Dust and Air Quality Innovation and Expertise

Unit 8 Nimrod
De Havelland Way
Witney
OX29 0YG
United Kingdom
Tel: (44) 1608 810110

Our ref: DS/GA/River Academy Air Quality Mitigation Plan
Contact: Gordon Allison
Tel: + 44 (0) 1608810110

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Air Quality Mitigation Plan to Discharge Condition 10 for River Academy Reading – Planning Reference 212061 - Addendum

Prepared by Gordon Allison

Introduction

This is an addendum to the Air Quality Mitigation Plan dated 17/01/23 to address comments made by Reading Borough Council on the original submission.

The comments from the Environmental Protection Officer regarding the Air Quality Mitigation Plan submitted for Condition 10 were as follows:

I have reviewed the air quality mitigation plan and it is generally acceptable, however I have the following comments which further information is required on prior to approval of the details:

- *Can the impact on air quality be quantified to some extent please, as required by the condition? For example, how many journeys might a measure save, and what is the likely impact of that on the original air quality assessment. I appreciate it will be based on estimates.*
- *Regarding the planting, please can more specifics be provided on how the development will be implementing this idea?*

The first bullet is addressed in an amended 'Summary and Quantification of Air Quality Impacts' section, and the second bullet is addressed in an amended 'Landscape Planting for Air Quality Mitigation Section'. A planting plan and schedule is appended.

Summary and Quantification of Air Quality Impacts

The River Academy is a new school to serve the increase in population in school age children in the north of Reading. The school is designed to have a catchment of 3 miles on first opening, declining to 1.5 miles as pupil admission by proximity progressively takes over, meaning that pupils will be encouraged and enabled to walk or cycle to school. According to the way in which the transport assessment has been carried out, there will however be an increase in vehicle trips to the school, with a consequent increase in vehicle exhaust emissions, including of NO_x which gives rise to NO_2. Some of these increases will occur on roads in the Reading Air Quality Management Area, where the local authority is taking action to improve air quality.

The air quality impacts have been assessed and accepted to be insignificant. The detailed air quality assessment is appended. The largest predicted increase in nitrogen dioxide at a residential receptor is predicted to be 0.13 µg/m^3. This quantum of change is below that which could be measured with any confidence by methods set out in Local Air Quality Management: Technical Guidance 2022. The greatest increase in nitrogen dioxide where air quality is already significantly impacted (over 30 µg/m^3) is predicted to be 0.07 µg/m^3, on Prospect Street in Caversham, resulting from an additional 90 trips per day. Air quality is predicted to be meeting the National Air Quality Objective on Prospect Street, by some margin, with the scheme in place.

The transport assessment and air quality assessment assume full trip generation on the year of opening, whereas in fact the school will expand gradually, year group by year group.

The transport assessment and air quality assessment do not assess the trips removed from the network, which are trips which would have otherwise taken place if the school was not built. These trips would have taken place in part on other roads in the Reading Air Quality Management Area.

For the purpose of the Transport Assessment any Travel Plan benefits through a reduction in vehicular trip generation were not taken into account.

The proposed catchment area for the school was defined for the Transport Assessment, and it was anticipated to be no more than 3 miles upon first opening. As the school fills to capacity, increased demand for admission would result in places being allocated to pupils who live the closest. This would therefore result in a tightening of the area from which pupils are drawn over time. In order to establish a baseline modal split for the purposes of assessment, the 2011 census travel to secondary school mode share data for schools across Reading has been used to estimate the mode share of pupils attending River Academy. This is considered a highly robust approach given the accessibility and catchment of the proposed site, which should see a greater uptake of walking and cycling (and corresponding reduction in car trips) than would be reflected in an average of all schools across Reading.

Quantified Emissions Reductions

Quantified emissions reductions have been estimated by examining the Travel Plan targets primarily, which identify reductions in car trips as a result of all the various measures that are being implemented as part of the scheme. This would essentially wrap up benefits associated with the off-site infrastructure improvements, cycle parking provision, and other TP specific measures, and ultimately proposes a 10% modal shift away from car onto alternative sustainable modes (applied to both pupil pick-up / drop-off and staff trips).

Looking at the traffic distribution assumptions from the TA, and weighted averages, it assumed average 1.71 km journey distances for pupils and 4.59 km for staff. These are one-way distances.

