URBAN GreenUP

D3.7: Final report about implementation and commissioning of NBS in Liverpool

WP 3 , T3.8

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URBAN GreenUP

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Contents

List of Figures

List of Tables

Abbreviations

CFT	Community Forest Trust
CRT	Canal and River Trust
JCLI	Joint Contract Landscape Institute
JCT	Joint Contract for Minor Works
LCC	Liverpool City Council
LSSL	Liverpool Street Scene Services Ltd (citys arm's length trading company)
NBS	Nature Based Solutions
SuDS	Sustainable Urban Drainage Systems
UGUP	URBAN GreenUP Project

0 Executive summary

Procurement processes for the URBAN GreenUP project have been led by both Liverpool City Council and the Community Forest Trust and have complied with EU, National and Local procurement policies and guidance.

The identified Nature Based Solutions to be procured ranged from simple off the shelf solutions to innovative design and build systems. Many of the proposals were new to the Liverpool and in response to this the procurement process commenced with a soft market testing exercise which helped to establish the level of commercial interest in the proposed packages of work.

The feedback and evaluation from this initial exercise was used to inform the regulatory process and ensure that the final procurement packages met the desired outcomes and maximised value for money. This process was seen as best practice in identifying the most effective way to package a complex array of interventions to achieve maximum value for money and informed the initial timetable for tendering and procurement of works.

This report details the three main approaches or categories of procurement that emerged from the soft market testing exercise and illustrates the various lots and projects within each category. For each project there is an overview of the procurement approach adopted, the delivery on site and a review of the key issues affecting implementation. This is supplemented by additional detail on the supervision of project delivery, the future establishment and maintenance of the various Nature Based Solutions (NBS) and the level of progress/completion to date. Only where the Non-Technical interventions received EU funding have they been included within this report.

At the current point of this submission Liverpool has been in UK lockdown for most of November 2020. Prior to this there were several weeks of full national lockdown over Spring 2020, followed by a summer of tight restrictions on activities and an autumn that has seen further top tier local lockdown for a month and the introduction of mass Covid testing in the city. Naturally the lockdowns have placed restrictions on normal working life and the city focus has been on the Covid testing and pandemic response, which has in turn delayed and affected many of the planned projects. Routine access to city council and other officers and offices has at times been prohibited and across the country contractors and operational staff have been on furlough and unavailable.

During a few summer weeks work resumed where possible, but progress was still hard to achieve for a variety of reason; be that lack of resources and materials, companies restructuring with accompanying staff losses, staff taking annual leave or still remaining on furlough, contractors focussing on previously delayed work, or the generally distracted and slower pace of delivery due to ongoing social distancing etc.

Many of the URBAN GreenUP key interventions were in the process of being delivered on site as the pandemic hit the UK and in the last week before lockdown, works on site were prioritised as far as possible to ensure they were safely completed before lockdown or ideally had reached a stage at which it was safe to stop so that we could continue at a later date.

The current situation is that a number of interventions have been delivered during lockdown or over the summer. Others such as delayed tree planting are underway now. Some works were part delivered with the appointed contractors later being unable or unwilling to complete, whilst other works rose in costs. Projects involving community activity have progressed without the desired level of involvement and although digital platforms of engagement have been used and some events have been re imagined in the light of Covid and the need for safe social distancing, many people remain pre occupied with the impacts of Covid and have been less willing to engage.

As the end of the year approaches all of the remaining delivery works are now underway or planned and the final works are out to tender with a new year on site start date.

As such this report provides an update on delivery 6 months after it was initially submitted but it cannot be considered as final. A final report can only be produced in late spring 2021 when all the works will hopefully be completed and in place.

1 Introduction

The fore-runner tasks 3.3, 3.4 and 3.5, 'Technical and Economic specifications for the Liverpool demo sites', were submitted at the end of August 2018, along with task 3.6 the Liverpool Monitoring Programme.

The report for the task 3.7 'Implementation plan review and tender publication', which outlined the approach for the tender documents for the Liverpool demos, was submitted at the end of September 2018 and provided detail on the various processes that would govern the different procurement processes. This was to ensure we tendered as fairly and transparently as possible to comply with Liverpool City Council, Community Forest Trust and EU procurement processes and policies and that we grouped works to obtain the best value for money. In essence the adopted approach to procurement was governed by a number of key factors which included:

- Both Liverpool City Council (LCC) and The Community Forest Trust (CFT) needed to consider EU, National and Local procurement policies and processes before final tenders could be advertised.
- The proposed packages of work were partly determined by the outcomes and feedback from a soft market testing exercise which helped to establish the level of commercial interest in the proposed packages of work and identified how procurement might achieve best value for money.
- All proposed works would need to consider issues such as obtaining internal political approvals, undertaking Equality Impact Assessments and having due regard for Social Value.
- Opportunities to work with partners on design, engage the community and include co-financing options should be explored.
- Exemptions requests to procurement may need to be considered to appoint specialist contractors– especially where proposed schemes or interventions were innovative or of a 'design and build nature'. In exceptional circumstances, a waiver of certain CSOs may be required in order to properly achieve the Council's aims.
- Procurement processes may also need to take into account the availability of suitably experienced and accomplished delivery partners.

This report provides an update to task 3.7 and outlines the three categories of procurement approach that were used to commission and implement delivery of the NBS interventions. These three categories were based on feedback from the earlier soft market testing and included:

- **A business as usual approach**: in-house procurement through existing services, providers, contractors and agreements, which are governed by threshold values and Liverpool City Council and Community Forest Trust contract standing orders policies and procedures.
- **Open Tender for Works on Liverpool City Council (LCC) Land:** external design and build contracts for projects on LCC land, which are led by LCC staff with support from external consultants and the LCC procurement officer.

- **Open Tender for Works on Third Party Land/Buildings:** external design and build contracts for projects on third party land and buildings; where the third party engages with Liverpool City Council and CFT's procurement process and participates in concept design and tender assessment.

Each of these categories contained a number of 'lots'; with the 'lots' consisting of thematically similar works so that they could be tendered and attract the contractor expertise required for successful delivery. Within each 'lot' were a number of different projects; some were progressed collectively and others separately. The approach for this depended on a range of practical factors such permissions, seasonal or other constraints, opportunities to co-procure with others on different timescales etc.

In general tendered works used variations of the JCT (Joint Contract) for Minor Works to govern procurement and delivery on site. This is designed for smaller, basic construction projects where the work is of a simple nature and was deemed suitable for the purposes of the various projects.

This report:

- details the project composition of the lots within each procurement category that was tendered;
- provides an overview of the procurement approach and delivery for each NBS;
- reviews issues that affected or delayed project delivery;
- outlines the contract supervision, establishment and agreed future maintenance responsibilities for each NBS project;
- provides images (where available) and a summary of progress, on site, to date, for each project; and
- updates and adds detail and progress to the earlier report submitted in May 2020.

2 Procurement

2.1 Procurement Categories, Lots and Projects

Figure 1 identifies the three procurement categories and approaches to procurement that were used. These three main approaches were generated following the outcomes of an earlier soft market testing exercise which was used to inform our final procurement approach.

CATEGORY ONE Business as usual
Work delivered in-house, through internal teams or by contractors using existing framework agreements and following standard procurement procedures

CATEGORY TWO Open tender for works on Liverpool City Council land
Delivered through competitive open tender

CATEGORY THREE Open tender for Works on Third Party land and/or buildings
Delivered through competitive open tender working with land/building owners

Figure 1: Final procurement approach and main procurement categories

Figure 2 illustrates the final category groupings with their respective procurement lots and projects. This does not differ significantly to the earlier outlined proposals within Task 3.7, but there are some amendments (e.g. the pollinator planting is now being delivered through a different approach to that originally envisaged). Where these types of changes have been made the reasons for this are provided within the text for that intervention.

Initial guideline budgets (that include a 10% contingency sum) are also attached for each of the lots. These helped to inform the tender and approvals processes and serve as a guide for the scale of potential works. The ability to move funding between different NBS interventions was helpful. Most interventions were delivered close to their initial budget allocations but there was a predicted underspend on a couple of larger interventions, which helped to supplement budgets on other works.

CATEGORY ONE Business as usual	
LOTS	**PROJECTS**
Lot 1: Tree Planting	Soft ground tree planting including container planted trees
Lot 2: Works	Highways improvements
	General Civils
Lot 3: Pollinator Roof	Royal Court Theatre
Lot 4: Mobile Forest	Mobile Forest

CATEGORY TWO Open tender for works on Liverpool City Council land	
LOTS	**PROJECTS**
Lot 1: Tree Planting	Trees in hard Landscapes (+ Biochar)
	Containers for trees
Lot 2 : Water	SuDs ponds
Lot 3: Bio-App	iNaturalist
Lot 4: Art	Art project
Lot 5: Pollinator Planting	Pollinators Demo A
	Smart Pillars Demo A
	Pollinators Demo C
Lot 6: Works	Signage

CATEGORY THREE Open tender for Works on Third Party land and/or buildings	
LOTS	**PROJECTS**
Lot 1:Water	Raingarden (now in Lot 3)
	Floating Islands
Lot 2: Green Walls	St Johns
	Parr Street
Lot 3:Baltic Quarter	Baltic Squares, Raingarden, Green Fences

Figure 2: Intended procurement categories under key themes

The procurement approach and delivery etc. for each of the projects is discussed in Section 3.

2.2 Procurement Processes

Business as Usual

All works that used the 'Business as Usual' approach followed city council standing orders, seeking both the necessary quotes and manager or report approvals to proceed and to place orders directly as required. This procurement approach covered routine works, often carried out by other city council services such as Highways or Liverpool Streetscene Services (LSSL). Works delivery was generally overseen by council officers and project staff.

Where procurement was led by the Mersey Forest Team, works were carried out or overseen by the Community Forest Trust. The financial and procurement processes for the Community Forest Trust are governed by the Trust's Procurement Policy. This is based on local authority procurement policies and as such mirrors those of Liverpool City Council.

Open Tenders

For approaches that used an open tender, both Liverpool City Council and Community Forest Trust's partners invitation to tender (ITT) procedure were followed and all advertised works were promoted to prospective bidders who were required to register and submit via the procurement portals, Due North and/or The Chest.

The invitation to Tender document requires the following as a minimum:

- A specification that describes the Council's requirements in sufficient detail to enable the submission of competitive offers.
- A requirement for bidders to declare that the tender content, price or any other figure or particulars concerning the tender have not been disclosed by the bidder to any other party (except where such a disclosure is made in confidence for a necessary purpose).
- A requirement for bidders to fully complete all tender documents including a form of tender and certificates relating to canvassing and non-collusion.
- Notification that tenders are submitted to the Council on the basis that they are compiled at the bidder's expense.
- A description of the Award Procedure and, unless defined in a prior advertisement, a definition of the Award Criteria in objective terms and if possible in descending order of importance.
- That the Council uses an e-Procurement system for undertaking all tendering exercises and only submissions received through the e-Procurement system will be considered and evaluated.
- Paper copies, CDs and other electronic formats will not be accepted.

For the URBAN GreenUP project this was supplemented with:

- A description of the wider general URBAN GreenUP project;
- A description of the required intervention, its planned location and sometimes a cost threshold or cost guideline;
- Pre- construction information and risk assessments where relevant;
- A range of relevant additional and supporting material that included maps, utilities surveys, soil analysis, species lists etc;
- A deadline for submission responses.

The application forms on the portal comprised of:

- Questions and declarations on the organisation and their finances, insurances and competence. The response for this needed to be satisfactory to allow applicants to progress to the wider project questions.
- A number of set questions about the contractors' experience and intended approach for the project. Questions were customised to each project.
- Requests for a cost breakdown for the advertised works.

Guidance on how the applications were scored and assessed was also provided.

On receipt of contractor submissions, they were first assessed by procurement officers and assessed on a number of financial elements including their financial stability and insurance thresholds. Those that satisfied this initial assessment were then scored by procurement officers for cost and value.

A small panel of relevant officers then individually and separately scored each submission for its responses, content and quality, using a standard scoring sheet to standardise the evaluations. These were returned to the procurement officer who reviewed the officer scores and if necessary set up a moderation meeting to allow for subsequent discussion and moderation of scoring. Based on the overall scoring and the percentage weighting of the scores between cost and quality a preferred contractor was identified and appointed. Further detail is contained within Task 3.7, 'Implementation plan review and tender publication.'

Most tendered works were carried out using a JCT contract for minor works, which was supervised by appointed consultants.

Exemption to Procurement

- For some interventions an exemption to procurement was requested. This only occurred:
    - Where the goods, works or services were required urgently, where this urgency had been brought about by events that were unforeseeable by and not attributable to the Council or Community Forest Trust;
    - Where the goods, works or services were of a specialist nature such that competitive prices could not be obtained;

- To develop a pilot service, where it could be demonstrated that there was no market, or where the market was not sufficiently developed;
- To engage an artistic performer, to appear at an event or function of a sporting, cultural, civic or business nature of which the Council was the owner; and
- Arrangements involving sponsorship.

All exemption requests required approvals of both senior operational and procurement managers within Liverpool City Council before these orders could be placed.

Although the lots and projects within the same category all followed similar routes to market and delivery, the detail for each individual procurement lot or project differed depending on issues involved. For example, some projects required utility surveys, planning permissions and safety assessments, whereas others did not. As such there is not a single route to procurement that covers all procurement lots or projects within each approach as the approvals and research needs for each intervention will differ. Figure 3 provides a simplified generic outline of the procurement processes.

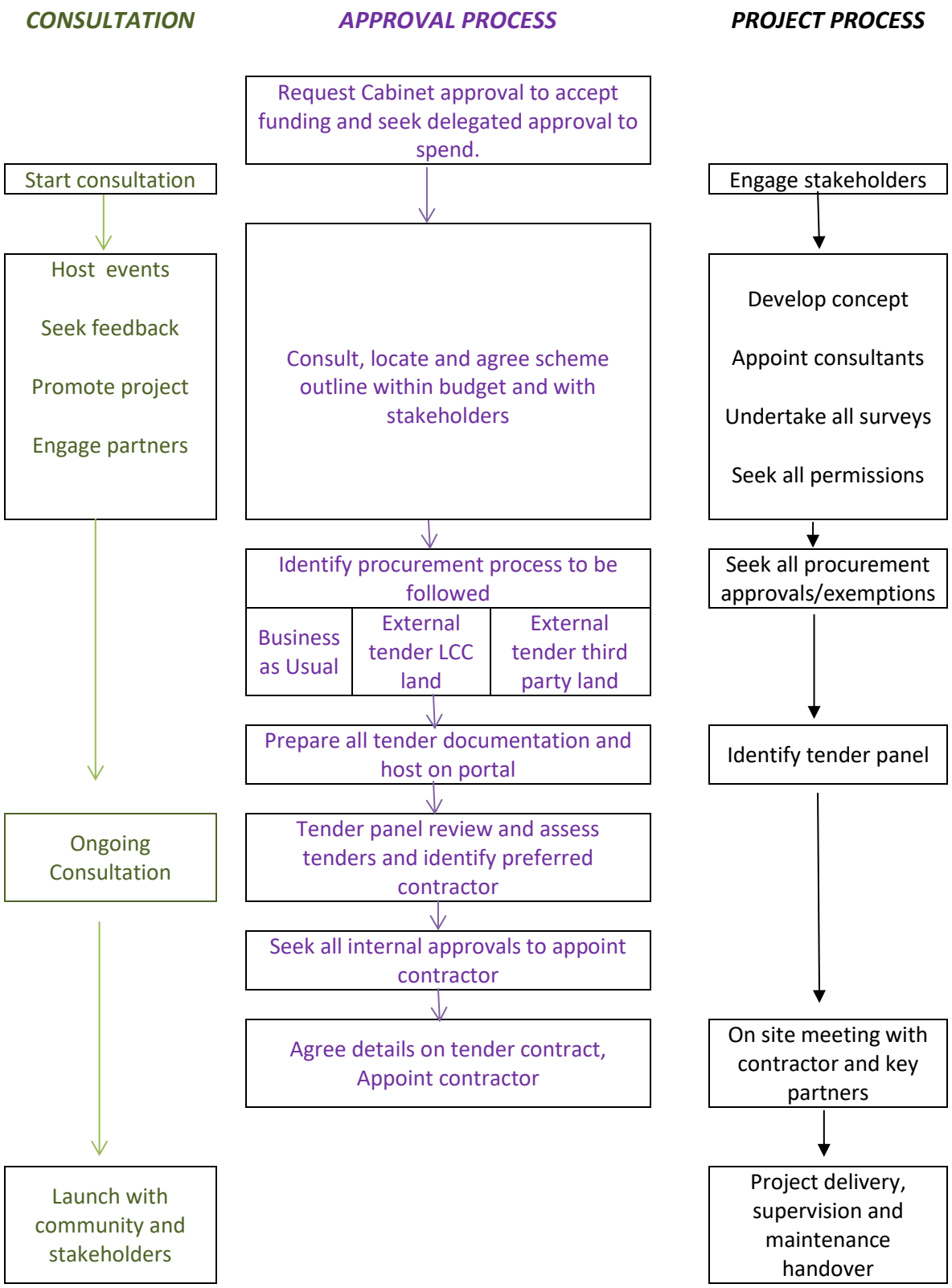


Figure 3: Simplified Flowchart Showing Procurement Processes

Factors Affecting Procurement and Delivery

Procuring a range of NBS in a relatively short time was a new and challenging experience for the city council, especially as many of the planned interventions were also new to the city. This meant that the learning associated with the procurement and implementation of some of the schemes would extend beyond the UGUP project team into city council supporting services such as procurement, legal and finance as well as into other services such as highways, drainage, parks, culture, planning, regeneration, building control etc. In addition, some of the proposed NBS procurement and delivery plans also provided varying degrees of challenge to external partners including, landowners and key stakeholders.

