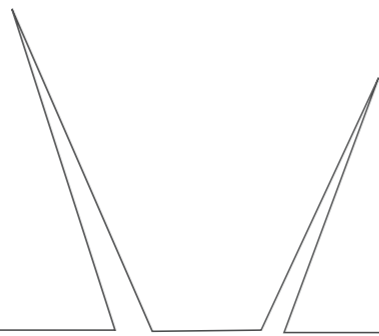


kettle
c o l l e c t i v e

| The Clyde Crossing
Design summary





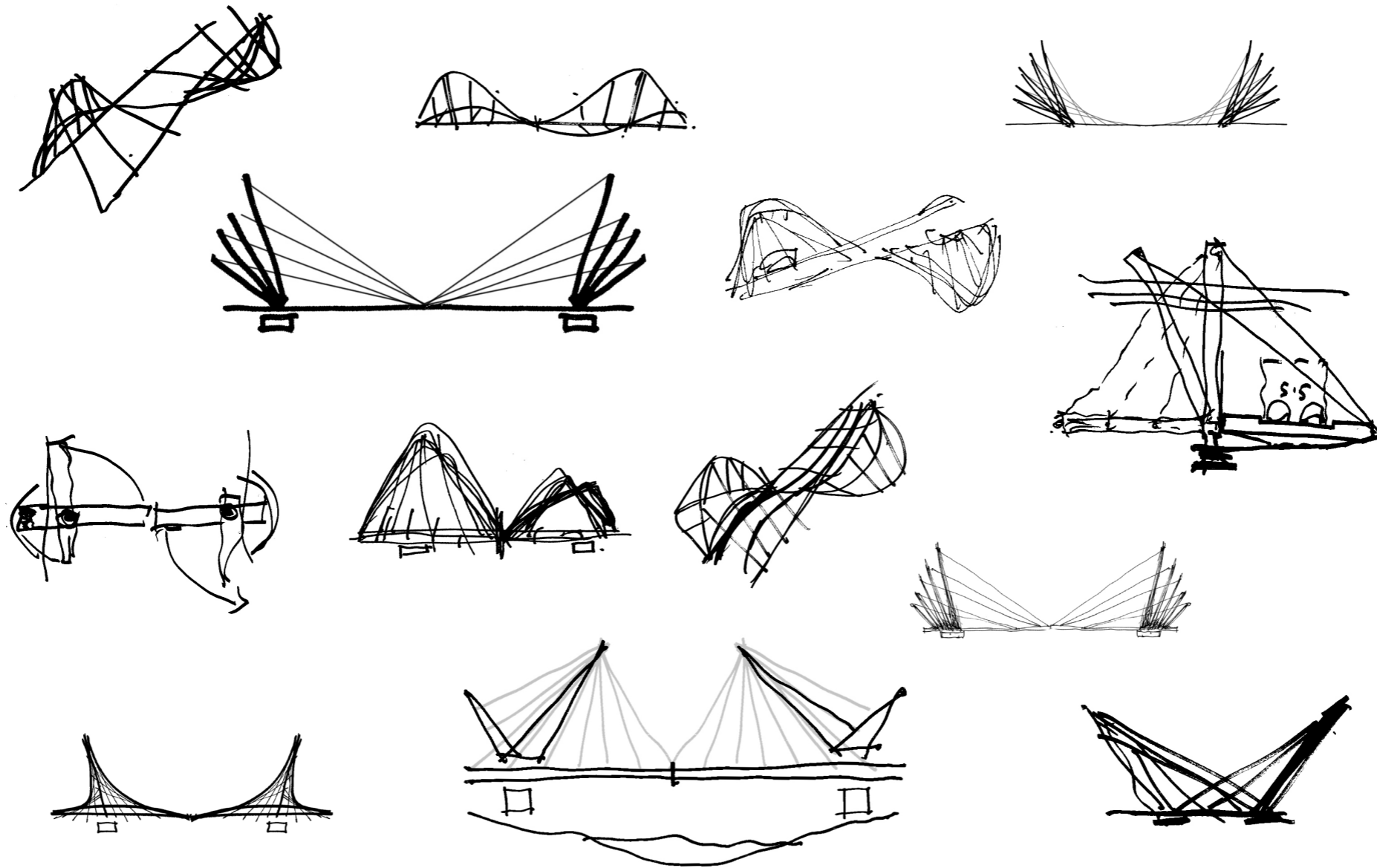
- 01 Introduction
- 02 Site context
- 03 Historic context
- 04 Masterplan Analysis
- 05 Concept
- 06 Proposals
- 07 Landscape strategy
- 08 Roads
- 09 Key buildings
- 10 Bridge proposals
- 11 Bridge lighting
- 12 Bridge Control buildings