- A 10% mode share reduction for pupil trips would see a total reduction of circa 376 car trips per day (assuming arrivals and departures in each respective peak). 338 x 1.71 km would be circa 643 veh / km per day saved as a result of the combined measures referenced in the TP. Assuming 190 school days per year this would be 122,170 veh / km per year for pupil trips.

- Applying this reduction to staff trips (though only assuming arrival in the AM and departure in the PM), the reduction in trips associated with the TP targets would be 31. 31 x 4.59 km would see circa 142 veh / km per day saved, which would be 26,980 veh / km per year.

- The cumulative total of these would be 149,150 veh / km per year.

The emissions avoided per year (based on 2024 emissions factors) would be:

NOx - 38.00 kg
$PM_{2.5}$ – 2.74 kg
PM_{10} – 4.82 kg

For the reasons set out above, the results of the air quality assessment are considered to be more conservative than will be the out-turn in reality. Mitigation measures are described below, appropriate to the likely level of air quality impact.

Landscape Planting for Air Quality Mitigation

Landscape planting is recognised as a means by which certain plants can be more effective than others in removing air pollutants, by virtue of offering a greater leaf surface area, over a longer period of time.

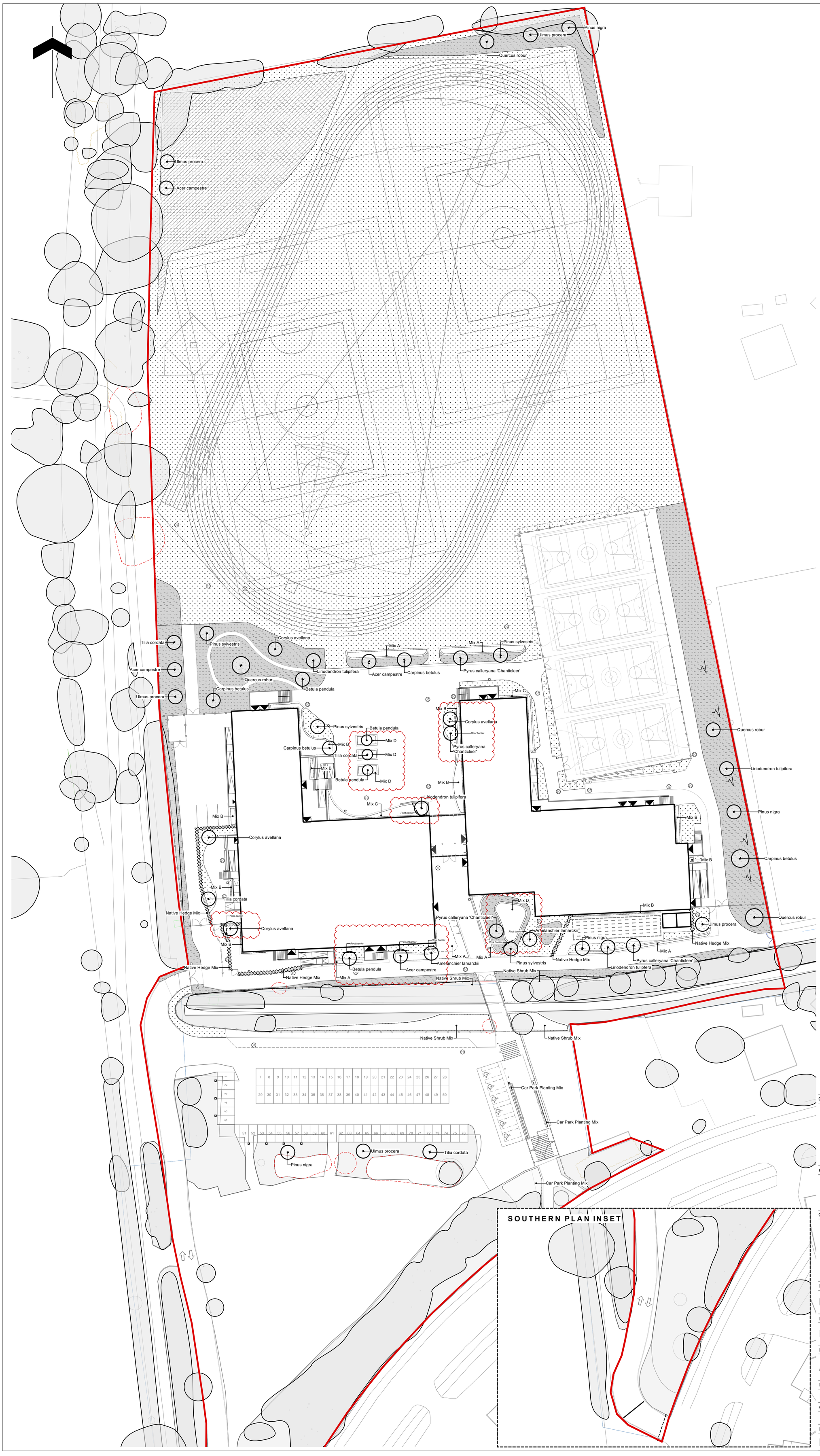
Plants help remove pollutants from the air by trapping the particles on their leaves, which are then washed off by rain or discarded as the plant drops its leaves. This can help to inform a planting palette that is varied in species, form and height, from ground covers and perennials to mid level shrubs and tall trees, that will provide a complex matrix to help trap particles that may stray into the development.

