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MEADOWSIDE PLOT 2 & 3

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LANDSCAPE MANAGEMENT AND MAINTENANCE PLAN

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Contents

1	MAINTENANCE	5
1.1	Maintenance: General	6
1.2	Maintenance: Softworks - Trees	7
1.3	Maintenance: Hardworks	9
1.4	Maintenance: Street Furniture & Lighting	14
2	DRAWINGS	15
2.1	General Arrangement	16
2.2	Hardworks Arrangement	17
2.3	Hardworks Construction Methods	18
2.4	Softworks Arrangement	19
2.5	Street Furniture Arrangement	20
2.6	Lighting Strategy	21



1.1 Maintenance: General

1.1.1 INTRODUCTION

Consideration during the design stage has been given to the future maintenance requirements of the hard and softworks elements within the Meadowside Plots 2 & 3 Public Realm development. The following maintenance document and schedules should be read in conjunction with the landscape design proposals and wider masterplan objectives.

This maintenance manual should be maintained as a living document and be regularly reviewed and updated. The manual addresses specific maintenance of both hard and softworks to assure that the public realm maintains a high quality appearance and setting for wider context. Many of the more general activities, highlighted below should be addressed by the management company as part of the standard public realm maintenance procedures.

Hardworks:

The report highlights the maintenance procedures for the external works. Many of the items will need further consideration by the management company.

Procedures for regular inspections of all paved areas, some of which will form part of the management company's standard procedure:

- Specification and methods for maintenance, watering and replacements of trees
- Specification and Requirements for work by Public Utilities and general surface reinstatement
- Procedures for non-attributable damage reinstatement
- Specification and sources of materials for repair/reinstatement (NBS Spec Public Realm)
- Street and amenity lighting requirements
- Winter Maintenance procedures
- Procedures for refuse collection and use of litter bins
- Procedures for street cleaning
- Procedures for the maintenance of Street Furniture

Softworks:

Specification and methods for maintenance, pruning, watering and replacements of trees.

1.1.2 HEALTH AND SAFETY

Health and Safety is an important consideration for anyone maintaining areas of public realm. The appointed maintenance team should be expected to produce and update risk assessments and method statements for any maintenance works and installation of both hard and softworks.

Maintenance works associated with highways matters will be common practice forming part of the management company's standard procedures.

1.1.3 MAINTENANCE OPERATIONS – TREE WORK GENERALLY

Identification: Before starting work agree which trees are to be removed or pruned.

Protection: Avoid damage to neighbouring trees, plants and buildings.

Standards: To BS 3998 and Health & Safety Executive (HSE) ‘Forestry and arboriculture safety leaflets’.

Removing branches: Cut as shown in Arboricultural Association Leaflet No 8 ‘Mature tree maintenance’.

Cut vertical branches similarly, with no more slope on the cut surface than is necessary to shed rainwater.

Appearance: Leave trees with a well balanced natural appearance.

Chain saw work: Operatives must hold a Certificate of Competence.

Tree work: To be carried out by an approved member of the Arboricultural Association.

ADDITIONAL WORK

- Defective, diseased, unsafe or weak parts of trees additional to those scheduled for attention: Give notice if detected.

PREVENTION OF WOUND BLEEDING

- Standard: To BS 3998, clause 8.

PREVENTION OF DISEASE TRANSMISSION

- Standard: To BS 3998, clause 9 and Appendix B.

WATER RESTRICTIONS

- General: If water supply is, or is likely to be, restricted by emergency legislation, submit proposals for an alternative suitable source of water. Obtain instructions before proceeding.

1.2 Maintenance: Softworks - Trees

MAINTENANCE	PRESCRIPTION	YEAR (S)	SEASON	FREQUENCY
1.2.1	Maintenance during defects liability period of 12 months after planting by main contractor.	1 – 2	As required	March - September
1.2.2	To establish new planting, maintain a 1m diameter weed free area around all trees (including tree grilles and within self bound gravel).	1 – 2	As required	2
1.2.3	Underground Tree Guy Wires: Inspection / maintenance times: Quarterly and after strong winds. Operations: Replace or re-secure loose or missing guy wires.	1 – 5	Spring - Autumn	2
1.2.4	Apply granular fertiliser according to manufacturer's recommendations.	1 – 5	Spring - Autumn	2
1.2.5	Ensure trees remain firmly bedded after disturbance and re-firm as necessary.	1 – 5	As required	To be determined
1.2.6	Control all pests and diseases as necessary.	All	As required	To be determined
1.2.7	Prune in accordance with good horticultural practice, thin, trim and shape as appropriate. Eg. Removing branches: Do not damage or tear the stem. Wounds: Keep as small as possible and cut cleanly back to sound wood. Cutting: Make cuts above and sloping away from an outward facing healthy, angled so that water will not collect on cut area. Larger branches: Prune neither flush nor leaving a stub, but using the branch bark ridge or branch collar as a pruning guide.	All	As required	To be determined
1.2.8	Prune multi-stem trees to maintain required uniform shape dimensions.		Autumn - early Winter	
1.2.9	Watering – Regular checks using a moisture probe testing during the first two years after planting on a monthly cycle during the summer months of May-September.	1-2	May-September	Monthly
1.2.10	Water as necessary to ensure healthy growth.	All	As required	
1.2.11	Replace dead or damaged trees to original specification. Remove within 1 month or as soon as possible and replace within the next available planting season.	All	As required	
1.2.12	Top up gravel / mulch around trees to original specification at the end of year three.	3		1
1.2.13	Autumn Leaf Removal: Collect accumulations of drifted leaves from the vicinity and from paved areas. Arisings: Remove.	All	Autumn - early Winter	As required

