

Cardiff Gasworks Masterplan Report

DRAFT WIP

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ARUP

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The Opportunity

“The Gasworks” represents one of the largest and probably most complex housing and community schemes delivered by Cardiff Council to date. At the same time it presents a unique opportunity to demonstrate how brownfield transformation can become a model for a regenerative and resilient urban enclave. One that eliminates the traditional paradox between “urban and nature”, between city and landscape, and substitutes it with an approach in which natural and human ecosystems thrive in harmony.

In this urban enclave, landscape acts as an integrator, providing coherence to architectural and typological differentiation, articulates the relationship between human and nature and provides identity to collective community spaces.

We have translated this model into five place objectives as specific guiding principles for the Gasworks site, introduced to direct future design and development. The five place objectives are Health and wellbeing, Energy positive, Space for nature, New ways of building homes and New ways of living.

An essential part of the natural ecosystem will be a new ‘sponge park’, connected to rain gardens, green roofs and permeable paving to manage, filter and store rainwater. This will provide a natural water management system and initial solutions to potential flood.

The potential to address climate change and move to net-zero carbon is significant and is explored in the Arup publication Green and Thriving Neighbourhoods produced in conjunction with the C40 Cities.

The 11,74 Hectares site, similar in size to the nearby Prospect Place, will deliver up to 500 new homes, over 1.2 Ha of open space, new community facilities, new active travel routes and a new home for the Joint Equipment Services.

It presents a major opportunity to deliver on the Council’s One Planet Cardiff vision and create a new standard for sustainable community creation.



Part 1 Vision and Objectives

Introduction

Purpose of this masterplan

Cardiff Council appointed Arup to prepare a high-level masterplan report for the Cardiff Gasworks site in May 2022. This project would set out baseline evidence gathering, and a series of vision objectives that would then be tested through three masterplan options.

The masterplan sets out a vision for community creation and a roadmap for next steps. This is articulated through a plan which integrates key considerations such as flooding, remediation and ecology with a place-based approach to new development.

Specifically, the masterplan explores options and sets design principles to delivery of the following key elements of the brief:

- Explore opportunities to contrast the industrial character of the Listed Gas Holder.
- Deliver strong urban design, providing high quality spaces and public realm with innovative approaches to architecture and building solutions.
- Design from conception an approach toward net-zero and sustainability including SUDs and on-site renewables.
- Explore the scope for a higher density of housing consisting of mixed tenure available through First Homes Cardiff.

- Provide a green corridor through the site connecting to wider green infrastructure including the River Ely and Hamadryad Park.
- Deliver strong urban design with innovative approaches to architecture and building solutions.
- Provide a green corridor through the site connecting to wider green infrastructure including the River Ely and Hamadryad Park.
- Test the capacity of the site to support.
- Integrate the existing modular homes at the entrance to the site.
- Integrate future Joint Equipment Services (JES), that would co-locate multiple warehouse and auxiliary building into one location.
- Consider a new community space located at the Gas Holder.
- Consider opportunities for the South Wales Veterans Association to manage community infrastructure, including a potential community building at the river edge, re-skilling via self build programmes, accessible homes and wider training and employment across the site.

This masterplan sets the framework for more detailed technical studies and design work and costings which will form the basis of Outline Planning Consent and the subsequent Detailed Planning Consent.

In advance of the delivery of this masterplan, a temporary housing plan will be delivered to provide emergency housing. It is anticipated this scheme will last for two years from early 2023.



An architectural rendering of a sustainable urban district. The scene features modern, multi-story residential buildings with large windows and balconies. In the foreground, there is a lush green area with a small pond, reeds, and a heron. A paved path winds through the space, with people walking, a person in a wheelchair, and a person on a bicycle. To the left, there are glass-enclosed greenhouses. The background shows more trees and a cloudy sky with birds flying. The overall atmosphere is one of a vibrant, inclusive, and environmentally friendly community.

The Vision

The Gasworks will drive forward a development of a truly sustainable and integrated urban district. It will be a unique and inspiring urban setting with a distinct character, delivering a range of property types and mix of uses to form an inclusive, vibrant urban district making prudent use of resources and reduced climate impact.

The Approach

Three pillars define the approach to deliver sustainable development at Gasworks:

- Innovation - Embracing and adopting new approaches to building new communities
- Collaboration - Partnership and co-creation – Creating a place alongside prospective community members and drawing in new voices such as local health boards to optimise
- Sustainability – Embedding sustainable development as a basic principle to direct all decision making in support of Net Zero Carbon targets and Climate Change resilience

Key statistics

500 homes of which 50% are affordable

1.2 Ha of new park for existing and new communities

4,000 m2 of community uses



Place objectives

The following section details a series of place objectives that must guide design and decision making as the project progresses. The objectives will need to be met to deliver the site vision.

**Health +
Well-being**

**Energy
positive**

**Space for
nature**

**New ways of
building
homes**

**New
Approaches
to living**

Place objectives

New ways of building homes

Overview

Modern Methods of Construction are allowing for more sustainable homes, quicker build times, lower maintenance costs, improved performance and greater opportunities to involve local workforces. For Gasworks this should include:

- Modular construction including the use of local supply chains and skills to fabricate and assemble new homes.
- Considering opportunities to upscale this method to deliver housing across Cardiff and Wales.
- Applying circular economy principles to avoid waste and promote the future reuse of materials.



Ebury Edge in Ebury Bridge Estate, Westminster. Arup, WCC.

Modular, meanwhile-use buildings with innovative demountable timber structural system, designed for future re-assembly elsewhere.

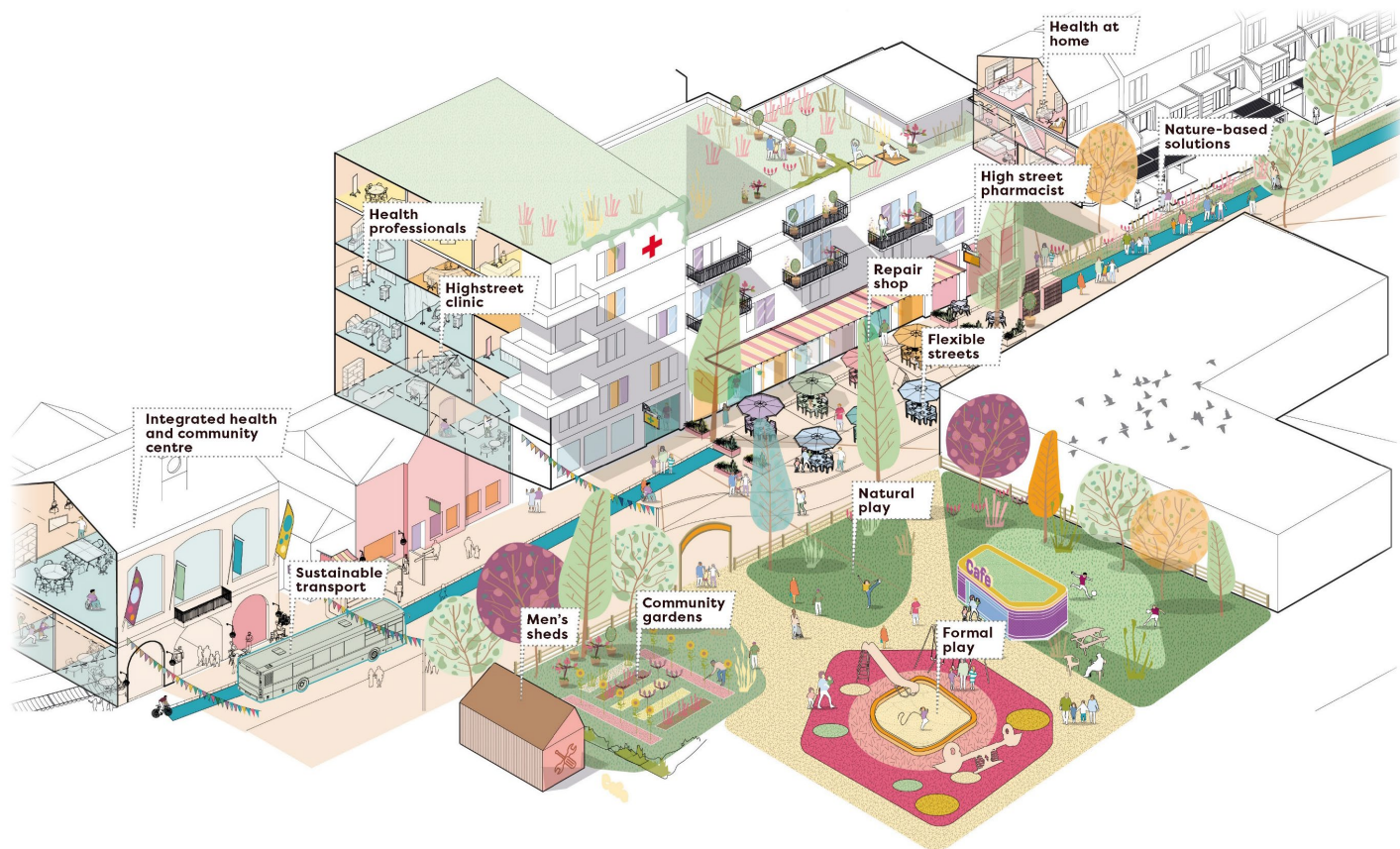
Place objectives

Health and wellbeing

Overview

Research from the World Health Organisation suggests up to 90% of good health and wellbeing comes from outside of the health and care system. Shaping communities and places to prevent ill health and reduce pressure on the current system will become an increasingly important consideration and must be a core objective for Gasworks.

- For the new community at Gasworks this will include:
- Strategies to eliminate social isolation through community infrastructure and networks such as shared gardens, Mens Sheds in addition to informal neighbourly support.
- Allowing active lifestyles through high quality parks, safe and attractive walking and cycling routes.
- Providing easy access to well designed and nature-rich spaces and parks.
- Enabling more 'health at home' through architectural design
- Exploring opportunities to place health and care provision within the community



Extract from *People, Place, Health - Designing a Health and Care Ecosystem for Wales*. Arup and The Bevan Commission (2022)

Place objectives

New approaches to living

Overview

New models of living have the potential to address long standing societal issues such as social care, isolation or to simply give families the opportunity for multiple generations to live close by.

