due to the anticipated tree root impact and crown conflict, the removal of T1 is recommended with replacement by 1x small / medium scale larger nursery stock tree, or 2-3x small trees would be suitable within the design. Further, the removal of G1 and T8 are included and it is recommended that a soft landscape section is utilised alongside the Akenside Road boundary for enhancement tree planting.

As a replacement for T8, and also to enhance the site in conjunction with the removal of T7, T9 and G2 (as above), it is recommended that 3x select or heavy standard nursery stock trees are planted. Medium scale species for mixed interest and biodiversity are recommended (Field Maple, Wild Service Tree, Rowan etc.) although ornamentals and alternate cultivars are also suitable, i.e. Paperbark Maple, Cercis.

3.3.5 The removal of the above trees or a proportion thereof may impact on the green cover in the first instance, however, development will present an enhancement opportunity. The currently declining and limited amenity of the site's trees is to be noted. Certainly, the vast majority of trees are obscured from offsite positions or in decline. The more notable trees which were once worthy of TPO protection have passed their best, as such removal would have no impact on the long term amenity of the site. Further, removal allow for the selection of new specimen species to enhance the site's long term amenity.

NOTE: This is reiterated and confirmed within the scheme as an enhanced front garden section with infilled and planted lightwell, retained landscape space, enhanced rear garden and prominent locations for new tree planting.

3.4 General Consideration for Site Operations

3.4.1 The process of site operations will still be important to confirm as a construction management plan / statement, i.e. to demonstrate the pedestrian only garden access, delivery and storage of materials, sensitive site preparations and protected trees etc.

3.4.2 As a basis for tree protection the following points will need to be considered:

- Tree, vegetation and shrub clearance and any agreed pruning works prior to works commencing by a suitably qualified arboricultural contractor;
- Induction of construction personnel regarding the agreed sensitive working methods, design details for tree protection and sensitive working areas;
- The storage of building sand / chemicals clear of trees and conditions to ensure no contamination/run-off into soils on site, i.e. polythene lined storage area.

3.5 General Overview for Tree Protection Considerations

3.5.1 The considerations for retained trees need to be addressed in order to ensure their protection. This is to account for the potential impact on retained trees and their growing environment from the proposed development and vice versa (these follow).

Tree Works

Proposed tree / shrub clearance which is necessary to facilitate the scheme will need to have considered the alternatives and be justifiable in the context of the proposed site layout, and is to be mitigated by a landscape scheme with replacement planting.

Only general landscape planting is considered necessary to replace poor quality trees, i.e. T2 - T5 with a higher quality specification planting for those others, i.e. T1 and T8.

Any trees which are to be removed should be well indicated to ensure that the retained trees are suitably protected. Hence, all trees which are to be removed are to be marked by a suitably qualified person [spraying the stems with a cross] prior to tree works.

Tree Crowns

Consideration is required for existing and newly planted trees whereby a scheme will need to take account of trees reaching their full growth potential. It is always prudent to provide adequate clearance from a tree's current crown for future growth.

NOTE: An alteration is proposed to the existing access routes and walkways, although the principal function is maintained with no raised pressures on the surveyed trees. As such no conflict arises between the scheme and retained tree's crowns which do not already form part of standard pruning works on site, i.e. crown lift and maintain ground clearance over site for path / parking clearance for retained trees.

Root Protection Areas (RPAs)

It is possible to undertake construction activities within trees' RPAs which does require greater attention to tree protection, foundation designs, phasing of works etc. If it is proposed to undertake works within these areas, more specific detail is required with an application to demonstrate the feasibility of said proposal.

NOTE: The RPAs of T6 and T16 - T18 cover the largest proportion of the site, and T10, T12 and T13 within the front garden and driveway. On this basis, and knowing of possible root growth influences, it is recommended that the existing soil levels are retained and protected within the RPAs unless confirmed otherwise by monitored and recorded tree root investigations, i.e. the landscape works need to account for RPAs by design.

NOTE: The hard surface works within the RPA of retained trees (T6, T10, T12, T13, T16 - T18) require sensitive methods and retained soil levels to ensure no change of circumstance for said trees. If a greater extent of works are proposed within these areas, more specific advice should be sought from a qualified arboriculturalist with a view to assessing the feasibility of said proposal and forming a suitable method statement.

3.5.2 The notable trees surrounding the property have been influenced by the presence of the road, level change and building foundation. It is recommended that the scheme and new hard landscape encroach no further on retained trees than currently observed and the existing levels within their RPAs remain; current crown to also be accommodated.

NOTE: The scheme accounts for the above advice whereby the retained hard surface entrance and garden area will have the levels maintained and works undertaken sensitively within the RPAs of retained trees: T6, T10, T12, T13, T16 - T18.

3.5.3 Demolition/Excavation Works

Any removal of existing built structures (including walkways, retaining walls etc.) or hard surfacing will need to be undertaken with great care where this occurs within or near to the anticipated rooting areas of retained trees.