Attempting anything new on this scale and in the time provided was inevitably going to highlight our inexperience in some areas and test our patience in others. The process did however provide a steep and valuable learning curve for council staff across different departments. Opportunities were taken to work across departments; reviewing processes and approvals where necessary and hopefully laying the ground for smoother delivery of follow on projects in the future.

It would be unrealistic to pretend that procurement and delivery went well first time for all projects and in the spirit of sharing some lessons learnt and highlighting some of the key issues affecting procurement and project delivery a number of factors that contributed to delays are listed below. These have been grouped under the generic headings of Approvals, Operational Issues and Covid-19. These are described more fully below and those particularly affecting delivery of specific projects are referenced within the relevant project section.

2.2.1 Approvals

Having the right approvals for a project are key to its successful delivery. The types of approval required can include formal approvals such as legal agreements, city council approvals, tender acceptances, legal contracts and formal permissions in addition to partner approvals and agreements.

Agreement of legal contracts

The capacity for legal support in LCC was limited and it took months to get agreement for additional external support on some issues. Key delays were encountered in the following:

- Appointing an external legal company to draft an agreement template for works on third party land and buildings.
- Agreement to the terms and conditions for monitoring equipment, which took up to 10 months due to issues with intellectual property and data ownership
- Staff changes in partner organisations changed or delayed legal agreements.

Landowner/Developer agreement

Landowner and/or developer agreement was an important factor on sites in third party ownership as they were taking on and committing to the long-term maintenance costs associated with the NBS and leading the way on NBS for other businesses in the city. We worked with a range of landowners from large corporate businesses such as at St Johns Shopping Centre, with Registered Housing Providers, with the Canal and River Trust for the water spaces, with a college and church as well as with several owners of smaller businesses. On some sites the agreements were slowed by factors including:

- Reaching an agreed shared vision for the site that met the project requirements and satisfied the landowner.
- On site issues affecting initial agreed designs, which forced redesign and further delay.
- Lack of existing site plans and construction information, resulting in the need for additional site surveys and testing.
- Unavailability of land owner or their staff for decisions.
- Business changes on issues such as land ownership, affecting the site of the planned NBS.

Approvals for permissions

Some schemes required approvals for planning permission, building regulations or financial spend.

- Planning permission was required in a conservation area which took several weeks.
- Stakeholder permissions were frequently required for works involving utilities or access to land etc.
- Building control regulations needed to be reviewed for the green wall projects following the report of the Grenfell Tower fire. Amended recommendations saw the inclusion of green walls classified as a form of external cladding and needing specific fire calculations to demonstrate their fire safety.
- Various city council internal approvals were required relating to pre-procurement business case, exemptions for procurement, delegated approvals to accept tenders, issue of purchase order numbers etc.
- Part way through the procurement process, in response to Liverpool City Council austerity, additional approvals to spend were introduced that required 3 separate senior officer approvals - lengthening the time to secure all the necessary approvals.
- Changes in political approvals also slowed delivery of schemes (a major early scheme was replaced by another.)
- Additional consultation was required when residents objected to proposals.
- Issues on securing traffic management approval to fix sensors in situ delayed their instalment (including 8 weeks delay over the Christmas holiday periods and low prioritisation of this work).

2.2.2 Operational issues

Opportunities were taken to integrate the proposed NBS into major city centre schemes to raise the profile of the URBAN GreenUP project, achieve a bigger final impact and to pilot this type of cross sectoral working with other city council departments. Key issues arising from this included factors associated with the location of schemes, emergency city centre works and the need to undertake utility surveys for all sites.

City centre schemes

The benefits of delivering high profile works in the city centre were sometimes compromised by external factors. The key issues encountered included:

- The unexpected and emergency safety need to demolish a major city centre arterial road and flyover into the city centre, which resulted in several months delay to the start of works on all other city centre schemes.
- A changing city development landscape that saw some ear-marked sites come forward for earlier development than originally envisaged (temporarily affecting the green corridor route during the project).
- Building contractors in the city, (not for the project) going into administration and delaying the completion of adjacent works (temporarily affecting the green corridor route)
- Launch of initiatives such as strategic development frameworks, which were positive in the longer term, but during their development opportunities to use complementary or match funding from developer agreements such as section 106 were halted. This was to avoid spending until an approved framework for spending was in place.
- Emerging opportunities to link UGUP works with existing contracts and procurement as schemes developed meant readjusting timescales for delivery to accommodate the additional benefits.

Statutory/Utility surveys

Information already exists on utility and stats (Statutory Undertakers Records) provision under pavements and roads etc. However, often the data is incomplete or out of date and cannot be relied upon. As a result, preliminary surveys did not always reveal issues on site at the point of delivery which created delivery delays.

- Stat and utility information available was not always comparable to commissioned surveys and it was not uncommon to discover additional underground pipes and cables that were not mapped and this often forced some level of re design.
- Commissioning surveys took additional time.

- One company accidentally missed off a site survey and it took weeks to raise another order and get them to go back and complete it, which in turn delayed progress.
- Some onsite works discovered unlisted underground services which prevented or altered delivery of planned schemes.

City Council capacity

Issues arose around the ability to prioritise delivery with city council staff and align this with other existing work and commitments. Areas where city council staff capacity became an issue were:

- Insufficient availability of specialised officer support specifically for work on trees, legal services and traffic management. Annual leave, sick leave (direct and indirect) sometimes added to the burden on other supporting staff and slowed progress.
- General UGUP staff capacity was at times an issue and the officer was often having to deal with managing the project at all levels as well as submitting deliverables, completing claims, reporting to senior managers or committees or engaging or responding to key stakeholders and local residents. Simultaneous deadlines or report deadlines close to delivery times were sometimes a challenge.
- Some supporting city council staff such as procurement were sometimes asked to prioritise other work.

Third party organisations

The project relied on engaging third party organisations for some elements of work such as surveys etc. and on some occasions, they were recipients of planned NBS works. Delays to delivery arose through the following:

- Many external partners, suppliers etc. took longer than anticipated to respond to requests. Many required chasing and prompting – some several times over several months.
- Following competitive tender one unsuccessful company challenged the appointed company, forcing a review, further provision of technical data and specialist expertise, delaying appointment and subsequent delivery by several weeks.
- Covid restrictions placed some key third party organisations on furlough for much of the year, delaying project delivery.

New emerging best practice

Delays to works were also a result of changes to best practice.

- Many of the NBS were new to the city and there was sometimes no established procedure for approval.

- Other NBS such as the green walls were delayed by new emerging guidelines following the Grenfell fire when green walls became recognised as building cladding. This resulted in the need for specialist fire regulation calculations and an application to Building Control.

Sustainability

The city council procurement policy promotes sustainability through embedding and assessing contracts on their social value. The URBAN GreenUP project by its very nature is keen to promote a sustainable solution to some of the climate change issues affecting the city. In this regard a number of sustainable options have been included into the installation of various schemes e.g.

- Irrigation of green walls is in part supplemented, at one scheme, from water run-off from the roof.
- Remote control of green wall irrigation systems allows adjustments without site visits in addition to providing a fire safety measure that allows the system operator to flood the wall in the event of a fire to protect the building
- The floating islands are constructed largely from recycled plastics and coconut coir
- The containers for the container trees have been sourced locally and are to be constructed of recycled materials
- Pollinator planting designs are reusing discarded granite setts from highways works to create paths that will allow an immersive experience through the planting
- Crushed materials from the removal of the city centre flyover is also to be used to create pollinator habitat substrates.

However, no matter how much it may be desired, not all elements of the planned installations can currently be made or easily sourced with completely sustainable materials. There is currently a trade off in that the city is trialling new and innovative solutions with NBS and the schemes installed need to be successful and well received. To achieve that, it is necessary to play a little safe and install something that has largely already been tried and tested elsewhere or is unlikely to fail due to the incorporation of new untested materials. Once the schemes have proven to be successful and have been adopted and championed by the city it is then possible to increase the specification and begin to request the exploration and use of alternative and more sustainable (though maybe unproven) materials in successive introductions.

If the city were to fully champion the use of untried materials with new technology and it failed, the project would be judged a failure, the city would face reputational damage, the good work to date would be undone and the introduction and replication of any future NBS could be set back years.

The UGUP project has sought to encompass and promote sustainability within its work wherever it can do so. As schemes are replicated across the city and we become more confident, further sustainability and lower carbon elements can be incorporated.

Maintenance

Maintenance of environmental schemes is an ongoing issue for many local authorities and is often viewed separately to the installation of schemes and frequently viewed as a financial burden. Whilst environmental schemes do need to have long term funded maintenance provision the same is also true of many other grey infrastructure schemes.

For many of the tree planting schemes the longer term maintenance will be incorporated into the city maintenance programme, but to help address the decreasing revenue budgets of local authorities, longer term maintenance of schemes has been considered wherever possible and contractors have been expressly requested to provide short and longer term costed plans for scheme maintenance.

The city council is also looking at the business case behind new schemes e.g.

- the maintenance of the water retention ponds should cost less than the remediation works from flooding events;
- the pollinator planting proposed should reduce traditional costs; and
- remote watering of the green wall will reduce irrigation efforts.

In addition, opportunities are being taken to directly involve operation staff, with on-site training to support continuing professional development and develop new skills.

Work will also continue as soon as it is safe to do so to engage with communities to encourage them to become actively involved in the maintenance of the new NBS close to their homes or work locations.

A real effort was also made during the selection of sites to place NBS onto third party land and to passport on the longer term maintenance to third parties with legal agreements where necessary (e.g. green walls, green roof, PopUp Forest, floating ecosystems, some pollinator sites, some tree planting locations etc). This approach helps to both relieve the city council of longer term financial maintenance burdens, and encourages the adoption and understanding of NBS by key city stakeholders and businesses who can help to lead the way.

Finally, for some interventions there are opportunities for 'adoption' and ongoing business sponsorship to help maintain these NBS into the future.

2.2.3 Covid-19 Pandemic

The timing of the Coronavirus and the subsequent spring/summer and later autumn lockdown affected project delivery and continues to do so. The issues encountered have been mainly operational in nature but have been separated out as the situation was unexpected and remains ongoing. As such it is difficult to put a clear timescale on some of the delays or to know at this stage what may need to change to ensure that some projects can still be delivered safely in the future.

- All new works were halted in the run up to lockdown as it became uncertain if staff would be in work to progress works/accept deliveries etc. This affected delivery of a number of projects e.g. trees in the depot could not be planted because machinery to support this could not be mobilised, orders for materials could not be placed as it was unclear if companies would be

continuing or permitted to continue to trade and tender awards for work were also temporarily halted. At the beginning of the pandemic many staff in non-essential roles were also seconded to food banks and other community assistance duties and as such there was no guarantee that LCC support staff would be available to help deliver works.

- Some works already on site were left semi completed as contractors closed down operational work. This was the case for the Parr Street green wall, which was a week into installation. Contractors on site were forced to secure the works and return home and it was several weeks later in June before they were able to return and complete works. Similarly, the floating islands were due to be installed the last week of March and were days away from being launched when the first UK lockdown was instigated. It took several weeks until June before they could be put into place and social distancing was still required.

- All co-creation activities with communities were suspended which affected delivery of a number of initiatives. Project launch dates and environmental seasons for planting etc. were missed. When lockdown was lifted over the summer the UK was placed into different levels or tiers of restrictions and in addition to the need to socially distance and wear a mask meetings were not permitted indoors and restricted to no more than 6 people outdoors. This had a knock on effect in attracting community engagement. Many residents (especially older or vulnerable residents) were fearful of leaving their home and although green space became increasingly important and valuable, people had other priorities and with many concerned about health or their income or having to educate their children at home etc. there was understandably less interest in active engagement. A digital Baltic Stakeholder Forum was trialled in the summer and email invitations sent to gateway organisations such as community groups, business groups, colleges, faith groups, local residents, ward members etc. but many organisations had placed staff on furlough or people were on annual leave and attendance was poor. A follow up newsletter to the group attracted no responses. However, there were some opportunities and a link was established with one local community event on the Baltic Green to promote URBAN GreenUP. Following the summer lockdown there was a small period of time when local restrictions were relaxed. During this time it was hard to progress issues as many people took the opportunity of annual leave to visit friends and family and there was a back log of work occupying most organisations following the earlier period of shut down. In autumn escalating Covid cases pushed Liverpool into the UK's top tier of restrictions and the country later implemented a further month long lockdown. It became apparent that projects now needed to be re-imagined so they could proceed differently and safely once people returned to work. As such efforts have been made to reschedule some events into spring 2021 (community planting) and there is now a more comprehensive and intensive programme of community engagement work planned for the bioapp in 2021 with fall-back options that can accommodate any future restrictions in relation to another Covid spike in infections.

- The pick back-up and lead-in times to re-start some planned works has also increased. Contractors were struggling to access materials and had fallen behind on delivery of jobs during the lockdown. This has resulted in delays to delivery of schemes as well as having a knock on effect on pricing etc. Some contractors were unwilling to honour pre covid agreements on pricing, which forced further procurement processes and administration (resulting in delays), while others took the opportunity of lockdown to restructure or realign their business (and chose to no longer deliver some aspects of their businesses which formed part of our planned delivery). The period of contractor pick up also coincided with the summer holiday period so there was a compounded impact from completing delayed works with many staff absent or on summer leave. Staff across organisations were sometimes deployed to critical services e.g. LCC procurement staff were asked to prioritise the purchase of Personal Protective Equipment (PPE) and for several weeks no other tenders were accepted. This further delayed the appointment to the final contracts of works and then subsequent lockdowns and the city's mass testing programme additionally impacted with further delays on general procurement not directly linked to Covid.

- Wider council staff integral to the project in support services were unwell and not available to work, lengthening the time to complete tasks. Some key staff were in hospital for 5-6 weeks at the start of the pandemic and then on long phased recovery over the summer. On their return they had many weeks backlog of work with some emergency issues to prioritise. Following the first lockdown the vast majority of staff did not return to work at city council buildings which made communication difficult at times. Not everyone had a council or personal laptop or phone and the opportunity for impromptu face to face discussions and agreement was lost with officers having to rely on emails which sometimes took a while to be answered if staff were otherwise deployed. In addition access to decision makers or council support services were affected which delayed associated administration and approval processes.

Despite the barriers faced many of the schemes are well advanced, others are in planning and some have completed. A number of installations have been reprogrammed to be delivered in the next available seasonal window of opportunity e.g. delayed tree planting will complete autumn 2020/spring 2021 and pollinator work will start on the ground in March 2021. Contracts have been let, works have progressed, co-creation activities have been redesigned (e.g. art materials for a workshop were instead delivered to people's houses, plans have been made that allow smaller groups to pre-book for outdoor events so we can continue works with local restrictions in place etc). Lessons learnt will help to shape changes to city council procedures and also help inform follower cities.

3 Business as Usual Procurement and Delivery

CATEGORY ONE Business as usual	
LOTS	**PROJECTS**
Lot 1: Tree Planting	Soft ground tree planting including container planted trees
Lot 2: Works	Highways improvements
	General Civils
Lot 3: Pollinator Roof	Royal Court Theatre
Lot 4: Mobile Forest	Mobile Forest

Figure 4: Category One, Business as Usual, Lots and Projects

The in-house approach is the 'business as usual' model for every day procurement within the city, with works being delivered through internal teams/ framework agreements, competitive quotes for low value works etc. Some of the proposed works would normally as a matter of routine be undertaken by other city council departments or arms-length companies such as the Liverpool Street Scene Services and this did not change. Works carried out under this approach included: Tree Planting, Highways and General Works.