Intergenerational and assisted living where homes are designed to support elderly relatives and younger family members under one roof are one such example. Co-locating former veterans within housing clusters to assist with PTSD is another.

Opportunities for community led housing and self-build schemes could also be implemented.

Many of these models remain relatively new in the UK context but there is an opportunity to innovate at Gasworks and to trial new approaches.

These approaches offer multiple benefits including;

- Reduced social isolation and subsequent mental and physical ill health.
- Transfer of skills, knowledge and behaviour between age groups.
- Potential reduction on external social care services.
- Improved community harmony and integration.



King's Cross Central supported diverse activities for more cohesive communities
<https://www.arup.com/perspectives/cities-alive-urban-childhood>

Place objectives

Energy positive

Overview

Ongoing instability in energy markets is inflicting significant harm to our economy, our well-being and exposing our reliance on foreign energy. This, in combination with a commitment to reach Net-Zero carbon has brought into sharp focus the need for more localised and resilient energy systems and greater efficiency. Energy must be a central objective for Gasworks with an elevated ambition to be 'energy positive' and contribute to city wide energy demand. Specifically, this may mean;

- Standards such as Passivhaus for new homes to minimise consumption
- Exploring on-site energy production to feed demand on-site but also the wider city.
- Utilisation of methane gas from Grangemoor Park for heat and power for the development
- Exploration of the use of biomass for electricity and heating within the development.



Place objectives

Space for nature

Overview

Between 1970 and 2013, 56% of species declined in the UK. New development should now be seeking to increase biodiversity. This could include;

- Linking established habitats with the site including the A4232 habitat corridor and River Ely including wooded 'dark' corridors to support species such as bats.
- Creating a mosaic of new habitats within the site to support targeted species and carbon sequestrations such as wetland/shallow pond and tree planting.
- The creation of diverse grasslands to provide habitat for invertebrates to support the wider ecosystem.
- Exploring opportunities for community involvement through projects such as Tiny Forests and Citizen Science initiatives.



Habitat mosaic including wetland habitat and species rich grassland will support local ecology.

Case Studies

Westergasfabriek & GWL- Amsterdam

A series of exemplar case studies were presented and explored during this initial masterplan process and are summarised here.

Westerfabriek is former industrial land developed into a park and cultural venue. The GWL terrain, opposite to the park, was transformed into a car-free, environmentally friendly residential area, a walkable community with pedestrian priority throughout.

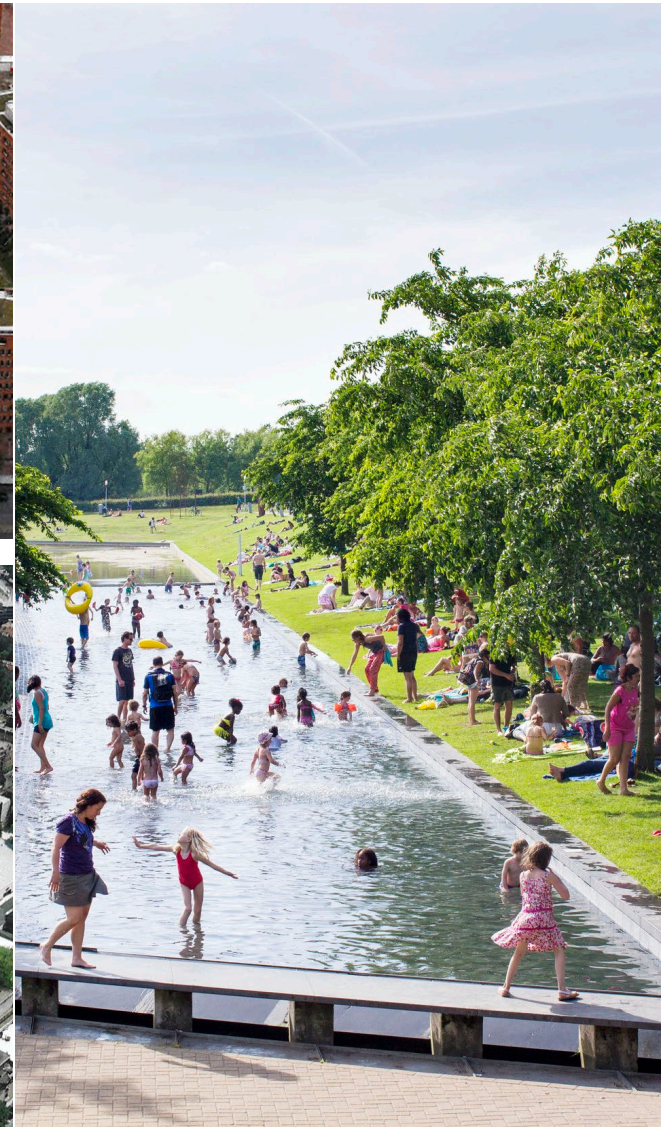
Vehicles are pushed to the edge of the development which creates more space for life to flourish within the site.

Key constraints to the site's re-development were; how to mitigate polluted land from the former gas uses, how to construct a park in such conditions, how to effectively re-use the historical structures on site and issues with funding the re-development of the site.

The projects were public sector led and delivered a new approach to living amongst nature.

The site integrated the key heritage item of an old water tower into the village centre of the development.

The development uses the larger apartment buildings as a protective barrier for the site from the noisy and busy road which runs adjacent to the site.



Case Studies

L'Innesto - Milan

A brownfield site located in close proximity to an existing rail line within a very urban context in Milan, the site looked to set a high-density development set within nature. Circular economy principles have been imbedded within the development from the strategic planning phase to unlock value for all stakeholders of the site.

The development provides for zero carbon social housing which, whilst at a high density provides for a human focused design initiatives and the inclusion of social spaces throughout the site.

The project was the winning entry from Arup within the C40 Cities programme, which focused on social aspects and the building elements.

The site is Italy's first zero carbon affordable housing development site.

<https://www.arup.com/projects/linnesto>



Case Studies

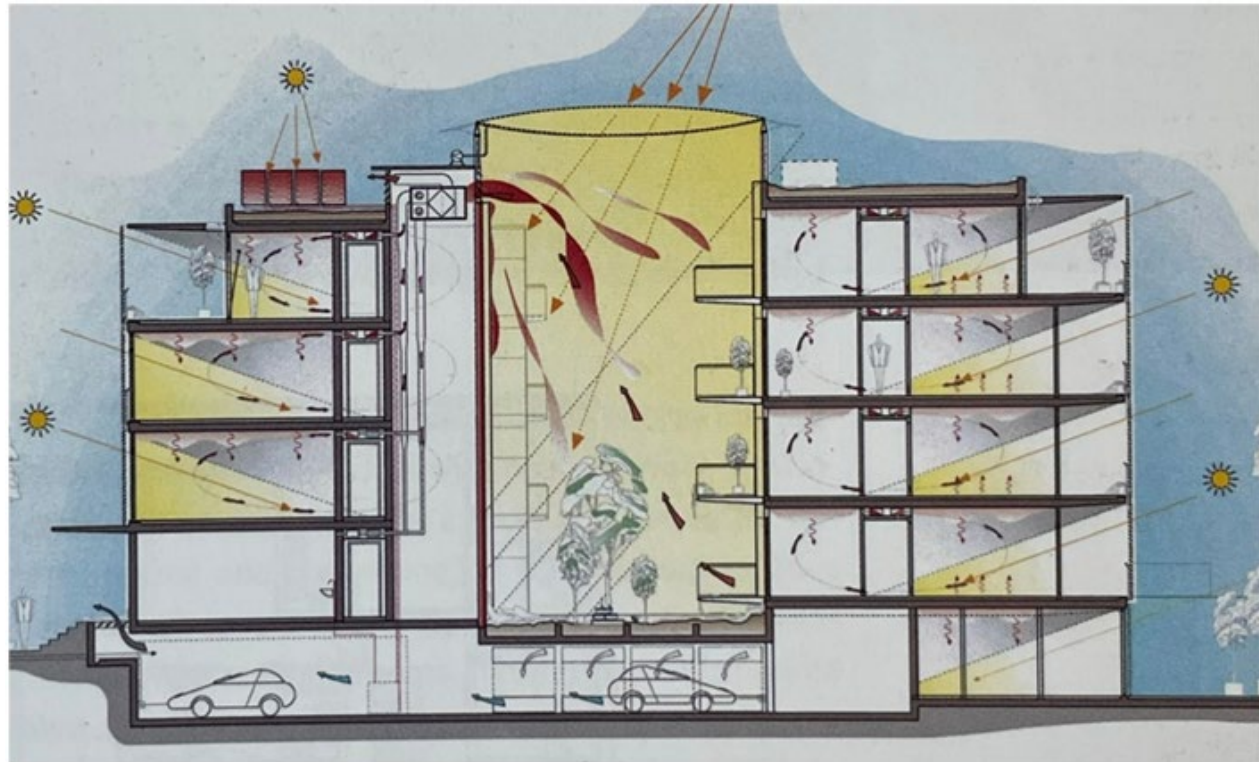
Kronsberg - Hannover

The development is a wholly sustainable neighbourhood with local energy and heat network to provide energy on site and well throughout architectural design which provides excellent thermal and solar amenity.

The site also looked at sustainable urban development solutions at an urban planning level.

The site is developed to include green and blue infrastructure at its core. This includes a side wide biodiversity enhancement and net gain.

Additionally, the development includes numerous low carbon homes and zero carbon homes, further boosting the lifetime sustainability of the development site.