Said works should adhere to the RPA restrictions, be undertaken manually with hand held non mechanical tools and ensure that existing ground levels are retained.

NOTE: As above, the hard surface works within the retained trees' RPAs will be undertaken sensitively and retain the existing soil levels in order to maintain the current conditions.

3.5.4 Hard Landscape Works

As with previously mentioned arboricultural restrictions to demolition/construction, the proposed works should avoid retained trees' RPAs. However, where ground works are proposed within RPAs, construction methods [for hard surfacing, walls etc.] should retain the existing ground levels, be undertaken sensitively and using a no dig design.

Hence, the conversion of soft surfaced areas within RPAs to hard surfaced walkways, patios etc., should retain existing soil levels and install surfaces manually (preferably to be permeable for root availability of water and nutrients).

NOTE: This will apply for the landscape works to the front and side of the property. Typically, existing hard surfaces within RPAs can be replaced on a like for like basis or with a preferential surface treatment. Elsewhere, conversion of soft surfaces within RPAs to hard surfaced walkways etc., will need to utilise a no-dig system to ensure no negative impact on the tree roots and/or growing conditions.

3.5.5 For proposed tree removals, new tree planting is to be integrated into a landscape scheme. The new trees should be of a suitable volume, species, scale, in suitably prepared planting locations with adequate space for future growth and development and to enhance the site's long term amenity contribution. Also, if the removal of larger scale trees and those protected by TPO is proposed (although made in the 1950's and now of lessened quality), this will need justification as part of the scheme. As such, pre-application advice / Tree Officer contact would then be recommended as a source of guidance in respect of the council's response to proposed tree removals.

NOTE: The proposed scheme only requires the removal of poor quality trees (T2 - T5, G2 and T14) and low quality trees (T1, T7 - T9 and T11).

NOTE: As per the Tree Officer site meeting which surrounded the principal of development and future tree cover, the removal of poor quality trees, those of small scale and limited visibility and scrubby overgrowth was discussed in favour of enhanced landscaping which was received positively.

NOTE: Likewise, the removal of trees in conjunction with the scheme with the aim of long term enhancement was also discussed. This included a mutual agreement on the identified tree survey defects, the trees' limited future contribution and the potential for site enhancement through landscape and tree planting.

NOTE: The scheme shows consideration for new tree planting, landscape provision and green cover. Certainly if executed correctly with suitably selected nursery stock selection, the scheme can demonstrate a long term amenity enhancement from trees. A detailed landscape scheme should be produced, which the council's Tree Officer may support as being addressed by way of condition; this will allow council steer on the more exact tree volume, location, species and nursery stock selection.

3.5.6 Based on the above review 'NOTE's, the following tree works are considered necessary in order to facilitate the proposed rear extension and in conjunction with the proposed landscape works. These tree works should be undertaken prior to any site works commencing, thus -

TREE WORK SUMMARY

NUMBER	TREE REMOVALS / PRUNING WORKS	
Vegetation (G1) & shrub clearance	Fell / clear to ground level	Remove all conflicting vegetation from the replacement rear garden retaining wall and new extension to provide 1.0 - 1.5m clearance for construction access.
T1	Fell to ground level and plant 2 new trees	Remove to facilitate the proposed scheme: - to be directly replaced in a similar location (rear garden) by new small / medium scale trees.
T2 - T5, G2 & T14	Fell to ground level and plant 2 new trees	Remove in conjunction with the scheme: - to be replaced with new tree planting as part of the general site landscaping and new ornamental trees.
T7 - T9, G3 & T11	Fell to ground level and plant 4 new trees	Remove to facilitate the proposed scheme: - to be directly replaced in a similar location (aside boundary or side garden) by new small / medium scale trees or functional hedge / group.
Retained trees		Protection by construction restrictions, retained hard surfaces within RPAs during site access, temporary fencing, manual work only (pedestrian access), suitable chemical / material handling, and sensitive hard landscape methods for works within RPAs (see; AMS).

3.5.7 Further to the above, the tree protection methods considered suitable for the surveyed trees are outlined as Arboricultural Method Statement 'considerations' at s.4; these are intended to demonstrate that the scheme is reviewed and considered achievable in line with the guidance and recommendations of BS5837.