3.1 Soft Ground Tree Planting including Container Planted Trees

The in-house tree planting programme comprised of trees planted in soft ground and trees planted in containers.

3.1.1 Procurement

LCC trees and accessories (such as ties, mulch and stakes etc.) were all procured via the city council's arboricultural officer on a 'business as usual' approach. They were purchased and delivered to the city council depot along with additional trees for other city projects to reduce associated road miles and carbon emissions. Many of the trees had been soft-tagged by the tree officer on an earlier visit to the nursery in the year which ensured that we were able to pre-select good, strong specimens. The trees were delivered in stages so that they did not have to spend too long in the depot and we could minimise the time between delivery and planting.

3.1.2 Project Delivery on Site

a. Soft Ground.

Liverpool City Council's arm's length company, Liverpool Streetscene Services (LSSL) routinely undertake soft ground tree planting between October – March and are qualified and experienced in this work. Earlier survey work had established the presence of any underground cables and utilities and where trees were close to roads or junctions, a road safety audit was commissioned to ensure planting did not obstruct lines of sight for pedestrians or visibility splays for drivers or inadvertently create hazards or risks to road users.

For LCC of the 48 trees programmed for soft tree planting, 38 were successfully planted before the country was placed on lockdown. The remaining 10 trees were delayed because specialised lifting equipment was needed to lift them for planting and a contractor was required to prepare the site for four of these trees. The lockdown prevented these final trees from being planted in time and they remained in the city council depot during the summer lockdowns where they were watered and maintained by staff. Of the 38 trees planted, two did not survive; one of these was at the Strand site in the Baltic Demo A and the other in the Otterspool orchard in Demo C. The demise of these trees was largely due to a lack of watering in lockdown during what proved to be the hottest and driest UK spring on record. The dying trees also attracted some antisocial behaviour and they were removed as soon as possible. No further losses have been reported. Replacement trees have been obtained and will be replanted during December 2020.

Plans are also now in place to plant the remaining 10 trees held in the depot before the end of 2020. Six of the remaining trees will go into existing soft ground. The remaining four trees are destined for a site that currently has a crushed aggregate topping and a contractor has now been appointed to remove this material to facilitate planting these trees.

All soft ground tree planting will be complete by the end of 2020.

b. Container Planting

LCC has identified thirteen trees for container planting; nine in amongst tight urban streets and four on a trafficked highway.

The container tree species have been ordered but due to the current lockdown have been retained in the nursery. The tender for these works has had a difficult journey to date. Originally it was planned that the on-site delivery of the 9 smaller container trees would be split between LSSL staff who will fix the containers and then plant the trees whilst the installation of the four larger containers on the highway would be the subject of a competitive tender within a mix of other URBAN GreenUP landscape works. Initially the tender was delayed due to technical issues with other components within it and then it was delayed due to Covid as procurement staff were tasked with prioritising the procurement of PPE. Following periods of furlough and leave the tender went out over the summer 2020. Despite securing confirmations from contractors that they had the capacity and ability to submit, only one tender was received and it was incomplete. Following further discussions and calls it

was agreed to fragment the lots within the tender and re-advertise. At this point the city was placed into the highest tier of Covid restrictions and a mass testing programme was introduced for the city and all other procurement was again suspended. As the city enters tier 2 restrictions in early December 2020 the parcel of lots forming this tender will once again be re advertised. Of 11 potentially interested contractors, 10 have expressed a desire to view and tender for these works. At present we anticipate appointing early in the New Year 2021 with an April 2021 completion date on site for all advertised works (subject to final agreements with the appointed contractor).

3.1.3 Factors Impacting on Procurement and Delivery.

A number of issues affected project delivery and the key ones are listed below in table 1.

Table 1: Factors impacting on works and delivery for soft ground tree planting.

Factor	Detail
APPROVALS	Approvals required from LCC Parks and third-party landowners.
OPERATIONAL	Capacity restrictions as only one LCC tree officer available and required to work across all tree planting programmes. Capacity restrictions as only one LCC project officer working across strategic and operational issues. Need for utility surveys and trial digs in some locations Traffic safety audit required to ensure safe sight lines for pedestrian and drivers.
COVID-19	Halted ability to progress some works. Uncertainty to order/commence works going forward. Halt on LCC procurement processes during periods of lockdown and city mass Covid testing when resources were re-diverted Despite confirmed contractor interest there were no suitable tender submissions on the first attempt. Following planting there was reduced irrigation during lockdown and 2 trees died and were later removed.

3.1.4 Supervision

Tree planting works have been and will continue to be supervised by trained and experienced staff.

For LCC soft ground and container tree planting supervision will be via LSSL officers and checked by either staff from Parks and Green Spaces, the Tree Officer and/or UGUP staff. For LCC trees planted in hard ground the appointed contractor or sub-contractor will oversee on site planting.

3.1.5 Establishment and Maintenance

For LCC the ongoing maintenance of tree planting in soft ground and containers will be accommodated within the city council annual maintenance programme.

3.1.6 Images

Soft Ground Tree Planting

Figure 5: Planting adjacent to the Strand

Figure 6: Planting at properties of Registered Housing Providers (Demo A)

Figure 7: Orchard Planting at Otterspool (Demo C)

3.1.7 Progress to date

Soft Tree planting on green corridor routes

10	20	30	40	50	60	70	80	90	100

Most soft tree planting has completed or is programmed to compete this season.

Container Tree Planting

10	20	30	40	50	60	70	80	90	100

These works will complete spring 2021.

3.2 Highways and Civils Works

The Highways works comprised of a project for dropped kerbs for accessibility, minor road resurfacing and improved crossing points and another separate project for civils works which included works to the outflow grill and a manhole at Sefton Park Lake and Otterspool as part of the water retention pond scheme. Signage for the various NBS installations was also to be procured from this budget, but the intention is to do this competitively once the installations are in place.

3.2.1 Procurement

LCC Highways officers worked with the URBAN GreenUP officer to undertake an assessment for the dropped kerbs and highway improvements and the URBAN GreenUP officer then requested that these works be costed and delivered through LCC Highways Service, following a business as usual approach. Highways staff incorporated these works into a larger highways improvement programme to provide value for money and reduce the impact of ad hoc highways works on traffic and pedestrians. A framework provider was appointed by Highways Services and the Urban Green UP Officer worked with the Highways Inspector to agree a pro rata payment based on the requested works as part of the project.

LCC Asset Management Services worked with the URBAN Green UP officer to oversee and let the contract for the works needed to modify the outflow grill at Sefton Park Lake and to undertake the civil works required to a manhole at Otterspool park as part of the water retention ponds scheme. In line with city council procurement processes several attempts were made to seek three competitive quotes without success. The civils works were therefore procured via a procurement exemption to the contractor that had submitted a quote. The costs of the works were low and below Euro 6,000.

3.2.2 Project Delivery on site

The highways improvement works were due to commence week commencing 9th March 2020 but were delayed as the Covid-19 virus began to impact on the city. A site visit was made by the URBAN GreenUP officer on 16th March 2020 and only limited evidence of work was visible. The Highways officer involved with delivering this project left the city council in late September 2020 and a colleague has now picked up these works. As these works did not form part of any major city scheme they were not progressed during the city lockdowns but a new delivery date has been approved and the works should be complete by the end of the year 2020.

The manhole work was completed by the appointed contractor in March 2020. The works to the lake outflow grill requires Environment Agency approval for the design to be sure they comply with the reservoir legislation and public safety governing this site. Discussions on a final design stalled with lockdown but in recent weeks there has been a socially distanced site visit with all interested partners and a final grill design has been agreed. The next steps will be to draw down some of the lake water to

ascertain how best to remove the existing grill and fit the replacement. This work should complete early in the New Year 2021.

3.2.3 Factors Impacting on Procurement and Delivery.

A number of issues affected project delivery and the key ones are listed below in table 2.

Table 2: Factors affecting procurement and delivery of highways and civils works

Factor	Detail
APPROVALS	Various approval/permissions from LCC Parks, LCC tree Officer, LCC Drainage and Environment Agency
OPERATIONAL	Capacity issues with one Highways Inspector co-ordinating these works with others in the city delayed prior delivery Highways staff changes directly associated with the scheme
COVID-19	Halted ability to progress some works. Staff across organisations were sometimes deployed to critical services or could not be easily contacted once working remotely.

3.2.4 Supervision

The highways improvements works will be supervised by LCC Highways Inspectors to ensure the materials and final finish meet the council requirements and adopted standards for highways.

Works to the manhole and outflow grill will be supervised by staff from Asset Management together with Staff from the Parks and Greenspace Team who will be guided by the Environment Agency and Reservoir Inspector guidance.

3.2.5 Maintenance and Establishment

Future ongoing maintenance of the highways improvements will be accommodated by the Highways Service and form part of the Highways maintenance programme. Ongoing inspection and maintenance of the outflow grill at Sefton Park Lake will form part of the city council's regular parks maintenance programme in the parks and be annually inspected by the Environment Agency under governing reservoir legislation.

3.2.6 Images

None currently available.

3.2.7 Progress to Date

Highways improvement works

10	20	30	40	50	60	70	80	90	100

Work is waiting to complete.

Civils work for schemes

10	20	30	40	50	60	70	80	90	100

Work is waiting to complete.

3.3 Pollinator Roof

Within the demo areas there were no council owned buildings where it was possible to install a traditional green roof and this was the same for suitable roof spaces in private ownership within the demo areas. There was also some concern about investing into a green roof that might be invisible to most of the public and possibly only privately accessible.

An opportunity arose, close to the site of one of the planned green walls, to consider installing a pollinator roof on an outdoor terraced area at a theatre. Whilst this would not include creating a soft ground or grassed area underfoot the space was elevated and could comfortably accommodate a range of container planters for biodiversity, colour and pollinators amongst the terrace seating. This area was visible from the nearby shopping centre steps, overlooked the bus depot and was publicly accessible to people visiting the theatre. The area was further enhanced by the build of a bespoke bug hotel which featured on the UK Channel 4 television programme 'Find it, Fix it, Flog it'; thereby promoting the roof and the benefits of such spaces to a wider audience.

3.3.1 Procurement

Due to the relatively low costs and with in-house expertise, the pollinator planting was procured in accordance with business as usual policies. Three potential designs were drawn up and discussions held with the Theatre and other officers regarding effectiveness to attract pollinators, structural integrity of the roof and future maintenance requirements.

The bug hotel was created as part of the TV programme from a discarded theatre prop. There was no cost to Urban GreenUP other than in supervision time.

3.3.2 Project delivery on site

Pollinator planting works were carried out under by staff and volunteers working under the supervision of an experience Landscape Architect.

The bug hotel was installed as part of the filming for the TV programme 'Find it, Fix it and Flog it' whereby a presenter upcycles materials into a new use. On this occasion, an old prop from the theatre was upcycled to form a quirky bug hotel for the theatre terrace. The programme was transmitted on the afternoon of 20 December 2019 on national TV.

3.3.3 **Factors** Impacting on Procurement and Delivery**.**

A number of issues affected project delivery and the key ones are listed below in Table 3.

Table 3: Factors affecting procurement and delivery of pollinator roof planting

Factor	**Detail**
APPROVALS	Approvals needed from building owner to ensure load bearing capacity of the roof and safety given public access.
OPERATIONAL	Ensuring that the trees, planters and bug hotel was securely attached given its roof garden setting and access to the public.
COVID-19	This phase was completed prior to Covid.

3.3.4 Supervision

Pollinator planting was supervised by an experienced Landscape Architect.

The installation of the bug hotel was overseen by Royal Court Theatre staff with the TV programme crew. Urban GreenUP Monitoring Officer Dr Stella Shackel was involved in the advising on the design of the bug hotel.

3.3.5 Establishment and Maintenance

Ongoing maintenance of the pollinator planting is being undertaken by Royal Court Theatre maintenance staff as well as volunteer gardeners.

The bug hotel is being maintained by the maintenance staff. This will be inspected and monitored by the Urban GreenUP Monitoring Officer as part of the biodiversity monitoring programme.

3.3.6 Images

Left to Right:

Figure 8: Pollinator Roof before planting; Pollinator Roof after planting– viewed from the adjacent shopping centre steps; Bughouse now installed on the pollinator roof

3.3.7 Progress to date

10	20	30	40	50	60	70	80	90	100

All works have completed.

3.4 Mobile Gardens

The initial ideas around containerised mobile trees that would form part of the day-to-day landscape of a pedestrianised square in the city centre and for specific activities and events could be moved to create more open space, has developed into a mobile forest that will provide an exciting opportunity to showcase the benefits of NBS in a variety of locations in the city.

On 23 May 2018 a "PopUP Forest" appeared in Williamson Square, Liverpool. The Urban GreenUP team took over the urban city centre square with up to 15 large canopied trees in containers (14-16cms *Betula jaquemontii)* and transformed the space for a day. A thermal imaging camera was used to visually demonstrate the cooling effect provided by the tree canopy. We used this as part of our consultation to raise awareness about both the current project and the value of nature-based solutions in urban environments. It was a key part of #EU Green Week and raised the profile of Urban GreenUP in the city.

In April 2019 the concept of the PopUP Forest moved on to a new design with an emphasis on the mental wellbeing as a result of Nature Based Solutions in the city centre. It took inspiration from the ideas from Japanese medicine about the benefits of forest bathing this pod created the sense of being in a forest, in a city. Mirrored walls reflected the trees to create the "in the forest" effect, birdsong and the smell of bark added to the sensory experience. This was opened by the England Tree Champion Sir William Worsley in June 2019. Since then the Forest has 'popped up' again in September at the Royal Court Theatre and there were a number of requests for the coming months, and plans to roll it out with Liverpool John Moores University.

3.4.1 Procurement

The procurement of a new PopUP Forest suitable for a city centre location that would be secure to remain overnight involved consideration of a number of factors. The structure needed to be of a reasonable size, with the option to have a lockable door also needed to be robust, vandal resistant and able to be safely secured to the pavement.

The PopUP Forest was designed by Liverpool based BCA Landscape and constructed by Royal Court Theatre set-building team who were based in the square and part of the Urban GreenUP project. The bespoke design was secured in line with normal procurement procedure with a quotation which included developing a concept and visualisations; develop a prototype with drawings, construction drawings and attendance during the build.

3.4.2 Project Delivery on site

The combination of the design and horticultural skills from BCA Landscape with the specialised theatre set-construction knowledge of the Royal Court Theatre team created a unique experience within the

heart of the city. The practical issues concerning health and safety, access and resisting any unwanted visitors overnight were overcome through design, risk assessments and close supervision. Costs were kept to a minimum by renting the trees from a local nursery for the duration as care and maintenance of the trees was essential given the unusually hot weather.

3.4.3 Factors impacting on works and delivery

A number of issues affected project delivery and the key ones are listed below in table 4.

Table 4: Factors affecting procurement and delivery of the Mobile PopUP Forest

Factor	Detail
APPROVALS	Permission needs to be obtained each time we want to use the Forest from the Business Improvement District from a public risk management perspective.
OPERATIONAL ISSUES	There were no operational issues other than ensuring that the trees were watered during spells of unseasonable hot weather.
COVID-19	A programme of future events and opportunities for the Forest has had to be put on hold due to the current lockdown.

3.4.4 Supervision

The PopUP Forest was very popular so there had to be close supervision through out to ensure sufficient time inside whilst managing a queue. Overnight a security guard was employed to ensure no damage to the PopUP forest. This worked well.

3.4.5 Maintenance

The PopUP Forest is dismantled and stored in the city. Checks are made on its structure when it is assembled. Opportunities exist to change the external messaging as required. However, In the light of the ongoing Covid issues and lack of future opportunities to engage communities with the PopUP Forest a permanent home for the PopUP Forest has now been agreed at a Forest School in the city where it will be enjoyed by many young people and continue to provide an educational resource.