Part 2 Understanding the site

Understanding the site

City context

Introduction

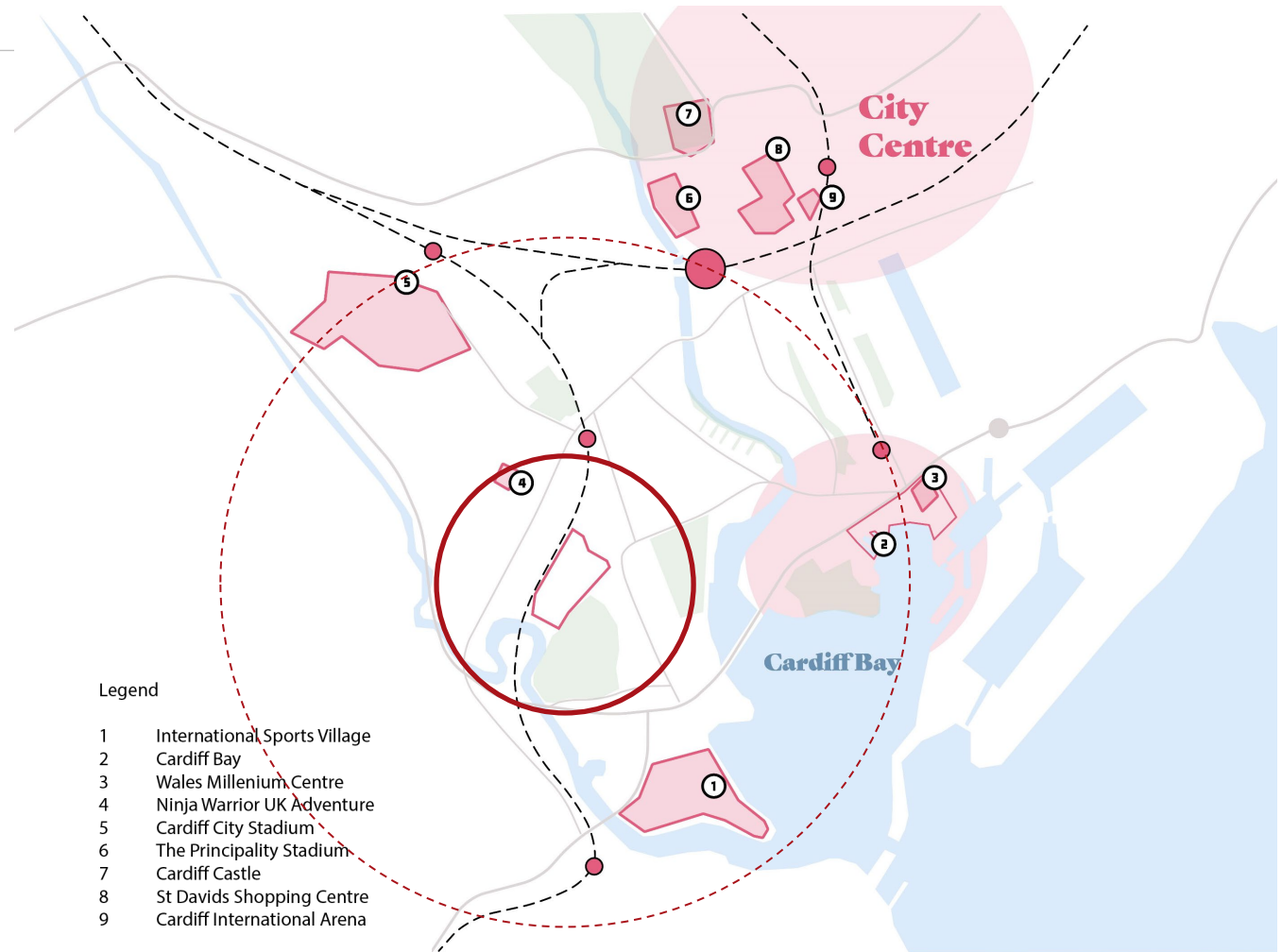
This section provides an understanding of the site context which has informed the masterplan proposal. It explores the site in relation to the wider city and more localised conditions include ecology and the existing context of Grangetown.

Wider context

The Gasworks site sits on the peninsula created by the Rivers Ely and Taff. Adjacent to the site is the rail corridor to Barry/Penarth. To the south is Grangemoor park and the International Sports Village the latter of which is subject to continued development and expansion.

The site is in close proximity to the Bay and City Centre providing easy access to leisure, employment, retail, services and national rail.

The possible impact of the completed scheme is significant. It has the potential to further regenerate Cardiff through enhanced community infrastructure, new community leaders and creating a precedent for future development and growth.



Existing destinations in the City

Understanding the site

Wider green and blue infrastructure

Connected parks, recreational routes and waterways provide essential walking, cycling and wheeling routes and allow nature to thrive.

The diagram shows a sequence of parks, open spaces, and habitats across the city. The A432 Habitat corridor runs south of the site, linking Grangemoor Park to the wetland reserve to the east. To the east of Gasworks is the existing Marl Park and sports pitches. Along the River Taff are the improved network of streets at Greener Grangetown, with Suds and landscape planting.

The current Gasworks site provides some ecological benefits in a post industrial landscape. The site currently provides no social benefits and is a gap within the wider landscape network. There is a major opportunity for Gasworks to provide high quality, useable open spaces for both existing and new communities in the area.



Green and blue infrastructure network across the City

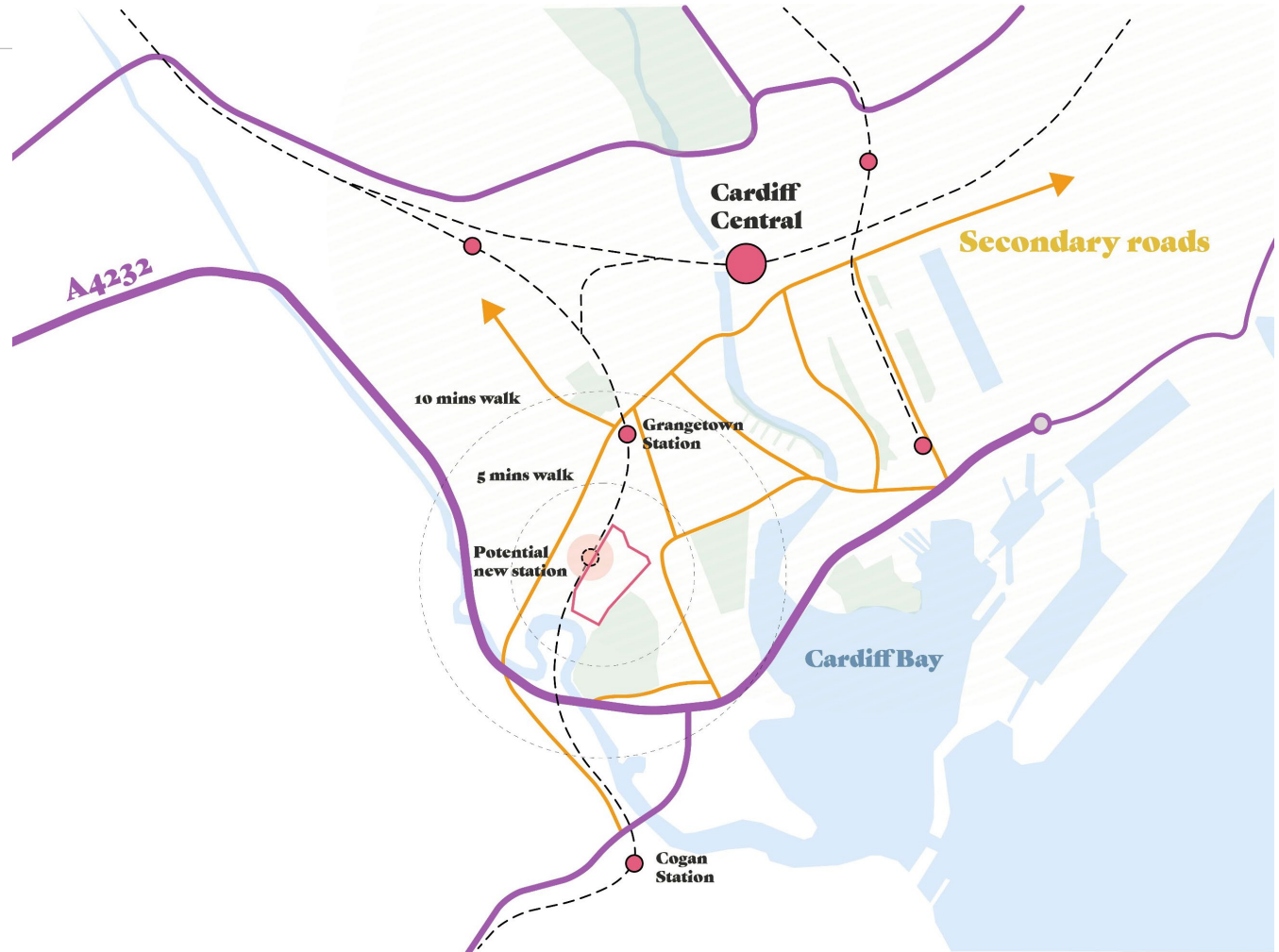
Understanding the site

City wide movement

Gasworks is located north of the A4232, a major transport link in the City. The site is connected to this via Ferry Road, which extends north east towards Cardiff Bay.

The rail station at Grangetown is around 10 minutes walk from the site, via an underpass north of the site boundary. This is currently an unattractive route for pedestrians and cyclists as it is isolated from buildings and activity. To the south of the site it is possible to connect to the Ely Trail, a popular riverside walking and cycling link.

Future studies should consider the opportunity to create a new station adjacent to the gasworks site which would create one of the city's largest Transit Oriented Development (TOD) locations. A TOD approach is one where development is located and densified around key public transport interchanges to encourage use of sustainable transport and support wider decarbonisation agendas.