4. METHOD STATEMENT 'CONSIDERATIONS'

4.1 Arboricultural Construction Restrictions

4.1.1 The following restrictions are considered relevant for tree protection purposes which are illustrated on the appended Tree Protection Plan:

a) There tree works at s.3.5.6 are required to facilitate the scheme and no additional tree works not specified within this arboricultural method statement (or leaning against or attaching of objects to a tree) are permitted unless agreed in writing by the council.

b) A secure section of Protective Barrier Fencing (hereafter; PBF) is to be installed around the soft surfaced borders for RPA protection (tree roots) and hard surfaces will be retained for works access; PBF will be installed prior to site works, material delivery or construction commencing.

c) Following the installation of PBF the fenced off sections are to act as Construction Exclusion Zones (hereafter; CEZ), whilst all RPAs are to be protected by sensitive measured detailed herein and as per the TPP.

d) No chemicals / materials are to be transported / stored / used / mixed within a RPA of CEZ, nor are these operations to occur on site without proper waste management by way of a prepared store location with polythene (or other) base liner to avoid leaching.

e) No fires are to be lit and no machinery, plant or vehicles are to be washed down within 10m of the tree's canopy, nor in a RPA, nor in a CEZ.

f) During construction processes the RPAs and CEZs will not be breached, i.e. no surface works without the prior advice of the consultant and the consent of the council; only the manual and sensitive removal of existing hard surfaces is permitted, i.e. no mechanical digging or scraping permitted within a RPA or CEZ.

g) Only following construction and hard landscape completion can the PBF be removed and any remaining approved landscape works then be completed; pedestrian access only, retained and protected soil levels for the trees' RPAs and works undertaken manually with non-mechanical hand tools).

4.2 Arboricultural Site Monitoring / Supervision

4.2.1 The council will typically request *'a scheme of supervision for the arboricultural protection measures'* which is considered necessary to confirm tree protection and adherence to approved working methods for trees.

4.2.2 The works are internal to site and access is for pedestrians only with trees offsite or towards the boundaries. Hence, phased works will be used with an illustrative tree protection fence rather than robust fixed barriers which would be over-prescriptive.

4.2.3 The appointed site contractor and/or project manager will be provided with this AMS and the TPP and will be briefed as to the prohibited works and tree protection.

4.2.4 A record of each site visit will be kept and a summary letter drafted for the client, the site manager and the local authority (to be sent to the client for distribution), thus -

- (1) Pre-commencement to confirm the approved tree works, tree protection fence alignment and construction restrictions for tree protection;
- (2) To confirm the completion of approved tree works and the tree protection fence installation and exclusion of RPA access;
- (3.a) Part way through construction works, and (3.b) after construction, ready for final hard landscape works to commence within RPAs (see; TPP); and
- (4.a) Part way through hard landscape works, and (4.b) on completion of hard landscape removal and replacement hard landscape ready for final soft landscape finishes within RPAs (see; TPP), to guide tree protection removal and to confirm adherence to the AMS.

4.3 Protective Barrier Fencing (PBF) Specification

4.3.1 Protective barrier fencing (hereafter; PBF) is to be installed to illustrate the no access areas for contractors, limit access to the existing driveway and paths and exclude all ground works, material storage and construction processes outside of the approved scheme and from the soft surfaced RPAs during construction.

4.3.2 PBF is to be used in conjunction with retained boundary walls and retained hard surfaces within RPAs for pedestrian access until construction completion (surface works within RPAs will be undertaken sensitively - detail to follow).

4.3.3 PBF is to be installed as per the TPP prior to any site works being undertaken and is to remain in place until construction completion.

4.3.4 The PBF is to be a fixed line aside the existing pathways to illustrate the Construction Exclusion Zone (CEZ) as the fenced off area. It is to prevent the pedestrian access into the soft surfaces borders and lawn and only allow access via the existing driveway and pathways and will be 1.5m tall ply hoarding with support posts.

4.3.5 Tree protection signage denoting the words “TREE PROTECTION ZONE – KEEP OUT” is to be affixed at 2.0m intervals (see TPP illustration).

4.4 Ground Protection

4.4.1 In order to avoid the need for supplementary ground protection, phased construction works are to be used in conjunction with the installation of the PBF; the soft surfaced borders are excluded for RPA protection and hard landscape / surface work within RPAs is to be delayed until construction completion (detail pending).

At the point of PBF being installed, the enclosed RPA sections become Construction Exclusion Zones (hereafter; CEZ) to protect the trees' rooting areas during construction.

4.4.2 Due to the PBF installation and retention of existing hard surfaces within RPAs (for the duration of works), RPA incursion is not anticipated. However, where this is requested, it may be necessary to protect tree roots and the growing environment. If so, the advice of the consultant will be sought and the council's written permission will be required.

4.5 Underground utilities

4.5.1 No new underground utilities are thought to be proposed as part of this scheme, and the existing utilities are understood to remain. However, where any excavations are required for repairs, improvements of for any new utility connections, drainage, or services within the RPAs on site, the excavation and installation methods will:

- Be undertaken after vegetation clearance and tree works, after the installation of tree protection measures and after the extension excavations;
- Follow an approved plan showing the type, width and depth of necessary utility installations, and confirm works as manual installation with tree root protection;
- Be undertaken after setting out of utility routes and an Arboricultural Inspection;
- Have a manual excavation undertaken under Arboricultural Supervision to identify roots larger than 25mm diameter and smaller clumps of roots; and
- The approved utilities will be laid over and under roots and trenches backfilled.