3.4.6 Images

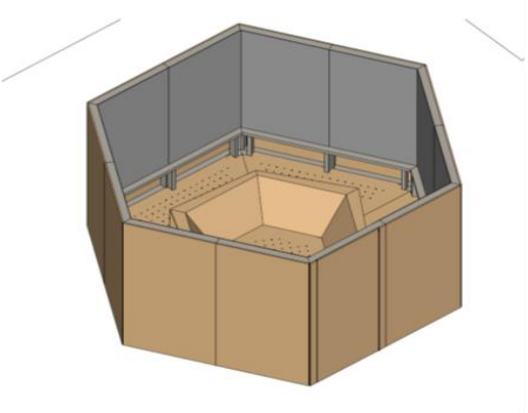


Figure 9: Structure of PopUP Forest **Figure 12: Outside view of PopUP Forest**

Figure 10: Inside the PopUP Forest

3.4.7 Progress to date

Delivery of Mobile Forest

10	20	30	40	50	60	70	80	90	100

The project is complete. The PopUP Forest will now relocate to a city Forest school location where it will be enjoyed by many young people and continue to provide an educational resource.

4 Open Tender for Works on LCC land

CATEGORY TWO Open tender for works on Liverpool City Council land	
LOTS	**PROJECTS**
Lot 1: Tree Planting	Trees in hard Landscapes + Biochar
	Containers for trees
Lot 2 : Water	SuDs ponds
Lot 3: Bio-App	iNaturalist
Lot 4: Art	Art project
Lot 5: Pollinator Planting	Pollinators Demo A
	Smart Pillars Demo A
	Pollinators Demo C
Lot 6: Works	Signage

Figure 11: Category two, Open tender for works on Liverpool City land, Lots and Projects

A number of specialised works were identified for this procurement approach early in the programme including some tree planting, the water retention ponds, the Bio-App, and Art project. These were then joined by the pollinator planting which was originally intended to be let as a single contract in-house. However, subsequent investigation showed that we did not have sufficient in-house expertise to deliver the pollinator work ourselves and there were a number of options to enhance the outputs achievable. As such the pollinator contract was split into 3 different tenders for maximum benefit which are explained further in section 4.4.5. As work progressed it was also agreed that the NBS signage for all the interventions would be best provided through a single procurement tender process.

4.1 Tree planting in hard landscapes and Biochar

Tree planting in hard landscapes was identified early as an area where external expertise would be required. Two locations were originally identified: Tree SuDs on the Strand in Demo B and retrofitting trees in the Baltic on Colquitt Street in Demo A.

4.1.1 Procurement

Strand Scheme- Demo B

In total there are 29 SuD trees being delivered into hard landscaping on the Strand city centre connectivity scheme. A possibility also exists to include a further 23 SuD trees in addition to two shade and two cooling trees as part of the wider landscaping at this location.

The Mersey Forest and city council URBAN GreenUP officers worked with LCC Highways project staff to influence the Highways competitive open tender for the city connectivity works planned on the Strand. Following appointment of the successful contractor Highway Services colleagues then let an advanced contract for the first SuDs element of work. Through the main Highways contract specifications the trees were introduced into a 'Silva Cell' that is capable of holding up to 9m^3 of soil. Adaptations were also incorporated to permit future URBAN GreenUP monitoring of the trees performance so that data could be collected for the project KPIs.

Similar procurement processes will be undertaken by LCC Highways Services to appoint contractors for subsequent phases of tree planting at this site.

The URBAN GreenUP project made a relatively small financial contribution of under €350,000 to the €21m budget for this large city centre scheme which includes the planting of up to 150 trees and the installation of cycle and pedestrian routes. The URBAN GreenUP funding contributed to the specialised tree planting and SuD monitoring system and the city council paid for the significant associated civils costs. This was a cost-effective solution for the URBAN GreenUP project, allowing us to implement a key NBS scheme in a strategic city centre location at a fraction of the overall costs with the opportunity to work with colleagues from other service areas and raise the profile of NBS.

Due to the size and extent of this project the trees for this scheme were procured via a quotation exercise - the species selected having been discussed and agreed with the tree officer and main scheme contractor in advance.

Baltic Location on Colquitt Street - Demo A

The trees to be planted in hard landscaping in the Baltic Demo area were (after detailed survey) reduced to four possible tree locations in a section of Colquitt Street. However, the site location for trees was not good as there was a building overhang which reduced natural light and restricted planting locations. A review of underground utilities revealed that the main city British Telecommunications (BT) hub lay very close to the planned tree pits. The costs to relocate the IT hub far exceeded the project funding and works were likely to take up to 2 years. Options were considered to work with BT to jointly tackle this issue and take the IT network through the tree pit structure. However, at this point the country went into the first of the Covid lockdowns and discussions were halted. It was not possible to get contractors to lift the pavement flags and assess the detail of the cabling and the quote from BT to do this was excessive and without any guarantee of progress or success. As such, rather than waste money on planting trees in an unsuitable location, further discussions were held with Highways staff and an opportunity was taken to procure a run of 8 street trees in the pavement as part of the Strand scheme. This had the benefit of providing twice as many trees as was originally planned under this aspect of works, reducing the allocated costs and incorporating this planting into a high city profile scheme. In addition, the new run of 8 street trees would be within 100m of the main SuD trees and the shade and cooling trees; thereby complementing

other works and enhancing the promotion and awareness of a number of different schemes within close proximity which makes for improved educational opportunities in the future.

The procurement approach for these Strand related works were via a city council Highways open tender to which URBAN GreenUP made a financial contribution under a Business as Usual agreement.

4.1.2 Project Delivery on site

Strand Scheme - Demo B

The first 14 SuD trees (a run of 8 trees and a second run of 6 trees) were successfully installed in February 2020. Supervision of the tree installation and associated civils has been overseen by the contractors and sub- contractors in addition to city council staff from Highways, URBAN GreenUP and the tree officer. The second phase of the works, involving a further 15 SuD trees, as well as the two shade and two cooling trees was out to tender at the point of lockdown. Of these works the 2 shade and 2 cooling trees are in place. However, utilities issues have prevented the planting of 10 SuD trees planned at Bath Street. Trial hole investigations found United Utilities Sludge Main, Scottish Power 132kV and 2 additional communications ducts to lie within the extents of the proposed tree installation. Diversion of these services was considered non-viable and alternative locations are being explored for these 10 SuD trees. However, six SuD trees were planted opposite the Liver Building in the central reserve and a further 7 are planned for the cycle track segregation island opposite the Liver Building although it is expected that due to main electricity cables there will need to be some onsite adjustment or potential reduction in numbers.

Subsequent planting of a further 23 SuD trees (subject to funding) is being discussed for early 2021 or in successive scheme phases.

Additional plans to retrofit 4 trees into Colquitt Street were abandoned due to technical and utility issues as detailed in the section below. Instead the opportunity was taken to introduce a run of 8 street trees in hard landscaping outside Georges Dock Building. These trees species selected was Ulmos Lobel. The trees will be planted into a silva cell that is 56 m long with a plan area of 112m^2 and a soil volume of 42m^3 topsoil and 42m^3 subsoil. An impermeable membrane will be installed on the vertical walls and base and the tree cell installation will include underdrain infrastructure.

Baltic Location on Colquitt Street – Demo A

The detail on tree planting at this location was under discussion with Highways contractors and sub-contractors employed under an existing city council Highways framework agreement. However, as outlined above early investigations highlighted a number of practical issues and constraints which could not be overcome and the scheme was abandoned in favour or the option to plant more trees in a higher profile scheme at a reduced cost.

Use of Biochar in Tree Pits

Early plans for some of the tree pit planting in hard landscapes included the introduction of various biochar mixes in the soil. In preparation for this a soil scientist was commissioned to look at the cost-benefit of this and to review existing scientific literature, both in the UK https://www.biochar.ac.uk and the United States https://biochar-us.org. The resulting report raised a number of issues that included:

Biochar is not one material but a wide group of porous carbonaceous solids produced by the pyrolysis (burning with limited oxygen supply) of organic materials. A wide range of organic materials can be used as feed stock and these include sewage sludges, wheat straw, softwood pellets, rice husk, oil seed rape straw and micanthus straw; however, the list can be extended to include almost any organic by-product. Research quality biochars are produced from dried pelletised feedstocks. The characteristics of biochar are heavily influenced by the maximum temperature reached during pyrolysis which for biochars destined for use in research will either be 550^0C or 700^oC.

Biochars produced on a commercial scale are far more variable than those produced for research. This is due to the use of less homogenous feedstocks and their more variable moisture content that leads to greater variation in temperature, which can be as low as 250^0C.

Biochar is produced in accordance with one of three standards. The International Biochar Initiative (IBI) is employed for commercial production but the range of value offered for potentially toxic elements is extremely wide. The maximum values are very considerably higher than those permitted for use in green waste compost and sewage sludges. While it may be that the high limits set reflect the lack of solubility of metals within Biochar (and hence their low potential for leaching), the standard is not appropriate for Biochars marketed for use as soil amendments and / or fertilisers in public open spaces. The European Biochar Standard (EBC premium) proposes thresholds for potentially toxic elements that are not dissimilar to those for green waste compost and sewage sludges and would appear to provide a more suitable basis on which to determine the suitability of a biochar for use as a soil amendment and / or fertiliser in public open spaces. The Biochar Quality Mandate (BQM) is the most exacting standard available, with the lowest thresholds for potentially toxic elements. This standard seems to be most suitable for the use of biochar for specialist purposes, such as the clean-up of contaminated land where the low starting concentrations of potentially toxic elements offers – presumably - the greatest scope for their absorption.

Research in Biochars dates back to the mid-2000s. Focus initially was on the role that the material could play in the de-contamination of industrial sites. The scope widened in the 2010s to consider the potential of the material to sequestrate carbon and to reduce CO2 production, as a means of climate change mitigation. Attention most recently has turned to the role of biochar as a soil amendment and its potential value in improving soil hydraulic properties and promoting plant growth.

A common misnomer is that biochars are fertilisers. This is incorrect. The fertiliser value of biochar is generally low (but dependent on the feedstock and temperature of pyrolysis) and considerably less than green waste compost and sewage sludge. A variety of materials which include seaweed, wormcasts and mycorrhizal fungi are added to biochar in proprietary products sold commercially as soil improvers and fertilisers. It is uncertain as to what extent the response of vegetation to these products is attributable to the biochar component itself or to the additives, all of which have - in their own right - individually been demonstrated to be effective in supporting plant growth.

Testimonials for proprietary products from commercial suppliers appear to be based largely on anecdotal evidence. Suppliers offer little or no guidance on how to use the products to maximum benefit.

The benefits to plant growth of using 'neat' biochar (un-amended) are not clear-cut. Experimental work has demonstrated that while soil physical properties may be improved through the addition of biochar the effects on soil chemical properties may not always be as predicted or desired. A common theme in the literature is that soil and plant response is heavily dependent on the feedstock from which the biochar is derived and the temperature of pyrolysis. Those materials that retain some residual fertiliser value produce the strongest growth responses. The results of trial work appear at face value to be far less predictable than those associated with the use of green waste compost and sewage sludge.

The particular concerns identified with using biochar as a soil amendment in planting pits were:

1. **Adverse effect on pH** – Most biochars are strongly to very strongly alkaline with a pH of 9-10. The optimum pH of soils for most species of trees used for street planting is moderately acid at 5.5-6. The addition of biochar is likely to raise soil pH.

2. **Immobilisation of zinc** – Biochar and arbuscular mycorrhizal fungi are known to bind metals, reducing their availability. This has implications for the availability of zinc to trees and has the potential to induce deficiency. This would have serious consequences for tree health as zinc plays an important role in chlorophyll production (chloroplast development), which would reduce photosynthetic rate and lead to a multitude of plant disease syndromes. This impact will be compounded by the effect of raising pH through the addition of biochar as the availability of zinc is reduced above pH 7.5

3. **Immobilisation of nitrogen** – Biochar has the potential to reduce mineralisation rates by the absorption of ammonium nitrogen and nitrate nitrogen onto biochar surfaces due to increased cation exchange capacity, as well as to immobilise nitrogen as a result of microbial degradation of labile (soluble) forms of carbon. These are most likely to have survived low temperature (@250^{o}C) pyrolysis.

The effects of biochar application on newly planted street trees will also be dependent on five factors:

1. **The feedstock from which the biochar is produced** – this will govern the nutrient value, the proportion and forms of carbon, ash content and concentration of potentially toxic elements.
2. **Temperature of pyrolysis** – this will determine the proportion and forms of carbon and concentration of potentially toxic elements.
3. **Addition of other materials** – the extent to which the characteristics of the biochar are modified by the combination (and amounts) of other materials with proven benefits are applied.
4. **Proportion of biochar** – the amount of biochar added to the topsoil and possibly subsoil used to backfill planting pits.
5. **Soil texture** – the benefits of biochar addition will be greatest in coarse textured (sandy) soils where its impact on hydraulic properties (water retention) will be greatest.

In summary, the use of biochar was considered to represent a risk to a high-profile planting scheme. The risks could be mitigated to some extent (but not entirely) by obtaining a biochar test certificate and further details of the feedstock and production process.

Other options considered included making use of a proprietary biochar based soil amendment / fertiliser instead of 'neat' 'biochar, but the results of using such a product would be difficult to interpret without an extensive range of treatments (ideally replicated and randomised), and it would be impossible to distinguish between the contribution of the biochar and the added materials.

Given that biochars greatest strength is in promoting improvement to soil hydraulic properties, its use as an amendment to subsoil could be contemplated. The burial of organic matter in soils below 500 mm would not normally be advised due to the potential for oxygen depletion and the development of anaerobic soil conditions. However, the high ratio of stable to labile carbon in biochar reduces this risk and could provide two benefits. The first would be an increase in water-holding-capacity and secondly, a means of absorption of nitrate nitrogen, ammonium nitrogen and phosphate leached from topsoil. Limiting use of Biochar to just one soil layer within soil pits would reduce the significance of any adverse effects (trees would still be able to obtain sufficient zinc from topsoils).

While biochars do have unique properties their value as a soil amendment / fertiliser is questionable. Biochars do not appear to offer a great deal of benefit 'over and above' those of PAS 100 green waste composts (PAS100:2018). Used correctly these would provide many of the same benefits as biochars to soil hydraulic properties. However, green waste composts are capable of supplying nitrogen, phosphorus and potassium in readily available and slow release forms, as well moderating pH towards neutral. Zinc and copper contained in green waste compost can also be beneficial. Green waste composts appear to be better than biochar in almost every conceivable way as a soil amendment and fertiliser.

As a result of the report it was decided that the use of biochar in a high profile city centre scheme would not be supported. Consideration is instead being given to potentially exploring the use of an accredited green waste compost as an alternative to biochar in later planting work with Mersey Forest.

4.1.3 Factors impacting on works and delivery

A number of issues affected project delivery and the key ones are listed below in table 5.

Table 5: Factors affecting procurement and delivery of tree planting in hard landscapes

Factor	Detail
AGREEMENT	Various approvals from LCC Highways, LCC Tree Officer, utility companies affected (specifically communications) and potentially various legal approvals. Traffic safety audit requested.
OPERATIONAL ISSUES	The unexpected and emergency safety need to demolish a major city centre arterial road and flyover into the city centre, resulted in several months delay to the start of planned works on the Strand scheme. Stat and utility information available was not always comparable to commissioned surveys. Presence of key city server and communications hub in the immediate vicinity caused delay and added cost and new agreements for the scheme at Colquitt Street which was declared unviable. On the Strand scheme some of the utilities could not be diverted and 10 planned SuD trees need alternative locations in later phases of the work. Investigation and scientific review raised issues that indicated that biochar would not be a suitable soil additive in a high profile city planting scheme
COVID-19	All new works were halted in the run up to lockdown as it became uncertain if staff would be in work to progress works/accept deliveries etc. – Strand and Colquitt Street Communication on additional surveys stalled as lockdown was implemented.

4.1.4 Supervision

Tree planting works have been and will continue to be supervised by Highways appointed contractors and their Landscape Architects for these projects. The city council tree officer and URBAN GreenUP officers will also usually be involved.

4.1.5 Maintenance and establishment

The ongoing maintenance of tree planting in hard landscapes will rest with the Highways contractor appointed landscape architects for a specified period of 2 -3 years as part of the initial contract and

thereafter will transfer to the city council and the trees will then form part of the city council tree maintenance programme.

4.1.6 Images

Figure 12: SuD Tree planting on the Strand

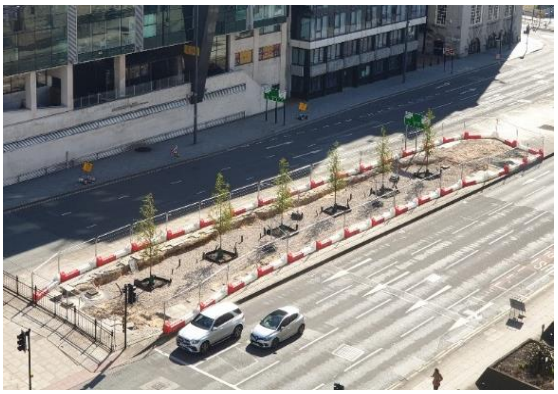
24th January 2020 Starting works

6th February 2020 Clearing material

8th February 2020 Tree pits in

10th February 2020 Trees are planted

24th February 2020 Works completing



21st April 2020 Trees in leaf

Figure 13: Advanced works on the Strand with separate runs of 8 and (as shown here) six SuD trees

4.1.7 Progress to date

Main SuD Strand Trees

10	20	30	40	50	60	70	80	90	100

The key 14 SuD trees are planted and awaiting connection.