A significant number of new trees have been proposed across the site providing a varied canopy above ground. Within the proposals, a varied selection of tree species has been selected, both deciduous and evergreen, which provides canopies all year round.

Leaves with a large surface area such as on ornamental grasses and ferns are particularly effective at trapping and filtering airborne particles. Species include Asplenium scolopendrium, Dryopteris wallichiana, and grasses such as Stipa tenuissima and Hakonechloa macra. As well as this, plants with hairy/furry leaves such as Perovskia and Lavandula provide this. Evergreen species such as Carex pendul, Carex divulsa and Stachys byzantine provide filtration in the winter as well as year-round interest.

Research has shown that plants that are located very close to the source of traffic-generated pollution are particularly effective, so it was important to retain the existing dense planting of trees and shrubs to the boundary of Richfield Avenue to the south of the site. As well as this, a native shrub mix consisting of species such as Acer campestre and Corylus avellana has been specified along the existing ditch which once these shrubs are established, will create a barrier between the most trafficked areas of the site and the main school.

Appendix 1: Planting Plan and Planting Schedule



KEY

TREES AND HEDGE PLANTING

- EXISTING TREES
- EXISTING VEGETATION
- PROPOSED TREE PLANTING *Refer to Planting Schedule*
- PROPOSED ROOT BARRIER
- PROPOSED HEDGE PLANTING *Refer to Planting Schedule*

TREES AND HEDGE PLANTING

- PROPOSED AMENITY PLANTING *Refer to Planting Schedule*
- PROPOSED MEADOW PLANTING *Refer to Planting Schedule*
- PROPOSED WILDFLOWER PLANTING *Refer to Planting Schedule*
- PROPOSED DRY SWALE *Refer to Planting Schedule*
- PROPOSED GRASS SEED *Refer to Planting Schedule*

REV	DATE	DESCRIPTION
C06	18/09/2023	Root barriers added to plan. Dry swale mix renamed Mix D.
C05	04/09/2023	Planting label amended to correct tree
C04	09/08/2023	Revised for construction following planning updates

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Department for Education

CONTRACTOR

BOWMER + KIRKLAND

CONSULTANT ALA

ares LANDSCAPE ARCHITECTS

PROJECT

River Academy

DRAWING TITLE

Planting Plan

DRAWING PURPOSE

A4 - FOR CONSTRUCTION

DRAWN BY	DATE	CHK'D BY	SCALE	MEDIA
MH	10.09.2021	JG	1:500	A1

CONTRACT DRAWING REFERENCE (AS REQUIRED)