4.6 Ground Works within RPAs (hard landscape removal)

4.6.1 For the removal of existing hard surfaces from trees' RPAs, the excavations must:

- Be undertaken after construction completion, so as to allow the removal of PBF;
- Be undertaken manually with hand held tools to break out / lift and remove the existing hard surface within the RPAs;
- Be undertaken manually with hand held tools to remove the sub-base;
- Stop the excavations when the original soil level is reached, i.e. to excavate no further than the existing garden's turf level; and
- Apply the approved landscape scheme finish, i.e. mulched border, turf etc.

4.7 Additional Tree Protection Considerations

4.7.1 The retained hard surfaces within the trees' RPAs will allow for pedestrian access and continued use of the site entrance and grounds during site works and no side access is thought to be required; where this is proposed, working methods for access will require arboricultural consideration if in proximity to retained trees..

4.7.2 General consideration for material storage, handling and pollution control is to be acknowledged by the appointed contractor whereby the materials are to be delivered to, stored and mixed atop the prepared surface atop the existing driveway, i.e. for pollution control (which is clear of retained trees).

4.8 Report Handling

4.8.1 This report is produced to demonstrate that the scheme is considered and reviewed in respect of the arboricultural constraints and is achievable in line with the guidance of BS5837. The recommendations herein are to be approved by the council as a means of authorised tree protection of which the planning team are to have access to a copy.

4.8.2 This report is released to the client and architect to be distributed at their discretion. The consultant is available for any queries relating to this report and/or trees.

This concludes our advice.

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Appendix I

Caveat

Any and all information supplied to Indigo Surveys Ltd by/on behalf of the client is assumed to be accurate unless otherwise informed. | This advice is limited to the observations made on the date of inspection as detailed herein and any deletion, editing or alteration will result in the advice being null and void in its entirety. | This advice in its entirety may be deemed null and void if remedial works are undertaken on any area of the site, on or after the date of the survey. | No liability is assumed by the author or by Indigo Surveys Ltd for any misuse, misinterpretation or misrepresentation of this advice. | This advice is not valid in adverse or unpredictable weather conditions or for any failure due to 'force majeure' or unpredictable events. | No responsibility is assumed either by the author of this advice or by Indigo Surveys Ltd for any legal matters that may arise as a consequence. | Neither the author nor Indigo Surveys Ltd will be required to attend court or give testimony as part of this agreement. | The responsibility for any works undertaken on the basis of the recommendations of this advice does not form part of this agreement.

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Appendix II

Terms and Definitions

"Arboriculturist" - person who has, through relevant education, training and experience, gained expertise in the field of trees in relation to construction.

"Competent Person" - person who has training and experience relevant to the matter being addressed and an understanding of the requirements of the particular task being approached.

"Topographical survey" - an accurately measured land survey undertaken to show all relevant existing site features. *A method of carrying out topographical surveys is given in RICS specification* Surveys of land buildings and utility services at scales of 1:500 and larger.

"BS5837 Tree survey" - should be undertaken by an arboriculturist to record information about the trees on or adjacent to a site. The results of the tree survey, including material constraints arising from existing trees that merit retention, should be used (along with any other relevant baseline data) to inform feasibility studies and design options. For this reason, the tree survey should be completed and made available to designers prior to and/or independently of any specific proposals for development.

"Tree categorisation method" - trees should be categorised in accordance with the BS5837 cascade chart by an arboriculturist. This 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.

"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, shown as an arboricultural constraint in m^2. The radius is calculated using the BS5837 calculation method. An arboriculturist may change the shape of an RPA but not reduce its area.

"Arboricultural implications assessment" - a study, undertaken by an arboriculturist, to identify, evaluate and possibly mitigate the extent of direct and indirect impacts on existing trees that may arise as a result of the implementation of any site layout proposal.

"Arboricultural method statement" - methodology for the implementation of any aspect of development that is within the root protection area, or has the potential to result in loss of or damage to a tree to be retained.

"Tree protection plan" - a scale drawing, informed by descriptive text where necessary, based upon the finalised proposals, showing trees for retention and illustrating the tree and landscape protection measures.