Additional Strand Planting

10	20	30	40	50	60	70	80	90	100

Planting has completed.

Street trees (run of 8)

10	20	30	40	50	60	70	80	90	100

These works are due to be completed early in 2021.

4.2 Tree Planting in Containers

A number of trees could not be accommodated into the hard landscape as originally envisaged and a decision was made to instead use container planting and to use the opportunity to trial trees in containers within city areas with a view to harvesting the tree for subsequent follow on planting in 3-5 years and then undertaking replacement planting. In this way the containers provide a small city centre nursery area, growing on trees for later planting whilst providing a range of ongoing benefits for local citizens.

4.2.1 Procurement

The procurement of suitable sized containers involved consideration of a number of factors. The container needed to be of a reasonable size, with the option to self-irrigate to reduce maintenance needs. They also needed to be robust, vandal resistant and able to be safely secured to the pavement. The four containers on the road build-outs also required reflective patterning to meet road safety audit requirements for visibility at night.

The final supplier was secured via a procurement exemption with a lead in and manufacture time of 4-6 weeks. In addition to procurement of the containers, some civils works were required to remove the existing concrete bollards that the containers (and planted trees) would replace and the city council's operational company, Liverpool Streetscene Services Limited (LSSL) were required to co-ordinate the installation of the containers and the planting up of the trees.

13 trees were identified for container planting; 9 within tight urban streets and 4 on a larger carriageway section.

4.2.2 Project Delivery on site

The orders for the containers was halted due to the pandemic as it was not certain if the company could continue to manufacture them or if LCC staff would be available to accept delivery during lockdown.

The 9 smaller containers will be installed and planted delivered by the city council's operational company, Liverpool Streetscene Services Limited (LSSL) and the 4 carriageway containers will be fixed in place by appointed contractors and then planted by LSSL the tender for the installation of the 4 carriageway planters was halted due to the pandemic.

It is anticipated that containers and trees can be planted in the autumn – subject to lockdown restrictions being lifted.

4.2.3 Factors impacting on procurement and delivery of containers for planting

A number of issues affected project delivery and the key ones are listed below in table 6.

Table 6: Factors affecting the procurement and delivery of containers for planting

Factor	Detail
APPROVALS	LCC Highways and Parks officers Road safety audit on proposed interventions was recommended by city council Highways officers which was delayed due to the lockdown. Procurement exemption was required for containers
OPERATIONAL ISSUES	Ability to prioritise delivery with city council staff and align this with other existing work and commitments e.g. tree officer Capacity issues with UGUP officer
COVID-19	Uncertainty halted order Delays to tender advertisement arose through city lockdowns, Tier 3

	restrictions, PPE procurement prioritisation and mass testing programmes Despite prior contractor confirmation of interest the first tender did not attract a full tender submission for consideration

4.2.4 Supervision

Supervision of the nine urban containers will be undertaken by LSSL staff and city council staff including the tree officer and the UGUP officer.

Supervision of the installation of the four carriageway containers will be undertaken by the appointed contractor.

4.2.5 Maintenance and establishment

The trees will be maintained by the city council and will form part of the ongoing tree maintenance programme. It is hoped that local businesses and community groups close to the container trees will assist with their ongoing maintenance. The 9 smaller containers are all situated close to a neighbourhood church that has a keen gardening group and it is hoped that they make take on some of the day to day maintenance of these trees.

4.2.6 Images

Figure 14: Example container with self-irrigation system and selected colour for the 9 urban containers

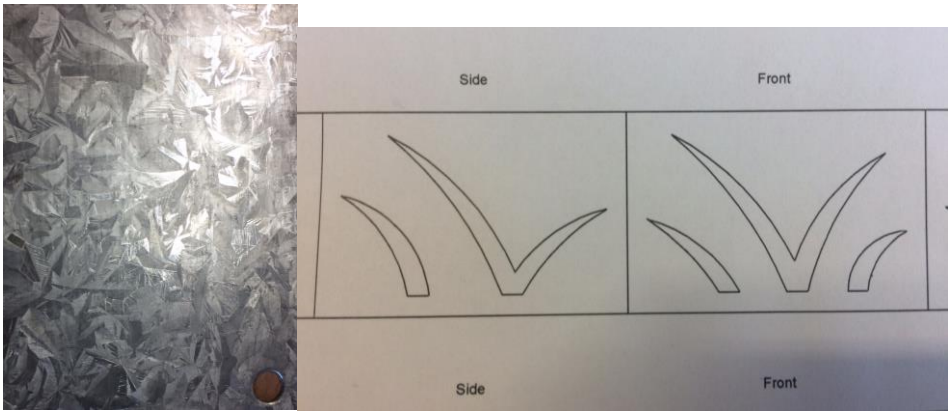


Figure 15: Examples of materials and cut our design for the main containers

4.2.7 Progress to date

Containers

10	**20**	**30**	**40**	**50**	**60**	**70**	**80**	**90**	**100**

Works will complete spring 2021.

4.3 Water Retention Ponds, Otterspool

Localised flooding is a persistent problem near Otterspool Park, often resulting in standing water that makes the park's Jericho Lane entrance and footways inaccessible. The water retention ponds were identified as a natural solution to deviate and store excess surface water flooding, improving accessibility to the park and create additional habitat and biodiversity.

4.3.1 Procurement

The contract for the work on the water retention ponds at Otterspool was commissioned in late 2019. The works were not particularly complicated and to ensure a reasonable price was achieved via the tender process a 60% weighting was given to quality and a 40% weighting assigned to cost. In addition, a decision was made not to include a guideline value for these landscaping works and to therefore hopefully avoid contractors pitching their costs at or just below the maximum guideline value.

Despite advertising the works as an open tender on the city council procurement portal only one company submitted a tender, with others declining as they did not have the expertise to deliver all the different elements of the work in-house, were too busy to tender for the works or could not meet the specified delivery deadline.

Works on site involved the creation of two linked water retention ponds, peripheral aquatic planting, reinstatement of a pathway and viewing area in addition to some culvert works to both open up a wet scrape area in the woodland and reduce standing water from localised surface water flooding at the entrance to the park. Due to the technical and multi-disciplinary nature of the intended works the final tender documentation and assessment process was supported by the project consultants appointed from the city council framework agreement.

The final tendered cost for this element of work was significantly under our original budget.

4.3.2 Project Delivery on site

Wet weather prevented significant on site works until February 2020. Works completed slowly over the summer lockdown as socially distanced working on site was achievable. Accessing materials during the pandemic attributed to some delays in delivery and the opportunity to engage local groups in some of the peripheral pond and wildflower planting was lost with most of this being delivered by the contractor during a period of lockdown to ensure that the planting went in at the right time of year. On site project delivery was co-ordinated and overseen by consultants appointed from the city council framework agreement. Two bird boxes and two bat boxes were added to the scheme, to enhance the habitat on site and to directly address recommendations in the initial ecological surveys.

4.3.3 Factors impacting on procurement and delivery of the water retention ponds

A number of issues affected project delivery and the key ones are listed below in Table 7.

Table 7: Factors affecting procurement and delivery of the water retention ponds

Factor	Detail
AGREEMENT	Agreements were required from LCC Drainage, Lead Flood Authority, LCC Parks and Tree officer and approvals from adjacent rail network landowners.
OPERATIONAL ISSUES	Ecological, tree and newt surveys were season specific and affected final design. Topographical surveys were required. Not all manholes could be easily located and ownership of some was not clear. Stat and utility information was not available for parts of the site. Following completion of the ponds a collapsed culvert on adjacent land has created some additional issues which are now being resolved through city drainage officers.
COVID-19	Delivery on site was slowed and temporarily halted Accessing materials during lockdown was sometimes difficult. Aspects involving community engagement were not able to progress.

4.3.4 Supervision

The project has been supervised by an externally appointed contractor from the city council's framework agreement. This is the same contractor who helped to design the scheme so is also best placed to oversee the implementation on site. The scheme is complex in some of its technical and environmental requirements. It requires the expertise, experience and time that a professional external contract can bring. The supervision contractor reports regularly to the URBAN GreenUP and relevant city council staff.

4.3.5 Maintenance and establishment

The ongoing establishment of the water ponds and their planted areas will be the initial responsibility of the appointed contractor to help ensure that works delivered are well maintained and fit for

purpose. Thereafter the ongoing maintenance will pass to the city council operation staff in LSSL and be incorporated into the parks' maintenance programme. As the site was previously prone to regular flooding and associated costs with reinstatement works it is anticipated that the costs of pond maintenance going forward can be accommodated within park budgets and provide an overall year on year saving.

4.3.6 Images

Main Pond Works in Progress

Figure 16: Onsite works at Otterspool water retention ponds. Laying the liner for the main pond.

Figure 17: Main pond in place awaiting planting

Figure 18: Main pond completed with viewing platform and peripheral wildflower planting

Figure 19: Top retention pond during clearance works

Figure 20: Top retention pond created with newly sown wildflower seeding on banks

4.3.7 Progress to date

Delivery of Otterspool water retention ponds

10	20	30	40	50	60	70	80	90	100

The scheme has completed

4.4 Bio-App iNaturalist

The original intention of the Bio-App was to produce a locally based 'bio-app' to encourage biodiversity monitoring. However, the budget was insufficient to do justice to this and a number of very good apps already existed. Following discussion with partners and the funding body it was agreed that this allocation would be better by promoting the use of an existing and internationally recognised existing BioApp called iNaturalist and engaging local citizens in biological recording in the areas of intervention. Liverpool has previously competed in the 'City Challenge' using iNaturalist to document and record city biodiversity and in 2019 came second for UK observations and 2nd in the world for UK verifiable observations per observer. The city region also has 3 of the top 10 world observers so is well placed to further promote the use of this international BioApp. Opportunity also existed to generate some replicable outputs from this approach, including a webinar with other front runner cities, who are using different apps.

4.4.1 Procurement

Procurement to deliver the new programme of work now focussed on letting a contract with specialists to promote the use of the existing iNaturalist app and to build a series of community engagement events around the sites of the intended NBS interventions. Fortunately, the experts required for this were already located in Merseyside and comprised of the Lancashire Wildlife Trust (charity) and the Merseyside BioBank Records Centre (non-profit organisation) who together have the ability and are uniquely placed to raise awareness and host events associated with promoting biodiversity via iNaturalist. In addition, they are able to interrogate the recording database to identify species locations and can do this as the project progresses as well as historically; thereby helping us to understand the biodiversity impact associated with the introduction of the new NBS.

Procurement was therefore via an exemption request due to the specialised nature of this project. The value of the contract let was that originally allocated to this intervention.

4.4.2 Project Delivery on site

Project delivery on site was deliberately scheduled to start in March 2020 to correspond to the timing at which some of the interventions were delivered on site. Lancashire Wildlife Trust and the Merseyside Bio Bank had planned a series of events and "bio blitzs" to engage local groups. In the event of the Covid-19 lockdown this work was suspended and discussions commenced on how we could re-imagine some of this work. As a start, information was posted on twitter etc. to encourage people stuck at home to download the iNaturalist app and record what they could find in their own gardens and local green spaces. Throughout the summer and Covid restrictions the Lancashire Wildlife Trust staff were furloughed and unable to engage with us on the programme. In addition during this time there were staffing changes at the Lancashire Wildlife Trust and we have worked with officers to create a revised engagement programme for 2021 that has built in fall back options and pre bookable, socially distanced events.

Additional aspects to the procurement and delivery for these works has included: procurement exemptions (for a specialist service) and some reimagining of the project delivery.

A recording website has been set up. https://www.inaturalist.org/projects/urban-greenup-baltic-triangle

4.4.3 Factors impacting on procurement and delivery of the Bio App.

A number of issues affected project delivery and the key ones are listed below in table 8.

Table 8: Factors affecting the procurement and delivery of the Bio App

Factor	Detail
APPROVALS	A procurement exemption was required
COVID-19	Staff from delivery body were on furlough throughout summer Covid restrictions which halted ability to progress the community engagement aspect that is fundamental to the envisaged works. Staff restructures within delivery body delayed programme revision

4.4.4 Supervision

The delivery of the BioApp project will be overseen by the URBAN GreenUP officer with support from LCC Parks staff and the URBAN GreenUP monitoring officer. An imaginative and exciting revised timetable of works has now been developed.

4.4.5 Maintenance and establishment

Future use of iNaturalist will be supported through annual city challenge events which will build on community engagement to date. It is anticipated that data produced from the project may be used to help inform future environmental NBS within the city. Opportunities also exist to partner the iNaturalist work with the URBAN GreenUP pollinator contracts and Baltic arts project and for these three parallel projects to link together for maximum impact. iNaturalist is an existing and well used app and it is hoped that promotion of the app through the project will ensure a legacy of users who will continue to add and upload biological recordings that form part of the official city recording.

4.4.6 Images

Please see website link https://www.inaturalist.org/projects/urban-greenup-baltic-triangle

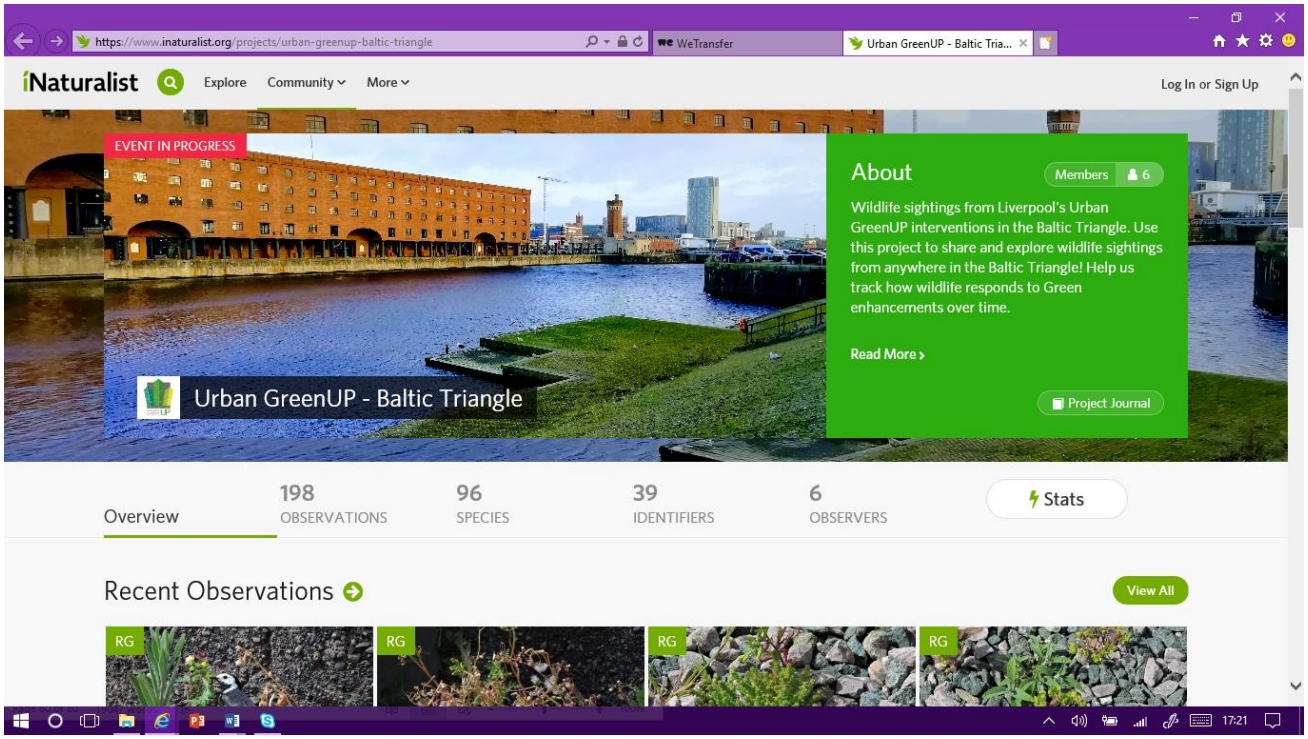


Figure 21: iNaturalist website for URBAN GreenUP

4.4.7 Progress to date

iNaturalist

10	20	30	40	50	60	70	80	90	100

Work has started, a new programme has been developed and is waiting to progress.

