



Queensberry
DESIGN LIMITED
RESIDENTIAL AND COMMERCIAL DESIGN CONSULTANTS

Taylor Wimpey (North East)
Phase 2, Monkton Lane, South Tyneside

SuDS MANAGEMENT PLAN

Rev A

19th January 2017

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Issue Sheet.

Prepared	Date		Checked	Date
I. Baciulyte	04.07.16		A Lowdon	09 08 16
Revisions.				Date
A	Revised Drawing added to Appendix 1, Landscaping drawings added to appendix 2. MDA			19 01 17

This document has been prepared solely as a SuDS Management Plan for Taylor Wimpey, Queensberry Design Ltd accepts no responsibility or liability for any use that is made of this document other than by the Client for which it was originally commissioned and prepared.

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Introduction

Queensberry Design Ltd has been commissioned by Taylor Wimpey to prepare a SuDS Management Plan in connection with a proposed Monkton Phase 2 residential development located off Monkton Lane in South Tyneside.

This SuDS Management Plan has been produced to demonstrate how the proposed SuDS basin will be managed and maintained in order to satisfy the requirements set out in CIRIA 753.

This report is provided to assist the adopting body/maintaining body in developing an appropriate Maintenance Plan.

Site Description

The Monkton Phase 2 site is approximately 13ha in size and is to consist of 143 residential houses. The area of the development is classified as a green field site. These proposals follow on from the Phase 1 development which is located directly north of the phase 2 site.

Surface Water Drainage

The development is served by a separate surface and foul water drainage network which is to be adopted by Northumbrian Water Ltd under Section 104 of the water industry act. There are no combined sewers proposed on the development.

Surface water generated by both phase 1 and phase 2 of the development is conveyed to the detention basin which is located at the south eastern corner of phase 2. The underground sewers which convey this surface water are to be adopted by Northumbrian Water Ltd under S104 agreement.

The surface water sewer at the eastern boundary of phase 2 was installed as part of the phase 1 works, and provided attenuation before the basin was able to be constructed.

The phase 2 works included some alteration of the eastern attenuation pipe network, to ensure one flow restriction is able to control run off from both phases – this is done using a Hydrobrake unit within manhole S40.

Restricted discharge in to the downstream watercourse requires attenuation, which is provided on site. the majority of this volume is provided within the basin, however a small percentage is located with the pipe network due to their diameter.

Detention Basin

The detention basin is located in the south eastern corner of the site with access directly off the public highway. Drawing QD1081-08-03 shows the basin GA and section; and is located in appendix 1 of this report. A 3m wide access track surrounds the basin; the side slope of the pond is not to exceed 1 in 4. Basin geometry is summarised below.

Invert level	33.700m
Track gradient	1:60
Water level (100yr + 30% climate)	34.871m (1171mm depth)
Total pond volume	706 m ³

The primary function of the detention basin is providing flow control through attenuation of storm water runoff, and to facilitate some settling of particulate pollutants.

The proposed basin will accommodate various plant species ranging from bankside planting to emergent and some marginal plants which will enhance biodiversity and bring a number of benefits to local communities. The basin landscaping schedule and planting plan is shown in appendix 2 of this document.

Operation and Maintenance Requirements

Regular inspection and maintenance is important for the effective operation of the detention. Maintenance responsibility for a detention basin and its surrounding area should be placed with a responsible organisation.

Regular mowing in and around the detention basin is required only along maintenance access routes, amenity areas (e.g. footpaths), across embankments and across the main storage area. The remaining areas can be managed as “meadow”, unless additional management is required for landscaping purposes.

An access track is provided to the detention basin for inspection and maintenance, including for appropriate equipment and vehicles, e.g. mowing equipment. Operation and maintenance requirements for detention basins are described in Table 1.

Many of the maintenance activities for detention basins can be undertaken as part of landscape maintenance and, if landscape management is already required at site, should have marginal cost implications.

Maintenance Plan Overview

Maintenance Schedule	Required Action	Frequency
Regular Maintenance	Litter, debris and trash removal	Monthly (or as required)
	Grass cutting – for landscaped areas and access routes	Monthly (during growing season) or as required
	Grass cutting – meadow grass in and around basin	
	Manage other vegetation and remove nuisance plants	Monthly (at start, then as required)
	Tidy all dead growth before start of growing season	Annually
	Remove sediments from inlets, outlets and forebay	Annually (or as required)
Occasional Maintenance	Re-seed areas of poor vegetation growth	Annually (or as required)
	Prune and trim trees and remove cuttings	As required
Remedial Actions	Repair of erosion or other damage by re-seeding or re-turfing	As required
	Remove silt build-up and restore basin to design contours	7-10 years as required
	Repair / rehabilitation of gully grating and/or manhole cover	As required
	Rehabilitate infiltration surface using scarifying and spiking techniques if performance deteriorates	1 per 5 years or as required
Monitoring	Inspect gully for blockages and clear if required	Monthly / after large storms
	Inspect banksides, gully and manhole for damage	Monthly / after large storms

Table 1. Detention Basin Operation and Maintenance Requirements

Regular Maintenance

Inspections & Reporting

Regular SuDS scheme inspections will:

- help determine optimum future maintenance activities
- confirm hydraulic, water quality, amenity and ecological performance
- Allow identification of potential system failures, e.g. blockage, poor infiltration, poor water quality etc.

Inspections can generally be required at monthly site visits (e.g. for grass cutting) for little additional cost, and should, therefore, be subsumed into regular maintenance requirements. During the first year of operation, inspections should ideally be carried out after every significant storm event to ensure proper functioning, but in practice this may be difficult or impractical to arrange.

Typical routine inspection questions that will indicate when occasional or remedial maintenance activities are required, and/or when water quality requires investigation include:

- are inlets or outlets blocked?
- does any part of the system appear to be leaking (especially ponds and wetlands)?
- is the vegetation healthy?
- is there evidence of poor water quality (e.g. algae, oils, milky froth, odour, unusual colourings)?
- is there evidence of sediment build-up?
- is there evidence of ponding above an infiltration surface?
- is there any evidence of structural damage that requires repair?
- are there areas of erosion or channelling over vegetated surfaces?

It is recommended that an annual maintenance report and record should be prepared by the maintenance contractor which should be retained with the owner's manual. The report should provide the following information:

- observations resulting from inspections
- measured sediment depths (where appropriate)
- monitoring results, if flow or water quality monitoring was undertaken
- maintenance and operation activities undertaken during the year
- Recommendations for inspection and maintenance programme for the following year.

Litter/debris removal

This is an integral part of SuDS maintenance and reduces the risks of inlet and outlet blockages, retains amenity value and minimises pollution risks. High litter removal frequencies may be required at high profile commercial/retail parks where aesthetics are a major driver.

Grass cutting

It is recommended that grass cutting be minimised around SuDS facilities, apart from swales and filter strips and structural embankments where a height of 100–150 mm is recommended to prevent the plants falling over, or "lodging", when water flows across the surface. In general, allowing grass to grow tends to enhance water quality performance. Short grass around a wet system such as pond or wetland provides an ideal habitat for nuisance species such as ducks and geese; allowing the grass to grow is an effective means of discouraging them.

Grass cutting is an activity undertaken primarily to enhance the perceived aesthetics of the facility. The frequency of cutting will tend to depend on surrounding land uses, and public requirements. Therefore, grass cutting should be done as infrequently as possible, recognising the aesthetic concerns of local residents. However, grass around inlet and outlet infrastructure should be strimmed closely to reduce risks to system performance. If a manicured, parkland effect is required, then cutting will need to be undertaken more regularly than for meadow type grass areas, which aim to maximise habitat and biodiversity potential.

Weed/invasive plant control

Weeds are generally defined as vegetation types that are unwanted in a particular area. For SuDS, weeds are often alien or invasive species, which do not enhance the technical performance or aesthetic value of the system, or non-native species and the spread of which is undesirable.

In some places, weeding has to be done by hand to prevent the destruction of surrounding vegetation (hand weeding should generally be required only during the first year, i.e. during plant establishment). However, over grassed surfaces, mowing can be an effective management measure. The use of herbicides and pesticides should be prohibited since they cause water quality deterioration. The use of fertilisers should also be limited or prohibited to minimise nutrient loadings which are damaging to water bodies.

Shrub management

Shrubs tend to be densely planted and are likely to require weeding at the base, especially during the first year to ensure that they get enough water. Shrubs should be selected so they can grow to their maximum natural height without pruning.

Occasional Maintenance

Sediment Removal

To ensure long-term effectiveness, the sediment that accumulates in SuDS should be removed periodically. The required frequency of sediment removal is dependent on many factors including:

- design of upstream drainage system
- type of system
- design storage volume
- Characteristics of upstream catchment area (e.g. land use, level of imperviousness, upstream construction activities, erosion control management and effectiveness of upstream pre-treatment).

Sediment accumulation will typically be rapid for the entire construction period (including time required for the building, turfing and landscaping of all upstream development plots). Once a catchment is completely developed and all vegetation is well-established, sediment mobility and accumulation is likely to drop significantly.

Vegetation/plant replacement

Some replacement of plants may be required in the first 12 months after installation, especially after storm events. Dead or damaged plants should be removed and replaced to restore the prescribed number of living plants per hectare.

Inspection programmes should identify areas of filtration, or infiltration surfaces where vegetation growth is poor and likely to cause a reduced level of system performance. Such areas can then be rehabilitated and plant growth repaired.

Remedial Maintenance

Infiltration surface/rehabilitation

In the event that grassed surface permeability has reduced, there are a number of landscape techniques that can be used to open the surface to encourage infiltration.

Such activities are not commonplace and are likely to be required only in circumstances where silt has not been effectively managed upstream. These landscape techniques include:

- Scarifying to remove “thatch”. Thatch is a tightly intermingled organic layer of dead and living shoots, stems and roots, developing between the zone of green vegetation and the soil surface. Scarifying with tractor-drawn or self-propelled equipment to a depth of at least 50 mm breaks up silt deposits, removes dead grass and other organic matter and relieves compaction of the soil surface.
- Spiking or tining the soil, using aerating equipment to encourage water percolation. This is particularly effective if followed by top dressing with a medium to fine sand, and is best undertaken when the soil is moist. Spiking or tining with tractor drawn or self-propelled equipment penetrates and perforates soil layers to a depth of at least 100 mm (at 100 mm centres) and allows the entry of air, water, nutrients and top dressing materials.
- As a last resort, it may be necessary to remove and replace the grass and topsoil by:
 - removing accumulated silt and (subject to a toxicity test) applying to land or dispose of to landfill
 - removing damaged turf which should be composted
 - cultivating remaining topsoil to required levels
 - re-turfing (using turf of a quality and appearance to match existing) or reseeding (to BS 7370: Part 3, Clause 12.6 (BSI, 1991) using seed to match existing turf) area to required levels. It may be necessary to supply and fix fully biodegradable coir blanket to protect seeded soil. Turf and seeded areas should be top dressed with fine sieved topsoil to BS 3882 (BSI, 1994) to achieve final design levels. Watering will be required to promote successful germination and/or establishment.

Construction Requirements

The bottom and side slopes of the basin should be carefully prepared to ensure that they are structurally sound and checks should be made that any embankment structures meet their design criteria. The preparation should also ensure that the basin will satisfactorily retain the surface water runoff without significant erosion damage.