Maintenance: Softworks - Herbaceous Planting

MAINTENANCE	PRESCRIPTION	YEAR	SEASON	FREQUENCY
1.2.14	Maintenance during defects liability period or 12 months after planting whichever is the greater	-	-	-
1.2.15	Maintain weed free area to the surface of all planting areas	1 - 5	March / October	9
1.2.16	Application of granular fertilizer (15:15:15)	1 - 5	Spring	1
1.2.17	Ensure plants remain firmly bedded after disturbance and re-firm as necessary	1 - 5	As required	Each maintenance visit
1.2.18	Re-firm plant supports and replace as needed	1 - 5	As required	Each maintenance visit
1.2.19	Prune as necessary to encourage healthy growth as illustrated on the drawings: Prune herbaceous perennials as required to maintain form and supply supports as needed during the	1 - 5	Spring/Summer	1
1.2.20	Prune hardy herbaceous perennials in autumn retaining feature flower heads or seed heads to provide interest through the winter months	1 - 5	Autumn	1
1.2.21	Prune tender perennials and borderline hardy perennials in spring once the risk of frost has passed (April / May). This is to protect the growing crown during winter.	1 - 5	April/May	1
1.2.22	Cut back early flowering perennials near to ground level after flowering to encourage fresh foliage and later summer flowering. Cut back again in spring.	1 - 5	Spring/Summer	2
1.2.23	Control all pests and diseases as necessary	1 - 5	As required	As required
1.2.24	Replace any dead/ under performing plants. Where planting continually fails to establish, undertake investigations to ascertain any underlying cause.	1 - 5	March/October	As required
1.2.25	Watering – Regular checks using a moisture probe testing during the first year after planting on a monthly cycle during the summer months of May-September.	1	May/September	5
1.2.26	Water as necessary to ensure healthy growth. Water as necessary to ensure healthy growth. If water supply is, or is likely to be, restricted by emergency legislation, submit proposals for	1 - 5	Spring	1
1.2.27	Top up mulch planting to original specification at the start of each year after the cutting back of tender perennials.	1 - 5		1
1.2.28	Divide large groups of perennials every 3 years:	3	Spring/Autumn	1
1.2.29	Divide summer flowering plants in spring or autumn providing that the ground is dry enough to work.	3	Summer	1
1.2.30	Divide spring flowering plants in summer after flowering.	-	-	-

1.3 Maintenance: Hardworks

1.3.1 MAINTENANCE OPERATIONS – HARDWORKS

Natural Stone surfaces need to be maintained such that they provide a safe passage for all pedestrians and highway users. It is also essential that areas, which have been subject to major investment, are protected and sustained through an effective maintenance regime. The success of any streetscape project will greatly depend on the attention given to maintenance.

It is important that paved surfaces are regularly inspected so that defects can be identified and rectified. Typically, early life maintenance or aftercare of new works will be the responsibility of the Main Contractor that delivered the works. The maintenance and defects liability period will generally be 12 months. The Main Contractor should visit the site at regular intervals during the maintenance period, to inspect all paved areas, and to undertake any remedial works. At the end of the maintenance period the contractor will be required to undertake remedial works to the satisfaction of the Client.

1.3.2 REPLACEMENT MATERIALS

Owing to the high visual quality of natural stone paving, effort is required to ensure surfaces are maintained as they were originally constructed. The need for replacement of high quality materials is required for all streetscape projects at some time. Delivery periods for many materials will normally be 2 to 3 months if not more, and in order to achieve early reinstatement, a stock of replacement materials should be provided out of the initial project budget. An allowance at the tender stage for the procurement and storage of surplus material, typically 3%, should be made. If carefully and securely stored this should allow quick replacement and give time for ordering of appropriate materials to replenish the store. The quantity of extra materials put in store will vary depending on the size and nature of the site. Paving materials and street furniture should also be considered.

Guidance: An allowance of 3% for the procurement and storage of natural stone materials should be made at the tender stage.

Materials include: Granite (Natural Stone) Setts, and Slabs in all colours and depths as required for the public realm.

Supplier:

Natural Stone Paving Material:
Hardscape Products Ltd
Eagley House, Deakins Business Park, Egerton, Bolton BL7 9RP
Tel: 01204 565 500

1.3.3 PAVING DEFECTS – RIGID AND FLEXIBLE

Common defects - Paved roads deteriorate in a variety of ways, depending upon the type of construction and cause of distress. When deterioration presents a safety hazard then maintenance becomes essential. Timely maintenance, in some instances can prevent deterioration progressing to a state where reconstruction is required. The majority of failures tend to be confined to the surface layers of paved roads, i.e. they concern the bedding and jointing that surrounds stone elements.

Descriptions and illustrations of common defects are given below:

Punching - Vertical downward movement occurs in and around wheelpaths. Punching shear is resisted by both the joints and bedding. The lower of the two capacities, joint shear or bed bearing will control the elements resistance to punching. The defect occurs in flexible and rigid surfacing. Localised or isolated areas of punching are likely to be due to poor workmanship. More widespread punching is more likely to be due to under design.

Progressive cracking - Debonding of the jointing material from stone elements commonly leads to progressive cracking. The continuous action of heavy vehicle tyres on the elements dislodges and pulverises sufficient quantities of the jointing material to cause a breakdown of the joint matrix. Inappropriate design and poor workmanship are likely causes. Factors likely to have contributed to this type of failure are:

- poor compaction of the bedding
- inadequate moisture content in stabilized bedding
- depth of elements
- low jointing strength
- early pavement trafficking
- inappropriate laying pattern

Movement - If the homogeneity of the upper layer is broken, it is impossible to control lateral movement with joint widths ≥10mm. Once the surface matrix is broken, it allows the tyre interaction of the traffic to move the setts in angular directions, thus perpetuating the breakdown of the rigid surface. Ingress of water then adds to the problems. Rutting is common and depending on the construction of the pavement the underlying layers of the structure will gradually deteriorate.

Flexible Movement - During the very early life of flexibly laid pavements, the joints between the units will be relatively porous. The ingress of water can consolidate jointing sand and it is important that the joints are regularly ‘topped up’ to replace the sand consolidated by rainwater or removed by other factors.

The joints will soon become semi-impervious as the build up of surface detritus seals the joints. Until this has occurred the paving should only be brushed by hand. Mechanical sweepers, and in particular sweepers with high suction forces, should not be used as there is a real risk of further loss of jointing sand.

When high traction forces exist such as with braking, accelerating and cornering occur the surface profile and element orientation can be lost with flexible construction. The ability of the surface elements to move and the surface to deform without, necessarily, a loss of stability defines the layer as being a ‘flexible’ layer.

Loss of jointing material - Mechanical breakdown or loss of jointing material in large elements allows the ingress of water. Load spreading ability will reduce if the bedding layer is broken down by the action of water, freezing effects, lateral movement etc.

Rocking of large elements - A stone element that is not evenly supported will rock when loaded. The problem is compounded as rocking pumps water and fines out from under the element, reducing the support further. Rocking or loose elements result in higher stresses being imposed on surrounding elements due to dynamic effects.