PROJECT - ORIGINATOR - ZONE - LEVEL - TYPE - ROLE - NUMBER	REVISION
FS0949-ALA-XX-ZZ-DR-L-0013	C06

KEY

PLANTING SCHEDULE

Individual Trees			
Latin name	**Common name**	**Specification (In accordance with NPS)**	**No.**
Acer campestre *	Field maple	8-10cm girth; 250-300cm, 2x; Standard; clear stem 175-200cm; 3 breaks, RB	4
Amelanchier lamarckii	Snowy mespilus	250-300cm, 3x; multi-stem; bushy; 3 stems minimum	2
Betula pendula *	Silver birch	12-14cm girth; 350-425cm, 3x; Heavy Standard; clear stem 175-200cm; 5 breaks, RB	4
Carpinus betulus *	Common hornbeam	8-10cm girth; 250-300cm, 2x; Standard; clear stem 175-200cm; 3 breaks, RB	4
Corylus avellana *	Common hazel	200-250cm; multi-stem; bushy; 5 stems minimum; 45-65L pot	4
Liriodendron tulipifera	Tulip tree	8-10cm girth; 250-300cm, 2x; Standard; clear stem 175-200cm; 3 breaks	4
*Pinus sylvestris**	Scots Pine	12-14cm girth; 300-350cm; 5x; leader with laterals; clear stem 150-175cm, RB	4
Pinus nigra	Austrian Pine	12-14cm girth; 300-350cm; 5x; leader with laterals; clear stem 150-175cm, RB	4
Pyrus calleryana 'Chanticleer'	Flowering pear	12-14cm girth; 350-425cm, 3x; Heavy Standard; clear stem 175-200cm; 5 breaks, RB	4
Quercus robur *	Oak	8-10cm girth; 250-300cm, 2x; Standard; clear stem 175-200cm; 3 breaks, RB	4
Tilia cordata *	Small-leaved lime	12-14cm girth; 350-425cm, 3x; Heavy Standard; clear stem 175-200cm; 5 breaks, RB	4
Ulmus procera *	English elm	12-14cm girth; 350-425cm, 3x; Heavy Standard; clear stem 175-200cm; 5 breaks, RB	5
		Total	**47**

Native Hedge Mix. Double staggered rows (6/Linear metre). Equal % mix		
Latin name	**Common name**	**Specification (In accordance with NPS)**
Acer campestre	Field maple	80-100cm, Transplant - seed raised, 3 breaks, 3L
Corylus avellana	Common hazel	80-100cm, Transplant - seed raised, 3 breaks, 3L
Fagus slyvatica	European beech	80-100cm, Transplant - seed raised, 3 breaks, 3L

Mix A: Amenity Planting Mix. Plant at 5/m²			
Latin name	**Common name**	**Specification (In accordance with NPS)**	**Mix**
Stipa tenuissima	Mexican feather grass	C2L, Full pot	10%
Allium giganteum	Giant allium	C2L, Full pot	8%
Stachys byzantina	Lambs ear	C2L, Full pot	10%
Rudbeckia fulgida var. sullivantii 'Goldstrum'	Black-eyed susan	C2L, Full pot	8%
Verbena bonariensis	Verbena	C2L, Full pot	8%
Echinacea purpurea	Coneflower	C2L, Full pot	8%
Lavandula angustifolia 'Hidcote'	Lavender	C2L, Full pot	8%
Achillea filipendulina 'Cloth of gold'	Yarrow	C2L, Full pot	8%
Alchemilla mollis	Lady's mantle	C2L, Full pot	8%
Knautia arvensis	Field scabious	C2L, Full pot	8%
Crocosmia 'Lucifer'	Crocosmia	1.5-2L, Full pot	8%
Calamintha nepeta	Lesser calamint	C2L, Full pot	8%

Mix B: Sreening Planting Sun Mix. Plant at 5/m²			
Latin name	**Common name**	**Specification (In accordance with NPS)**	**Mix**
Stipa tenuissima	Mexican feather grass	C2L, Full pot	10%
Calamagrostis x acutiflora 'Karl Foerster'	Feather reed grass	C2L, Full pot	10%
Lavandula angustifolia 'Hidcote'	Lavender	C2L, Full pot	10%
Rudbeckia fulgida var. sullivantii 'Goldstrum'	black-eyed susan	C2L, Full pot	10%
Verbena bonariensis	Verbena	C2L, Full pot	10%
Stachys byzantina	Lambs ear	C2L, Full pot	10%
Echinacea purpurea	Coneflower	C2L, Full pot	10%
Geranium macrorrhizum 'White-ness'	Rock cranesbill	C2L, Full pot	10%
Alchemilla mollis	Lady's mantle	C2L, Full pot	10%
Brunnera macrophylla 'Jack frost'	Siberian bugloss 'Jack Frost'	C (1.5-2L)	10%

Mix C: Sreening Planting Shade/Partial Shade Mix. Plant at 5/m²			
Latin name	**Common name**	**Specification (In accordance with NPS)**	**Mix**
Asplenium scolopendrium	Hart's tongue fern	C (1.5-2L)	10%
Brunnera macrophylla 'Jack frost'	Siberian bugloss 'Jack Frost'	C (1.5-2L)	20%
Dryopteris wallichiana	Alpine wood fern	C (1.5-2L)	15%
Carex elata 'Aurea'	Bowles's golden sedge	C (2L)	20%
Meconopsis baileyi	Bailey's Himalayan blue poppy	C2L, Full pot	10%
Geranium macrorrhizum 'White-ness'	Rock cranesbill	C2L, Full pot	10%
Alchemilla mollis	Lady's mantle	C2L, Full pot	15%