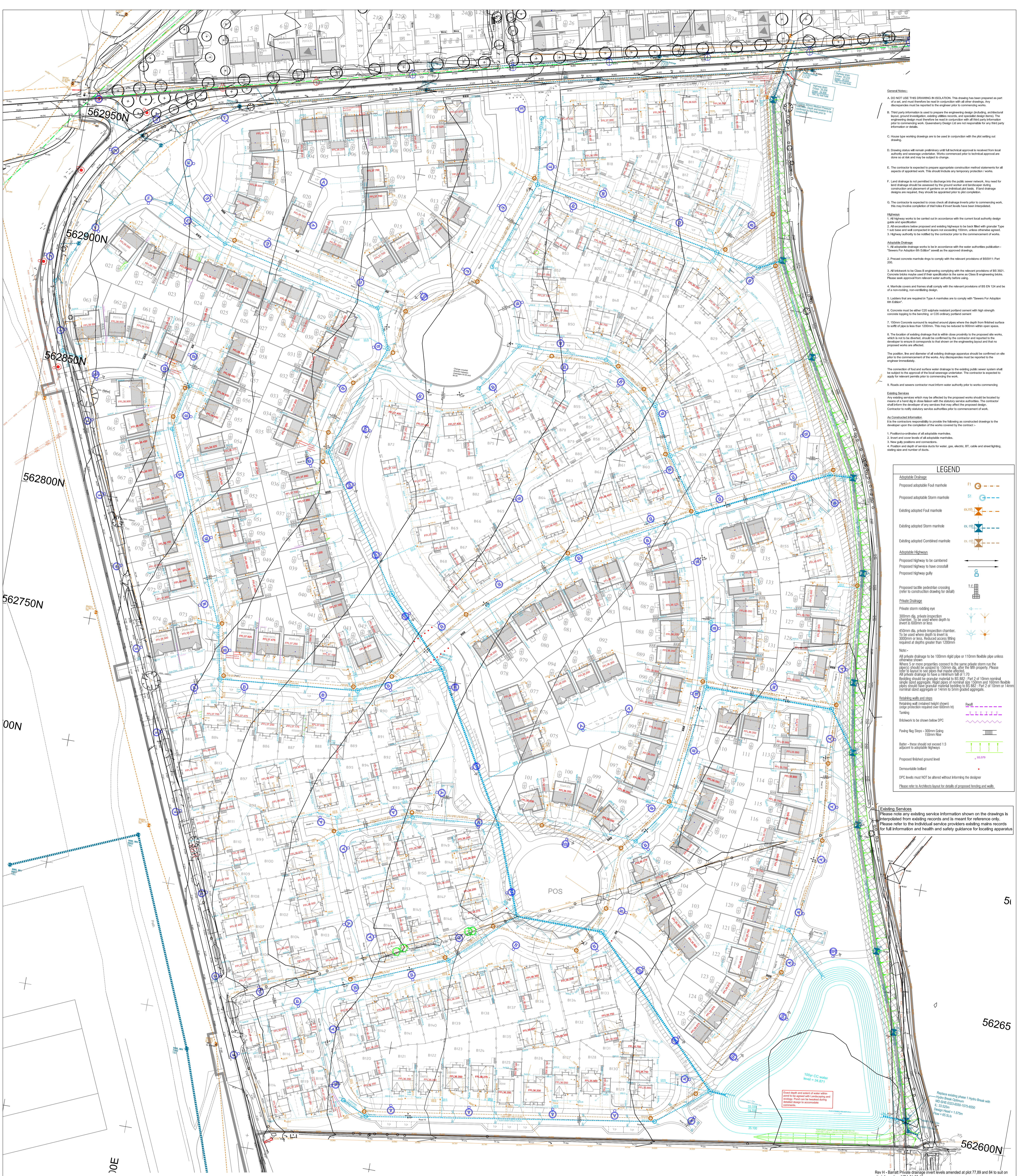
Backfilling against inlet and outlet structures needs to be controlled to minimise settlement and erosion. The soils used to finish the side slopes need to be suitably fertile, porous and of sufficient depth to ensure healthy vegetation growth. If an impermeable liner is used, care should be taken to ensure that it is not damaged during construction.

During the SuDS establishment phase, runoff from bare soils should be minimised.

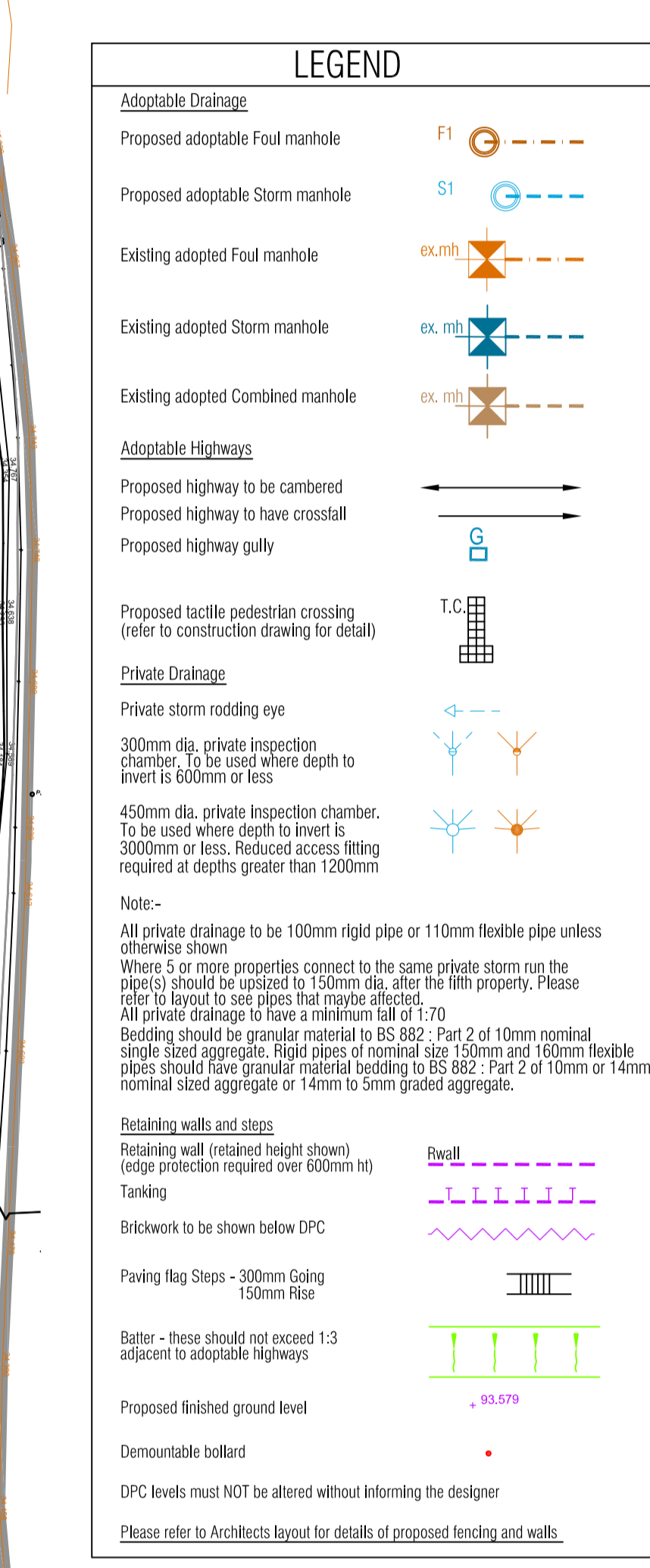
For example:

- vegetative on slopes should be rapidly established
- base-of-slope trenches should be introduced to retain the inevitable runoff of sediments
- construction should be timed to avoid autumn and winter when high runoff rates are to be expected.

Appendix 1 – Design Drawings



- General Notes:**
- DO NOT USE THIS DRAWING FOR CONSTRUCTION. This drawing has been prepared as part of a scheme and must be used in conjunction with all other drawings. Any discrepancies must be reported to the engineer prior to commencing work.
 - The party responsible for the design of the scheme is the engineer. The engineer, architect, landscape architect, ground engineer, surveying engineer, and other design team members are not responsible for the design of the scheme. The engineer is not responsible for any third party information or data.
 - These drawings are to be used in conjunction with the planning application and any other relevant documents.
 - Drainage status will remain as shown on the site plan unless otherwise indicated. All drainage works must be approved by the local authority prior to commencement of work.
 - The contractor is expected to prepare appropriate construction method statements for all aspects of approved work. This should include any temporary protection works.
 - Land drainage is not proposed into the public sewer network. Any need for land drainage should be assessed by the ground worker and landscape during construction and placement of gullies or other drainage beds. If land drainage design is required, they should be approved prior to commencement of work.
 - The contractor is expected to cross check all drainage inverts prior to commencing work. The new inverts must be at least 100mm above the existing inverts.
- Highways:**
- All highway works to be carried out in accordance with the current local authority design guide and standards.
 - All excavations below proposed existing highways to be back filled with granular Type 1 sub-base and well compacted to meet the relevant standards. Unless otherwise agreed.
 - Highway authority to be notified by the contractor prior to the commencement of work.
- Adoptable Drainage:**
- All adoptable drainage works to be in accordance with the water authorities publication - 'Manual For Adopted Drainage' issued as approved drawings.
 - Present concrete manhole steps to comply with the relevant provisions of BS5911: Part 200.
 - All inlets to be Class B engineering complying with the relevant provisions of BS 800. Concrete blocks must be used if their specifications in the same as Class B engineering blocks. Please refer to relevant standards for further details.
 - Manhole covers and frames shall comply with the relevant provisions of BS EN 124 and be of a non-slip, non-slip design.
 - Ladders that are required in 'Type A' manholes are to comply with 'Technical For Adoption in England'.
 - Coverlets must be after C25 concrete, sealed jointed concrete with high strength concrete topping to the kerbside, or C30 concrete jointed concrete.
 - 100mm concrete surround to be required around pipes where the depth from finished surface to depth of pipe is less than 1200mm. This may be reduced to 50mm where open surface.
 - The location of drainage inverts shall be in accordance with the proposed site plan. Inverts which are not to be shown, should be confirmed by the contractor and approved by the relevant authority prior to commencement of work.
- The position, size and diameter of all drainage apparatus should be confirmed on site prior to the commencement of work. Any discrepancies must be reported to the engineer immediately.
- The connection of foul and surface water drainage to the existing public sewer system shall be in accordance with the relevant standards. The contractor is expected to apply for relevant permits prior to commencing work.
- Existing Services:**
- Existing services shown on drawings are to be maintained and protected by the contractor. The contractor is responsible for the location and depth of all services. The contractor is responsible for the location and depth of all services. The contractor is responsible for the location and depth of all services.
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LEGEND

<p>Column Height: 6m MOUNTING HEIGHT TUBULAR STEEL COLUMN TO S.T.C. CURRENT PRIVATE DEVELOPMENT SPECIFICATION</p> <p>LANTERN: 76mm SPIGOT MOUNTED THORN R2L2 SMALL</p> <p>TILT: 5 DEGREES</p> <p>LAMP: CLO / 2.41km / 12LED 4000K(NW) 700mA, 20watts</p> <p>PEC/DIMMING: PHILIPS STARSENSE "OLC" NODE</p>	<p>Column Height: 6m MOUNTING HEIGHT TUBULAR STEEL MID-HINGED RAISE & LOWER COLUMN TO S.T.C. CURRENT PRIVATE DEVELOPMENT SPECIFICATION</p> <p>LANTERN: 76mm SPIGOT MOUNTED THORN R2L2 SMALL</p> <p>TILT: 5 DEGREES</p> <p>LAMP: CLO / 3.57km / 24LED 4000K(NW) 500mA, 34watts</p> <p>PEC/DIMMING: PHILIPS STARSENSE "OLC" NODE</p>	<p>Column Height: 6m MOUNTING HEIGHT TUBULAR STEEL COLUMN TO S.T.C. CURRENT PRIVATE DEVELOPMENT SPECIFICATION</p> <p>LANTERN: 76mm SPIGOT MOUNTED THORN R2L2 SMALL</p> <p>TILT: 5 DEGREES</p> <p>LAMP: CLO / 2.41km / 12LED 4000K(NW) 700mA, 20watts</p> <p>PEC/DIMMING: PHILIPS STARSENSE "OLC" NODE</p>	<p>Column Height: 6m MOUNTING HEIGHT TUBULAR STEEL MID-HINGED RAISE & LOWER COLUMN TO S.T.C. CURRENT PRIVATE DEVELOPMENT SPECIFICATION</p> <p>LANTERN: 76mm SPIGOT MOUNTED THORN R2L2 SMALL</p> <p>TILT: 5 DEGREES</p> <p>LAMP: CLO / 4.72km / 24LED 4000K(NW) 500mA, 49watts</p> <p>PEC/DIMMING: PHILIPS STARSENSE "OLC" NODE</p>	<p>Column Height: 10m MOUNTING HEIGHT TUBULAR STEEL COLUMN TO S.T.C. CURRENT PRIVATE DEVELOPMENT SPECIFICATION</p> <p>LANTERN: 76mm SPIGOT MOUNTED THORN R2L2 MEDIUM</p> <p>TILT: 5 DEGREES</p> <p>LAMP: CLO / 9.18km / 60LED 4000K(NW) 500mA, 86watts</p> <p>PEC/DIMMING: PHILIPS STARSENSE "OLC" NODE</p>	<p>EXISTING LIGHTING COLUMN TO REMAIN, EXISTING LIGHTING COLUMN TO BE REMOVED.</p>
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Note

Within the boundaries of this Scheme there are HIGH VOLTAGE underground cables in the proximity of areas requiring excavation.