Broken or damaged elements - Apart from being unsightly, cracking and spalling can become a hazard if it creates a trip. Spalling occurs during transport and laying, but can less commonly be a fault in the material. It can result during manufacture, impact loading, abrasion and weathering. Inappropriate size or depth of element results in fracture under loading.

1.3.4 TREATMENT OPTIONS

Maintenance treatment will depend on the type of defect and what has caused the deterioration. For some surfacings, topping up of jointing may be all that is required, but poor surface profile may require a site investigation to provide information on the condition of the pavement at depth. Suitable strategies can then be formulated based upon informed engineering judgment.

The table on the next page summarises some common defects, resulting problems and treatments.

Maintenance: Hardworks

1.3.4 TREATMENT OPTIONS

DEFECT		PROBLEM	TREATMENTS	
FLEXIBLE	RIGID		TEMPORARY	LONG-TERM
Loss of jointing material	-	Loss of stability	Replace jointing material	-
-	Debonding of jointing material	Initiation of failure mechanism	Monitor / investigate	Replace jointing or reconstruct if poor design
Broken or damaged elements	Broken or damaged elements	Unsightly water ingress	-	Replace or reconstruct
Missing elements	Missing elements	Trip, water ingress	Fill holes	Replace element
Rocking elements	Rocking elements	Hazard to users	Relay	-
Spalling of arises or surfaces	Spalling of arises or surfaces	Unsightly trips	-	Replace
Widening of joints	-	Loss of stability, water ingress	Fill wide gaps if hazard	Relay elements and strengthen edge restraint if necessary
Depressions and bumps		Hazard for users	Fill or ramp. Contact undertaker if cause is failed reinstatement	Relay
Rutting		Hazard for users	Monitor, warn users	Relay
Slippery surface		Hazard for users	Warn users or restore texture	Clean, restore texture or renew surfacing
Surface contamination		Hazard for users and unsightly	Clean or neutralize	Replace surfacing if necessary
Vegetation		Surface slippery	Warn users, clean	Consider increasing frequency of maintenance
Water		Surface water	Salt if freezing	Relay surfacing to correct gradients and crossfall
-		Blocked drain	Clear blockage	-

Guidance: To ensure the chosen treatment is cost effective, consideration should be given to the maintenance history of the paved surfacing, its future use and the likely failure mechanism.

Maintenance: Hardworks

1.3.5 LIFTING, REPAIR AND RELAYING

Relaying elements of flexible construction should be carried out in the same way as new construction (Refer to NBS specification). Additional guidance for flags is given in BS 6677. Removing a damaged single element prior to relaying can be difficult, particularly if it is small element, as breaking it out may disturb adjacent modules. It may be necessary to consider relaying all elements, which abut the damaged area, or to relay a full line of elements back to an edge restraint. If the surface has poor profile, elements will need to be lifted over the whole of the affected area. In all cases a complete renewal of the bedding material should always take place. An experienced paver is required to execute a good reinstatement.

JOINT REPAIRS

Where elements are part of a rigid construction and degradation of the cement mortar joint has occurred, it will be necessary to refill the joint. If necessary the joint should be raked out, which is time-consuming and costly. It may be more appropriate to use a small hand-held grinder with an attachment to remove the dust and debris, in a controlled manner, into some form of hopper. Once the joints have been cleaned out they can be refilled with a mortar appropriate to the trafficking category. Care is required to confine the mixture to the joint and prevent staining of the surface. Trafficking should only be allowed once the mortar has gained the appropriate strength.

RE-TEXTURING

Re-texturing of stone surfaces which have become slippery due to vehicular or heavy pedestrian traffic can be undertaken by various methods including scabbling, sand or shot blasting, high pressure water jetting or application of a weak acid. Scabbling is slow but can be used successfully on flags, especially where there is some form of surface growth. Sand blasting can be successful but results in a lot of fine particles and debris, which must be removed separately. Shot blasting with steel shot involves the use of specialised machinery, which sucks up debris and shot by vacuum. The steel shot is separated magnetically in the return loop for continuous re-use. This is a very successful process that tends to form a lightly-exposed aggregate surface on flags, giving a pleasing appearance. However, regular use of this technique can sometimes cause problems and retexturing areas around street furniture is difficult. Flexible Joints may need resealing with sand after any high pressure method has been used.

Guidance: Stone surfacings will become slippery and an appropriate re-texturing technique should be used to restore skid resistance.

SEALING

Proprietary sealing agents are commonly used on paved surfaces, to reduce moisture penetration of the laying course material, and minimise staining from spillages. The paving surface must be completely dry and clean before any sealer is applied with the manufacturer instructions adhered to at all times. Whilst such products may offer certain advantages, careful consideration must be given to the suitability of the sealant and any subsequent effect on the colour appearance and slip/skid resistance of the paving.

1.3.6 CLEANING

GENERALLY

The following recommendations deal with vehicles and associated equipment for use on paved footways/footpaths/pedestrian areas and roads:

- The equipment should be purpose designed to sweep the particular area and surfacing product. If there is any doubt, the vehicle manufacturer should be consulted.
- Where possible, low ground pressure tyres should be fitted to reduce the risk of breaking or cracking of flags.
- Tyres should be inflated according to the manufacturer’s recommendations, again to ensure minimum weight distribution per square mm.
- Polypropylene, not wire, brushes should be used.
- Sweeping brush pressures should be set to the minimum required to suit the particular task, i.e. surfaces swept regularly will require a lower setting than those swept infrequently or those covered with heavy deposits.
- When sweeping, engine revolutions should be set at the minimum required to maintain vacuum (suction) pressure.
- Operators, including reliefs, should be trained to manufacturers’ recommendations and tyre and brush pressures should be regularly checked.
- Advice should be given to operators that, when equipment is stationary or left unattended, suction, brush rotation and water jetting equipment should be switched off to avoid the risk of damage to the area below the stationary equipment.
- In new or re-laid areas, agreement should be reached on a period of manual cleaning (at least four weeks) to allow the paving to settle and the joints to seal. This period may be reduced by using either a water-based bonding agent or elastomeric prepolymer sealant and by agreement with the cleansing authority on an appropriate sweeping regime.
- Following the use of mechanical cleaning operations, re-sanding of the joints in flexibly laid areas may be necessary.

THE USE OF POWER WASHING EQUIPMENT ON PAVED AREAS

To aid in the removal of surface staining power washing equipment is often considered. Whilst such techniques offer certain benefits, particularly for larger areas, it is important that care is taken in their use to avoid damage to the structural integrity of the paving.