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Appendix III

Data Table:	As appended (BS5837 Tree Survey Key & Table)
Tree Constraints Plan: (TCP / Scheme Overlay)	As appended (17238/TCP/01_Rev.A)
Tree Protection Plan: (Application Stage)	As appended (17238/TPP/01_Rev.A)

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TREE SURVEY 'KEY' - BRITISH STANDARD 5837:2012 'TREES IN RELATION TO DESIGN, DEMOLITION & CONSTRUCTION - RECOMMENDATIONS'		
FIELD KEY:		
TPO/CA	-	On client request: presence of Tree Preservation Orders (TPO) / site location within a Conservation Area (CA) & date checked;
TREE REF. #	-	Tree reference number: tag or plan number (T - individual tree, G - group of trees/shrubs, H - hedge);
SPECIES	-	Genus, species and/or common name;
AGE	-	Age classification (NP - new planting, Y - young, SM - semi mature, EM - early mature, M - mature, LM - late mature, OM - over mature);
HEIGHT (in m)	-	Approximate height of tree in metres;
CANOPY (in m) N - S - E - W	-	Approximate branch spread in metres of the four principal compass points;
STEM (in mm)	-	Stem diameter in millimetres: measured in accordance with s.4.6 of BS5837;
RPA (in m)	-	Circle radius of the Root Protection Area: calculated using the stem diameter (single/multiple stem variant, as outlined within BS5837);
CLEARANCE (in m)	-	Crown clearance in metres above the adjacent ground level;
IST BRANCH (in m)	-	Clearance in metres to first significant branch and direction of growth (where relevant);
VITALITY	-	Physiological condition typically gauged from canopy cover and annual extension growth (good, fair, poor, dead);
ESTIMATED REMAINING CONTRIBUTION	-	Approximate number of years the tree will continue to make a contribution without the need for oppressive arboricultural intervention, categorised in years as <10, 10-20, 20-40 and >40;
NOTES	-	Structural and physiological condition observations;
BS CAT.	-	BS5837 tree quality assessment category: resulting from structural/physiological condition and remaining contribution (approximate
	-	Standard retention category **U**: in such a condition that any existing value would be lost within 10 years;
	-	Standard retention category **A**: high quality and value, in such a condition as to be able to make substantial contribution of 40+ years;
	-	Standard retention category **B**: moderate quality and value, in such a condition as to make a significant contribution of 20+ years;
	-	Standard retention category **C**: low quality and value, currently in adequate condition to remain until new planting could be established
	-	Standard retention sub-category, mainly due to: **1**- Arboricultural values, **2**- Landscape values, **3**- Cultural values, including conservation;
MANAGEMENT	-	Preliminary management recommendations (as appropriate);
' * '	-	Within the survey schedule denotes an estimate

TREE SURVEY IN ACCORDANCE WITH BRITISH STANDARD 5837:2012 'TREES IN RELATION TO DESIGN, DEMOLITION & CONSTRUCTION - RECOMMENDATIONS'

CLIENT: Mr Dan Wagner ***PROJECT REF:*** 13891/A3 ***SITE:*** 15 Wedderburn Road, London, NW3 5QS

CONTACT: Clive Sall Architects ***SURVEY DATE:*** 24-July-2013 & 01-Dec-2016 ***ARB CONSULTANT:*** Andrew Turnbull *FDSc MArborA*