Street lighting design provided by Balfour Beatty Ltd. For further information please refer to Balfour Beatty design drawings BBLP6012-0642 V1 & BBLP6012-0642 V2

Rev H - Barratt Private drainage invert levels amended at plot 77.89 and 84 to suit on site information. MDA 31 08 16

Rev G - Road 79a in with Luke's lane amendment to suit updated survey information, also road 8 amended to suit topography. MDA 20 02 16

Rev F - Taylor Wimpey plot drainage updated to suit house type. MDA 15 02 16 Rev E Drawing amended to reflect new planning layout. KJH 23 09 15

Rev D Drawing amended to reflect new planning layout. KJH 09 09 15

Rev C - Gargues 36, 100, 116 & 133 external amended. KJH 18 08 15

Rev B Drawing amended to suit architects layout changes. Street lighting design added. KJH 17 08 15

Rev A: Gully positions amended, main foul run levels amended. Hydro Break note changed. KJH 30 07 15

Drawing Status

PRELIMINARY

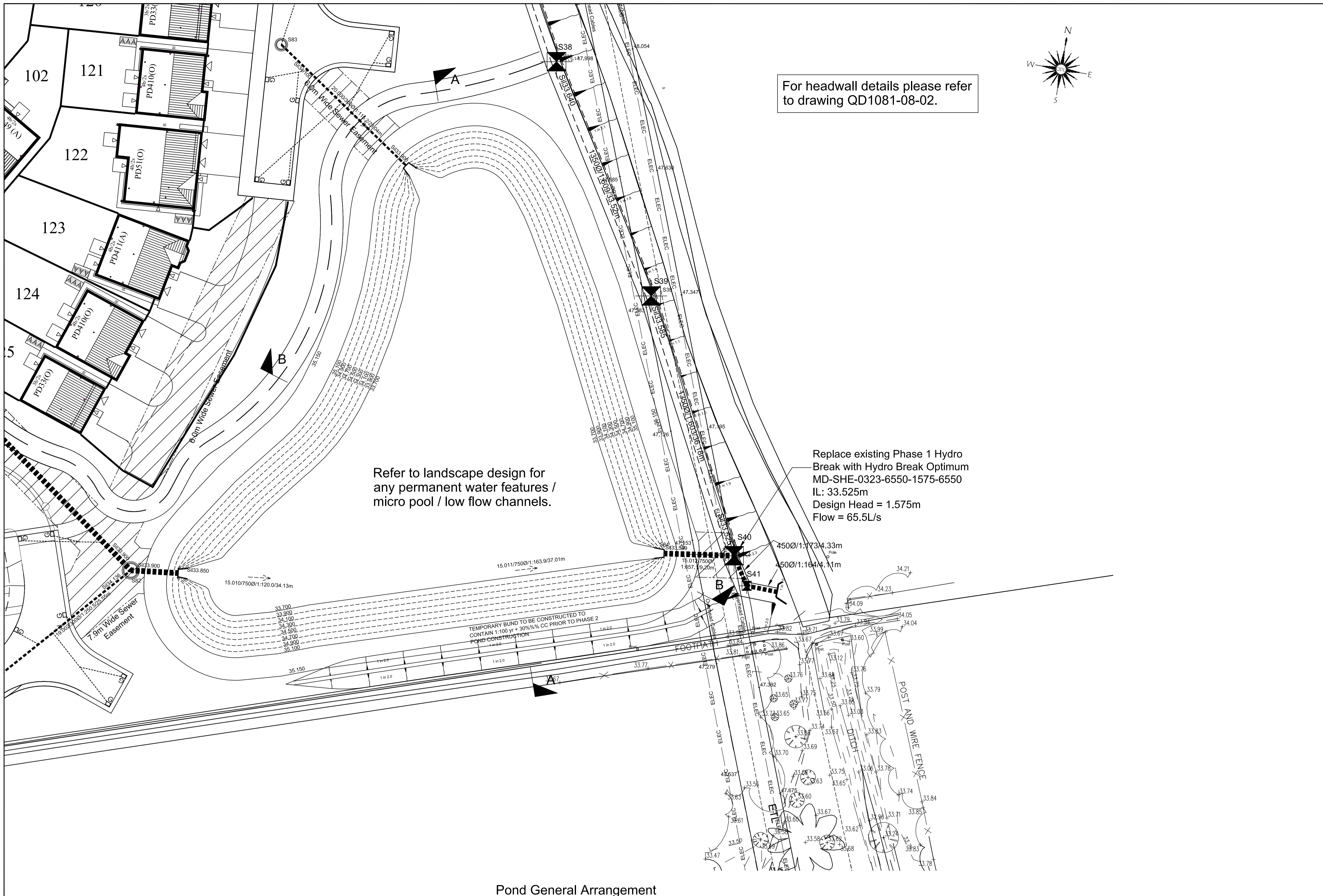
Title: **Barratt Homes & Taylor Wimpey Luke's Lane, Monkton Phase 2 Engineering Layout**

Scale: 1:500@A0 Date: July 2015

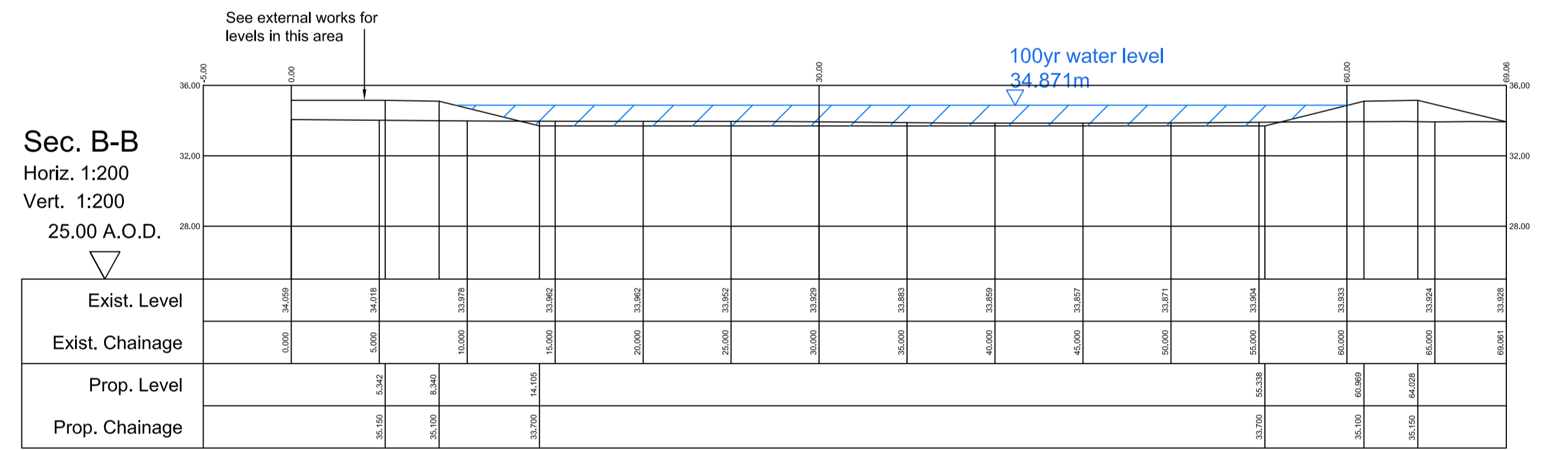
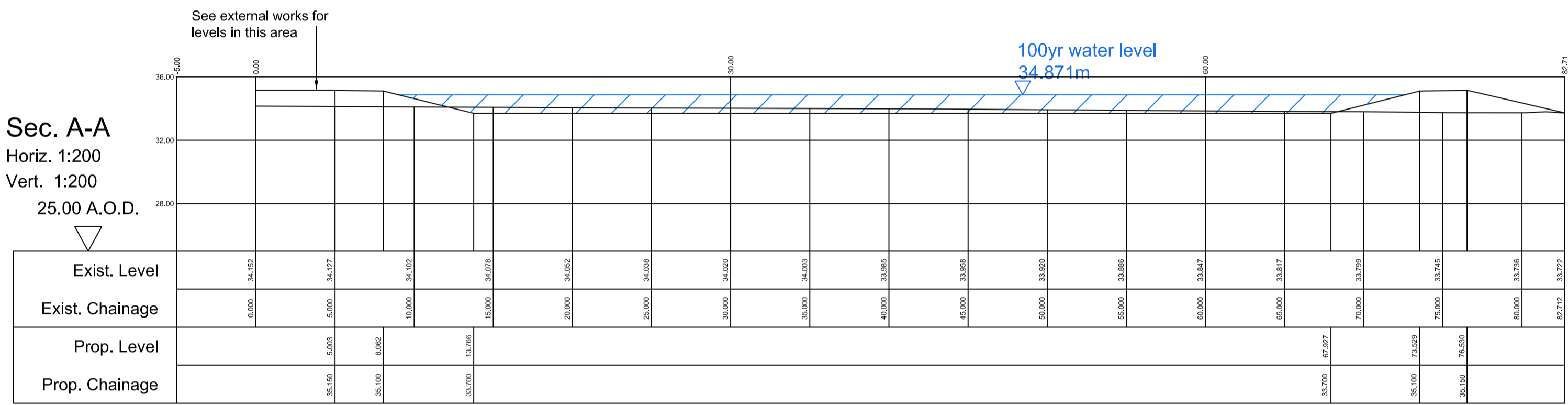
Drawn by: KJH Email: ken.horn@queensberrydesign.co.uk

Checked by: QD1081-03-01 Revision: H

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Pond General Arrangement
Scale 1:200



Colour	Band	Area
Red	+1.00	1.75
Red	+0.75	0.25
Red	+0.50	1.75
Red	+0.25	3.42
Red	0.00	35.12
Red	-0.25	71.23
Red	-0.50	142.46
Red	-0.75	427.37
Red	-1.00	1424.77
Green	0.25	1.88
Green	0.50	7.12
Green	0.75	14.24
Green	1.00	28.48
Green	1.25	56.96
Green	1.50	113.91
Blue	2.00	455.65

Cut and fill volume result

Cut volume: 706m³
Fill volume: 789m³
Balance: 53m³ (F18)