When using any form of Power Washer the following guidelines should be strictly adhered to:

- The power washer should be used on a setting, which is sufficient to remove the dirt without causing any further distress. A low-pressure setting is recommended.
- Do not direct the power lance directly down on to the paving, as this can result in loss of jointing material.
- Ideally a spraying movement should be adopted holding the power lance at a shallow angle, not greater than 300 across the diagonal (i.e. not parallel to joints).
- Certain high-pressure jetting machines have been known to mark / damage the surface of certain types of paving material. It is therefore prudent to carry out a small test area before commencing on a larger area.
- The area should be inspected after cleaning to ensure that joints are full.

GENERAL DIRT AND DETRITUS

To remove general dirt and detritus, regular brushing is recommended. If detritus reduces the intensity of the colour of the material then this can be reestablished by scrubbing with a mild detergent e.g. washing up liquid, and hot water.

Ensure all the detergent has been thoroughly washed from the surface on completion of the cleaning and the resulting run-off is carefully channeled to either drainage points or containers where it can be safely disposed of.

MOSS, LICHENS AND ALGAE

Moss, lichen and algae can be prevalent on hard surfacing where the area is heavily shaded, is under trees or is not laid to an adequate fall. If such growths do occur and are considered undesirable then the area should be treated with a proprietary weed or moss killer used in accordance with the manufacturers’ instructions. Such products take some days to be effective and are most effective when applied during a spell of dry weather. The washes work best if any thick growths are scraped off first and the wash is well brushed in. Some treatments leave a residue to discourage the re-growth of the moss and algae but this will only be of limited value if the surrounding conditions leave the paving damp and in shade.

RUST STAINS

Initially action must be taken to eliminate the sources of staining. To remove the rust stain, the surface should first be wetted with clean water and then the affected area treated with a 7 to 10% dilution of Hydrochloric acid solution.

Guidance on the safe use of chemical treatments (Acid Washing) is given later in this document.

Maintenance: Hardworks - Treatment Options

OIL STAINS

Oil can penetrate readily into hard surfacing materials, but it should not stain if any spillages are removed promptly with an absorbent material e.g. paper towels, cloth or absorbing granules. Do not attempt to wipe the stain as this will drive the oil into the surface of the units and spread it over a wider area.

If the stain persists then an emulsifying degreaser should be employed. Brush the cleaner onto the affected area, leave for a period of time according to the manufacturers instructions and then wash the emulsified oil away with plenty of clean water.

Alternatively the surface can be scrubbed with a detergent and hot water taking care to ensure that the strength of the detergent is not detrimental to the appearance of the paving. However, for persistent oil staining, steam cleaning may have to be considered.

BITUMEN STAINS

Fresh bitumen should be allowed to cool down before removing it with a paint scraper or similar. If it is particularly resistant, the use of ice to make the bitumen brittle may be required prior to scraping it from the paving. Any residue should be removed with an abrasive powder and finally the whole area rinsed with clean water. Certain proprietary cleaning agents are available to remove bitumen but these should be tested on an inconspicuous area of paving first.

GRAFFITI & PAINT STAINS

Both paint and graffiti are difficult to remove from most hard surfacing materials. Fresh wet paint should be soaked up with an absorbent material without wiping the paint, as this will spread the stain. It should then be treated with a suitable solvent such as white spirit and then the area washed with a de-greasing agent taking care in the disposal of the run-off material.

Dried paint should be scraped off as far as possible and then an appropriate paint remover applied.

Paint manufacturers may often be able to give more detailed advice on the removal of paint and graffiti. Therefore they should be consulted directly for specific recommendations.

EPOXY & POLYESTER STAINS

Areas of solidified epoxy or polyester resin can be removed by carefully burning off the area with a blowtorch. Care must be taken not to inhale any fumes given off.

If, after burning, a black stain remains, this can be removed by scrubbing with detergent and hot water. For larger areas grit blasting may have to be considered, however the effect of such treatment on the micro texture of the surface should be carefully considered. Again it is advised that a small area be tested before any large-scale operations are undertaken.

SMOKE, FIRE AND TOBACCO STAINS

Normally such stains can be removed by scrubbing with detergent and hot water. Where the stains persist, a mixture of scouring powder and household bleach can be used. It is important the bleach is washed from the area with clean water once cleaning is completed and the run-off carefully disposed of.

BEVERAGE STAINS

These can normally be removed by scrubbing the stain with detergent and hot water. If the stain is persistent, apply a household bleach solution and then rinse the area with clean water taking care to dispose of the run-off safely.

CHEWING GUM

Chewing gum is a particularly difficult substance to remove from hard surfaces.

Newly discarded gum can be scraped off by using a mechanical scraper but hardened gum can only be removed by both freezing the gum and chiseling it from the surface of the paving or utilising a hot water/steam cleaner.

For specific advice on chewing gum removal it is recommended that specialist contract cleaning companies be contacted directly for further details.

SCUFF MARKS FROM VEHICLE TYRES

These can normally be removed by steam cleaning, or by scrubbing the area with detergent and hot water.

CEMENT AND LIME STAINING

Both types of staining can occur on paved surfaces, usually as a result of contamination from other sources, such as concrete street furniture or the use of onsite mortars and concrete.

Cement and lime deposits are generally insoluble and therefore require treatment by a suitable acid cleaner to fully remove them.

Guidance on the safe use of chemical treatments (Acid Washing) is given later in this document.

EFFLORESCENCE

Efflorescence on concrete

Efflorescence, or lime bloom, is a transient phenomenon of ordinary Portland cement. Its effect is to lighten the colour of concrete and can appear as a white deposit covering part or the entire surface. Except in severe cases, the phenomenon disappears completely when the surface is wet and reappears as the units dry out.

The phenomenon is temporary, and will with time disappear as a result of natural

weathering and trafficking processes.

Efflorescence is not a manufacturing fault and is not detrimental to the long-term performance and durability of the units in any way.

Alternatively efflorescence can be removed chemically by using a suitable acid cleaner. Guidance on the safe use of chemical treatments (Acid Washing) is given later in this document.

We recommend the following following contractors to carry outperiodical maintenance cleaning works.