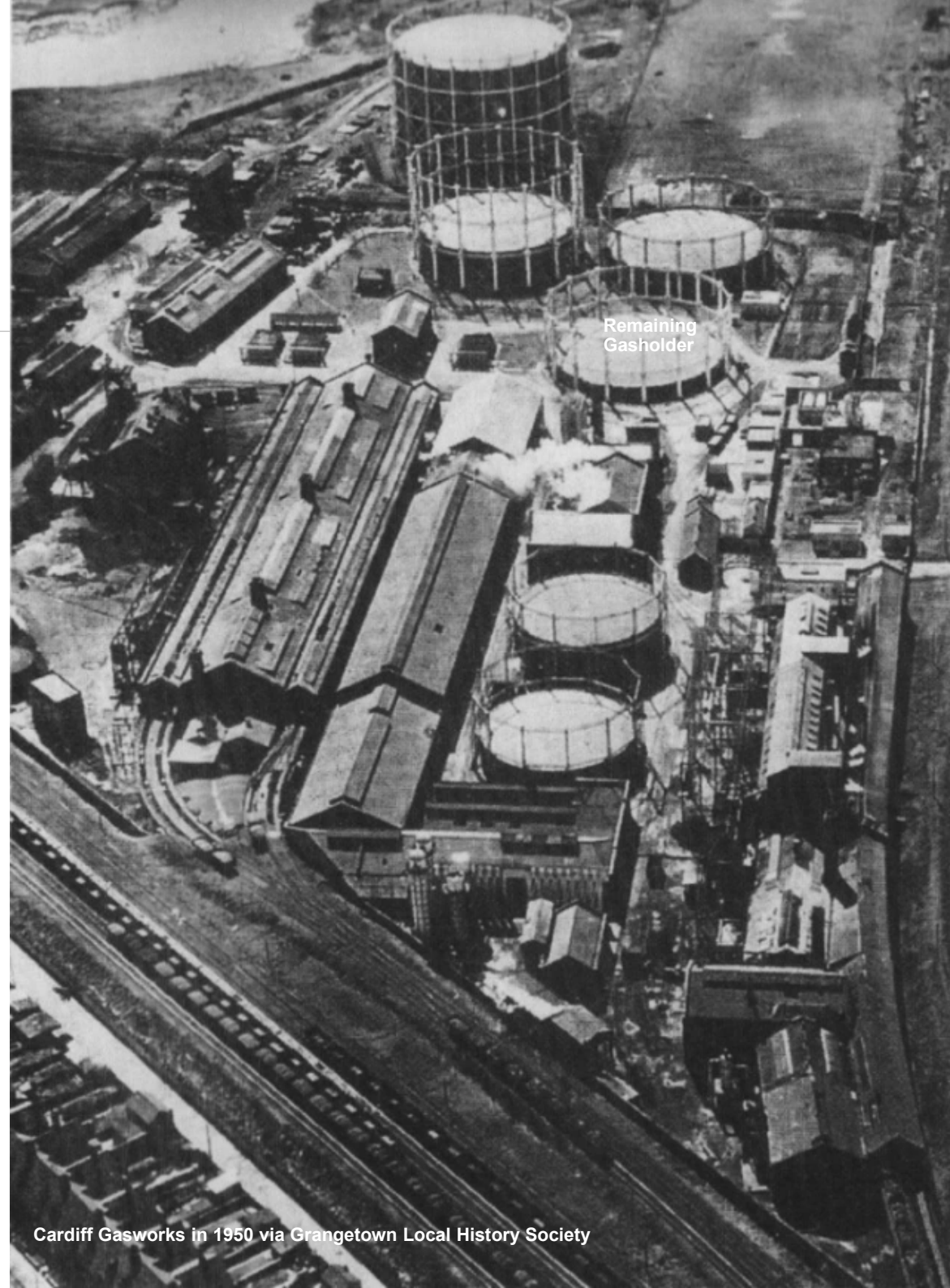


Citywide movement network diagram

Understanding the site

Site history

A the name suggests, the 10.24 Ha Gasworks site housed major gas infrastructure primarily for the servicing of gaslight throughout the city. Opened in 1863 the site used a coal combustion process to extract gas which was subsequently stored in a series of on-site gasholders. As part of extensive site clearance works, only one of these remains on site today. The structure is Grade II Listed.



Cardiff Gasworks in 1950 via Grangetown Local History Society

Understanding the site

Local context

Within its local context the site can currently be considered as isolated from its surroundings. The rail line provides a hard edge between the site and Penarth Road to the north-west. To the south the site is Grangemoor Park, a former rubbish dump which has been remediated, and the River Ely with the Ely Trail shared pedestrian and cycle network. To the north of the site is a large, prominent blue Ikea store.

Cardiff Bay Retail Park has its rear to the Gasworks site and there is a singular informal pedestrian route running between the edge of Grangemoor Park and the north of Cardiff Bay Retail Park.

The proposed Channel View development which is currently subject to 400 units at outline planning is to the east of the site across Ferry Road.

Within the north-east of the site are three modular apartment buildings originally constructed during the covid pandemic to house homeless families.



View west looking at rail line



View of existing modular emergency accommodation



View north of existing
IKEA Store



View west looking at rail line

Understanding the site

Site constraints

Currently the site is constrained and isolated by the rail line running along the western boundary, Ikea to the north and then a lack of connection to Cardiff Bay Retail park and Grangemoor Park along the eastern edge.

There is only one singular vehicle entrance to the site, accessed from Ferry Road to the north.

The site suffers from contamination arising from its prior use as a Gasworks. There is some remaining infrastructure associated with this still on site, including a telecoms mast and some above ground gas utilities.

On the north-east corner of the site sites 3 modular apartment buildings which are used for temporary housing

The site is located within Flood Zone C1 and Flood Zone B.



The Masterplan

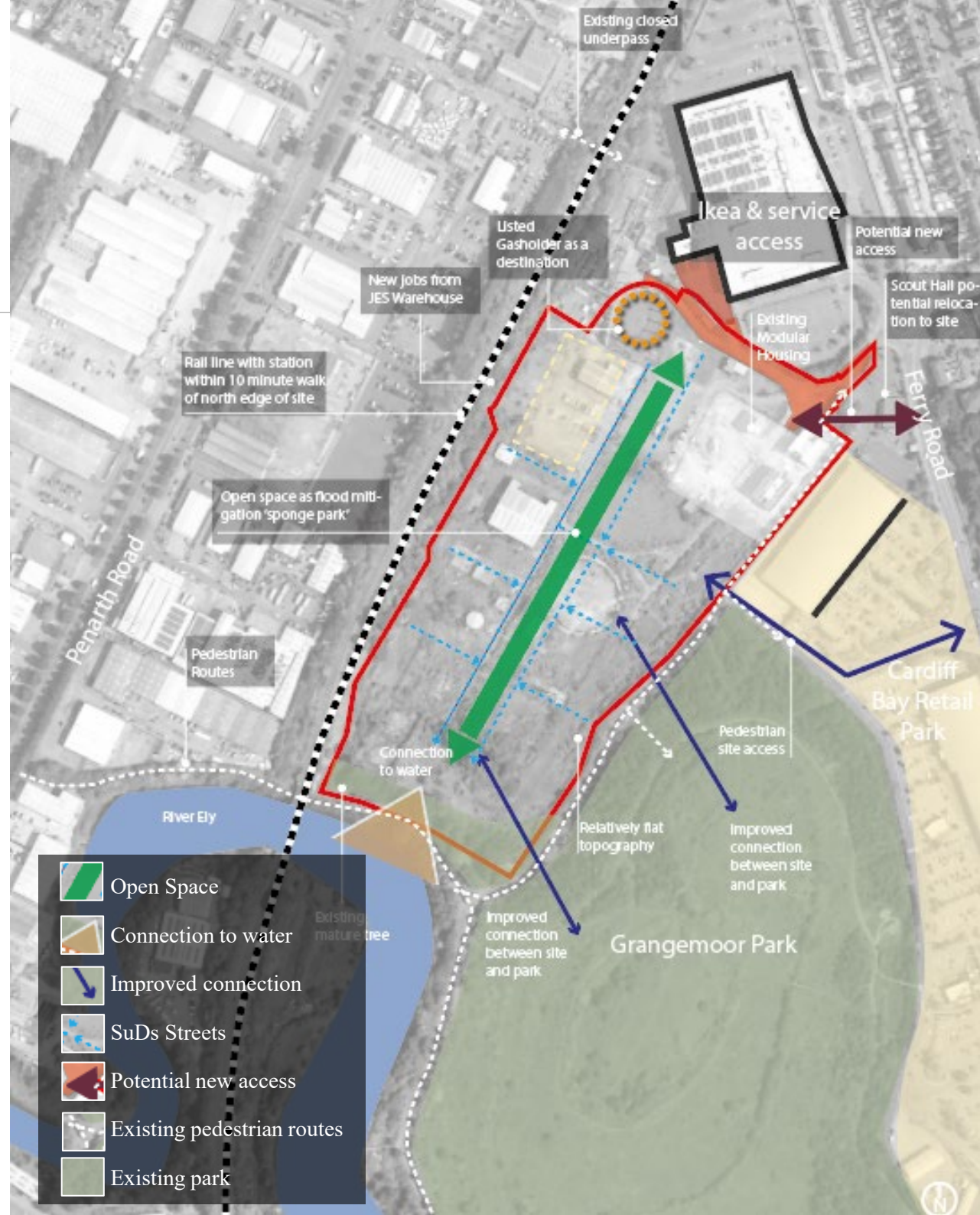
Site opportunities

Many of the constraining factors of the site do also provide for significant opportunities on the site.

Flood mitigation strategies including the inclusion of a 'sponge park' creates resilience to climate change, and also creates a unique residential amenity that provides a place for, nature, play, recreation and somewhere to dwell and the opportunity for informal social contact for members of the new community.

The inclusion of the JES warehouse provides additional social value to the development through providing a new, custom built and suitable home for an important service to the people of Cardiff, and additional jobs.

Improving the connections of the site allow for the opening up to the River Ely, greater pedestrian access to Cardiff Bay Retail Park and a new frontage and connections to Grangemoor Park providing more activity and a greater purpose for the park.



Planning policy summary

The planning strategy for the site is included within the Appendix of this report. A summary of the planning policy is provided below. The site is designated within the Local Development Plan for the development of 500 homes, 1.2ha of open space and biodiversity net gain. The warehouse is not included within the designation but does not create a barrier to development as the 500 homes can still be accommodated on site with the warehouse.

Summary

- Identified as a Strategic Site under Policy KP2(B)
"Housing-based scheme of 500 homes and other associated community uses"

Necessary Infrastructure

- Contribution to off-site facilities
- Minimum 1.2ha Open Space (including 1 playground, 1 teen facility, plus contributions to formal open space, allotment provision and play provision).
- Biodiversity Net Gain
- Sustainable Drainage

Essential / Enabling Policy Requirement

- Improve pedestrian access to public transport in the vicinity of the site
- Masterplanning requirement
- Provision of new and enhance links to the Ely Trail, Grangemoor Park, Cardiff Bay Retail Park and other community facilities in the area.