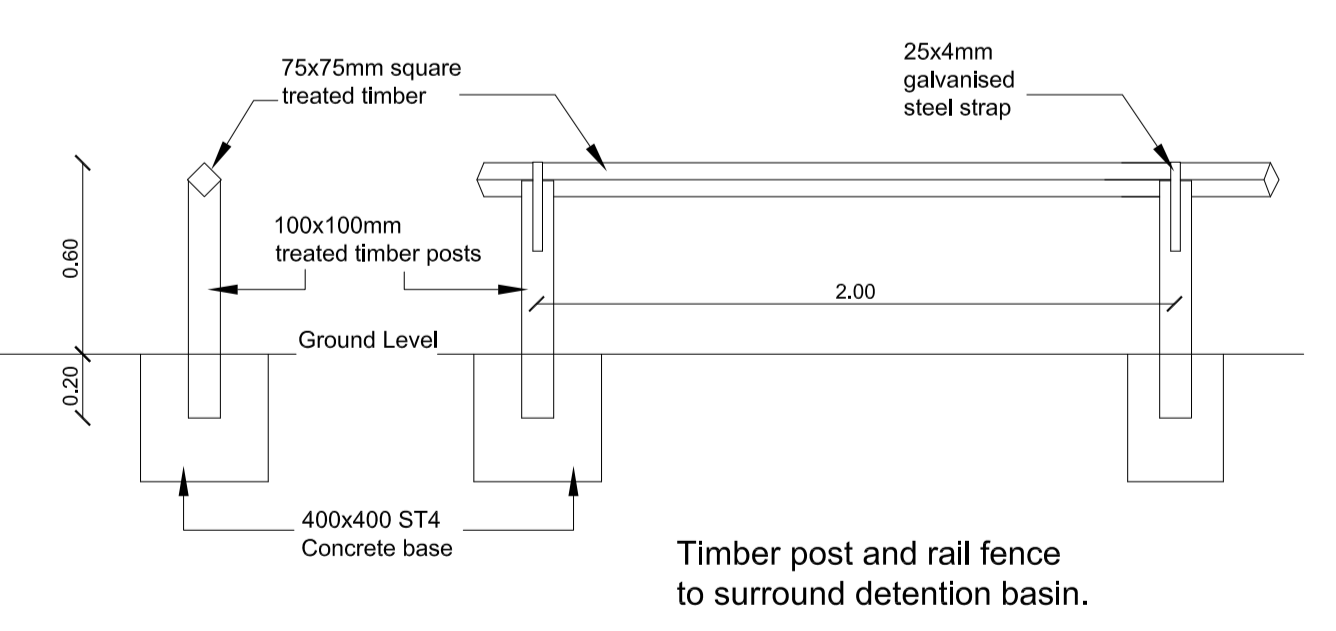
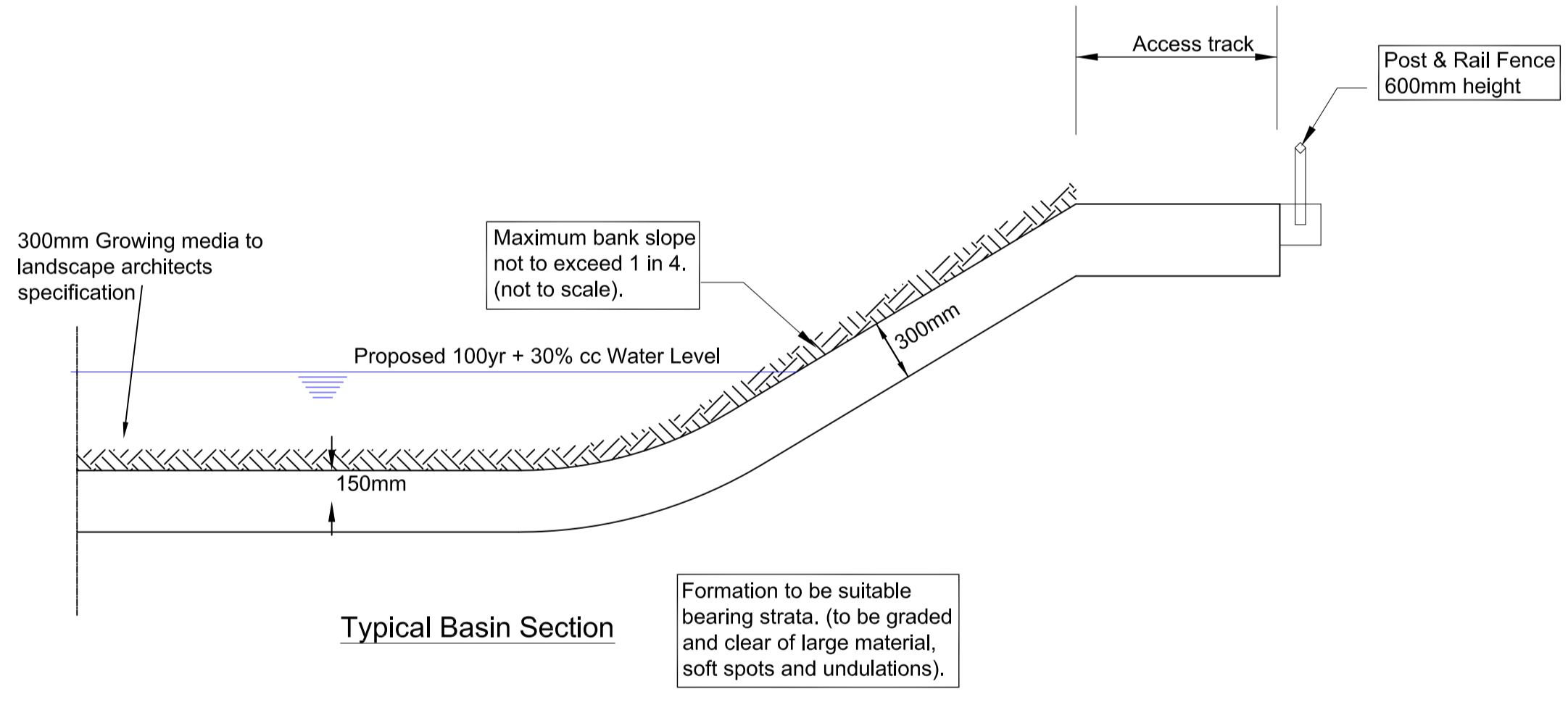
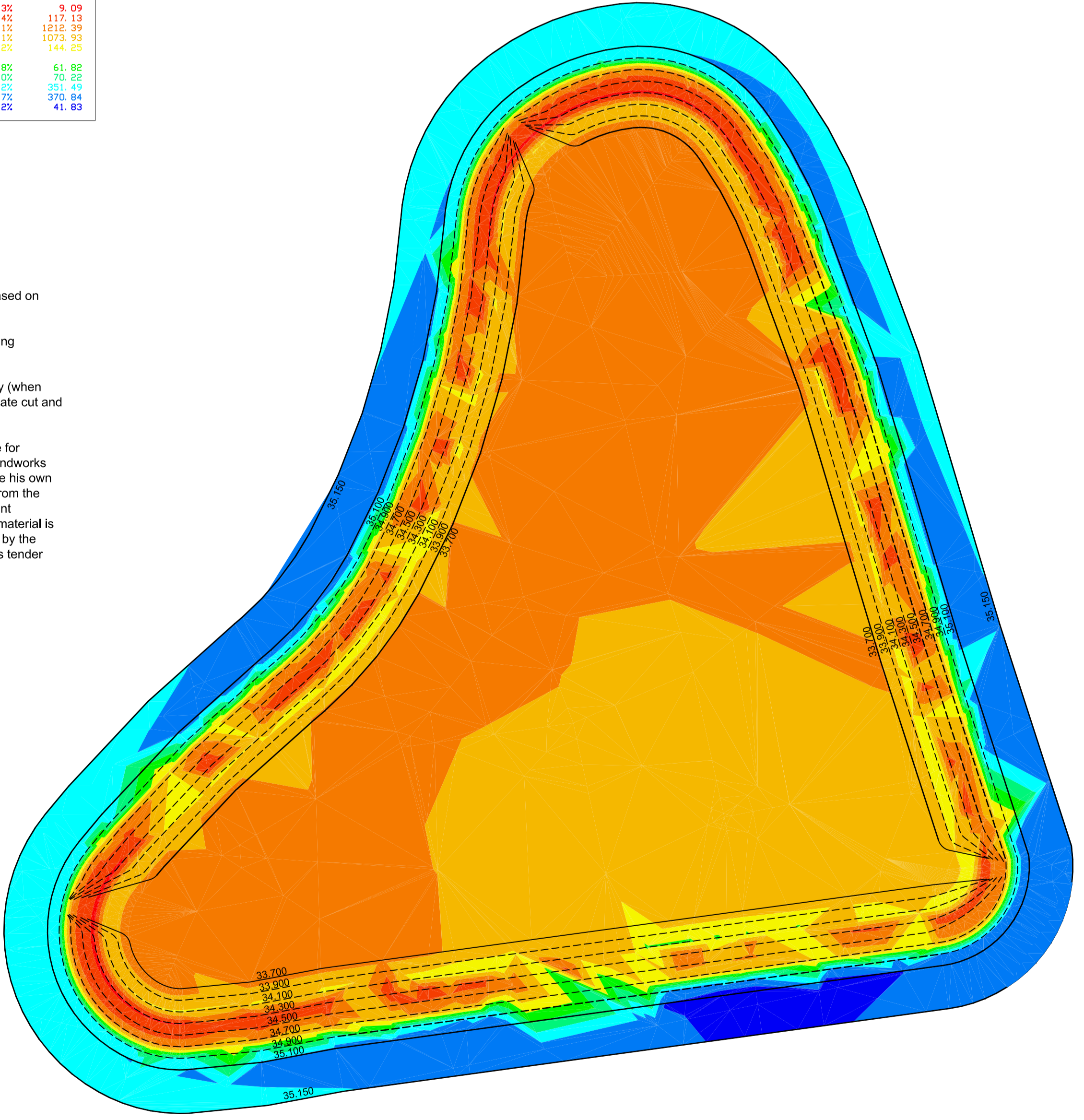
Cut area: 2411m²
Fill area: 924m²
Total area: 3335m²

Volume calculations have been based on surface to surface models.

1. Models have been produced using information available at the time.

2. Post demolition/site strip survey (when available) can be used to re-calculate cut and fill volumes.

3. Cut and fill volumes advised are for guidance purposes only. The groundworks contractor is expected to undertake his own computation of materials volume from the information provided. Any significant deviation between the quantity of material is recommended and that calculated by the contractor, is to be quantified in his tender quotation.



- General Notes:**
- DO NOT USE THIS DRAWING IN ISOLATION. This drawing has been prepared as part of a set, and must therefore be read in conjunction with all other drawings. Any alterations must be notified to the engineer prior to commencing work.
 - Third party information is used to prepare the engineering design (including, but not limited to, ground investigation, existing utility records, and specialist design items). The engineering design must therefore be read in conjunction with all third party information and is not to be used in isolation. Queensberry Design Ltd are not responsible for any third party information or data used.
 - House type working drawings are to be used in conjunction with the plot setting out drawing.
 - Drawing status will remain preliminary until full technical approval is received from local authority and coverage and/or other works concerned prior to technical approval are done as at risk and may be subject to change.
 - The contractor is expected to prepare appropriate construction method statements for all aspects of proposed work. This should include any temporary protection works.
 - Land drainage is not permitted to discharge into the public sewer network. Any need for land drainage should be assessed by the contractor and approved by the local authority prior to construction. Any drainage design is to be subject to approval by the contractor and placement of gullies on an individual plot basis. If land drainage designs are required they should be approved prior to commencement of work.
 - The contractor is expected to cross check all drainage details prior to commencing work. This may involve completion of final notes if levels have been incorporated.
- Highways:**
- All highway works to be carried out in accordance with the current local authority design guide and specifications.
 - All construction shall proceed and existing Highways to be closed with proper 'Type 1' road bases and will be completed to Type 1 or exceeding 100mm, unless otherwise agreed.
 - Highway authority to be notified by the contractor prior to the commencement of works.
- Adoptable Drainage:**
- All adoptable drainage works to be in accordance with the water authority publication - 'Sewers For Adoption (9th Edition)' saved as the approved drawings.
 - Physical concrete manhole traps to comply with the relevant provisions of BS5911: Part 2(2).
 - All drainage to be Class B engineering complying with the relevant provisions of BS 3051. Concrete blocks must be used if the specification is the same as Class B engineering blocks. Please seek approval from relevant water authority before using.
 - Manhole covers and frames shall comply with the relevant provisions of BS EN 124 and be of a non-slipping, non-ventilating design.
 - Ladders that are required in Type A manholes are to comply with 'Sewers For Adoption (9th Edition)'.
 - Concrete must be either C20 sulphate resistant portland cement with high strength concrete topping to the base or C30 ordinary portland cement.
 - 150mm Concrete surround is required around pipes where the depth from finished surface to top of pipe is less than 100mm. This has to extend to 500mm either side of pipe.
 - The location of existing drainage that is within close proximity to the proposed site works, which is not to be altered, should be confirmed by the contractor and reported to the developer to ensure it corresponds to that shown on the engineering level and that no proposed works are affected.
- The position, line and diameter of all existing drainage apparatus should be confirmed on site prior to the commencement of the works. Any discrepancies must be reported to the engineer immediately.
- The connection of foul and surface water drainage to the existing public sewer system shall be subject to the approval of the local sewerage undertaker. The contractor is expected to apply for relevant permits prior to commencing the work.
- Roads and sewers contractor must inform water authority prior to works commencing.
- Existing Services:**
- Any existing services which may be affected by the proposed works should be located by means of a hand dig in close liaison with the statutory service authorities. The contractor should inform the developer of any services that may affect the proposed design.
- Contractor to notify statutory service authorities prior to commencement of work.
- As Constructed Information:**
- It is the contractor's responsibility to provide the following as constructed drawings to the developer upon the completion of the works covered by the contract -
- Position coordinates of all adoptable manholes.
 - Invert and cover levels of all adoptable manholes.
 - New gully positions and connections.
 - Position and depth of service ducts for gas, water, electric, BT, cables and diverging lighting, stating size and number of ducts.

Drawing Status

PRELIMINARY

Title: **Barratt Homes & Taylor Wimpey Luke's Lane, Monkton Phase 2 Pond - Typical Details**

Scale: **1:500@A0** Date: **July 2015**

Drawn by: **KJH** Email: **ken.horn@queensberrydesign.co.uk**

Drawing No: **QD1081-08-03** Revision: **-** Checked By: **-**

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- General Notes:-**
- DO NOT USE THIS DRAWING IN ISOLATION. This drawing has been prepared as part of a set, and must therefore be read in conjunction with all other drawings. Any discrepancies must be reported to the engineer prior to commencing works.
 - Third party information is used to prepare the engineering design (including architectural layout, ground investigation, existing utilities records, and specialist design items). The engineering design must therefore be read in conjunction with all third party information prior to commencing work. Queensberry Design Ltd are not responsible for any third party information or details.
 - House type working drawings are to be used in conjunction with the plot setting out drawing.
 - Drawing status will remain preliminary until full technical approval is received from local authority and sewerage undertaker. Works commenced prior to technical approval are done at risk and may be subject to change.
 - The contractor is expected to prepare appropriate construction method statements for all aspects of appointed work. This should include any temporary protection / works.
 - Land drainage is not permitted to discharge into the public sewer network. Any need for land drainage should be assessed by the ground worker and landscaper during construction and placement of gardens on an individual plot basis. If land drainage designs are required, they should be appointed prior to plot completion.
 - The contractor is expected to cross check all drainage inverts prior to commencing work, this may involve completion of trial holes if invert levels have been interpolated.

- Adoptable Drainage**
- All adoptable drainage works to be in accordance with the water authorities publication - "Sewers For Adoption 6th Edition" as well as the approved drawings.
 - Precast concrete manhole rings to comply with the relevant provisions of BS5911: Part 200.
 - All brickwork to be Class B engineering complying with the relevant provisions of BS 3921. Concrete bricks may be used if their specification is the same as Class B engineering bricks. Please seek approval from relevant water authority before using.
 - Manhole covers and frames shall comply with the relevant provisions of BS EN 124 and be of a non-rocking, non-ventilating design.
 - Ladders that are required in Type A manholes are to comply with "Sewers For Adoption 6th Edition".
 - Concrete must be either C20 sulphate resistant portland cement with high strength concrete topping to the benching, or C35 ordinary portland cement.
 - 150mm concrete surround in required around pipes where the depth from finished surface to soffit of pipe is less than 1200mm. This may be reduced to 900mm within open space.

The location of existing drainage that is within close proximity to the proposed site works, which is not to be diverted, should be confirmed by the contractor and reported to the developer to ensure it corresponds to that shown on the engineering layout and that no proposed works are affected.