Chris Henderson
Nationwide Public Area Cleaning Ltd
(NPAC Ltd)
Admin Office:
28 Whiston Grove
Moorgate
Rotherham
S60 2TX

FREEPHONE: 0800 019 8874
Mobile: 07855 452558
Email: ch@npac.me

NOTE: Vanadium staining can react badly to the application of acid cleaners. These types of cleaning substances have been known on occasions to have the effect of “fixing” the vanadium staining to the surface of the paving.

It is therefore important that prior to any acid cleaning being undertaken, the paving is checked to ensure that any signs of vanadium staining have thoroughly weathered away before acid cleaners are applied.

If some form of chemical treatment is required to remove more stubborn vanadium staining, then this should be undertaken using an organic acid that will not have the aforementioned effect of “fixing” the stain to the paving.

ACID WASHING

Stubborn and persistent stains that will not generally weather away naturally will require the application of a specific acid cleaning treatment to remove them.

Prior to any acid cleaner being applied, the surface must be thoroughly wetted with clean water to prevent the acid being absorbed directly into the paving. A dilution of 7 to 10% of hydrochloric acid should then be prepared and applied to the affected area.

Maintenance: Hardworks - Treatment Options

As the staining begins to dissolve, some frothing may be apparent, which should be followed by agitation of the surface using a stiff bristle brush to completely remove all trace of the stain.

Once this process is complete the whole surface should be rinsed thoroughly with clean water, taking care to dispose of the run off safely. In the vast majority of cases, one treatment will be sufficient; however, in some cases re-treatment may be required.

When using any form of chemical treatment the following guidelines should be strictly adhered to:

- With deeper stains, the degree of acid treatment may result in an acid etched appearance.
- Protective clothing (gloves, boots, goggles etc.) should be worn at all times when using chemicals and the appropriate first aid measures must be available on-site.
- Take care to ensure that surrounding materials and landscaping are protected. Soft landscaping and exposed metals can be severely affected by chemical treatments.
- It is better to treat several times with the correct dilution than to use concentrated acid, which may damage the surface of the unit.
- When diluting acids, always add acid to water and not water to acid.

GENERAL CLEANING

An annual detergent wash is also recommended.

1.4 Maintenance: Street Furniture & Lighting

1.4.1 MAINTENANCE OPERATIONS – STREET FURNITURE & LIGHTING

In addition to the recommendations below, also refer to the maintenance and operational instructions from the individual street furniture and lighting suppliers. Advice from the suppliers can also be sought regarding the maintenance of their products using the contact details supplied.

TIMBER TO BENCHES / SEATING

The timber should be treated with Osmo or Owatrol Rubbing Oil. Every 2 years the wood should be cleaned down using the a pre treatment solution which de-oxidises the wood before re-coating with the Oil. As long as this is done, the wood will keep its colour and will have a much greater lifespan than if left untreated. Osmo/Owatrol Oil are commercially available products and will be available through any good wholesaler or exterior furniture supplier.

GRANITE BOLLARDS

For natural stone street furniture elements refer to Section 1.3 of this document with regard to general cleaning methods. For stains that cannot be removed using general cleaning methods, contact the supplier for more specific cleaning advice and recommendations. Steel elements should be washed down with proprietary cleaner and washed down with clean water.

Supplier: Granite Bollards, Granite Plinths to Seating
Hardscape Products Ltd
Eagley House,
Deakins Business Park, Egerton,
Bolton BL7 9RP
Tel: 01204 565 500

STAINLESS STEEL FURNITURE: BOLLARDS AND BENCHES

The stainless steel should be washed down with proprietary cleaner and washed down with clean water. All hinges on bins to be checked and oiled regularly being careful not to leave oil stains on surrounding paving.

For folding bollards, ensure the post is kept clean and free of debris. Clean and lubricate the lock using a lubricant similar to WD40. Always ensure the cover plate is closed when the bollard is not in use. Clear any debris around the cover plate and hinge. Contact the supplier for further advice.

Supplier: Bollards
Bailey Streetscene Ltd
Adlington Business Park
London Road, Adlington

Cheshire
SK10 4NL
Tel: 01625 855 900

Supplier: Steel Frame Structure to Benches.
Goosefoot Street Furniture Ltd.
Britannia House
Junction Street
Darwen, BB3 2RB
Tel: 01254 700213

CORTEN STEEL FURNITURE: TREE GRILLES, CYCLE RACKS, LITTER BINS, DOOR STOPS, HANDRAILS, WAYFINDING TOTEMS AND PLANTER EDGES
Corten steel does not require any treatment. The coarse-grained patina is graffiti and sticker-resistant, and any repairs or alterations to the Corten steel structure will become invisible over time due to its natural oxidation.

Supplier: Tree Grilles, Cycle Stands, Door Stops.
Goosefoot Street Furniture Ltd.
Britannia House
Junction Street
Darwen, BB3 2RB
Tel: 01254 700213

Supplier: Litter Bins
Vestre.
2 Eastbourne Terrace
W2 6LG
London
Tel: 07780 770945

Supplier: Planter Edges
Kinley Systems
Northpoint, Compass Park
Staplecross
East Sussex
TN32 5BS
Tel: 01580 830688

LIGHTING COLUMNS

Check side panels and light fittings periodically and tighten if required.

Clean as required in accordance with supplier/manufacturer’s recommendations and periodically inspect LED light fittings and control boxes.

Supplier:

Philips lighting, Philips Centre,
Guildford Business Park
Guildford, Surrey. GU2 8XH
Tel: 0870 601 0101

DRAINAGE

Inspection routines are essential to maintain efficient performance of drainage channels and they should be carried out at frequent and regular intervals. The frequency will depend upon the location and the environment, and should be based on local knowledge, but inspections should be carried out at least once a year, and more regularly in locations with high footfall or where there are street trees.