TREE REF. #	SPECIES	AGE	HEIGHT (in m)	CANOPY (in m) N	S	E	W	STEM (in mm)	RPA (in m)	CLEARANCE (in m)	1st BRANCH (in m)	VITALITY	LIFE EXPEC.	NOTES	BS CAT.		MANAGEMENT
T1	Apple; *Malus,. Rosaceae*	M / LM	9	4.5	4.5	3	5	360	4.3	2	1.5m - union	Normal	10 - 20	Established free, good crop cover, maintained by pollard. Multiple stem at 1.5m+ with good regrowth but starting to encroach building. Only visible in garden.	C	3	Retain / replace tree cover as part of scheme.
G1	Mixed Border (Laurel, Choisya, Ivy, Apple Blossom, Pyracantha)	SM - M	5 - 7	/	/	/	/	/	/	0	/	Fair	10 - 20	Mixed shrub border pruned laterally to encourage height and screening. Located in retaining wall border and around raised patio.	C	3	Retain / replace functional screen as part of scheme.
T2	Laurel; *Laurus, Lauraceae*	SM	5.5	3	1	2	1	130	1.6	1	/	Fair	10 - 20	Lapsed planting, likely for formal cover but height encouraged for screen, collective growth.	U		Consider removal in conjunction with the scheme / site works.
T3	Cherry; *Prunus, Rosaceae*	M	5	0.5	1	2	0	260	3.1	1.5	/	Very Poor	< 10	Almost dead.	U		Remove.
T4	Laurel; *Laurus, Lauraceae*	M	6	2	2	2	1.5	190	2.3	1	/	Fair	10 - 20	Lapsed planting, likely for formal cover but height encouraged for screen, collective growth. Dieback in crown.	U		Consider removal in conjunction with the scheme / site works.
T5	*Cotoneaster, Rosaceae*	SM / M	8	2.5	3	2.5	3	120	1.4	0	/	Fair	10 - 20	Lapsed planting, likely for formal cover but height encouraged for screen, collective growth. Multiple stem base.	U		Consider removal in conjunction with the scheme / site works.
G2	Mixed Shrub Border (Laurel, Cotoneaster, Ivy, Virginia Creeper)	SM / M	5 - 8	/	/	/	/	/	/	0	/	Fair	10 - 20	Contains T2 - T5, collective canopy, informal provides screening and blends with Ivy covered wall.	U		Consider removal in conjunction with the scheme / site works.
T6	Crab Apple; *Malus, Rosaceae*	LM	9.5	4	6	5	7	450	5.4	2.5	2m - union	Normal	10 - 20	Multiple stem at 2m, growing with paved RPA close to wall and house. Slight balcony overhang, multiple stem crown with some branch conflicts. Decay at old pruning points just above multiple stem union, previously reduced.	C	3	Retain (25% reduction required for risk management) or replace tree cover as part of scheme.
G3	Cypress x3	Y / SM	4 - 5	/	/	/	/	/	/	1	/	Fair	10 - 20	3x small stems grow as collective and provide buffer to wall and screening. Limited future contribution.	C	2	Not to guide or constrain the layout - simple replacement landscaping required.
T7	*Cotoneaster, Rosaceae*	M	10	4.5	3	5	2.5	184	2.2	1.5	/	Fair	10 - 20	Co-dominant at 0.5-1.0m, congested crown from reaction growth, growth lean and low quality form. (Multiple stems measured 140mm and 180mm).	C	2	Not to guide or constrain the layout - replacement planting required (ornamental).
T8	Cherry; *Prunus, Rosaceae*	M / LM	14	4.5	4.5	4	3.5	334	4.0	4	6m - North	Fair	20 - 40	Co-dominant base, located in shrub border. Previous branch reduction noted in parts, sparse crown and stem scarring on largest stem. (Multiple stem 210mm and 260mm).	C	2	Retain (monitor tree's condition for risk management) or replace tree cover as part of scheme.
T9	Cherry; *Prunus, Rosaceae*	M / LM	6.5	0.5	4.5	1	4	250	3.0	2.5	2m - S.West	Fair	10 - 20	Multiple stem at 2m, maintained by pollard with average form and regrowth. Suppressed by T8.	C	2	Not to guide or constrain the layout - replacement planting required (ornamental).
T10	Cockspur Thorn; *Cretaegus, Rosaceae*	M	8	2.5	2.5	3.5	3	170	2.0	1.5	1.5	Normal	10 - 20	Multiple stem crown, fairly congested from regrowth after crown reduction.	C	3	Not to guide or constrain the layout - replacement planting required (ornamental).
T11	Ornamental Cherry; *Prunus, Rosaceae*	SM	6.5	2.5	2	2	1.5	80	1.0	1.5	1.5	Normal	10 - 20	Multiple stem crown, established, fair form and small scale.	C	3	Not to guide or constrain the layout - replacement planting required (ornamental).
T12	Mespil; *Amelanchier, Rosaceae*	SM	9	2	2.5	2	1.5	80	1.0	1	1	Normal	10 - 20	Multiple stem stock at base, located in planter with good form and canopy cover, small scale.	C	3	Not to guide or constrain the layout - replacement planting required (ornamental).
T13	Crab Apple; *Malus, Rosaceae*	M	9	3.5	4	3.5	3.5	200	2.4	3.5	3.5	Normal	10 - 20	Central to block paved driveway, co-dominant at 3-5m with good form and canopy cover from growth at base.	C	3	Not to guide or constrain the layout - replacement planting required (ornamental).
T14	Golden Chain; *Laburnum, Fabaceae*	SM /M	4.5	1	3	1.5	2	160	1.9	1.5	2.5m - N.East	Fair	< 10	Growing in confined conditions, suppressed by T13.	U		Consider removal.
T15	Street Tree: Lime; *Tilia, Tiliaceae*	Y	8	2	2.5	2	2	150	1.8	2.5	2.5	Normal	40 +	Established young street planting with stem damage and stub at 2.0-2.5m.	C	1 / 3	Local Authority managed.
T16	Street Tree: Lime; *Tilia, Tiliaceae*	M	18	5	4	4.5	4	630	7.6	2.5	6m - South	Normal	40 +	Multiple stem at 3.5m, maintained by pollard, good canopy form and leaf cover.	A	2	Local Authority managed.
T17	Street Tree: Lime; *Tilia, Tiliaceae*	M	20	6	5	6	4.5	590	7.1	2.5	6m - union	Normal	40 +	Multiple stem at 5-6m, maintained by pollard, good canopy form and leaf cover.	A	2	Local Authority managed.
T18	Street Tree: Sycamore; *Acer, Aceraceae*	SM / M	16	5.5	5	5	5.5	520	6.2	4	5m - union	Normal	40 +	Multiple stem at 6-7m, maintained by pollard, recently pollarded with no current regrowth, tears and rubs of cambial layer from pruning points.	A	2	Local Authority managed.