4.5 Art Project

It was agreed early in the project that the art project should start once the NBS interventions began to be put in place. This was so we could engage interested local residents and groups close to the interventions and use the new NBS as a source of inspiration for the art project. A number of options and approaches were considered and LCC urban design and culture officers were engaged at the beginning.

4.5.1 Procurement

Working with LCC officers in urban design and culture an initial approach was made to a Liverpool arts collective (COOL) to ask for expressions of interest to get involved and help deliver the URBAN GreenUP arts project. Three local organisations came together to express an interest. These included the Open Eye Gallery (well established photography gallery) dotart.com (who represent local artists) and First Take (a local video and media recoding organisation). Together they helped to develop the outline of a proposal which provided an opportunity for some interesting art workshops which directly engaged the community, linked to wider project promotion and provided value for money.

The three organisations were appointed via a procurement exemption due to the specialised nature of this project and will, under the leadership of dotart.com, oversee the commissioning of an artist to produce a single or multiple art works that interpret the ethos of the URBAN GreenUP project. An open tender resulted in 35 applications and 5 shortlisted artists who were interviewed remotely in May 2020 and the preferred artist, Something and Sons, has now been appointed.

4.5.2 Project Delivery on site

Project delivery on site was scheduled to start in March/April 2020 as some of the NBS interventions went on site. Community art workshops were planned initially to help engage people and generate community art from workshops for the linked web pages being developed in addition to generating ideas for more permanent physical art. Due to the current lockdown all community events were put on hold. Where possible a different approach was taken to engage residents and art materials for the planned workshops were instead delivered directly to people isolating at home. A couple of small, outdoor walks were photographed and a short video made asking people about their green space. Further videos will be made for each of the planned habitat sculptures and work is underway seeking locations, approvals and finalising designs. It is hoped that the habitat art sculpture trail can be launched in May 2021 to coincide with Liverpool's Light Night celebrations and thereby attract significant interest.

A spin off pilot project that sought to tell the history of the city and its resilience through its trees was piloted with dot art and the city council, with support from Mersey Forest. Six local people selected trees that held a story for them and there has been a wider call to ask more people to submit stories of trees that tell the history of the city and showcase the resilience of the people and the city.

4.5.3 Factors impacting on procurement and delivery for the art project.

A number of issues affected project delivery and the key ones are listed below in table 9.

Table 9: Factors affecting the procurement and delivery of the art project

Factor	Detail
APPROVALS	A procurement exemption was required.
COVID-19	Halted ability to progress some community workshops. Interviews for artists delayed due to staff on furlough. Approvals for siting of habitat sculptures have been delayed due to lockdown and closure of some potential buildings (e.g. college and retail units).

4.5.4 Supervision

The delivery of the Arts project will be overseen by the lead arts organisation (dotart.com) in conjunction with the LCC urban design and URBAN GreenUP officer.

4.5.5 Maintenance and establishment

The digitised community art may feature on linked web pages or final NBS signage. The physical art work(s) will need to be robust and sustainable for the duration of the project and ideally for several years thereafter.

4.5.6 Images

None currently available.

4.5.7 Progress to date

Art Project

10	20	30	40	50	60	70	80	90	100

Artist appointed and project has been revisited to ensure social distancing can be applied for community engagement.

4.6 Pollinator Planting

The pollinator planting for verges and spaces was originally to be let under a Business as Usual approach but it became apparent that the city council in-house skill level and capacity was not sufficient to confidently undertake innovative planting schemes and the project would be better served by working with experts to test more novel approaches and to provide support and opportunities for additional learning with in-house officers. A variety of approaches and opportunities were embraced which resulted in the pollinator work being let as 3 separate contracts. These comprised of pollinator planting of spaces and verges in Demo A, smart pillar pollinator introduction on lamp posts within Demo A and pollinator planting of spaces and verges in Demo C.

4.6.1 Procurement

For the pollinator planting of verges and spaces in Demo A, it was agreed with LCC Parks officers that innovation and cost were equal key requirements and to reflect this there was a 50% weighting applied to both quality and cost on the tender scoring. The tender was specifically targeted at a number of local organisations and attracted two quality submissions. Guideline costs were included within the tender and this resulted in one application which significantly exceeded the guideline costs and the second which came in comfortably below.

The tender proposed a co-creation approach to engage communities at the start and work with them to influence the design and colour palette of the planting in subsequent seasons. Additionally, we requested that residents be engaged in the harvesting and re-sowing of seeds as well as in the longer term maintenance of the spaces. Opportunities to co-create pollinator homes would also be explored. The final tender documents were supported by external consultants who provided risk assessments and other supporting information and also engaged in the final tender assessment.

Works on the ground in Demo A would also be complemented by a number of smart pollinator pillars (hanging baskets that wrap around lamp posts) available only via Scotscape Ltd and a procurement exemption was sought to enable these to be ordered and installed.

The pollinator works for Demo C adjoined a major city centre connectivity scheme and an option arose to use the LCC Highways externally and competitively appointed contractors (and subcontractors) to undertake pollinator planting within both this high-profile scheme and along the rest of the identified URBAN GreenUP corridor sites. A fixed contribution sum was agreed for installation and 2 years establishment. This approach enabled us to maximise cost and efficiency benefits as part of a larger scheme, raise the profile of the works, engage some hard to reach members of the community through the main contract works and extend quality pollinator planting along a further 1 km of green corridor.

4.6.2 Project delivery on site

The planned local engagement, design and delivery for Demo A were halted due to the various city lockdowns and work was re-scoped and rescheduled to deliver from spring 2021.

Work has now developed to zone the areas for planting in Demo A into different horizontal areas along the line of the estuary. This zoning of habitats reflects what was once there before the city developed and what can also still be found further along the estuary where land has remained undeveloped. The plan is for each pollinator site to be tailored to its environment and to deliver a range of pollinator planting as well as provide shelter and other habitat requirements for the pollinators. Planting will also extend the current pollinator season in these locations. The different planting sites will be linked throughout the green corridor with the planting of pioneer pollinator species using historical seed records held in the Liverpool World Museum. Opportunities have also been taken to reuse highways granite setts from works nearby to provide simple paths through some of the planting for a more immersive experience. Designs are complete, ground preparation is underway at some sites and works are now due to commence in March 2021.

Figure 22: Example of the pollinator zoning and the proposed habitat characteristics in Demo A

Ten locations have been identified for the smart pillar pollinators and orders are ready to be placed subject to the LCC Highways Street Lighting Engineer agreeing the wind loading stress calculations. Continuation with orders was halted due to the lockdown as it was not known if the smart pillars could be fitted safely. For maximum impact and effect a run of smart pillar lamp posts are desired but with limitations on some older lamp posts it has proved hard to find sites that run through the pockets of housing or retail outlets where it will be possible to engage local residents in their longer ongoing maintenance. Delivery of this initiative will commence in the New Year 2021.

Demo C works comprised of 3 separate sections for planting. The first extended the URBAN GreenUP Demo C corridor by 1km along the central boulevard of Princes Avenue. Complementary works here added a pedestrian and cycleway as part of a wider city connectivity scheme. The URBAN GreenUP pollinator planting comprised mainly of wildflower turf and ran the length of the works. The design of the planting had engaged a number of community groups and the works were delivered on site in June 2020 during lockdown. However, due to social distancing requirements there was insufficient time in

the contract to also deliver the 2 remaining sites. The original contractor initially agreed to complete works at the same rates of pay but the submitted quote was several times greater and outside the scope of the budget. It was difficult to find a contractor that was available to deliver the planting at the 2 remaining sites and further work was required on procurement, approvals etc. At present the new contractor is in place and we are awaiting final confirmation to proceed with some of the work now and the remainder next spring 2021.

4.6.3 Factors impacting on procurement and delivery of pollinator planting.

A number of issues affected project delivery and the key ones are listed below in Table 10.

Table 10: Factors affecting the procurement and delivery of pollinator planting

Factor	Detail
APPROVALS	Procurement exemptions required for smart pillar purchase Approval needed for wind stress calculations on lamp posts (smart pillars) Approvals needed from LCC Parks, Streetscene and Highways Services. Additional procurement approvals needed to complete scheme with second contractor
OPERATIONAL	Small delays on getting soil analysis completed to inform the tender for Demo A. Delays on city centre connectivity linked schemes (Demo C) due to emergency demolition of city flyover. Larger Covid related delays on site resulted in contract over run and only one of the 3 sites being completed.
COVID-19	Halted ability to progress some works. Staff across LCC were sometimes deployed to critical services Community engagement aspect halted. It was difficult to source another contractor post lockdown who could deliver the remaining schemes at a reasonable price.

4.6.4 Supervision

The delivery of pollinator work in Demo A will be overseen by LCC parks and URBAN GreenUP staff.

The delivery of the smart pillars will be overseen by the LCC Street Lighting Engineer with LCC Parks, Streetscene and URBAN GreenUP staff.

The delivery of pollinator planting in Demo C will be overseen by the city council Highways landscape sub-contractors for this scheme with LCC Parks and URBAN GreenUP staff.

4.6.5 Establishment and Maintenance

Future ongoing establishment of the pollinator verges in Demo A will be undertaken initially by the appointed contractor and thereafter by LSSL staff with community support.

Future ongoing establishment and maintenance of the smart pillars will be undertaken initially by the providers, Scotscape Ltd and thereafter sponsorship will be sought with local businesses and community groups to maintain them in the longer run.

Establishment of pollinator works in Demo C will be undertaken initially by the appointed landscape contractor and thereafter by LSSL with some community support.

4.6.6 Images

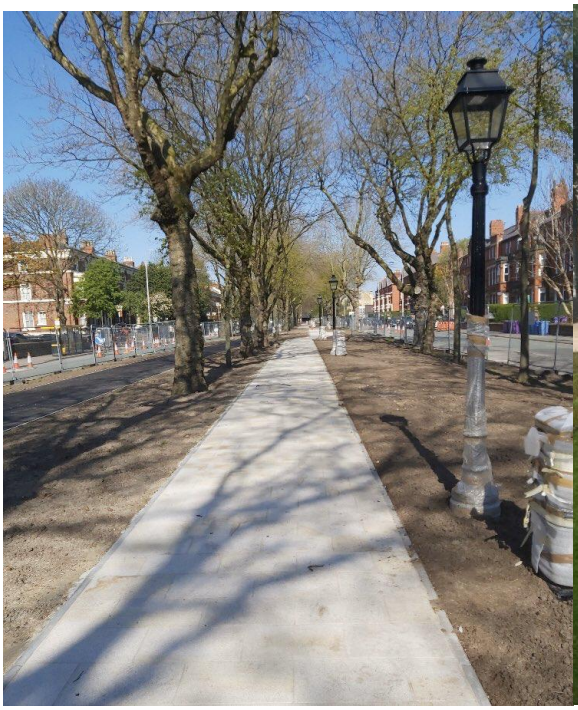


Figure 23: Princes Avenue scheme underway

Figure 23i: Pollinator turf laid June 2020

Figure 24: Smart Pillar pollinator

4.6.7 Progress to date

Pollinator Works Demo A

10	20	30	40	50	60	70	80	90	100

Work is waiting to progress.

Smart Pillars Demo A

10	20	30	40	50	60	70	80	90	100

Work is waiting to progress.

Pollinator Works Demo C

10	20	30	40	50	60	70	80	90	100

Remaining works on 2 sites are imminent

4.7 Signage Works

It was always envisaged that signage would form part of each installation budget as this is crucial in raising awareness of the various services and benefits each of the NBS installations would be providing. Following discussion, it was agreed that the signage would be best let as a single contract for key NBS installations after all the interventions were in place. This provided a cost effective approach as well as a further opportunity to promote the NBS again as the signage will additionally help launch the green routes formed by the NBS.

4.7.1 Procurement

The NBS are currently not all completed and the tender for signage will follow in a few months' time as the last NBS are installed.

4.7.2 Project delivery on site

The contract for signage provision will include installation and delivery and will be overseen by LCC Highways Officers, LCC Urban Design Officer, the URBAN GreenUP Project Officer and relevant third-party land or business owners, depending on the final siting of the signage.

4.7.3 Factors impacting on procurement and delivery of signage works

To date the key factor is the delayed completion of some NBS works.

4.7.4 Supervision

As per section 4.7.2

4.7.5 Establishment and maintenance

Signage will be robust and long lasting, requiring minimal maintenance. The maintenance of signage will be the responsibility of the landowner, most likely Liverpool city council.

4.7.6 Images

None to date

4.7.7 Progress to date

Some early consideration has been given to final design with the option to have signs that are recognisable, help to explain and signpost the green routes and can also in places potentially provide bug habitats. This element of the work will be progressed as the interventions near completion.

10	20	30	40	50	60	70	80	90	100

Work remains ongoing

5 Open Tender for Works on Third Party Land/Buildings

CATEGORY THREE Open tender for Works on Third Party land and/or buildings	
LOTS	**PROJECTS**
Lot 1:Water	Raingarden (now in Lot 3)
	Floating Islands
Lot 2: Green Walls	St Johns
	Parr Street
Lot 3:Baltic Quarter	Baltic Squares, Raingarden, Green Fences

Figure 25: Category Three, open tender for works on third party land and/or buildings Lots and Projects.

A number of specialised works were identified for this procurement approach early in the programme including the water interventions and the green walls and pollinator roof tenders.

These projects contained the most 'unknowns' and were considered to pose the highest risk to delivery and work therefore commenced early in the hope we could accommodate any additional unanticipated approvals or design issues.

The process for these interventions was via the appropriate local government procurement portals: 'Due North'. The advertised works were promoted to prospective bidders who were required to register and submit via the portal. Works were carried out using a JCT contract for minor works, which was supervised by appointed consultants.

5.1 Rain Garden

Originally the project envisaged installing two rain gardens in close proximity to each other within Demo A. The first raingarden was on Upper Pitt Street, running parallel to the road in an area of wide pavement. The second was between Madison and Tradewind Squares in East Village in the Baltic area of the city and was to be complemented by vertical green infrastructure that included tree planting, green fences and trellis green walls.

5.1.1 Procurement

Surveys initially indicated that both rain garden schemes could progress, but following more intrusive surveys at the second site, it became clear there were restrictive technical issues on the site of the second raingarden which could not be overcome. The key issue was that the second site lay above an underground car park which extended underground further than originally thought. As such the depth

of land above the car park was insufficient to create the 'fall' needed for the second rain garden and there were additional concerns about structural loading on an area above a void.

As such only one rain garden was able to proceed and the option for the second with hard drainage pavement was lost. However, the associated vertical greening planned at the second site was still viable and could be delivered.

The original idea was to tender both rain gardens and associated works together for cost efficiencies but the additional surveys, delays and several redesigns for the second raingarden and associated works had, by this point, delayed the intended tender process for the first rain garden by almost a year.

To speed up the procurement process and gain cost efficiencies in planned works, the first rain garden and the associated complementary green infrastructure planned at the site of what was to have been the second rain garden would now be added to the last remaining LCC works tender and form a component of the Baltic Quarter project, which is detailed in section 5.4.

The information below in sections 5.1.2 – 5.1.7 details the aspects associated directly with the first raingarden.

5.1.2 Project delivery on site

Delivery of the first raingarden at Upper Pitt Street is now being progressed to tender with other landscaping works in the Baltic Quarter lot, (see Section 5.4). Progress on this tender has been additionally delayed to date as procurement staff were tasked with the sourcing of PPE during the pandemic and all other non-essential works were placed on hold. Despite contracting various contractors to confirm their interest the first tender only attracted one incomplete submission. Due to the increase in project value the tender additionally requires the approval of a LCC pre-procurement business case.

Project delivery will be undertaken by the appointed contractor following tender.

5.1.3 Factors impacting on procurement and delivery of raingardens.

A number of issues have affected project delivery to date and the key ones are listed in table 11 below.

Table 11: Factors affecting the procurement and delivery of raingardens

Factor	Detail
APPROVALS	Approvals needed from third party land owners – five re-designs required for raingarden that was unable to proceed to tender LCC Parks, Streetscene and Highways Services consultations plus fire service for accessibility. New value of combined tender with other works required a pre procurement business case.
OPERATIONAL	No plans or construction details available for parts of Baltic Quarter site. Works undertaken to lift surface flags to make physical investigations A large void under the Baltic Quarter site (underground car park) extended further than thought preventing direct planting and adding weight limitations to subsequent designs Surveys required for water drainage which forced several redesigns Despite prior confirmation of interest there was no complete submission for the first tender and the subsequent re tender was delayed
COVID-19	Halted ability to progress final procurement to tender, with periods of time where procurement staff were unable to progress this due to other city priorities such as the procurement of PPE and the mass city testing programme. Staff across LCC were sometimes deployed to critical services

5.1.4 Supervision

The supervision of the rain garden contract is detailed in Section 5.5.4 as this now forms part of the Baltic Quarter tender.