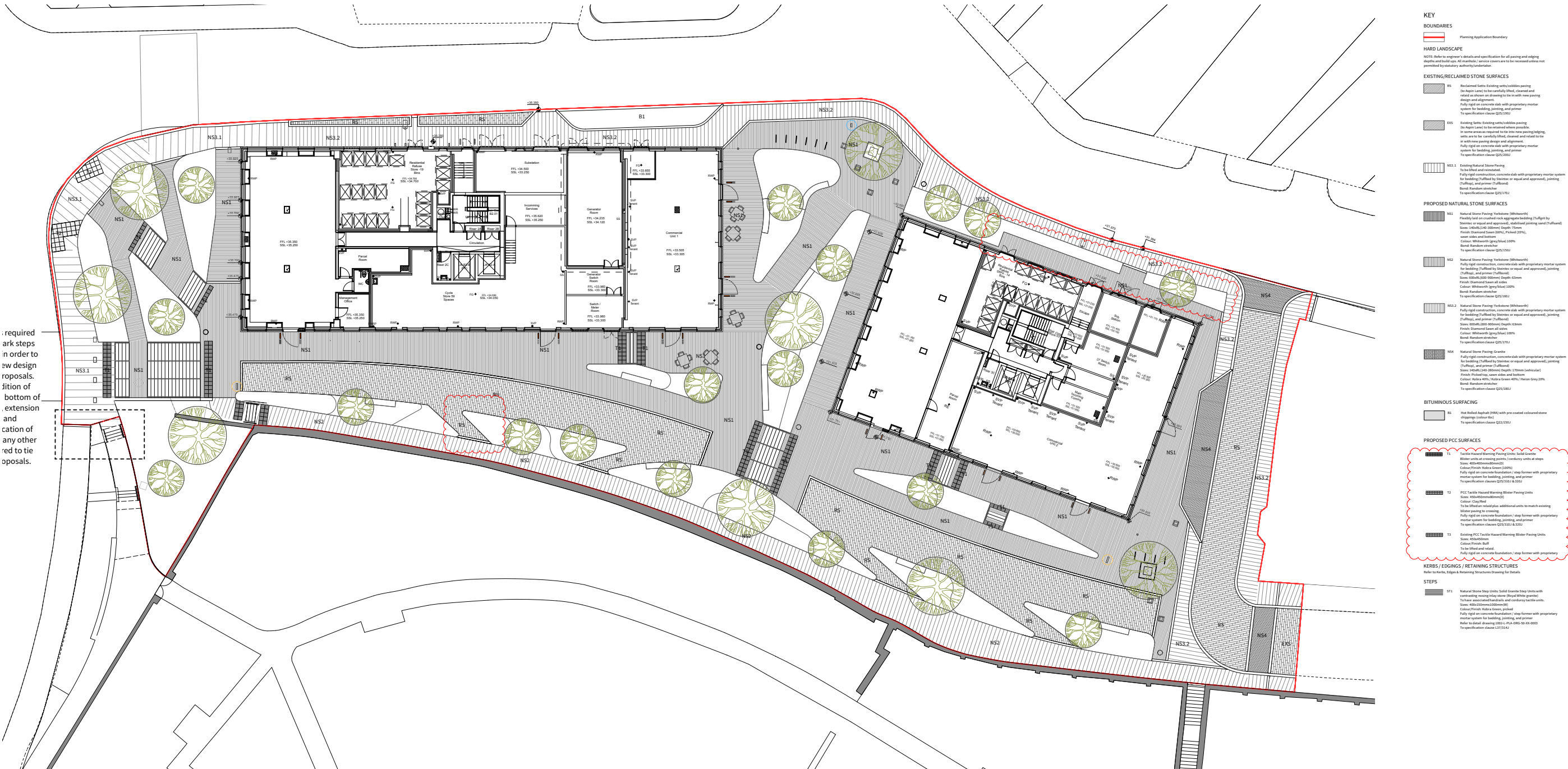
Supplier: Drainage Channels
Marshalls PLC
Landscape House
Lowfield Business Park
Elland
HX5 9HT
Tel: 0345 302 0400