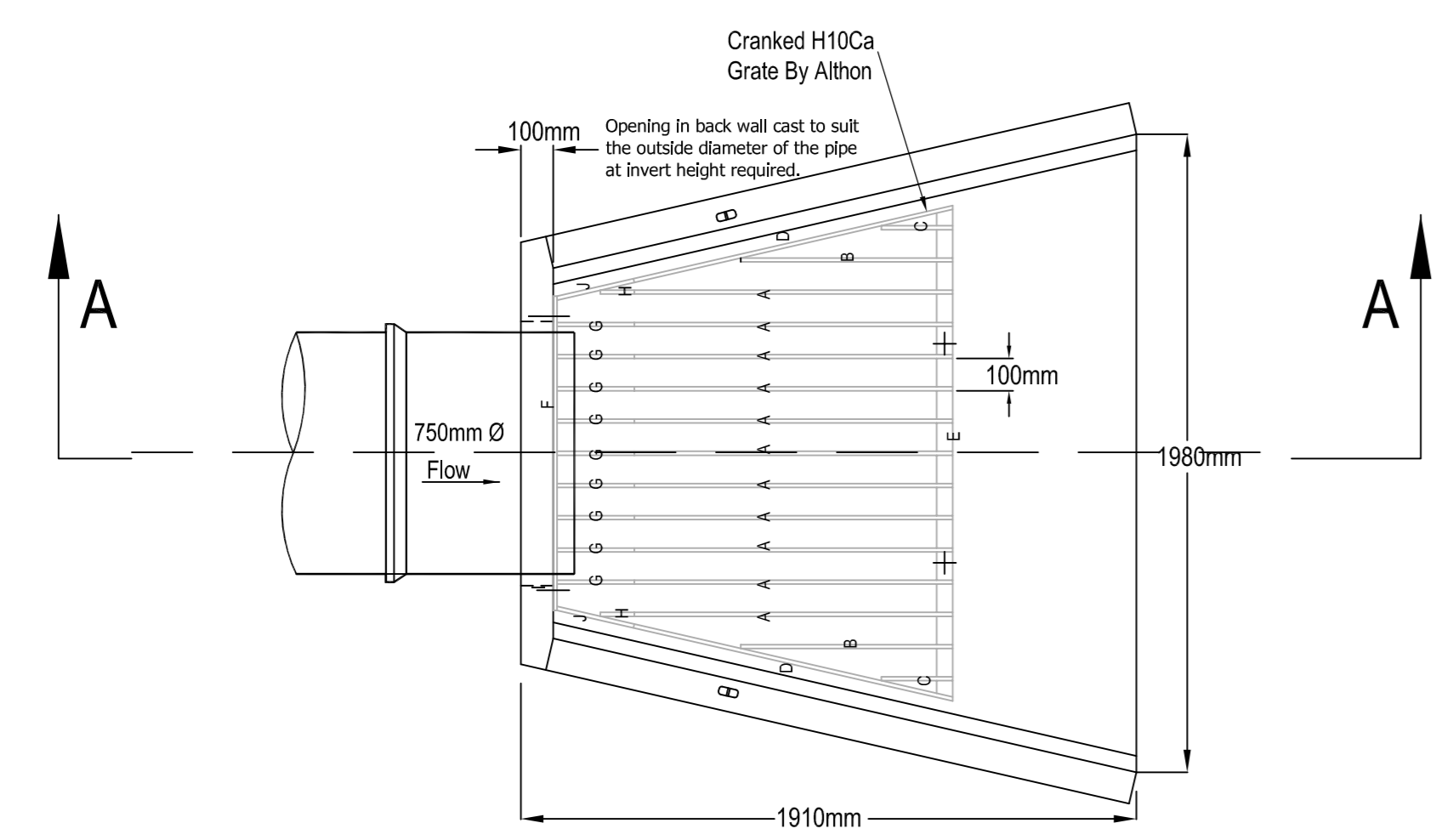
The position, line and diameter of all existing drainage apparatus should be confirmed on site prior to the commencement of the works. Any discrepancies must be reported to the engineer immediately.

The connection of foul and surface water drainage to the existing public sewer system shall be subject to the approval of the local sewerage undertaker. The contractor is expected to apply for relevant permits prior to commencing the work.

Existing Services
Any existing services which may be affected by the proposed works should be located by means of a hand dig in close liaison with the statutory service authorities. The contractor shall inform the developer of any services that may affect the proposed design. Contractor to notify statutory service authorities prior to commencement of work.

As Constructed Information
It is the contractors responsibility to provide the following as constructed drawings to the developer upon the completion of the works covered by the contract :-

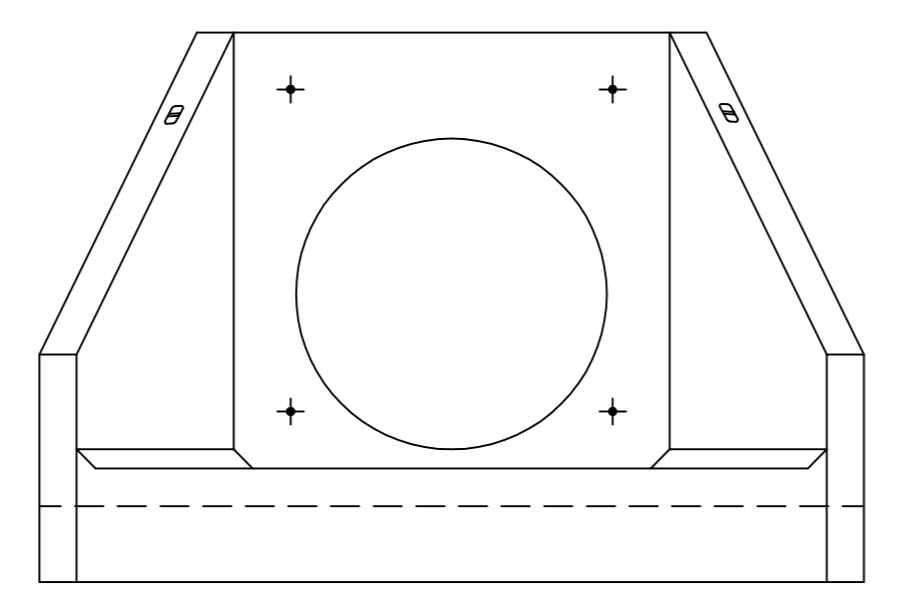
- Position/coordinates of all adoptable manholes.
- Invert and cover levels of all adoptable manholes.
- New gully positions and connections.
- Position and depth of service ducts for water, gas, electric, BT, cable and street lighting, stating size and number of ducts.



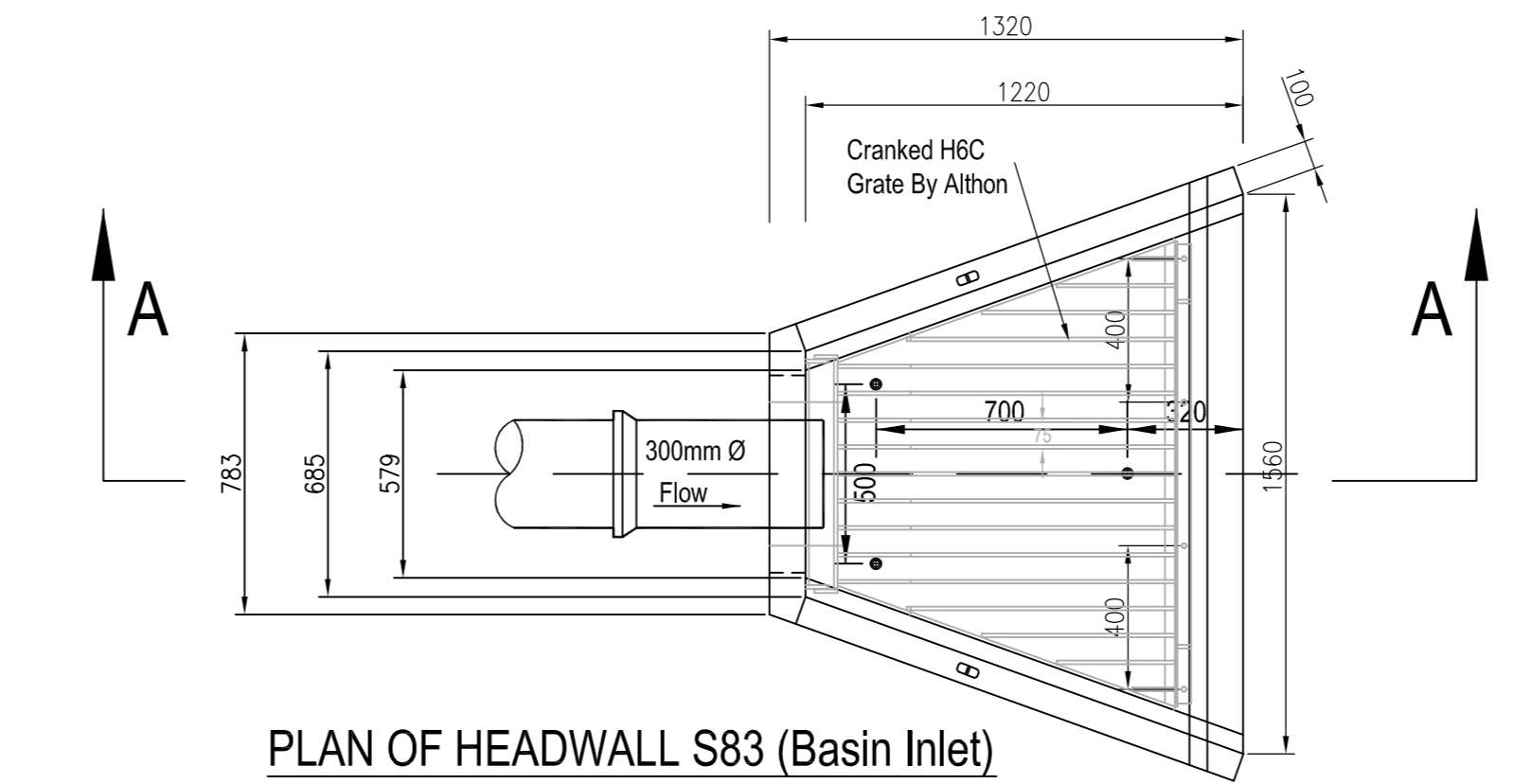
PLAN OF HEADWALL S82 (Basin Inlet)
Athlon H10CA Precast Concrete Headwall

Installation
Units should be bedded on minimum 100mm of semi-dry concrete. Sit the headwall level or with a slight fall 150 from pipe to spill mouth.
For full detailed installation instructions contact ALTHON Ltd, 01603 488700

Material: Reinforced concrete



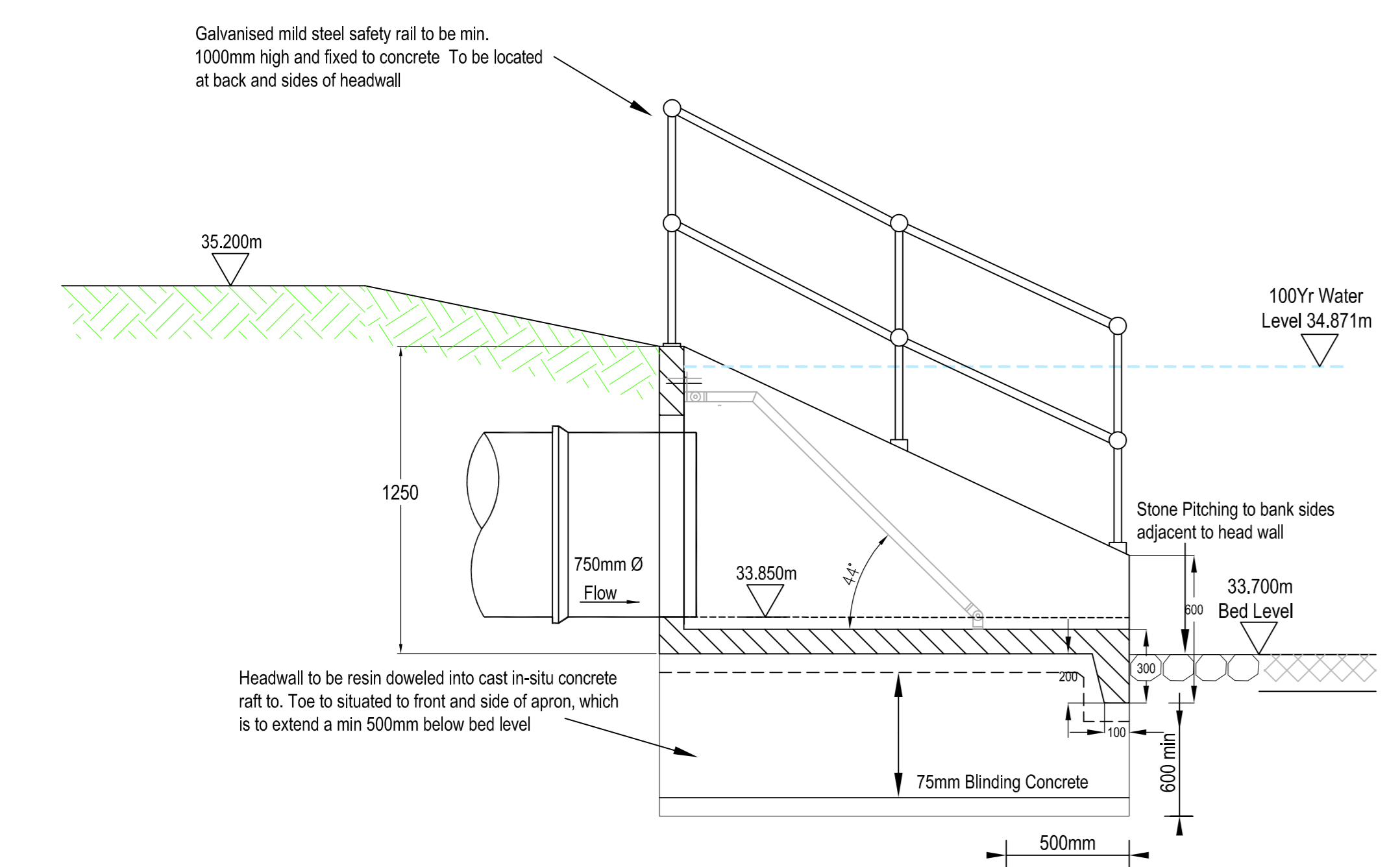
Material - Reinforced Concrete.
Weight - Approximately 1860kg
All dimensions in mm.