5.1.5 Establishment and Maintenance

Future ongoing establishment of the rain garden will initially be by the appointed contractor to be identified in the Baltic Quarter tender award and thereafter by Liverpool city council.

5.1.6 Images

Only concept images exist for the tender, which is waiting to be placed on the city council procurement portal. It is envisaged that the rain garden will consist of several interconnected 'blocks' of planting along the pavement/carriageway edge.

Figure 26: Concept image of raingarden for Upper Pitt Street

5.1.7 Progress to date

Raingarden

10	20	30	40	50	60	70	80	90	100

The tender has been re advertised and a New Year start date is envisaged.

5.2 Floating Islands

The initial concept for the floating islands was to have 1 -3 islands in Wapping Dock and to assess their impact on awareness and biodiversity.

The final concept evolved to a single 63m^2 floating island with trees in the salt waters of Wapping Dock and an additional 25m^2 floating vegetated island in the freshwater environment at Sefton Park Lake. The smaller, additional island at Sefton Park provided an opportunity to test the ability of this NBS to

help reduce the likelihood of toxic algal blooms which are a regular occurrence at this site and necessitate the closing of the Lake in most summers.

5.2.1 Procurement

An external competitive tender was let for these works and the design specification was developed in conjunction with the Canal and River Trust as land or water owners of the dock and with LCC Parks Officers for the freshwater island due to be installed in Sefton Park Lake. Technical expertise and experience in this new NBS was a key requirement of the tender, as was the opportunity to deliver something innovative. As such the tender weightings for the project were set at 70% quality and 30% cost. A guideline value for works was included to ensure that we could afford the proposals that were submitted. Although there was interest from a number of companies, some were unable to propose anything within the available budget and others were busy or not interested. In the end there was only one submission, which came in at about 10% higher than the guideline tender value. The company appointed are experienced in the UK and in Europe and America and the submission addressed the requirements of the project as well as providing the ability to test some innovative features in the island design which fitted well with the ethos of the project.

5.2.2 Project delivery on site

The islands were both completed and due to be launched week commencing 23rd March 2020 but delivery and launch was delayed due to the pandemic. Opportunities to engage local residents were also restricted but some members from the Friends Sefton Park Group helped for a few hours at the dock planting and on the morning of the lake planting there were a few project partners who were able to attend and assist with the launch. Both islands were launched in June 2020 and were well received with good media coverage despite the pandemic. The smaller island in the park has been 'adopted' by the Friends group who are monitoring the biodiversity and often tweet about the various animals that it attracts. The larger island in the dock had some pre-planned successional planting scheduled in September 2020 which provided an opportunity to access the island and add more saltwater tolerant species. During this visit some underwater filming showed how quickly a vibrant underwater community had established with a range of sponges, seaweed, small fish and jellyfish

https://www.biomatrixwater.com/news/underwater-life-thrives-below-our-floating-salt-water-ecosystem/

5.2.3 Factors impacting on procurement and delivery of floating islands

A number of issues affected project delivery and the key ones are listed below in Table 12.

Table 12: Factors affecting the procurement and delivery of floating islands

Factor	Detail
APPROVALS	Approvals needed from CRT, Harbour Master and LCC urban design officer re heritage aspect and LCC Parks Community consultation highlighted a resident who did not support the scheme Post lockdown, CRT staff changes instigated a need for a new licence agreement.
COVID-19	Community engagement in planting and launching was not possible, but compensated by smaller groups of people involved with the project Supplier unable to travel to deliver islands and delayed launch Media coverage good but limited due to pandemic.

5.2.4 Supervision

The delivery of floating gardens are a new challenge to the city and at one site forms a complex project on third party waters. The project will therefore be supervised by an externally appointed contractor from the city council's framework agreement. This is the same consultant who helped to design and take scheme to tender so they are well placed to oversee the implementation on site. The scheme is complex in some of its technical and environmental requirements. It requires the expertise, experience and time that a professional external contract can bring. The supervision contractor reports regularly to the URBAN GreenUP and relevant city council staff.

5.2.5 Establishment and Maintenance

Future ongoing establishment of the floating islands will initially be by the appointed contractor for a 2-year period. The smaller freshwater island will pass into the ongoing parks maintenance programme and be supported the Park's Friends Group. It is anticipated that the larger floating island at the Dock can be supported in the longer term by either, the Canal and River Trust or sponsored by a local business.

5.2.6 Images

Figure 27: Island components awaiting delivery

Figure 28: Wapping Dock ecosystem island in situ

Figure 29: Sefton Park Lake planting

Figure 30: Ecosystem in situ, November 2020

5.2.7 Progress to date

Floating Islands

10	20	30	40	50	60	70	80	90	100

Work has completed.

5.3 Green Walls

Two sites were identified for green walls. These lay in Demo A and Demo B. The Demo A site comprised of an area of 132m^2 and was adjacent to a highway and pavement in a small road just off the town centre. The Demo B site covered an area over 60m long and covered over 200m^2 and was positioned at elevation overlooking the bus station and adjacent to the pollinator roof.

5.3.1 Procurement

Procurement of the green wall at Demo A was led by the LCC URBAN GreenUP Officer and that at Demo B was led by officers from the CFT.

Both green walls were competitively procured separately from a number of submissions. The final walls selected were of different designs and supplied by different contractors. Landowner agreement was key to the final design and legal contracts were put in place to clarify future responsibilities and risk.

Green Wall – Demo A

The green wall tender was advertised with a 70% quality weighting and a 30% cost weighting together with a guideline cost value to ensure we received submissions that were affordable. The emphasis was placed on quality to ensure we received designs that were deliverable and sustainable. The green wall would be large and very visible and failure would reflect badly on future installations of NBS into the city.

An open day site visit was held for interested contractors and a number of submissions were received which outlined different approaches and varying options on green wall coverage. This was the first tender assessment of the project for LCC and as some of the submissions were complicated and some of the tender panel inexperienced assessments initially varied and the LCC Procurement Officer hosted a moderation meeting to get consensus and identify a preferred contractor.

Responses to the tender were in parts disappointing and many contractors failed to answer questions or complete submitted paperwork, even though many were well experienced and had delivered significant works globally. In part this was probably due to Local Authority procurement processes which were complex and unfamiliar to contractors and we subsequently simplified, numbered and reduced questions on other tenders.

The submitted costs ranged enormously, with one at 100% more than the maximum guideline value. All were more than expected and whilst the preferred contractor came in at just under the maximum guideline value the knock on effect was that there was far less funding left to deliver any additional vertical green infrastructure or green fences as had been originally envisaged. It was decided that the green wall was a significant element to the NBS programme and that we should proceed. Having the ability to move funding between interventions was valuable at this point and it was decided that emerging underspend on other interventions within the wider project be allocated to help bolster funding for additional trellis green walls and green fences. The green wall at Demo A is comprised of natural soil modules but we were unable to incorporate any rain water harvesting as the roof was fragile and unsuitable and of insufficient size to irrigate the intended wall.

Following initial appointment of the preferred contractor (ANS Global) the city council received a challenge from an unsuccessful contractor alleging that the selected green wall system would fail to meet existing fire regulations. Additional supporting information was requested from the preferred contractor. At this point the early findings from the Grenfell Tower Fire were also made public and green walls became classified as exterior cladding and subject to more stringent fire calculations. Specialist fire calculations for the green wall system were then undertaken by an independent and experienced third party and LCC Building control approval was additionally sought to

ensure that the intended wall complied with newly emerging best practice. This, together with planning permission (as the wall was in a conservation area) delayed the final award of the contract and start of works by several weeks. In line with city council procurement procedures, unsuccessful contractors were notified and provided with scoring and feedback on their submissions.

Green Wall – Demo B

A JCLI contract was let to design, build, establish and then maintain a 213m^2 green pollinator wall for a period of five years at St Johns Shopping Centre, Liverpool.

This was tendered on The Chest as an open tender. The closing date was originally 24th May 2019 and later extended to 31st May due to the site visit being held, and five tenders were received.

As with Liverpool City Council, the green wall tender was advertised with a 70% quality weighting and a 30% cost weighting. The emphasis was placed on quality to ensure we received designs that were deliverable and sustainable as the green wall at St Johns Shopping Centre would be large and very visible, and failure would reflect badly on future installations of NBS into the city.

The tenders were evaluated by three independent assessors as was suggested as the best technological solution by Singular Green, the green wall specialists in the Urban GreenUP project partnership.

The winning bid by Biotecture scored the highest, and the Contract was awarded by Cheshire West & Chester Council to Biotecture on 17th June 2019 for £174,270. The contract award notice was published on Contracts Finder. As this was a works contract, a basic message went out on the Chest to say to the other tenderers that they were unsuccessful.

5.3.2 Project delivery on site

Project delivery for the Demo A Green wall at Parr Street was initially slowed due to the procurement factors listed in 5.4.1. Works on site commenced in mid-March with a 3 week delivery timescale. However, as the UK approached lockdown it became clear that they would not complete in time. Contractors stayed on site for a few extra days to complete the exterior batoning and install the irrigation and pump systems before travelling home. The plants remained at the nursery and the contractors returned in June 2020 to complete the works on site. The Parr Street wall has attracted a lot of favourable comment and the video footage was used to help launch the environment section of the new city plan as well as images being used for the city region; a clear sign of how the city has embraced and views the green wall.

The green wall at Demo B at St Johns Shopping Centre progressed relatively quickly. Initial site visits and the design work went positively, with good involvement and engagement from the owners at St Johns who were keen to have the green wall installed for 12 November 2019.

Work commenced on 28th October 2019 when it was discovered that the structure of the brickwork was not solid as the report on which Biotecture had relied upon. A series of alternatives were suggested and tried but did not meet fire regulations. The project was paused on Monday 4th November, and the green wall plants remained dormant.

A solution was found which involved the installation of steel reinforcements, and the additional legally required qualified CDMC Project Manager to oversee a two-week installation. The contract with CW&C was amended to CFT. The existing contract was halted and a new JCLI contract agreed.

The wall was completed on 22 May 2020.

5.3.3 Factors impacting on procurement and delivery of the green walls.

A number of issues affected project delivery and the key ones are listed below in table 12.

Table 12: Factors affecting procurement and delivery of green walls

Factor	Detail
APPROVALS	Planning permission and independent fire calculations and were required. Demos A & B Legal contracts were required between funder and building owner. Demos A &B Visual design agreement was required between contractor and building owner. Demos A & B
OPERATIONAL	Changes in emerging best practice. Demo A Challenges to preferred supplier. Demo A Inadequate structural information for the supporting wall. Demo B. Changes to company building ownership in Demo A, requiring legal amendments
COVID-19	Contractors were on site but had to leave before all works were completed as they could not be delivered with safe social distancing. Demo A Demo B green wall proceeded slowly as social distancing was easier on an elevated and privately accessible space. Less opportunity for promotion during lockdown. Demo A and B.

5.3.4 Supervision

Green wall Demo A was supervised by appointed consultants.

Green Wall Demo B was supervised by CFT project officers, with additional Construction Design & Management Regulations being undertaken by a suitably qualified manager.

5.3.5 Establishment and Maintenance

Establishment of the green wall at Demo A will be undertaken by the contractor for the first 2 years and then pass to the building owner in the longer term, under a legal agreement.

Establishment of the green wall at Demo B will be undertaken by the contractor for five years and then pass to the building owner in the longer term, under a legal agreement.

5.3.6 Images

Figure 31: Green wall batons, preparation of site

Figure 32: Completed green wall in place, Parr Street

Figure 33: Works underway at Demo B green wall

Figure 34: Completed green wall at Demo B

5.3.7 Progress to date

Green Wall Demo A

10	20	30	40	50	60	70	80	90	100

Works are completed

Green Wall Demo B

10	20	30	40	50	60	70	80	90	100

Works are completed

5.4 Baltic Quarter

This is an amended package of works arising from the original raingarden proposals which seeks to 'mop up' a number of outstanding projects for efficiency and cost effectiveness and to include the deliverable rain garden as a component of this tender.

The Baltic Quarter works will also include the associated vertical green infrastructure works planned to complement the second raingarden in Demo A where there are possibilities to place green fences in the Baltic Quarter to test pollinator panels and add biodiversity and green infrastructure in a hard urban area. Similarly the option for green fences and green trellis walls at Demo C will also form part of this revised tender package and include an opportunity to test a different type of green fence along a main road to see if the fence could redistribute vehicle exhaust particulate matter and improve immediate local air quality for pedestrians.

5.4.1 Procurement

This package of works contains the following elements:

- **Raingarden** as outlined in section 5.1.
- **Green Fences** for Demo A and C (which were always envisaged to progress at the end, once the initial learning associated with the green walls was understood).
- **Trellis style green walls** identified to be installed in the Baltic Quarter Demo A and also at the Otterspool underpass, Demo C.

- **Cooling trees** (in large containers) in Demo A also form part of the submitted schemes to increase vertical green infrastructure in the hard surfaced areas where direct planting was not possible due to the presence of an underground void.

This final package of works for tender was assembled to progress these remaining items. Although it contains a number of different NBS, project staff are now more confident in their ability, with some consultant support on the preparation of the tender, to externally tender these works to progress delivery. Early investigations highlighted a number of potentially interested consultants who had the expertise and desire to deliver the range of works within this package. Some of these works are on third party land and others are on city council land. Whilst the raingarden works are quite tightly specified the remainder of the tender is more concept focussed and asks interested contractors to propose solutions to address issues we have raised for various locations and to submit a final design.

5.4.2 Project delivery on site

The tender was finally approved and advertised in September 2020 on the portal. Despite confirmation from a number of contactors that they were willing and able to submit bids there was only one incomplete submission returned. Enquiries revealed that this was due to many staff taking annual leave to visit family and friends as Covid restrictions were lifted.

The re-tender process was halted as the city entered a mass Covid testing programme and was then re advertised in early December 2020. The works were split more clearly into 4 separate lots and contractors were able to bid separately for one or a number of lots, act as a consortium or bid for the works in their entirety. A number of interested contractors were contacted again before the tender publication to ensure they remained interested.

Delivery on site will be via the appointed contractor/s.

5.4.3 Factors adversely impacting on works

Whilst some issues for the non-progression of the planned second rain garden are listed under section 5.1, others at this time are not yet known.

5.4.4 Supervision

The project will be supervised by an externally appointed contractor from the city council's framework agreement. This is the same contractor who helped to design and take scheme to tender so the consultants are well placed to oversee the implementation on site. The scheme is complex in some of its technical and environmental requirements. The supervision contractor reports regularly to the URBAN GreenUP and relevant city council staff.

5.4.5 Establishment and Maintenance

Establishment and maintenance will be determined following tender but is likely to rest with the landowner.

5.4.6 Images

Artist's impressions and concept design works to date are shown below and future contractor designs are to be submitted as part of the tender process.

Figure 35: Various concept designs for trees in containers, green fences and trellis green walls

5.4.7 Progress to date

10	20	30	40	50	60	70	80	90	100

The tender is currently on the procurement portal.

5.5 NBS impact on development of the RUP

The delivery of the URBAN GreenUP schemes to date has had a noticeable effect in the city. The fact that the green walls and floating islands are visible to so many people and now part of the city scape has made many realise that these are features we can have within a city landscape. As such the URBAN GreenUP project has come to the fore a little more. References to URBAN GreenUP can now be found in the city Strategic Regeneration Frameworks and in the current Public Realm masterplan which is being developed. Inspired by the visible presence of the green walls, consultants and developers are now drawing up plans that have more tree planting and include new NBS such as rain gardens. In recent months the images of the green walls and island have been used in city regional environmental promotions and when the Liverpool Mayor launched the update of the city plan the environment section of the video comprised of edited footage from the URBAN GreenUP green wall promotional filming. Councillors and regeneration staff are also keen to promote and link the works to the city's climate change actions and there have been several enquiries from developers about replicating some of the completed schemes on their land/buildings. Awareness of the role of NBS has been highlighted within partnering service teams such as Highways who have now sought to include tree SuDS in other key city centre schemes and there is an understanding of the green value in what were previously grey infrastructure schemes. The full value of these schemes has yet to emerge as it can only be fully articulated and shared once the post intervention monitoring is complete and we can begin to quantify the multiple associated benefits.