Mix D: Entrance & Courtyard Mix. Planted at 4 per m2 in single species groups of 1, 3 or 5 plants			
Latin name	**Common name**	**Specification (In accordance with NPS)**	**Mix**
Ajuga reptans	Bugle	C (1.5-2L)	15%
Campanula glomerata	Clustered bellflower	C (1.5-2L)	15%
Carex pendula	Pendulous sedge	C (1.5-2L)	20%
Filipendula vulgaris	Dropwort	C (1L)	15%
Hakonechloa macra 'Aureola'	Golden hakonechloa	C (2L)	15%
Osmunda regalis	Toyal fern	C (1.5-2L)	20%

Car Park Planting Mix Planted at 4 per m2 in single species groups of 1 or 3 plants			
Species	**Common name**	**Specification (In accordance with NPS)**	**Mix**
Carex divulsa	Grey Sedge	C2L, Full pot	25%
Cornus canadensis	Dwarf Cornel	C2L, Full pot	25%
Hakonechloa macra	Japanese Forest Grass	C2L, Full pot	25%
Heuchera 'Green Spice'	Coral Bells	C2L, Full pot	25%
Bulb Underplanting to Car Park Mix			
Species	**Common name**	**Grade (cm)**	**No. per m²**
Anemone Blanda 'Atrocaerulea'	Winter Windflower 'Ingramii'	Grade 7/8	25
Galanthus nivalis	Common snowdrop	Grade 5/6	30
Hyacinthoides non-scripta	Common bluebell	Grade 7/8	25
Lilium rubellum	Maiden lily	Grade 16/18	15
Scilla autumnalis	Autumn Squill	Grade 7/8	25

Native Shrub Mix Planted at 1 per m2 in single species groups of 1, 3 or 5 plants			
Latin name	**Common name**	**Specification (In accordance with NPS)**	**Mix**
Acer campestre	Field Maple	60-80cm height; C (2L); branched	15%
Corylus avellana	Common Hazel	60-80cm height; C (2L); branched	15%
Crataegus monogyna	Common Hawthorne	60-80cm height; C (2L); branched	20%
Euonymus europaeus	Common Spindle	60-80cm height; C (2L); branched	15%
Prunus spinosa	Blackthorn	60-80cm height; C (2L); branched	20%
Rosa canina	Dog rose	60-80cm height; C (2L); branched	15%

Amenity Grass Seed. Application rate: 5g/m2
Mixture: 35% Chewings fescue, 35%Slender red fescue, 20% Smooth stalked meadow grasss, 10% Brown top bent.

Meadow Grass Seed. Application rate: 5g/m2
Mixture: RE2 - Lowland Meadow Mix or similar

Wildflower Seed. Application rate: 5g/m2
Mixture: WF1 Flowering Meadow by Germinal Seed

* native tree species

TIMES OF YEAR FOR PLANTING

- Deciduous trees and shrubs: Late October to late March.
- Conifers and evergreens: September/ October or April/ May.
- Herbaceous plants (including marginal): September/ October or March/ April.
- Container grown plants: At any time if ground and weather conditions are favourable.

REV	DATE	DESCRIPTION
C03	18/09/2023	Dry Swale Mix swapped to Mix D. Ranunculus lingua taken out, replaced with Hakonechloa macra 'Aureola'
C02	19/04/2023	Planning changes formally issued for construction following LPA comments
P08	04/04/2023	1. Tree species updated to suit 30:20:10 rule - Amelanchier, Corylus, Pyrus, Tilia, Ulmus and Pinus nigra added. 2. Additional 8 trees have been added, 3 to the south of the car park and 5 to the north corners of the sports field to act as a buffer 3. Hedge species updated to show native hedge mix 4. Species of bluebell updated to Common Bluebell

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PROJECT

River Academy

DRAWING TITLE

Planting Schedule

DRAWING PURPOSE

A4 - FOR CONSTRUCTION

DRAWN BY	DATE	CHK'D BY	SCALE	MEDIA
MH	10.09.2021	JG	1:500	A1

CONTRACT DRAWING REFERENCE (AS REQUIRED)

PROJECT - ORIGINATOR - ZONE - LEVEL - TYPE - ROLE - NUMBER	REVISION
FS0949-ALA-XX-ZZ-DR-L-0014	C03