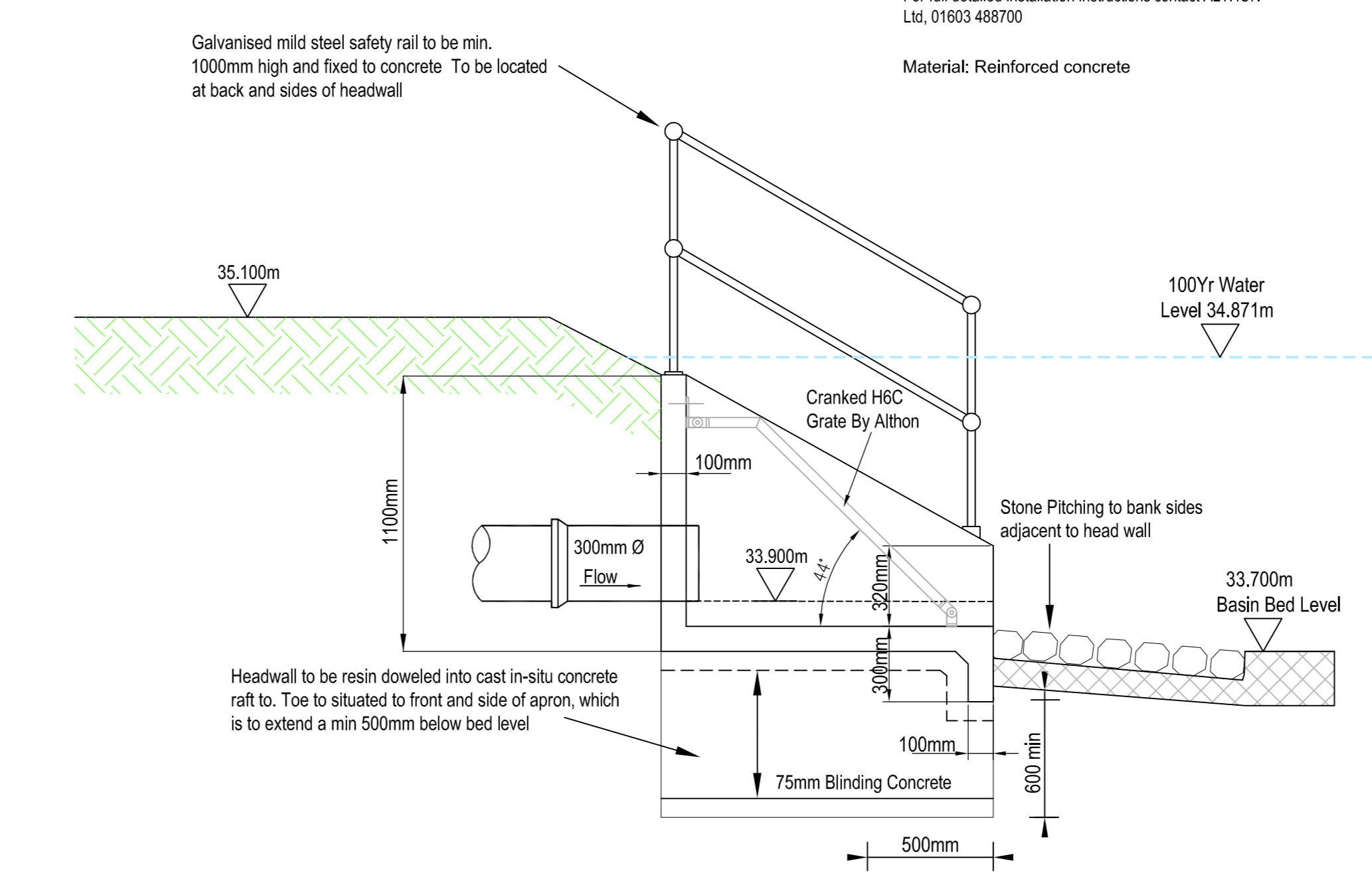
PLAN OF HEADWALL S83 (Basin Inlet)
Athlon H6CA Precast Concrete Headwall

Installation
Units should be bedded on minimum 100mm of semi-dry concrete. Sit the headwall level or with a slight fall 150 from pipe to spill mouth.
For full detailed installation instructions contact ALTHON Ltd, 01603 488700

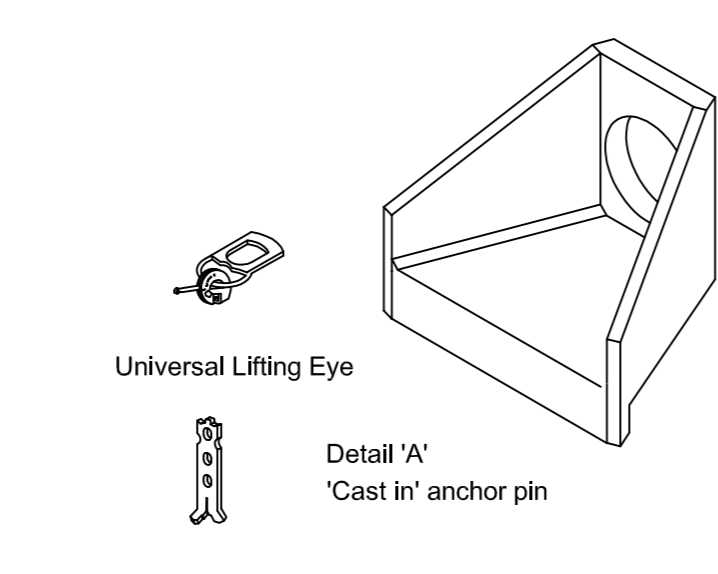
Material: Reinforced concrete



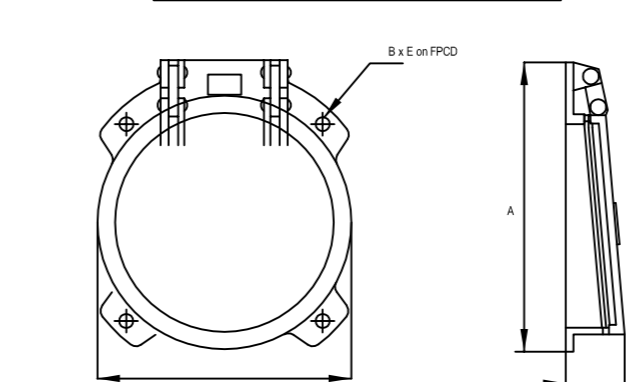
HW-S20 SECTION A-A
Athlon H10CA Precast Concrete Headwall



HW-S83 SECTION A-A
Athlon H6CA Precast Concrete Headwall



Althon Flap Valve Details



Item No	A	B	C	D	E	F	Gate Dia	Flap Headwall Type
80	235	200	65	4	18	160	M16	H3C
100	262	225	66	4	18	186	M16	H3C
150	318	285	66	4	18	240	M16	H3C
200	334	285	75	4	18	295	M16	H3C
225	366	310	79	4	18	325	M16	H3C
250	383	326	81	4	18	355	M16	H3C
300	428	375	85	4	18	410	M16	H3C
350	506	462	124	4	23	476	M20	H3C
375	603	455	127	4	23	495	M20	H3C
400	661	517	129	4	23	525	M20	H3C
450	705	550	116	4	23	585	M20	H3C
500	755	630	121	4	23	650	M20	H3DC
600	890	750	129	4	28	776	M24	H3DC
700	1020	910	175	6	28	840	M24	H3DC
750	1090	995	170	6	28	925	M24	H3DC
800	1128	1025	175	6	28	950	M24	H3DC B
900	1289	1175	210	6	28	1050	M24	H3DC B

MATERIAL SPECIFICATION

Frame
Constructed in ductile Iron Grade 420/12 to BS EN 1563 : 1997, for wall, pipe or thimble mounting applications.

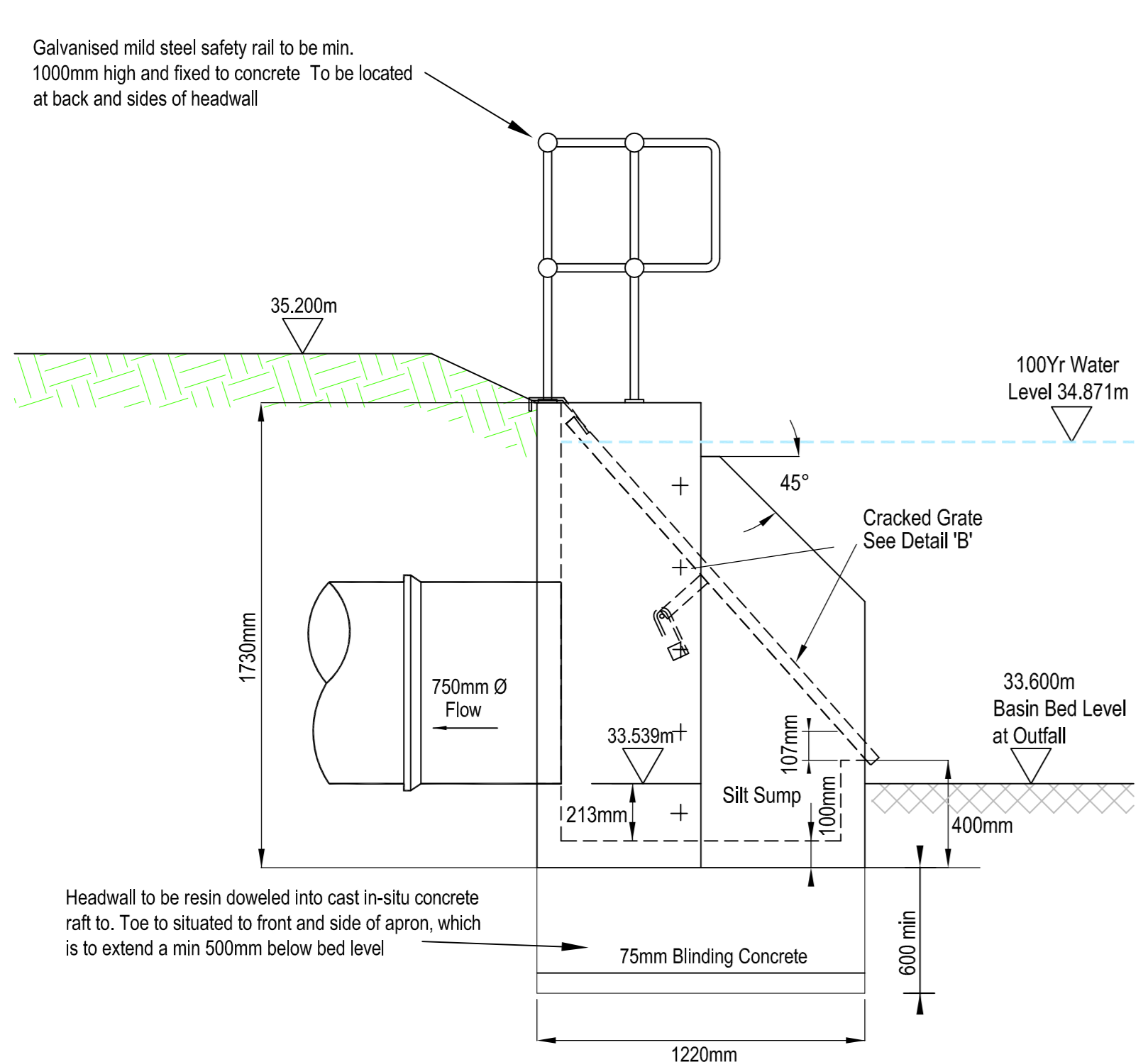
Door
Constructed in ductile Iron Grade 420/12 to BS EN 1563 : 1997, designed to withstand static seating heads up to 6 metres.

Sealing Faces
Phosphor bronze sealing faces to BS EN 12167 : 1996 are supplied as the standard material. Sealing faces are set to 0.1mm feeler gauge non-acceptance to provide an effective seal.