Together these and other works are being recognised and helping to inform the city's future Renaturing Urban Plan.

5.6 Future Risk and Mitigation Strategy

Following the delays and issues introduced to planned project delivery from Covid it is prudent to consider other future scenarios that may further delay works and to plan accordingly. The project team have already been incorporating flexibility into the project going forward:

- At present the last tender is out to contractors and this has been fragmented to attract the greatest possible options for future delivery.
- The works involving community engagement are being reconsidered. With a Covid vaccinated community anticipated by spring 2021, plans have been rescheduled and condensed into a year-long, more intensive programme in 2021 that includes fall back and alternative options in the event of any further Covid spike.
- A digital consultation community group of stakeholders has been set up in the Baltic (Demo A) which provides a route to further promote ongoing works and involve local communities
- Contractors and other delivery staff are now accustomed to new working practices and new on site safety procedures which will allow the safe delivery of future planned works and engagement.
- To ensure continued monitoring data can be collected during any restrictions staff have removed monitoring equipment from the university and operated from home, batch freezing water samples for later analysis in the labs.

6 Budgets and Expenditure

The budgets for the NBS interventions were set at the start of the project, almost 3 years ago and in many cases before URBAN GreenUP city plans were consulted on, before site investigations were undertaken and in advance of any city council approvals. Not surprisingly, in the course of consulting, investigating and seeking approvals to the planned NBS there have been technical, political and economic influences and new opportunities have also arisen. As such the developing programme of work has needed to be flexible to accommodate change and capitalise on opportunity and initial budget allocations have needed revision. Although the total sum of funding allocated was in the right order of magnitude, the ability to move funding between different projects has been critical for delivery. Tables 13 and 14 show the intervention budgets for both LCC and CFT with both the original allocation and today's estimated costs.

Table 13: Liverpool City Council Budget Allocation for NBS- original versus latest request to reflect anticipated actual cost

ACTION	DESCRIPTION of SUBCONTRACTING	NEW COST	ORIGINAL
LAc1- New green cycle route	Installation a new green cycle route (600 linear meter) -	**23,618 €**	**98,226 €**
LAc2 - Green Travel Route	Creation of 2 km of green travel routes. Enhancing and defining existing pedestrian routes with GI, re-naturing 3 km in order to develop a green pedestrian and cycle route	**54,066 €**	**0 €**
LAc4-Urban Catchment forestry	Solutions to retrofit sustainable tree cover in cities to reduce flood risk and improve water quality	**613,934 €**	**159,330 €**
LAc5-Shade trees. Species to spread canopies	Trees in strategic locations to maximise summer time shading	**41,883 €**	**0 €**
LAc6-Cooling trees. Species to maximise cooling effect	Trees planted to take advantage of evapo-transpirative cooling.	**139,519 €**	**94,875 €**
LAc7-Urban Carbon Sink	Water planting interventions designed to maximise and test carbon sequestration (4,000 trees)	**15,588 €**	**19,734 €**
LAc8-SUDs	Implement Sustainable Drainage Systems to replicate natural drainage systems	**329,069 €**	**948,750 €**
LAc12-Pollinator verges	Systems to link green areas and provide food sources for pollinator	**143,985 €**	**141,174 €**
LAc13-Pollinator walls/vertical	Strategic green vertical interventions to enable corridors of pollinator friendly GI that link other areas.	**240,697 €**	**127,512 €**
LAc16-Floating gardens	Innovative gardens to install over the aquatic areas	**94,114 €**	**79,200 €**
LAc18-Wood allotments	An initiative to involve volunteer labour in managing young woodland	**0 €**	**11,305 €**
LAc22- Green art/engagement	Promotion of Artistic interpretation of NBS in order to increase awareness and participation by citizens	**33,527 €**	**30,360 €**
LAc24-BioApp	Design and development a locally based bioapp that can assist with monitoring the increased local biodiversity and engage a new community	**23,187 €**	**22,580 €**
	TOTAL	**1,753,136 €**	**1,733,046 €**

As works progressed and costs became clearer the city took the opportunity to make a request during a project amendment period to re-allocate funding between project proposals and work packages and to adjust working budgets to new costs listed above.

Table 14: Community Forest Trust Budget Allocation for NBS- original versus latest request to reflect anticipated actual cost

ACTION	DESCRIPTION of SUBCONTRACTING	NEW COST	ORIGINAL
LAc4-Urban Catchment forestry	Solutions to retrofit sustainable tree cover in cities to reduce flood risk and improve water quality	**0 €**	**328,916 €**
LAc2- Green travel route	Creation of 2 km of green travel routes. Enhancing and defining existing pedestrian routes with GI, re-naturing 3 km in order to develop a green pedestrian and cycle route	**0 €**	**5,594 €**
LAc5-Shade trees. Species to spread canopies	Trees in strategic locations to maximise summer time shading	**0 €**	**18,975 €**
LAc6-Cooling trees. Species to maximise cooling effect	Trees planted to take advantage of evapo-transpirative cooling.	**0 €**	**18,975 €**
LAc7-Urban Carbon Sink	Water planting interventions designed to maximise and test carbon sequestration (4,000 trees)	**0 €**	**0 €**
LAc13-Pollinator walls/vertical	Strategic green vertical interventions to enable corridors of pollinator friendly GI that link other areas.	**533,600 €**	**273,543 €**
LAc14-Pollinator roofs	Strategic green roof interventions to enable corridors of pollinator friendly GI that link other areas	**13,082 €**	**54,648 €**
LAc15-Mobile gardens	Urban green garden with capacity of moving	**63,250 €**	**52,800 €**
LAc18-Wood allotments	An initiative to involve volunteer labour in managing young woodland	**0 €**	**0 €**
LAc26- GI for Mental health	Activities to Link GI with mental health a well-being	**0 €**	**22,770 €**
	TOTAL	**609,932 €**	**776,221 €**

As works progressed and costs became clearer Mersey Forest took the opportunity to make a request during a project amendment period to re-allocate funding between project proposals and work packages and to adjust working budgets to new costs listed above.

6.1 Changes to budget allocations

Changes to budget allocations have arisen for a number of reasons. These include changes associated with:

- **Alterations or replacement to the initial scheme proposed.**

  Some schemes changed or needed to change over the 3 year lead in to the on the ground delivery. One such example where a project needed to be amended to continue to deliver it was a result of the difficulties and practical problems encountered in retrofitting trees directly

into pavements in the Baltic area. The opportunity to trial some above ground containers was a different approach to achieve a similar objective but came with new costs and issues. Another example of this was the opportunity to fragment the pollinator planting project which also incurred changes to both the procurement routes and a division of the available funding amongst 3 separate projects.

- **Returned tenders exceeding original guideline costs**

  Sometimes the returned tender pricing exceeded the original sum allocated and the guideline value and a decision had to be made to either accept the higher costs, go back out to tender or see where reductions could be made. Going back out to tender risked not getting any further responses or delaying the works. Diluting the intended scheme to fit within the original budget was not always cost effective. Sometimes reducing the size of the installation and its impact was not directly related to a similar reduction in cost and it was, on occasion, more cost effective to invest a little more to deliver something of value than to reduce the size of the installation to fit the budget. This situation occurred for the floating island, where there was only was contractor submission. It also occurred for both the final green wall costs, which exceeded the provisional estimates and in doing so largely consumed ear marked budgets for vertical green infrastructure such as green fences and alternative trellis green walls.

- **Returned tenders under original guideline costs**

  Occasionally, such as in the case for the water retention ponds, the tender submission came in well under the envisaged budget, thereby releasing underspend to projects which were struggling to deliver anything of value for their allocated sum. The reason the water retention ponds were cheaper than envisaged was probably due to the fact that although the NBS proposed was 'new' the skills to deliver it were not and basic landscaping and civils works are in a competitive market. Although this scheme came in under budget the 10% contingency was required to address unforeseen issues arising through works on site. A large underspend was also seen on the cycle and pedestrian routes as the direct works were incorporated into a wider city programme that delivered a range of improvements and cycle and pedestrian routes within the demo areas.

- **Schemes unable to progress**

  The second planned raingarden at Tradewind and Madison Squares could not progress despite several attempts, some site investigation works and 5 unsuccessful redesigns to try and accommodate the technical constraints on site. There was no alternative location for a rain garden that still remained viable and so the underspend from the second rain garden was used to support additional costs for schemes such as the green wall at St Johns and some additional tree planting.

- **Project delivery by another partner**

  Throughout the project we were keen to take opportunities that arose and being able to incorporate the Tree SuDs in the Strand as part of a high profile city centre connectivity scheme provided an opportunity to make a relatively small contribution to a much larger scheme that not just delivered the Tree SuDs but also introduced cycleways and green pedestrian routes in the heart of the city and the demonstration areas. The simplest way to progress this was for the budget allocation to be transferred (moving from CFT to LCC) so that the funding was directly available to the city council who were commissioning these works.

- **Unexpected expenses**

  Despite initial surveys and discussions with stakeholder there were several projects that triggered unexpected expenses. Examples included the need for a road safety audit for all NBS adjacent to roadways, additional communication utility surveys for trees being planted in hard surfaces, the recommendation for a newt survey at Otterspool as well the need for additional materials at Otterspool (to allow for coverage of unforeseen rough ground under the pond liner area). The need for fire calculations on cladding was also an unexpected expense that only emerged as the project went to site and the Building Control guidance changed. The largest unexpected expense arose from the additional support structures required to progress the St Johns green wall.

- **Unexpected events**

  Sometimes no matter how professionally planned a project may be there is always a risk that remains unforeseen. As the URBAN GreenUP plans developed we capitalised on the experience of other LCC staff involved in high profile city centre connectivity schemes and linked our relatively small budgets with some multi million pound schemes. This provided excellent value for money and helped to raise the profile of the project as well as embed more natural approaches with other city council and stakeholder service areas. Despite the planning behind these large multi-million pound schemes nothing could be done to avoid the delays they were subject to when a key city centre flyover and arterial road was declared unsafe and needed to be removed. A specialist contractor was required to remove the unsafe flyover over a 3-4 month period, with each piece removed weighing the same as a fully laden 747 passenger plane. An unavoidable knock on effect of closing and removing a key city centre route was to delay all other programmed works in the city centre so that the city did not become gridlocked. This impacted on both the Strand and Princes Avenue connectivity schemes and associated works.

  In a similar vein of unexpected events, the covid-19 pandemic was not on any project risk register at the start of the project and even with business continuity planning there is little that can be progressed and delivered when a country is locked down for months. The UK lockdown

and the inability to access work offices, paper records, liaise with partner organisations or visit work sites has seriously stalled the delivery of many URBAN GreenUP projects.

- **Reallocation of funding across the wider project.**

  As the project has progressed it became apparent that there was a need to re-allocate staff time across different work packages. Approval was specifically sought to provide additional support to monitoring so that we could ensure quality data.

- **Use of contingency**

  All projects had a 10% contingency built into their budget which was particularly useful for responding to small issues e.g. an unexpected survey or additional materials to accommodate previously unknown issues on site. To date most contractors have applied to use some of the contingency but there are a couple of projects which look set to deliver without accessing their contingency sums. Whilst it was anticipated that the big and complex projects would possibly need to use the contingency budget as we were working in unfamiliar areas it was sometimes equally true that the simple projects sometimes also needed a contingency.

6.2 Final project spend and budget allocations.

At the present time with many planned works only part delivered or on hold due to the pandemic it is not possible to give any detailed breakdown on final costs for each project. Although careful overall financial monitoring is in place the detail behind each scheme is not easily accessible as finance staff have been moved to work on recovering city financial losses and some staff directly involved in the procurement costing process have been hospitalised as a result of the pandemic and are not yet back at work.

From experience to date on those that have completed, we know that additional costs can sometimes be incurred late in the project due to unforeseen changes, such as the need for additional fire calculations for the green wall or, issues arising on site when earth is moved or pavements are lifted.

It is also possible that in recovering from the covid-19 pandemic budgets may change again. This could be due to a number of possible reasons such as appointed contractors no longer being financially viable to trade and the city having to re-procure at a higher price with another body, or something as simple as having to budget for the potential replacement costs of trees trapped in the depot that may not survive until the next planting window. Until lockdown is lifted and the majority of people return to work the extent of any subsequent budget changes are unclear.

However, although final figures cannot currently be given at this stage of work and delivery for each intervention, it is possible to provide some interim guide values for some key project elements and these are detailed in the following two tables.

Table 15: Guideline NBS scheme costs

NBS Scheme Costs	Size	*Cost in Euros (inc 10% contingency)
Green Wall	130m2 200m2	€112,700 €276,000
Water retention ponds	C1600m2 open water and peripheral planting	€129,950
Floating island	25m2 (freshwater) 63m2 (salt water)	c. €9,200 c. €69,230
Trees	12-16cm girth or 20-25 cm girth: supply, plant, mulch, tie, irrigate, establish	c. €805 (soft ground) inc establishment c €8,625 - €13,80 (hard ground) inc establishment
Containers	2mx2mx1m 1.5m x1.5m x 1m	€1,604 plus carriage €972 plus carriage
Smart pillars	3m long, wrap around lamp post	€2,875each (+ €29/month maintenance)
Pollinator	Seeding per m2 Turf per m2	€1.78/m2 €17.39/m2
Mobile Forest	5m x 4.5 m hexagonal	€6,210 (+storage, security, tree hire/time) = €63,250
Pollinator Roof	200m2	€13,082
SuDs Tree planting	Civils etc Soil cell/m3 – 9m3/ tree	€202 civils + €1,989 chamber €529/m3 or €4,761/tree
Consultants support, design, tenders etc	All LCC projects	€44,545
Consultant supervision	4 large complex projects	€33,695

***£1 = €1.15 (May 2020)**

Table 16: Other NBS related costs

NBS Other Costs	Size	Cost in Euros
Surveys ecological	Ecology and tree survey at Otterspool/Sefton Park Newt survey (water chemistry and 2 visits)	€5,002 €2,429
Surveys topographical (Baltic and Otterspool)	Various sites along corridor routes for interventions	€4, 830
Stats and topographical surveys for tree planting in Baltic and Otterspool	c. 1.5 km pavement and 7 key tree planting sites	€13,581
Fire calculations green wall	Specific fire rating calculations (specialist firm)	€3,450
Licences for green walls	Standard fee	€1,150
Legal support	Develop legal template for works (third party land)	€2,462
Road safety audit	6 intervention locations adjacent to carriageway	€4,341
Air quality diffusion tubes	48 tubes for NO2/month	€292/month
Water quality analysis	20 samples/month for 3 years for heavy metals 20 samples/month for 3 years nutrients	€12,650 €5,750
Footfall counters	7 x pedestrians, cycle, vehicle count lines for 2.5 yrs	€35,362
Continuous monitors	3 x temperature, humidity, lux (LoraWan) for 3 yrs 4 x No2/CO/H2S and PM for 3 years	€1,725/project €10,985/project

*£1 = €1.15 (May 2020)

7 Appendices

7.1 LCC Procurement

Liverpool City Council Contract Standing Orders

Total Value	Procurement Method	Competition Requirements
Up to £5,000	At least two written quotations are to be sought and a record kept to justify why this option has been chosen (e.g. lowest cost, best value for money).	At least two written quotations
£5,000 - £24,999	To be procured through the CPU's Category Management Team, except with the consent of the Director of Finance and Resources.	A quotation or tender exercise to be undertaken by the CPU
£25,000 - £100,000	To be procured through the CPU's Category Management Team, except with the consent of the Director of Finance and Resources.	A tender exercise to be facilitated by the CPU. If advertised, must include advertising on the Council's eProcurement system and on Contracts Finder.
Over £100,000 and below EU threshold	To be procured through the CPU's Category Management Team, except with the consent of the Director of Finance and Resources.	All opportunities must be advertised on the Council's eProcurement system and on Contracts Finder.
Above EU threshold for Goods, Services and Works	To be procured through the relevant CPU Category Management Team following EU compliant procedures.	OJEU and Contracts Finder

Procurement Policy:
https://www.gov.uk/guidance/public-sector-procurement-policy

EU procurement directives and the UK regulations guidance page:
https://www.gov.uk/guidance/transposing-eu-procurement-directives.

Standard Selection Questionnaire:
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/558531/PPN_8_16_StandardSQ_Template_v3.pdf
Liverpool City Procurement Portal:

https://procontract.due-north.com/Register

7.2 Mersey Forest procurement Policy

Please click on the icon to open the document.	 CFT policy.docx