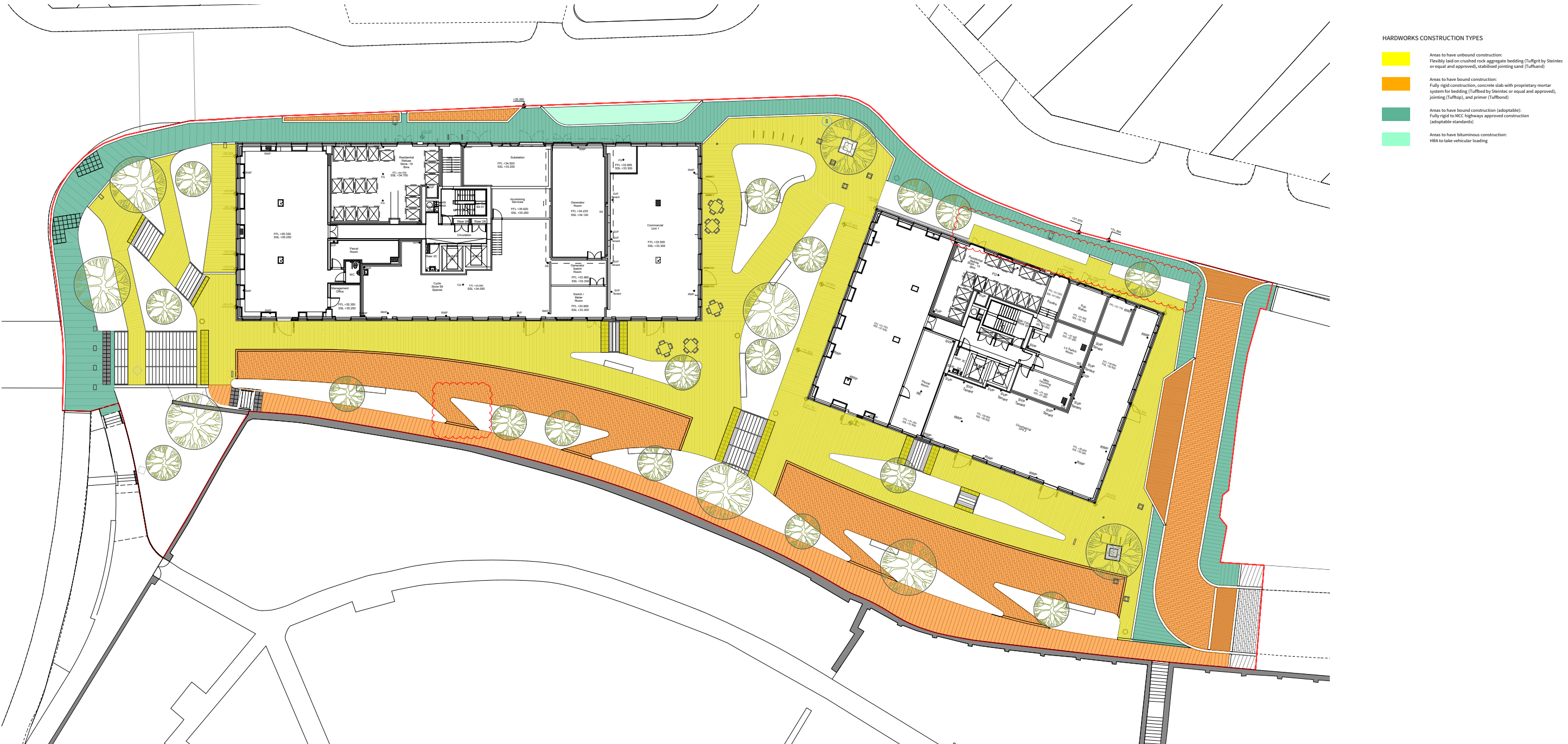
2.1 General Arrangement



2.2 Hardworks Arrangement



2.3 Hardworks Construction Methods



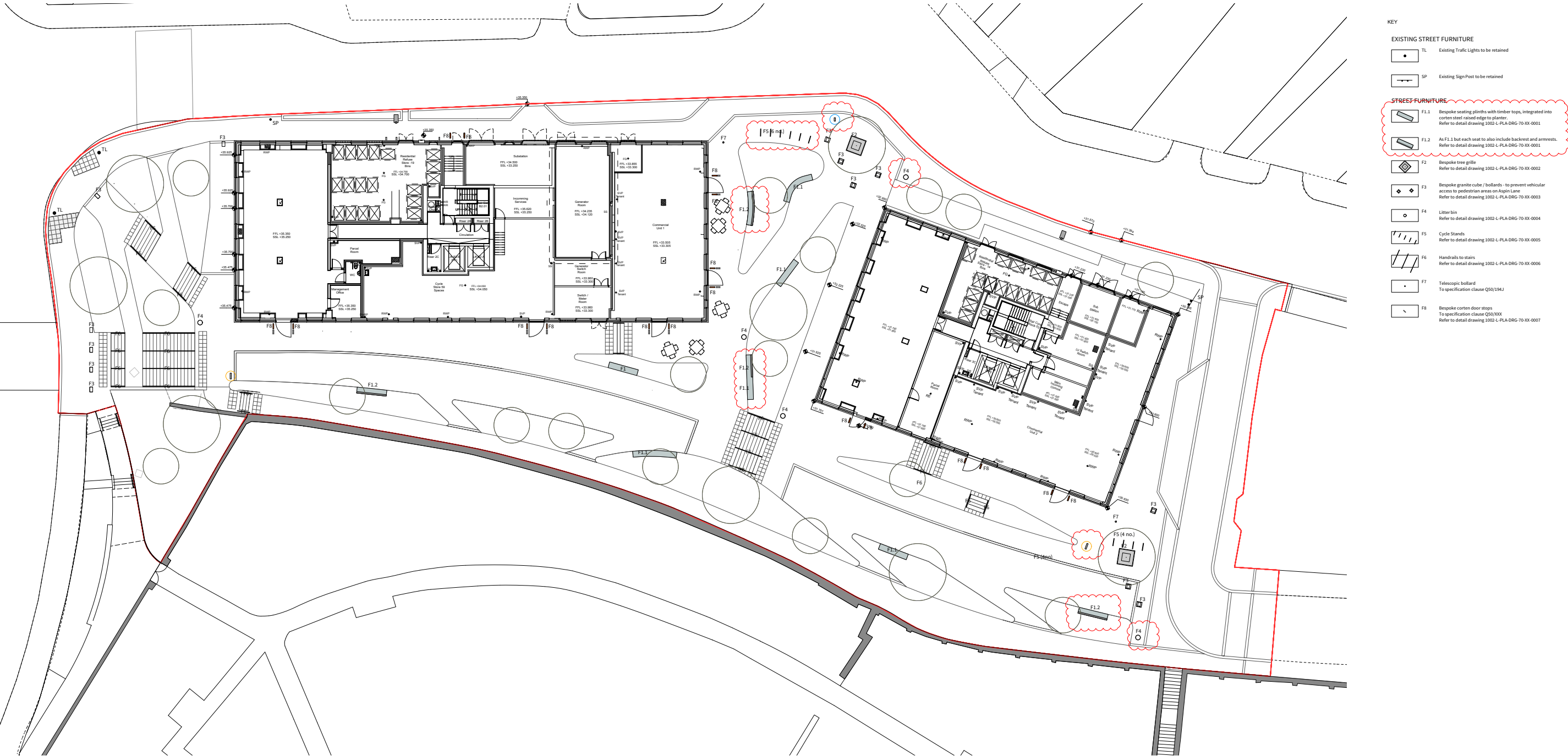
2.4 Softworks Arrangement



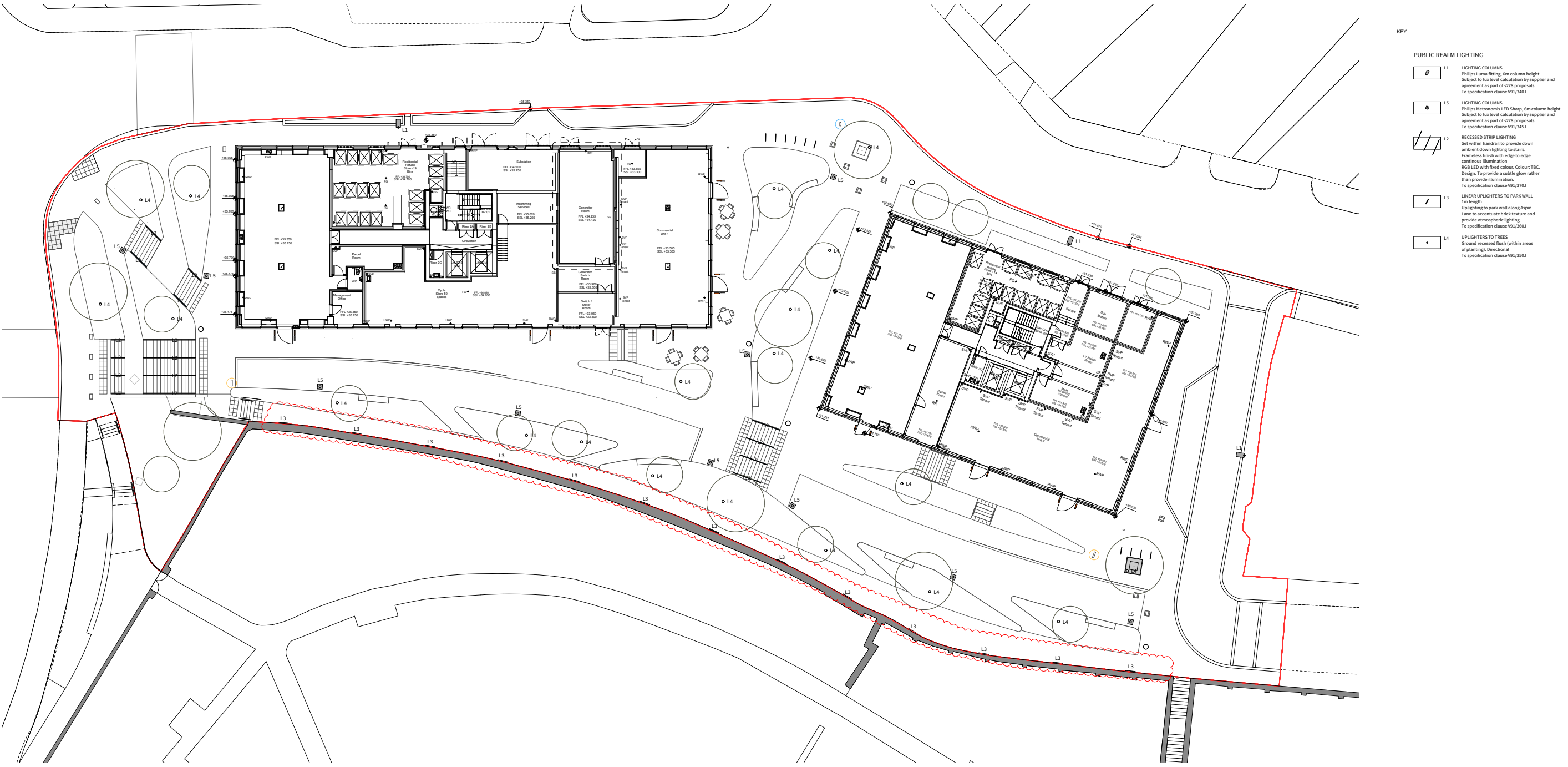
PLOTS 2 & 3 PLANTING SCHEDULE

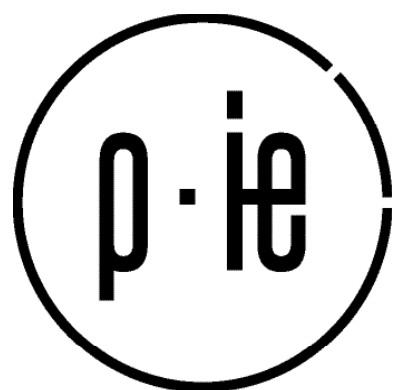
Trees							
Qty	Name	Girth (cm)	Height (cm)	Root Type	Container Size	Habit	Comments
1	Liquidambar styraciflua	30-35	500-550	RB		Semi mature, 2m clear stem, underground guyed 4.6x transplanted	As shown
5	Magnolia kobus	30-35	500-550	RB		Semi mature, 2m clear stem, underground guyed 4.6x transplanted	As shown
2	Metasequoia glyptostroboides	40-45	800-700	RB		Semi mature, 2m clear stem, underground guyed 4.6x transplanted	As shown
3	Platanus orientalis 'Digitata'	40-45	500-550	RB		Semi mature, 2m clear stem, underground guyed 4.6x transplanted	As shown
3	Paulownia tomentosa	40-45	500-700	RB		Sr: Semi-mature, clear stem minimum 200cm	As shown
1	Quercus palustris	40-45	800-700	RB		Sr: Semi-mature, clear stem minimum 200cm	As shown
Multistem							
Qty	Name	Girth (cm)	Height (cm)	Root Type	Container Size	Habit	Comments
1	Amelanchier x grandiflora 'Robin Hill'	400-450		RB		Multistem specimen, 4x transplanted min 3 strong stems, umbrella pruned	As shown
4	Cercidiphyllum japonicum	300-350		RB		Multistem specimen, bushy 3 stems minimum	As shown
3	Persicaria persica	400-450		RB		Multistem specimen, 4x transplanted min 3 strong stems, umbrella pruned	As shown