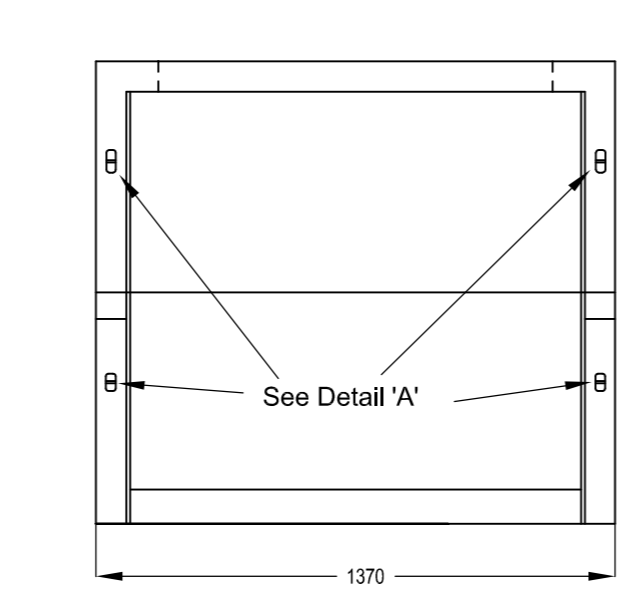
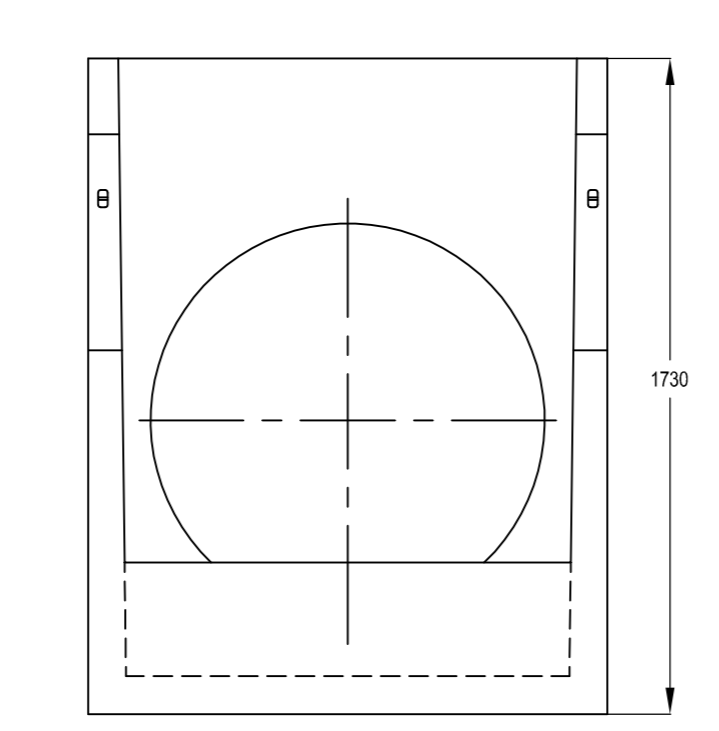
Hinge Links
Manufactured from ductile Iron Grade 420/12 to BS EN 1563 : 1997.

Hinge Pins
Manufactured from stainless steel to BS EN 10088 : 1995 Grade 1.4401 (316).

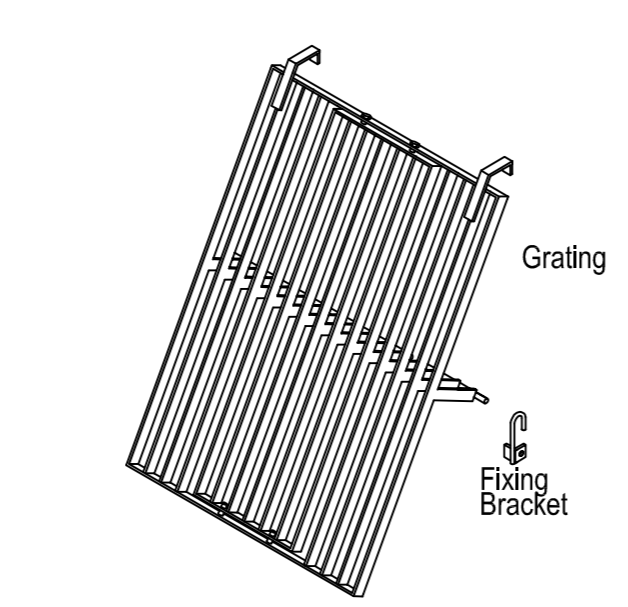
Coating
Black Plascoat PPA571 thermoplastic coating powder to 200 microns minimum thickness. This coating gives excellent resistance to ultraviolet light, salt spray and atmospheric pollutants.



S84 SECTION A-A
Athlon 29HDSTB Precast Concrete Silt Trap Headwall Detail



Plan View on HW-S84



Cranked Grate Detail 'B'

FOR APPROVAL

Title: **Barratt Homes & Taylor Wimpey Monkton Phase 2 Headwall Details**

Scale: 1:20 @ A0 Date: July 2015

Drawn by: FT e-mail: frank.hegarty@queensberrydesign.co.uk

Revision: - Checked By: -

QD1081-08-02

QUEENSBERRY DESIGN
ENGINEERING & ARCHITECTURAL CONSULTANTS

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NORTH WEST & YORKSHIRE OFFICE
2A St Martin's Lane, York, YO1 1RN T: 01904 506662
www.queensberrydesign.co.uk

Appendix 2 – Landscape Drawings



SAFETY, HEALTH & ENVIRONMENTAL INFORMATION
 In addition to the hazards / risks normally associated with the types of work detailed on this drawing, note the following:

Construction
 1. No abnormal risk
Maintenance / Cleaning
 1. No abnormal risk
Decommissioning / Demolition
 1. No abnormal risk

It is assumed that all works will be carried out by a competent contractor, working where appropriate, to an approved method statement. This is not an exhaustive list and reference should be made to the Health and Safety Plan.

- Key**
- Site Boundary
 - Existing hedgerows to be retained, reinforce and managed (to be protected during construction in accordance with BS5837:2012)
 - Proposed Advanced Nursery Stock tree planting
 - Proposed extra heavy tree planting (feature trees)
 - Proposed extra heavy tree planting (feature trees)
 - Proposed selected standard tree planting
 - Proposed standard trees
 - Proposed shrub planting
 - Proposed hedge planting (Proposed native hedges to be planted with post and wire hedge protection fence)
 - Proposed turf to front gardens (Mediation by Rowlock, or similar approved)
 - Proposed turf to back gardens (Mediation by Rowlock, or similar approved)
 - Proposed species rich grass mix (WFC10 Species Rich Lawn or similar approved. Sown at 10g/m² 40000 to 50000 seeds per m². In areas where an existing grass sward is present, this to be overseen at 5g/m²)
 - Proposed species rich grass mix - SUDS/ Wetland Areas (WFC10 Wetland and Pond by Generalists, or similar approved)
 - Proposed bulbs/ wildflower plugs
 - Proposed marginal/ emergent planted areas
 - Proposed grassed mounds
 - Proposed scrapes/ditches

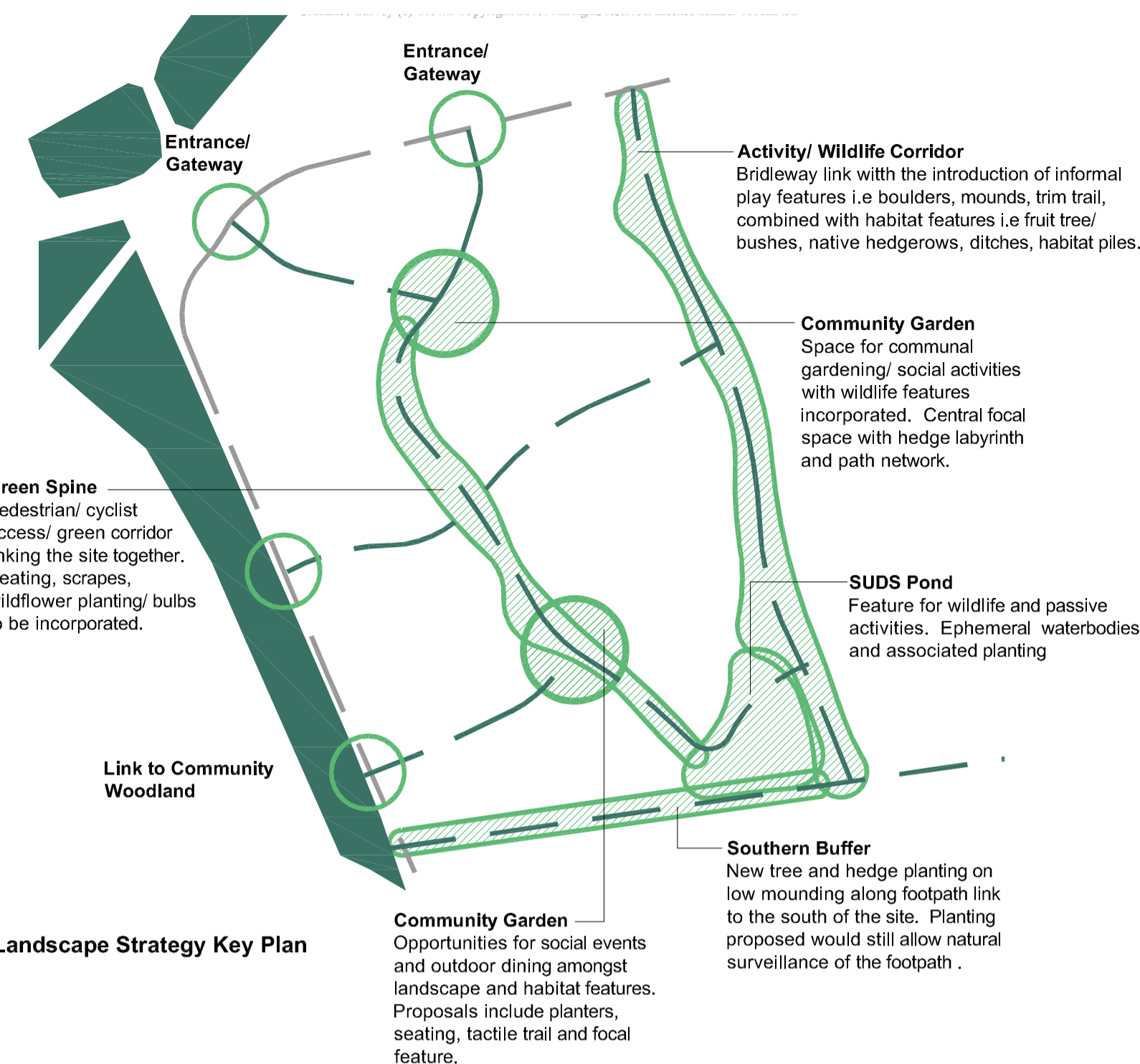
NOTES
 All trees planted within 2m of a highway or adopted footpath, or within 3m of proposed utilities to be planted with a root barrier.

Tree No.	Species	Height	Form	Specification	Quantity
1	No. Prunus avium Plena	10-12m	Standard	4.5k clear stem min. 200cm	1
2	No. Prunus avium Plena	10-12m	Standard	4.5k clear stem min. 200cm	1
3	No. Prunus avium Plena	10-12m	Standard	4.5k clear stem min. 200cm	1
4	No. Prunus avium Plena	10-12m	Standard	4.5k clear stem min. 200cm	1
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7	No. Prunus avium Plena	10-12m	Standard	4.5k clear stem min. 200cm	1
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100	No. Prunus avium Plena	10-12m	Standard	4.5k clear stem min. 200cm	1

Tree No.	Species	Height	Form	Specification	Quantity
101	No. Prunus avium Plena	10-12m	Standard	4.5k clear stem min. 200cm	1
102	No. Prunus avium Plena	10-12m	Standard	4.5k clear stem min. 200cm	1
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150	No. Prunus avium Plena	10-12m	Standard	4.5k clear stem min. 200cm	1

INDICATIVE SOFT LANDSCAPE SPECIFICATION

Generally, all earth works associated with landscape operations are to be made good, to self levels are to be graded to 5



INDICATIVE PLANTING SCHEDULE

Native Individual Tree Planting
Extra Heavy Standards: 14-16cm girth, 4.0 - 4.5m high
Selected Standards: 10-12cm girth, 3.0 - 3.5
Standards: 8-10cm girth, 2.5-3.0m high

Ornamental Street Trees
Advanced Nursery Stock, 18-20cm girth, 4.5 - 5.0m+ high
Extra Heavy Standards: 14-16cm girth, 4.0 - 4.5m high
Selected Standards: 10-12cm girth, 3.0 - 3.5

Ornamental Trees (within private gardens)
Standards: 8-10cm girth, 2.5-3.0m high

Native Hedge Mix
Double Staggered Row
Bare Root, 60-80cm, 6 per/linear metre

Native Marginal/Aquatic Planting
Wildflower plugs planted in clusters of 5 to 10 of each species from the selection below. Average density 10/m² to allow for natural colonisation