Likely Obligations

- Transport and Highways
- Functional Open Space
- Schools and Education
- Community Facilities
- Healthcare
- Public Art
- Waste Management



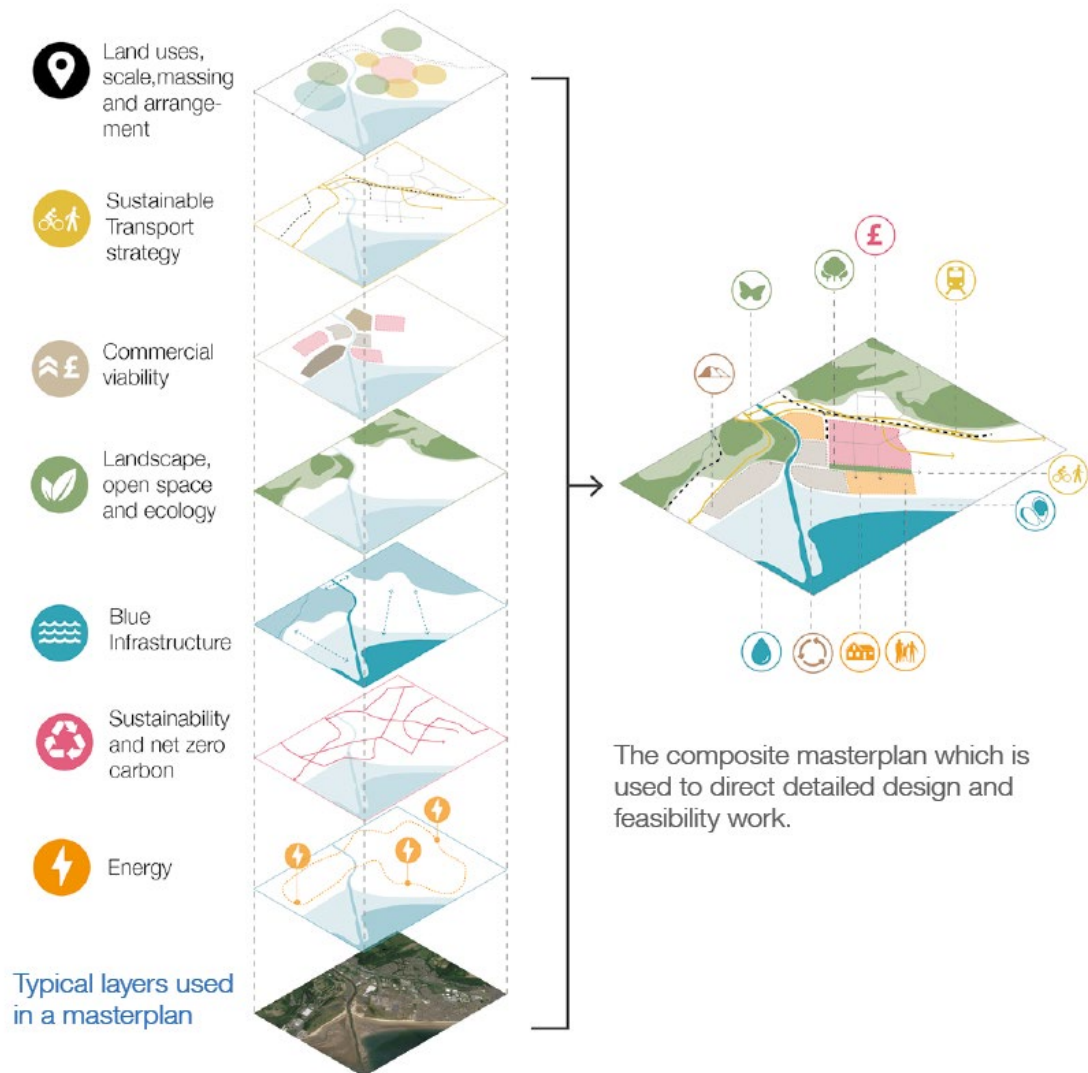
Part 3 The Masterplan

Masterplan

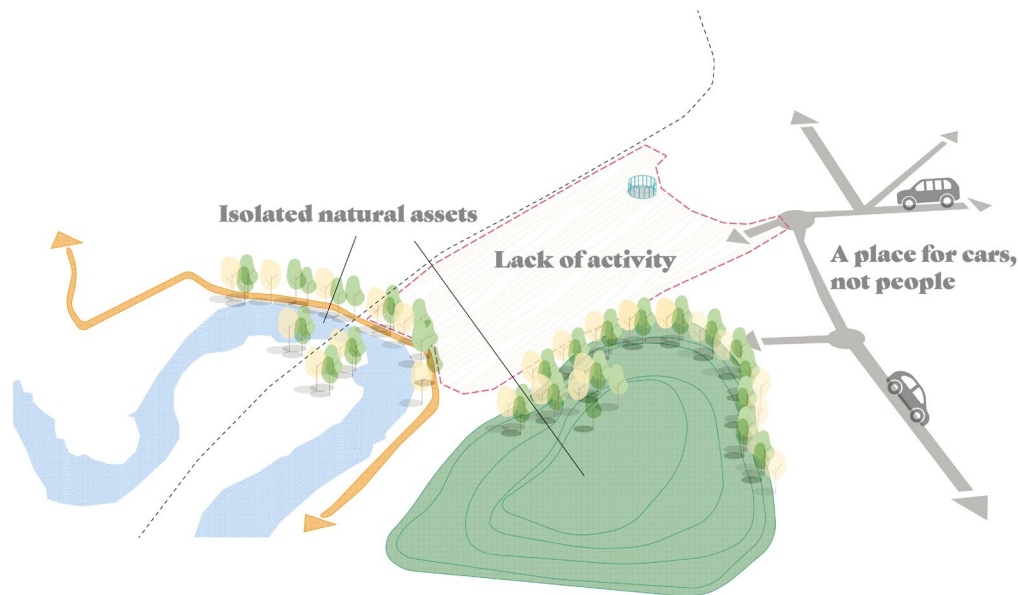
Introduction

Masterplans are made up of many 'layers', that represent different aspects of the plan, as illustrated in the graphi. For the Gasworks, at this early stage the focus has been on mobility, landscape, water and land use.

The following section explains how these layers support the vision and place objectives.



The Opportunity

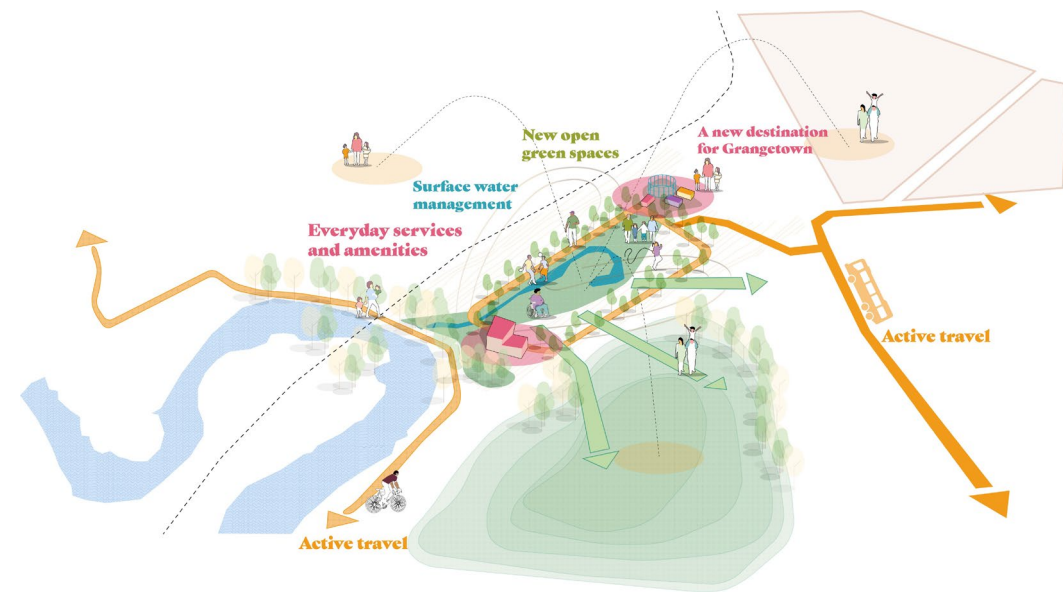


The existing context

The Gasworks site is isolated from surrounding communities. Both the River Ely and Grangemoor Park are disconnected from surrounding neighbourhoods.

The historic Gasholder is isolated and under-utilised within the site.

Communities east and west of the rail line are cut off from each other.



A new community

Gasworks will become a place and heart of the community, with new destinations, open spaces and activities, using the Gasholder as a local landmark.

The site will be a piece of 'living infrastructure' that creates a 'bridge' between the River Ely to Grangemoor Park forming one continuous piece of green and blue infrastructure.

The existing communities at Grangetown and Penarth Road can access and enjoy these new places via new active travel links, which extend to the Ely Trail.

Concept Design

Key moves

The masterplan design is formed around four distinct, organising concepts. These relate the basic access and movement, green and blue infrastructure and the approach to development. They are;

01 – A clear movement loop

Defined boulevard provides access to all plots, with sequence of secondary links between it.

02 – Network of open spaces

Central ‘Oxbow Park’ open space for people and nature.

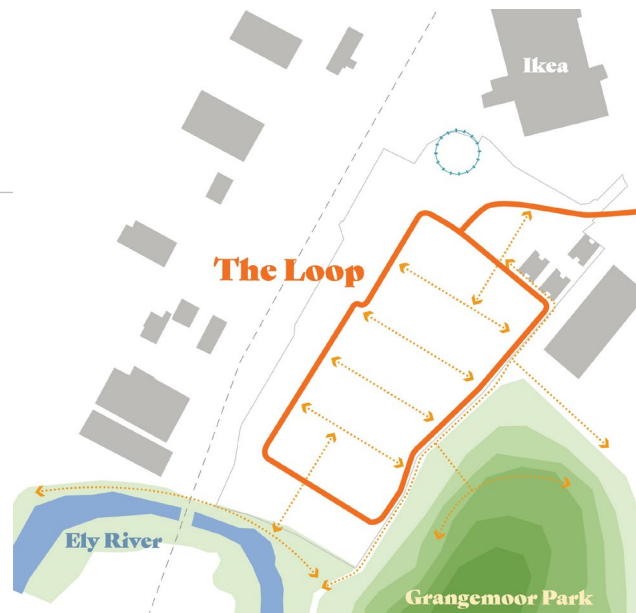
Habitat creation opportunities along the railway and river edge.

03 – A living water system

On-site management of surface water, with living water system that cleans and filters water before returning it to the Ely River.

04 – Sustainable development plots

A grid network of development plots accessed by the Loop, with frontage on street and on park spaces.



The Masterplan Sustainable Transport

The following pages explain the various layers that make up the masterplan.