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REV.	DESCRIPTION	DWN	CHK'D	DATE
A	Revised plan overlay ref: 276_004_P3	AT	TB	14/08/17
/	Overlay of proposed scheme 'ground'	AT	TB	03/01/17

CLIENT
Mr Dan Wagner

PROJECT
13891_/A3
15 Weddersburn Road,
London, NW3 5QS

TITLE
Tree Constraints Plan
(TCP / Scheme Overlay)

DWN	DATE	CHK'D	DATE	APP'D	DATE	SCALE
AT	03/01/2017	TB	03/01/2017			1:100

Indigo Surveys Ltd
(Mail) 2nd Floor, 1 Hunters Walk, Chester, CH1 4EB
Telephone: 0333 123 7080 www.indigosurveys.co.uk

Drawing Number
13891/TCP/01
A2
REV. A

Tree Protection Specification

These tree protection measures are within the Arboricultural Method Statement (ref: 13891/A3_AMS) and to be adhered to, thus:

a) Only the tree works listed here and within the AMS are required and proposed in conjunction with the proposed scheme and no additional tree works are permitted unless agreed in writing by the council (subject to exemptions).

b) PBF is to be installed prior to site work, i.e. prior to delivery of materials, site set up, site preparation and/or construction, and the existing driveway, patio and walkways are to be retained and the existing hard surfaces for access until construction completion.

c) Once the PBF is in place the enclosed areas are to act as Construction Exclusion Zones (no access is permitted); any welfare and materials are to be delivered using the existing access and ensure all storage is clear of tree crowns and RPAs (see; TPP);

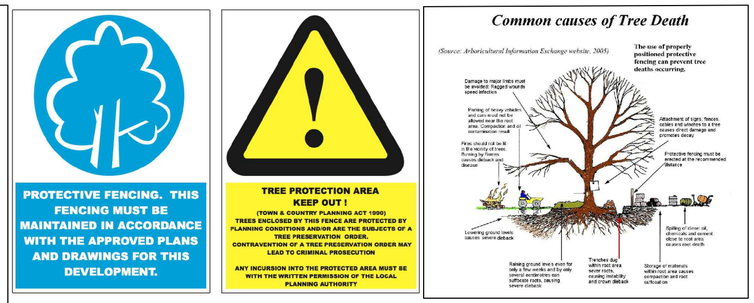
d) No chemicals or materials are to be transported or stored or used or mixed within an exposed RPA or Construction Exclusion Zone (CEZ) – cement and chemicals will be delivered, stored and mixed within the existing driveway area and be clear of trees;

i) No fires are to be lit and no machinery, plant or vehicles are to be washed down within 10m of tree canopy or within a RPA/CEZ.

j) RPAs/CEZs may not be breached, i.e. no surface work, without consultant advice and council consent; except for pedestrian access for sensitive landscape works (after construction), and no mechanical digging or scraping is permitted within a RPA / CEZ.

k) When all construction is complete the retained hard surfaces within RPAs can be sensitively excavated and the new hard landscape works completed as well as any remaining soft landscaping/tree planting works be undertaken.

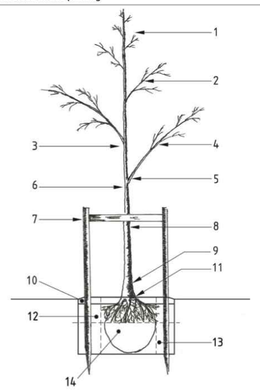
Tree Protection Signage – Example



Tree Planting – Example Design

(c) British Standards Institute (www.bsigroup.com)

Figure F.8 **Factors involved in tree planting**



Key

1	Straight leader	8	Clear stem
2	Formative pruning, as necessary	9	Bud/graft union
3	Size	10	Mulch
4	Lateral branch subordination, as necessary	11	Root flare
5	Branch union with no included bark	12	Irrigation
6	Height/stem diameter ratio	13	Soil volume
7	Support	14	Type and condition of root system

Tree Protection Specification (for Landscape Works)

The tree protection measures within the Arboricultural Method Statement (ref: 13891/A3_AMS as 'AMS') are to be adhered to as per the additional details below:

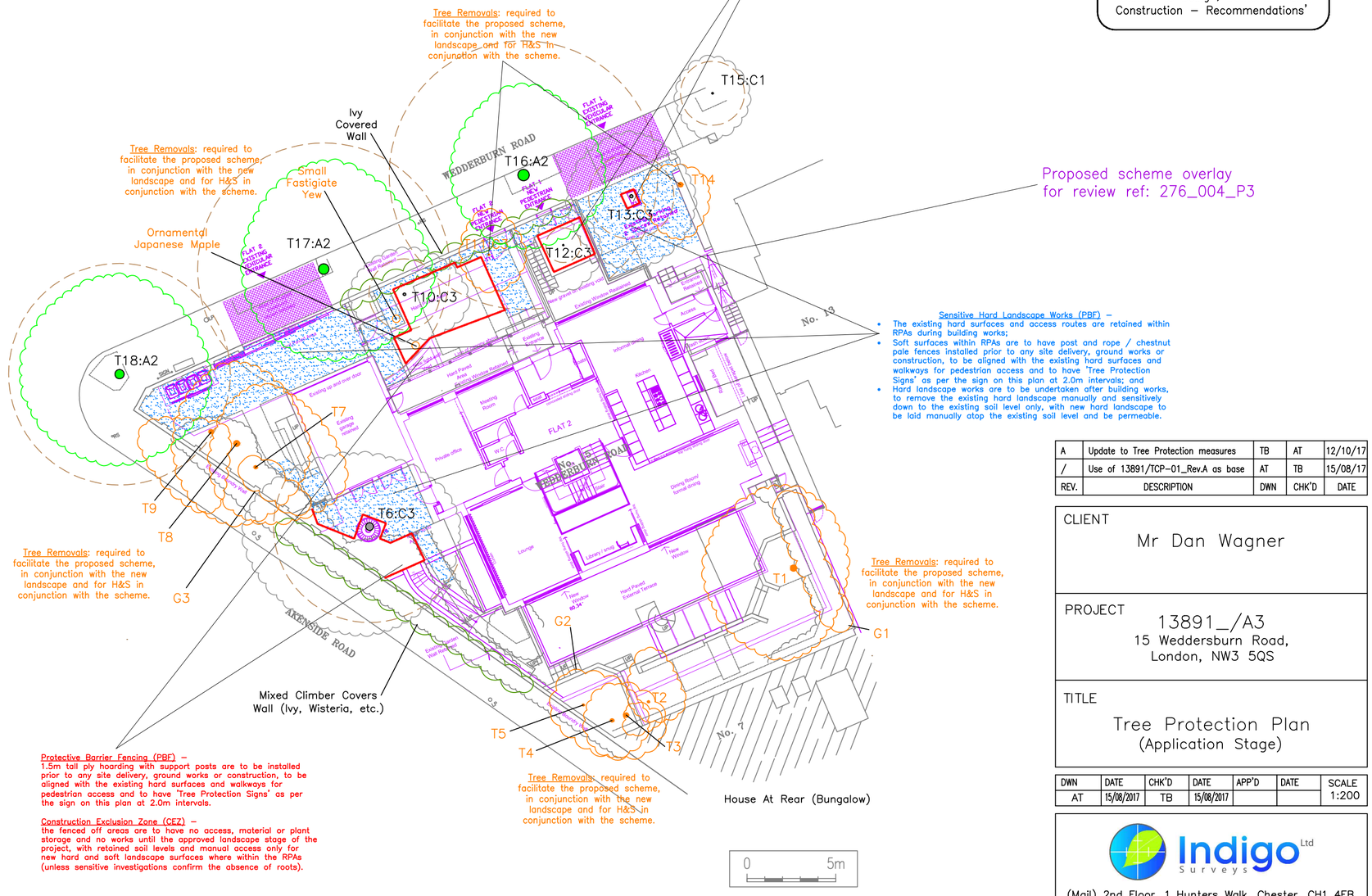
a) Landscape works will be undertaken as per an approved Landscape Scheme with tree protection measures;

b) Regrading works and hard landscaping can be conducted in a traditional manner due to the protection of RPAs (where outside of illustrated RPAs, or if investigations confirm the absence of roots) – 'No mechanical digging or scraping is permitted within a RPA';

c) Protective Barrier Fencing (PBF) may be removed to enable the landscape works to commence within RPAs / CEZs after work to the property is complete.

d) The existing hard landscape surfaces are to be removed manually using hand held tools only (no driven or tracked machinery) and retain soil levels;

e) Once the grounds are sensitively prepared within RPAs, manual hard landscape installation may be undertaken within RPAs where soil levels are retained (see; AMS), soft landscape and tree planting be completed (no driven manchinery/vehicles).



KEY

- Tree Crown Spread
- Root Protection Area (RPA)
- Tree Stem
- T1 Tree No.

Tree Condition Category

- A
- B
- C
- U

Indicative

The surveyed trees are illustrated as per the Constraints Plan as prepared in accordance with British Standard BS5837: 2012 'Trees in Relation to Design, Demolition and Construction – Recommendations'

REV.	DESCRIPTION	DWN	CHK'D	DATE
A	Update to Tree Protection measures	TB	AT	12/10/17
/	Use of 13891/TCP-01_Rev.A as base	AT	TB	15/08/17

CLIENT
Mr Dan Wagner

PROJECT
13891_/A3
15 Weddersburn Road,
London, NW3 5QS

TITLE
Tree Protection Plan
(Application Stage)

DWN	DATE	CHK'D	DATE	APP'D	DATE	SCALE
AT	15/08/2017	TB	15/08/2017			1:200

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Drawing Number
13891/TPP/01

A2

REV. A

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