Amenity Turf - Rolawn Medallion 125
to all mown grassed areas within private gardens, general public and semi-private landscape areas

Typical sown seed mixture:

Sauvignon	Perennial Ryegrass	12.5%
Evita	Perennial Ryegrass	6.25%
Mariapita	Perennial Ryegrass	6.25%
Reggae	Slender Creeping Red Fescue	20%
Cezanne	Slender Creeping Red Fescue	15%
Musica	Chewings Fescue	20%
Miracle	Smooth Stalked Meadow Grass	10%
Limousine	Smooth Stalked Meadow Grass	10%

Ornamental Shrub/Herbaceous Planting
2-3L & 10-15L Average Pot Size
Average density 3-5/m²

- Allium giganteum
- Armeria maritima
- Briza media
- Buddleja davidii
- Carex pendula
- Carex elata 'Aurea'
- Choiysya temata
- Cornus 'Elegantissima'
- Cortaderia selloana 'Pumila'
- Crocsmia 'Lucifer'
- Deschampsia cespitosa
- Dryopteris filix-mas
- Euonymus fortunei 'Silver Queen'
- Festuca glauca
- Geranium 'Johnsons Blue'
- Geranium 'Wargrave pink'
- Hebe red edge
- Hebe 'Sutherlandii'
- Hebe vernicosa
- Hedera hibernica
- Kniphofia 'Royal Standard'
- Lavandula angustifolia
- Leymus arenarius
- Lonicera nitida 'Maygreen'
- Luzula sylvatica
- Pachysandra terminalis
- Phormium 'Purpureum'
- Phormium 'Tropicale'
- Pinus mugo 'Pumilio'
- Potentilla fruticosa 'Red Ace'
- Prunus 'Cherry Brandy'
- Rosa 'Kent'
- Salvia officinalis
- Skimmia 'Rubella'
- Stipa arundinacea
- Stipa calamagrostis
- Stipa gigantea
- Stipa tenuissima 'Pony Tails'
- Viburnum davidii
- Viburnum tinus
- Vinca minor

Amenity Grass Seeding
to all semi-private mown grassed areas and village greens.
British Seed Houses - A24 (Wear and Tear) or similar.

Typically:

Coun	Slender Creeping Red Fescue 35%
Aberlrip	Perennial Ryegrass 20%
Raisa	Chewings Fescue 20%
Vesuvius	Perennial Ryegrass 20%
Highland	Bent Grass 5%

Neutral Grassland Mixes: General Areas

Grasses (sown at 3gm²)

Cynosurus cristatus, Crested dog's-tail	20%
Anthoxanthum odoratum, Sweet vernal grass	25%
Festuca rubra, Red fescue	20%
Poa trivialis, Rough meadow grass	10%
Agrostis stolonifera, Creeping bent-grass	15%
Phleum pratense, Timothy	5%
Alopecurus pratensis, Meadow foxtail	5%

Core Species (sown at 0.5gm²)

Primula veris, Cowslip	5%
Centauria nigra, Knapweed	10%
Leucanthemum vulgare, Ox-eye daisy	30%
Lotus corniculatus, Bird's-foot trefoil	25%
Rhinanthus minor, Yellow rattle	15%
Gallium verum, Ladies bedstraw	5%
Papaver rhoeas Poppy	5%

Neutral Grassland Mixes: Wildflower Areas

Grasses (sown at 3gm²)

Cynosurus cristatus, Crested dog's-tail	20%
Anthoxanthum odoratum, Sweet vernal grass	20%
Festuca rubra, Red fescue	20%
Poa trivialis, Rough meadow grass	10%
Agrostis stolonifera, Creeping bent-grass	15%
Phleum pratense, Timothy	5%
Alopecurus pratensis, Meadow foxtail	10%

Core Species (sown at 0.3gm²)

Primula veris, Cowslip	5%
Centauria nigra, Knapweed	5%
Leucanthemum vulgare, Ox-eye daisy	53%
Lotus corniculatus, Bird's-foot trefoil	15%
Gallium verum, Ladies bedstraw	10%
Papaver rhoeas Poppy	2%
Prunella vulgaris Selfheal	10%



Key

- Site Boundary
- Existing hedge to be retained, reinforced and managed - gaps to be filled with species and individuals
- Proposed feature trees - Extra heavy trees with particular qualities - large, long lived
- Proposed extra heavy tree planting
- Proposed selected standard tree planting
- Proposed standard tree planting
- Proposed turf to front gardens (to be installed prior to completion. Health & Safety approved)
- Proposed turf to back gardens (to be installed prior to completion. Health & Safety approved)
- Proposed species rich amenity grass seed
- Proposed species rich mix - SUDS/ wetland areas (to be installed prior to completion. Health & Safety approved)
- Proposed marginal / aquatic planting - wetland areas
- Proposed bushes/ wildflower plugs
- Proposed shrub planting
- Proposed hedge planting (with post and rail hedge panels where)
- Proposed grassed mounds
- Proposed scrapes
- Existing ditches (with benches)
- Proposed ephemeral waterbodies (complete with ditches with base of 100cm ponds)
- Proposed timber benches/ seating
- Proposed feature boulders - for play and habitat creation
- Proposed trim trail / play features (along eastern boundary)
- Indicative location for focal feature/ Waymarker
- Indicative location for bat bricks - 20 no.
- Indicative location for bird boxes for Swifts - 10 no.
- Indicative location for terrace bird boxes for Sparrows - 10 no.

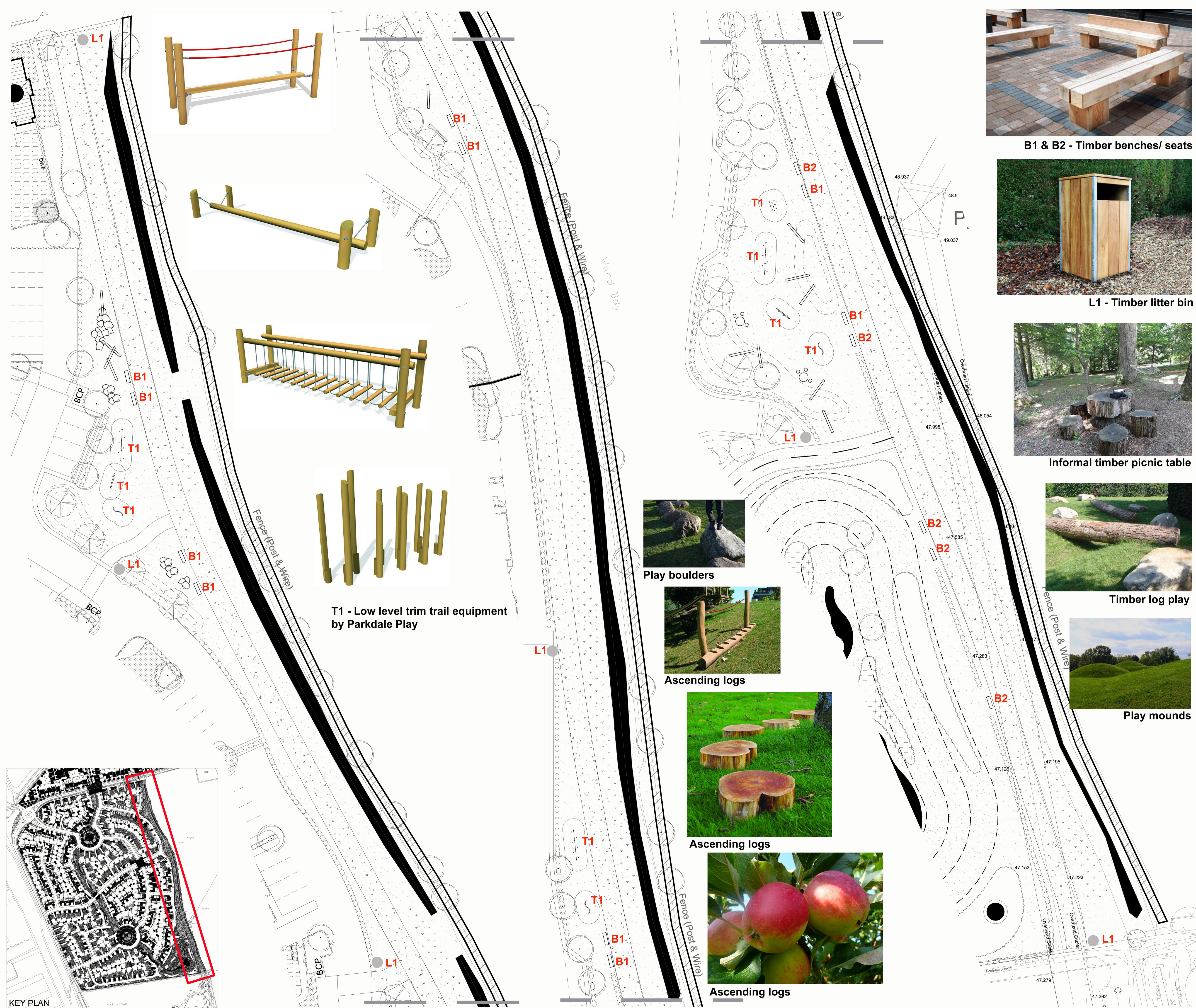
B	Revisions in accordance with changes to visitor parking bays	yes	DH	SL	09/15
A	Revisions in accordance with layout changes inc. visitor parking bays	yes	DH	SL	08/15
Rev.		CDM.	By.	Chk.	Date.
Proj.	Monkton Fell - Phase 2	Loc.	NE31		
Client.	Taylor Wimpey/ Barratt David Wilson Homes				
Dwg.	Landscape Strategy				
Scale.	1:1000@A1	Date.	05/15		
Drawing No.	914_01	Rev.	B		

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Monkton Fell



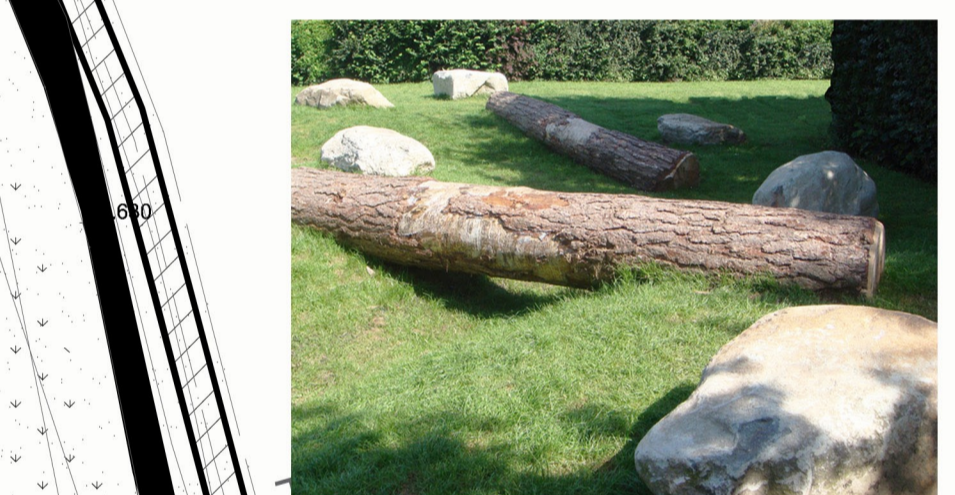
B1 & B2 - Timber benches/ seats



L1 - Timber litter bin



Informal timber picnic table



Timber log play



Play mounds



Play boulders



Ascending logs



Ascending logs



Ascending logs

Key

- Proposed extra heavy tree planting
- Proposed selected standard tree planting
- Existing boundary ditch
- Existing hedge to be reinforced, gaps infilled and managed
- Proposed rolled gravel path - carboniferous limestone 25mm depth wearing course (5mm to dust)
- Proposed turf to front gardens
Mediation by Rowlain, or similar approved
- Proposed turf to back gardens
To be undertaken prior to occupation. Mediation by Rowlain, or similar approved.
- Proposed species rich amenity grass seed
Aberlawn by Geminal Seeds, or similar approved
- Proposed species rich mix - SUDs/ wetland areas
WFGS Wetland and Pond areas by Geminal Seeds, or similar approved
- Proposed marginal / aquatic planting
wetland areas
- Proposed bulbs/ wildflower plugs
- Proposed shrub planting
- Proposed hedge planting
(with post and wire hedge protective fence)
- Proposed grassed mounds
- L1** Proposed Litter Bin
LLG102 by Langley Design or similar approved
- B1** Proposed Timber Bench
SBN317 by Langley Design or similar approved
- B2** Proposed Timber Seat
SST300 by Langley Design or similar approved
- Proposed Timber Picnic Table
Informal - Formed from tree trunks
- Boulders
(500 - 1000mm dia from CED, or similar approved)
- T1** Proposed trim trail / play features
(along eastern bridleway)
- Indicative location for focal feature/Waymarker

Rev. yes - - -
Proj. Monkton Fell - Phase 2
Client. Taylor Wimpey/ Barrat
Dwg. David Wilson Homes
East Corridor

Scale. 1:250@A1
Drawing No. 914_22

Date. 07/15
Rev. -

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