The site is defined by sustainable modes of travel, with clearly defined walking and cycling routes, and car-free zones. Walking and cycling have the greatest priority through an extensive network of routes that link with Grangemoor Park, the Ely Trail and eastward to Grangetown.

The Primary movement route is a boulevard loop route which is the primary link for vehicles. By following this loop, the central park is car free allowing a safe and attractive recreational space for residents.

This tree lined avenue includes space for on-street parking for visitors, landscape enhancements on both verges and 3m wide footways for pedestrians.

Access to the proposed JES building is segregated from the main housing network.

Links to public transport infrastructure are improved, such as the link to bus stops on Ferry Road, and the active travel links to Grangetown Station to the north. Embedded flexibility within the structure of blocks and streets means that any potential rail link adjacent to the site can be linked directly to the street layout.



- Primary movement route - Vehicular, bicycle and pedestrian
- Pedestrian only linkages and routes
- JES access
- Ely trail
- Existing bus stop
- New site access



Sustainable Transport

Greener Grangetown Cardiff

Intergated SuDS, active travel and placemaking deliver city-wide resilience, improved health and wellbeing, cleaner air and improved biodiversity.

The Masterplan Green infrastructure

Creating space for nature and resilience

The Linear 'Oxbow Park' forms the central spine of the development. It provides flood mitigation, sustainable drainage, climate change resilience, community amenity, place for nature, play and social contact. The name is derived from the dynamic nature of Oxbow Lakes which fill and recede pending the degree of rainfall.

A well defined green loop movement corridor which provides space for nature and sustainable urban drainage, use of landscape on improving the streetscape

A series of east-west SuDs streets collector rain water and filter and direct toward the Oxbow Park. The soft, landscape setting of these streets add to the overall character of development.

Boundary planting assisting with drainage, softening the boundary especially adjacent to the rail way

Boulevard and network of tree planting providing a new increase in tree canopy further improving climate resistance and natural localised temperature moderation (resilient to the heat island impact)



-  Linear green core park with green and blue infrastructure
-  Green Route Boulevard
-  SuDs Streets
-  Boundary Landscape

The Oxbow lake “sponge” park

The dichotomy between natural and man-made environments is blurred as nature becomes part of cities, improving air quality, moderating extremes of temperature and supporting human wellbeing.



Greenwich Peninsula Ecological Park, UK



Parc Um Belval/ Water-retention Boulevard, Luxembourg

The Masterplan

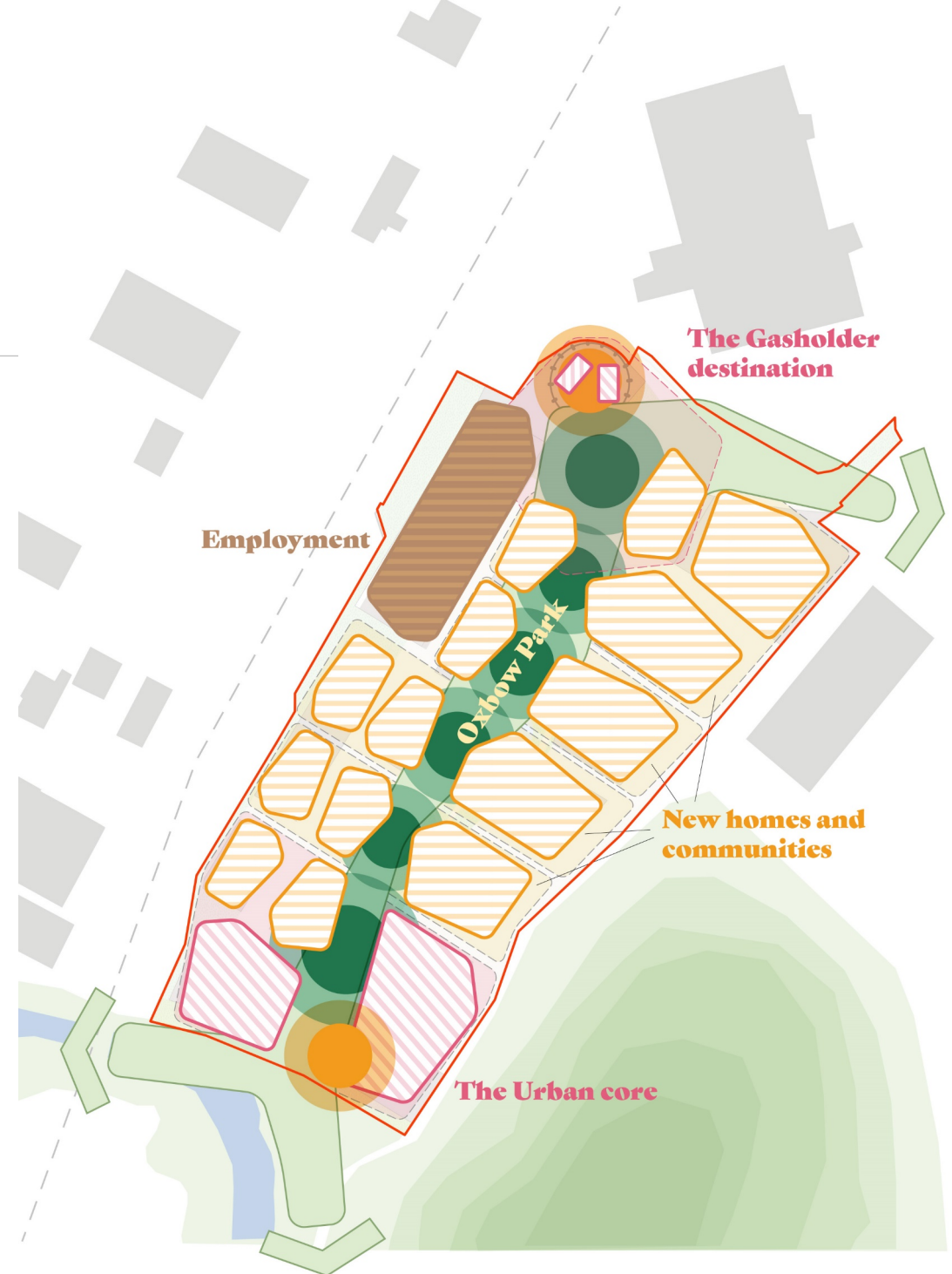
Character areas and places

Shaping a place

The masterplan proposes higher density homes towards the river, taking advantage of views towards the landscape.

The central open space is overlooked by new homes and communities, which help to activate it and increase sense of safety. Each 'finger' of homes could take ownership of an aspect of the Oxbow Park, through food growing, play spaces or seating areas.

To the north of the site, the Gasholder becomes the key destination with new activities within it. This forms the natural terminus of the open space, and is surrounded by new jobs and homes.





A new destination for local communities

The Masterplan Heights and views

Shaping a place

The development provides for a variation in building heights which aim to provide a different experience throughout the site.

There is a clear hierarchy of heights with increased height on the western boundary providing a buffer between the rail line and the rest of the site.

Around the village core area of the development building heights are highest, giving greater visual importance to this area and concentrating density.

Lowering the building heights on the eastern side allows for greater solar access across the development. Buildings are also orientated to ensure maximal solar access is achieved.

Building heights are often broken up within the same building which allows for view corridors to be created and also create visual interest across the development.



The Masterplan

Flood risk and mitigation

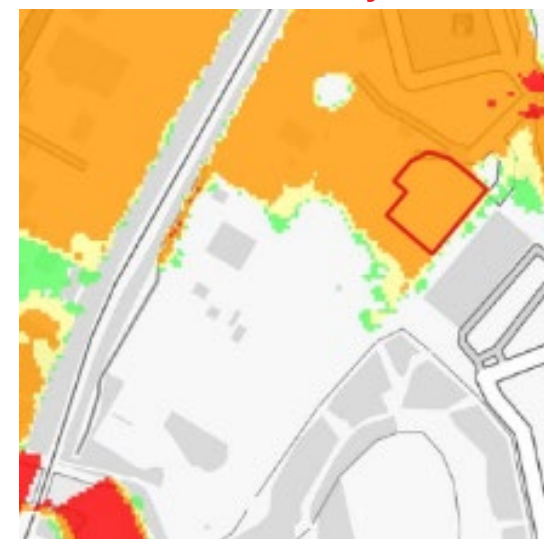
Shaping a place

Parts of the site are at risk of flooding from both rivers and sea, but benefits from flood defences. A more detailed assessment is presented in Appendix B, but summarised as follows:

- The site is flood free during 1 in 100 fluvial and 1 in 200 year tidal events, taking into account climate change
- Localised areas in the north flood during a 1 in 1000 year fluvial event. Upfilling is proposed in these areas to allow development to proceed, detriment testing is currently being carried out. It is considered likely that flood mitigation measures can be incorporated to allow development to proceed in accordance with the requirements of the current TAN15
- The flooding during a 1 in 1000+CC fluvial event is more widespread and deeper, the detriment caused by loss of floodplain is likely to be more significant. Development of the ‘Sponge Park’ at a lower level, that can flood, will provide an opportunity to mitigate some of the detriment, but it is unlikely to be sufficient in volume. Consequently, if the revised TAN15 is published in 2023 in its draft form, there could be challenges that would need to be overcome to allow development to proceed in the northern area
- A separate emergency works scheme is currently being planned for the site, as part of these works, areas in the north will be raised under the existing TAN15, which will change the flood baseline and would benefit this future provision.



Flood Extent 1 in 1000 year



1 in 1000+CC Flood Extent



‘Sponge Park’

Gellurp Nature Park, Denmark

Central water body for flood attenuation, habitat creation
and community amenity

The Masterplan Blue infrastructure

Shaping a place

Blue infrastructure and sustainable drainage measures have been considered and incorporated in the masterplan from the onset.

A key component is the central ‘Sponge Park’, which offers the opportunity to both treat and attenuate surface water flows, via swales and basins, whilst also help mitigate fluvial flood risk.

Further SuDS measures such as rain gardens along the streets, green roofs on the buildings and permeable paving in car park areas can be used to treat surface water.

The surface water will ultimately be discharged into the River Ely in the south, via a large sewer in the east and possibly the ditch in the west and direct outfall in the river to the south.



‘Sponge Park’ Hendre Lakes, Cardiff

Expansive new park space creates vital habitat, communal open space whilst managing rainwater in extreme events.