5	Betula utilis jacquemontii 'Snow Queen' Multi Stem Tree	300-350		RB		Multistem; bushy; 3 stems minimum	As shown
Shrubs							
Qty	Name	Girth (cm)	Height (cm)	Root Type	Container Size	Habit	Comments
87	Agastache foeniculum 'Alabaster'			C	SL		Full pot
66	Anemone x hybrida 'Honore Jobert'			C	SL		Full pot
175	Asarum europaeum			C	2L		Full pot
78	Astrantia major 'Ruby Wedding'			C	SL		Full pot
216	Blechnum spicant			C	SL		Full pot
110	Gaura lindheimeri 'Whirling Butterflies'			C	SL		Full pot
115	Heuchera cylindrica 'Greenfinch'			C	SL		Full pot
420	Luzula nivea			C	SL		Full pot
206	Nepeta x faassenii			C	SL		Full pot
162	Matteuccia struthiopteris			C	SL		Full pot
76	Persicaria amplexicaulis 'Firetail'			C	SL		Full pot
251	Polystichum setiferum 'Herrenhausen'			C	SL		Full pot
89	Salvia x sylvestris 'Viola Klose'			C	SL		Full pot
118	Tiarella cordifolia			C	SL		Full pot
Grasses							
Qty	Name	Girth (cm)	Height (cm)	Root Type	Container Size	Habit	Comments
332	Hakonechloa macra			C	SL		Full pot
217	Stipa arundinacea			C	SL		Full pot
170	Calamagrostis brachytricha			C	SL		Full pot

2.5 Street Furniture Arrangement



2.6 Lighting Strategy





MANCHESTER

2 Back Grafton Street
Altrincham,
WA14 1DY
+44 (0)161 928 9281

LONDON

Waterside, 44-48 Wharf Road
London,
N1 7UX
+44 (0)207 253 5678

LIVERPOOL

Tempest 5.3, 12 Tithebarn Street,
Liverpool,
L2 2DT
+44 (0)151 363 1230

STANDISH

Standish Gatehouse, Stonehouse,
Gloucestershire,
GL10 3BZ
+44 (0)145 360 7080