A dynamic landscape that transforms during extreme weather events to mitigate flooding



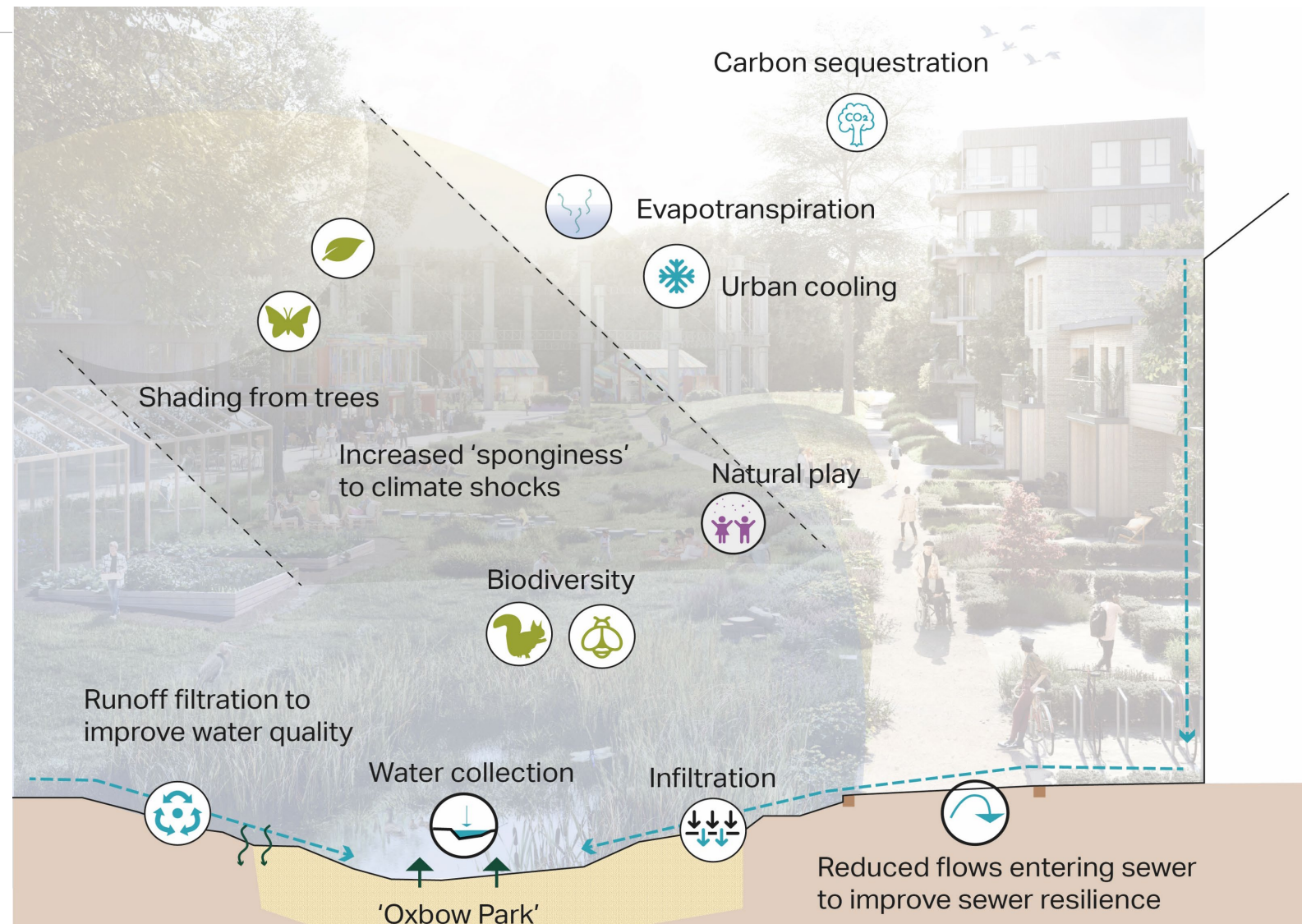
The water system at Gasworks

Water runoff from buildings is directed towards the central open green space.

Infiltration of water is encouraged and reduces flows entering the sewer network.

Water is filtrated to improve water quality using nature based solutions such as reed bed planting.

Biodiversity, urban cooling and natural play elements are all integrated into the ecosystem.



Illustrative water system section

This illustrative masterplan shows a potential arrangement of buildings and open space

- 1) Public open space and community uses around the Gasholder
- 2) JES Warehouse
- 3) Village Centre
- 4) Central park with 'Oxbow' lake sponge park
- 5) Townhouse Area
- 6) Apartment buildings



Townhouses: 76
Apartments: 472
Total Units: 545

Apartments calculated at a 80% building efficiency and average unit size of 65m2

Energy positive

Passivehaus, closed loop, renewables, Grangemoor park gas harvesting, site wide energy source
CHP/Biomass

Space for nature

Habitat mosaic and wider links, community role, citizen science, wider green corridors

Health & well-being

Nature, active lifestyles, community, health at home, Men's shed

New ways of building homes

MMC/modular – wider opp, circular economy

New approaches to living

Intergenerational, blind tenure, veterans community





DRAFT WIP

The Masterplan

Joint Equipment Service (JES) Rational

Arrangement and Location

The JES warehouse is proposed to be located in the north west corner of the site. This allows for its own dedicated access and for the building to form a partial linear buffer between the rail line and the residential development.

Locating the JES warehouse in its current location also allows for the separation of traffic between the warehouse, and the residential portion of the development.

Development of the JES Warehouse is also currently proposed to be the first phase of development of the site, which will be built whilst the temporary modular housing development is on site, the location in the northwest corner does not constrain this temporary modular home village. It also allows the warehouse to be brought forward and to be functional prior to the wider masterplans physical development.

The location in close proximity to the residential elements of the masterplans poses no issue, this is due to the warehouse only being open during standard working hours and is not anticipated to provide any excessive noise or light pollution. It is not anticipated that there will be any odour pollution.



Concept Proposed JES Warehouse Plan

The Masterplan

Joint Equipment Service (JES) summary

Shaping a place

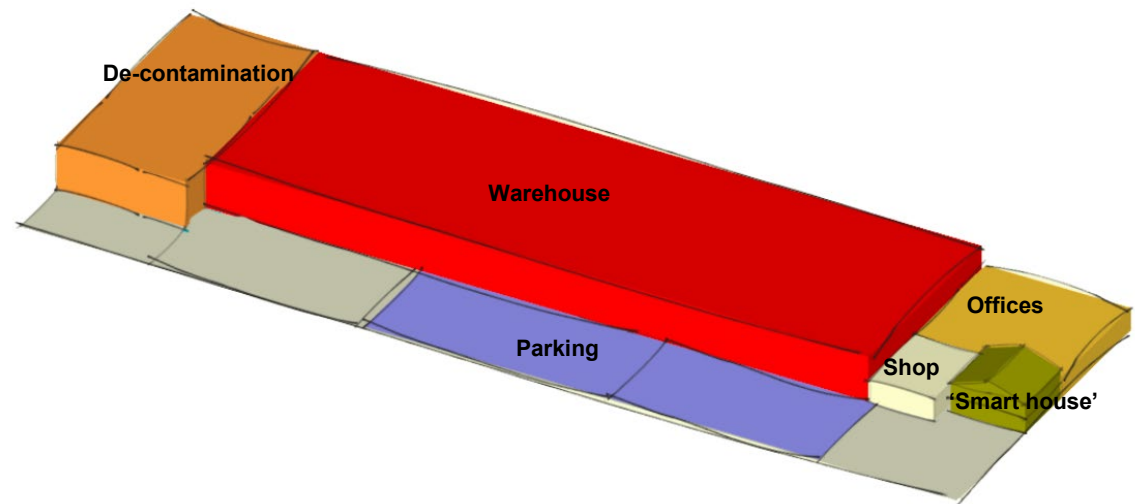
As part of this commission, Arup have undertaken a preliminary assessment of a new JES building within the site. A summary of the brief is provided below.

The JES warehouse is required to be delivered by June 2023. The JES development will be a total of 4900m² and is to comprise of:

- 3250m² main warehouse
- 750m² de-contamination area
- A 2-storey 280m² 'smart demonstration house'
- A 130m² Shop for private sales
- 460m² office space
- 55 parking spaces of which 20 are to be secure

The preferred option is the result of design iteration and consultation with the existing JES to find the logistical best configuration.

A separate dedicated vehicular to the JES was seen as a big positive. Placing the de-contamination area to the rear of the warehouse with direct access and placing the public facing elements to the north of the warehouse provides the most efficient use of the building footprint and logistical efficiency for the running of the warehouse.



Concept Proposed JES Warehouse Plan

Part 4 Moving forward

Moving forward

Next Steps

Delivery and stewardship of the site

This initial study has explored the potential of site through a new vision for a thriving and sustainable community. It has identified five place objectives to meet this vision and direct future design and development considerations.

In the short term, temporary housing will occupy site and plans will progress for the delivery of the JES building. The masterplan outlined within this study will need to be developed further through the following steps;

Early engagement

It is recommended that an early engagement strategy involving community groups (such as the army veterans) and key stakeholders is undertaken. This will help further the understanding of the local area and reveal local community aspirations and concerns. It will also help identify and enable future ‘place champions’, those individuals and groups who will take an active role in creating a community such as the Veterans group. Innovative engagement and partnership methods should be used early on, to develop exemplary methods of designing, funding, implementing, managing and maintaining the site, throughout all stages of its development and lifecycle and to identify stewardship of key elements.

Circular Economy

The circular economy is a systems solution framework that tackles global challenges like climate change, biodiversity loss, waste, and pollution and cities and neighbourhoods are an ideal environment to apply circular principles. For example by eliminating waste and pollution in our urban developments and systems, we need to build in circular economy principles from the very start of the design process. Cities such as London, Amsterdam and Glasgow required new developments to meet circular economy principles on multiple fronts.

Detailed masterplan and planning consent

Further, more site studies will need to be undertaken to support a detailed masterplan. This will include but not be limited to:

- Utilities and infrastructure plan
- Flood Consequence Assessment (FCA)
- SABS
- Ecological survey
- Landscape masterplan
- Sustainability assessment
- Transport plan

These will inform a detailed masterplan that will in turn form the basis of outline and subsequent detailed planning applications.

Housing Innovation Forum

Potential to establish a “Housing Innovation Forum”, which can be used to secure external market perspective and involvement and test the Masterplan as it emerges. It should comprise of a range of actors in the building environment, and include relevant government stakeholders, house builders, housing associations, lenders/institutional investors and construction industry representatives.

Learning from elsewhere.

Learning from successful urban regeneration elsewhere, the Council should be actively involved in procuring the development, strategically phase development stages, ensure early provision of community infrastructure, allow for meanwhile uses and community initiatives, use “living labs” to test new approaches and ensure land values are determined by what is planned, rather than the other way round.



Gasworks Masterplan Report

Final

24/11/2022



Appendix

Appendix

Subject Ferry Road Gasworks Masterplan - Flooding and Drainage
Job No/Ref 288330
Date 10 November 2022

Ferry Road Gasworks Masterplan – Flooding and Drainage Note

1. Flood Risk and Mitigation

The current published TAN15 Flood Map shows that the northern area of the site is within Flood Zone C1 (areas of flood plain served by significant infrastructure, including flood defences), whilst the central and southern area of the site is within Flood Zone B (areas known to have flooded in the past), see Figure 1.



Figure 1 - Current TAN 15 Flood Map

The NRW Flood Map shows that the northern area is at a low risk of flooding from rivers and sea, but benefitting from flood defences for both. The central and southern area is shown to be outside flood risk areas. It is planned to update TAN15 in 2023 and new flood maps have been published to advise on the flood risk associated with the revised document. These flood maps show that the whole of the site is within a Defended Zone.

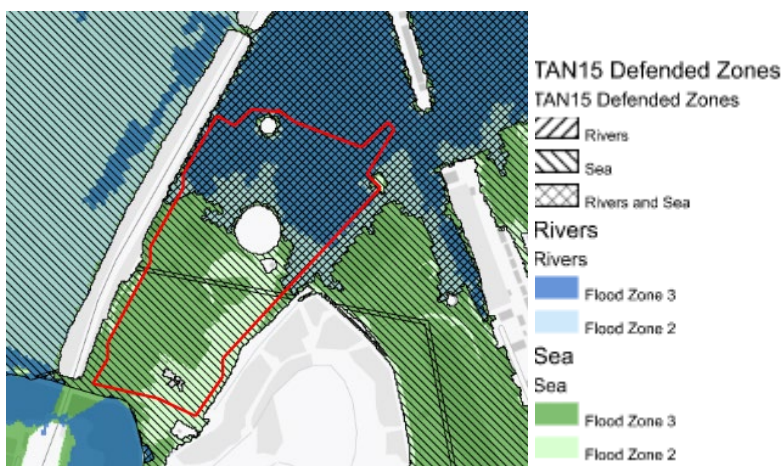


Figure 2 – Proposed New TAN15 Flood Map

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Job No/Ref	288330
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Arup have commissioned specialist flood consultants JBA to clarify the flood risk of the site and advise on potential mitigation measures. JBA have advised that the site is flood free for a 1 in 100 fluvial and 1 in 200 tidal events, taking into account climate change (CC). However, during a 1 in 1000 year flood event, localised areas in the north experience shallow flooding, see yellow and green areas in Figure 3, with an extreme flood level estimated as 7.51mAOD. It is likely that to allow development to proceed in the north, levels will need to be raised. This will lead to a small loss in flood storage and could lead to detriment in external areas, which is not allowed under the current TAN15 requirements. Further detriment testing is currently underway to clarify extent of detriment and to consider compensation flooding. The vast majority of the site is already above 7.51mAOD, and since the extent of flooding is shallow and localised, it is considered likely that a solution can be found by lowering landscaped areas.



Figure 3 – Flood Extent 1 in 1000 year

Under the proposed revised TAN15 proposals, the 1 in 1000+CC for fluvial events also needs to be considered. JBA have also modelled this scenario, the flood extent is more significant, covering the northern area of the site, see green, yellow and orange areas in Figure 4, with an extreme flood level estimated as 8.44mAOD. By raising the site levels in the north, more significant flood volume is lost and off-site detriment is likely to occur. Under the proposed masterplan, areas in the centre of the site are to be kept low and landscaped as part of the 'Sponge Park', this provides an opportunity to compensate for some of the loss of flood storage, however the area is smaller than that shown coloured in Figure 4 and therefore is unlikely to remove all the detriment. There is currently some uncertainty regarding the timing and requirements of the new TAN15, therefore the impact of this issue on the development proposals is not clear.

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Figure 4 – 1 in 1000+CC Flood Extent

A separate emergency works scheme is currently being planned for the site, as part of these works, areas in the north will be raised under the existing TAN15, which will change the flood baseline and would benefit the future provision if implemented as planned.

2. Drainage

The site was a gasworks for a number of years and was served by existing drainage. A large surface water drainage pipe is present along the eastern boundary of the site, a ditch is present along the western boundary and the River Ely is present to the south-west. A DCWW combined sewer is present along the north-eastern boundary, whilst further combined sewer are present within Ferry Road to the north. A private rising main and pumping station is present along the river in the south, it is understood this transmits flow for Sports Village site to the DCWW network the other site of the River Ely further west.

New foul drainage will need to be provided for the proposed development. The likely destination for foul flows is towards the existing combined sewers in the north-east, although the possibility of connecting into the pumping station to the south could be explored, if that is adopted by DCWW and capacity exists. The site is relatively flat and it is considered likely that one or two pumping stations will be required on site to transmit flows to the existing DCWW foul network.

New surface water drainage will need to be provided for the proposed site. In Wales, Schedule 3 of the Flood and Water Management Act 2010 has been implemented, requiring sustainable drainage to be incorporated into development plans, in accordance with Welsh Government standards and Sustainable Approval Bodies (SABs) in Local Authorities to review proposals, via Pre and Full SAB Applications. For this site, infiltration is unlikely to be an acceptable option due to ground contamination, the destination for

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surface water flows are likely to be the large surface water sewer in the east and River Ely in the south. Water will need to be treated close to source; measures such as green roofs on buildings, permeable paving, bioretention devices (rain gardens) and swales could be considered to provide appropriate treatment. Attenuation may be required, although significant attenuation is available along and downstream of the River Ely from the impounded Cardiff Bay barrage and the SAB has indicated that this could be used for attenuation. The proposed masterplan takes into account the requirements for sustainable drainage, rain gardens are proposed along the streets, whilst the proposed 'Sponge Park' running through the centre of the site offers opportunities to both treat and attenuate flows via swales and basins; green roofs and permeable paving should be considered for buildings and large parking areas respectively, see surface water drainage concept in Figure 5.

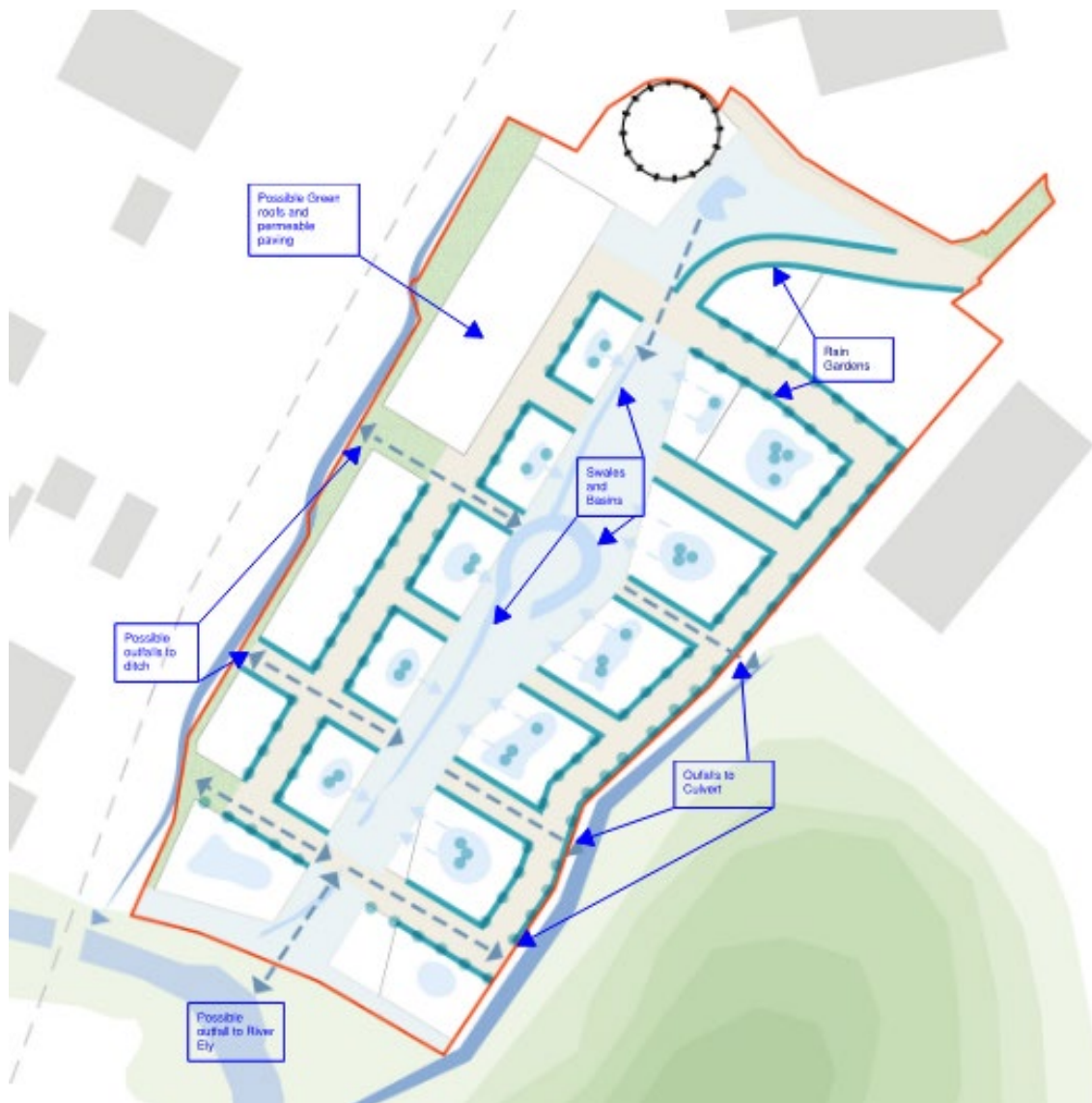


Figure 5 – Surface Water Drainage Concept