Date	Revision	Prepared By	Checked By	Authorised By
04/07/17	00	LT	DH	TK

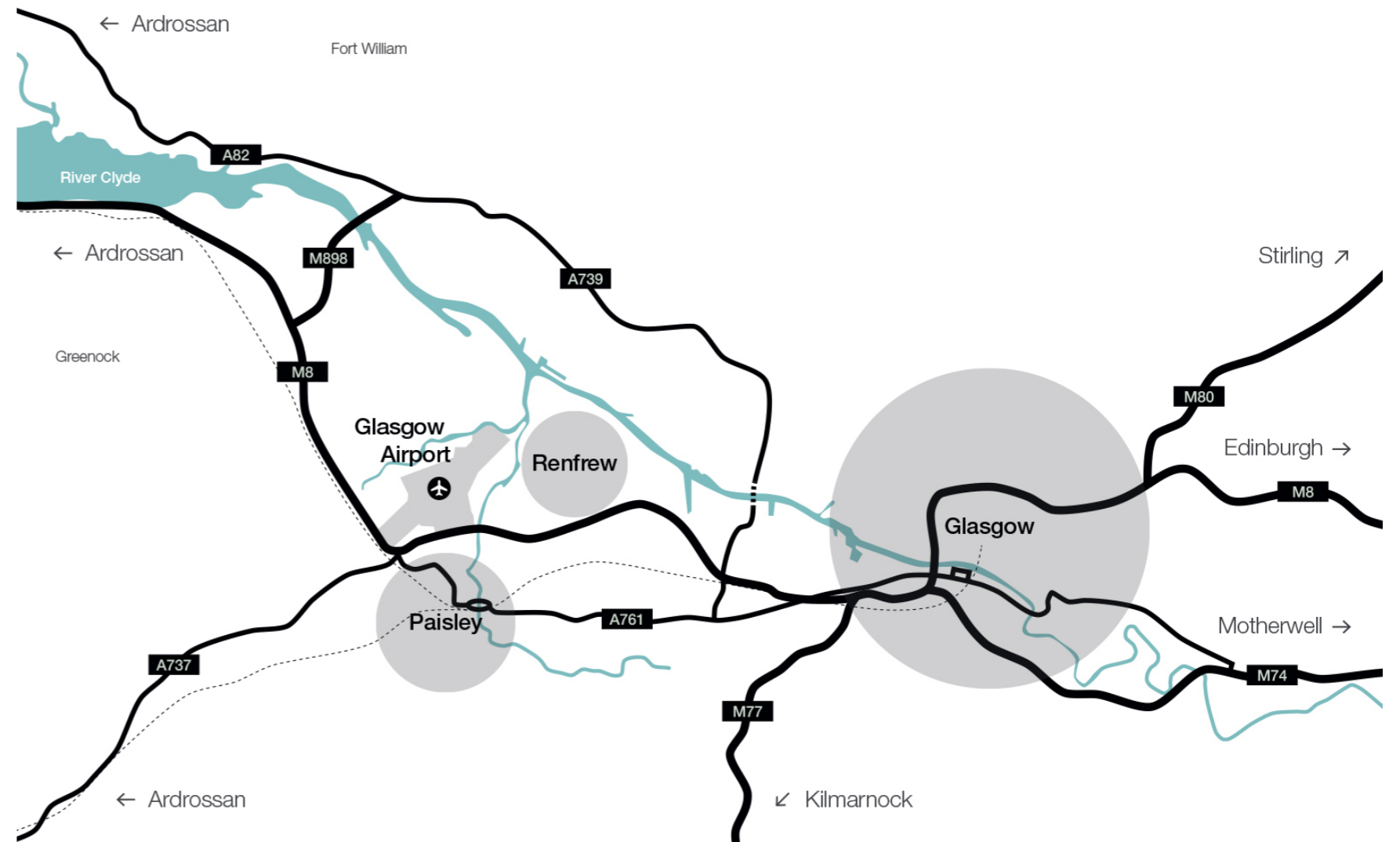
1. Introduction

The intention of this document is to provide a summary of the research and design work carried out on the study area around the proposed Clyde Crossing between Renfrew and Yoker.

A summary of the analysis and heritage research has been included, along with design work covering the bridge and associated control buildings.



2. Site context





GLASGOW
AIRPORT

PAISLEY

RENFEW

★ BRIDGE
LOCATION

YOKER

RIVER CLYDE

Site location

The study area is located on either side of the Clyde, close to both Yoker and Renfrew. The site is defined by its location on the Clyde waterfront, with the proposed bridge potentially creating a location of key importance. Glasgow airport is located close by to the south east of the site, and is located on an approach route. Being located on the airport approach and within a 13km radius of the airport, it is important that CAA design guidelines for development be taken into consideration.

The study area is located within the Clyde Waterfront and Renfrew Riverside, under the Renfrew City Deal Masterplan, of which the proposed bridge is a key part. This is part of a wider development area extending to and including areas around Glasgow Airport.

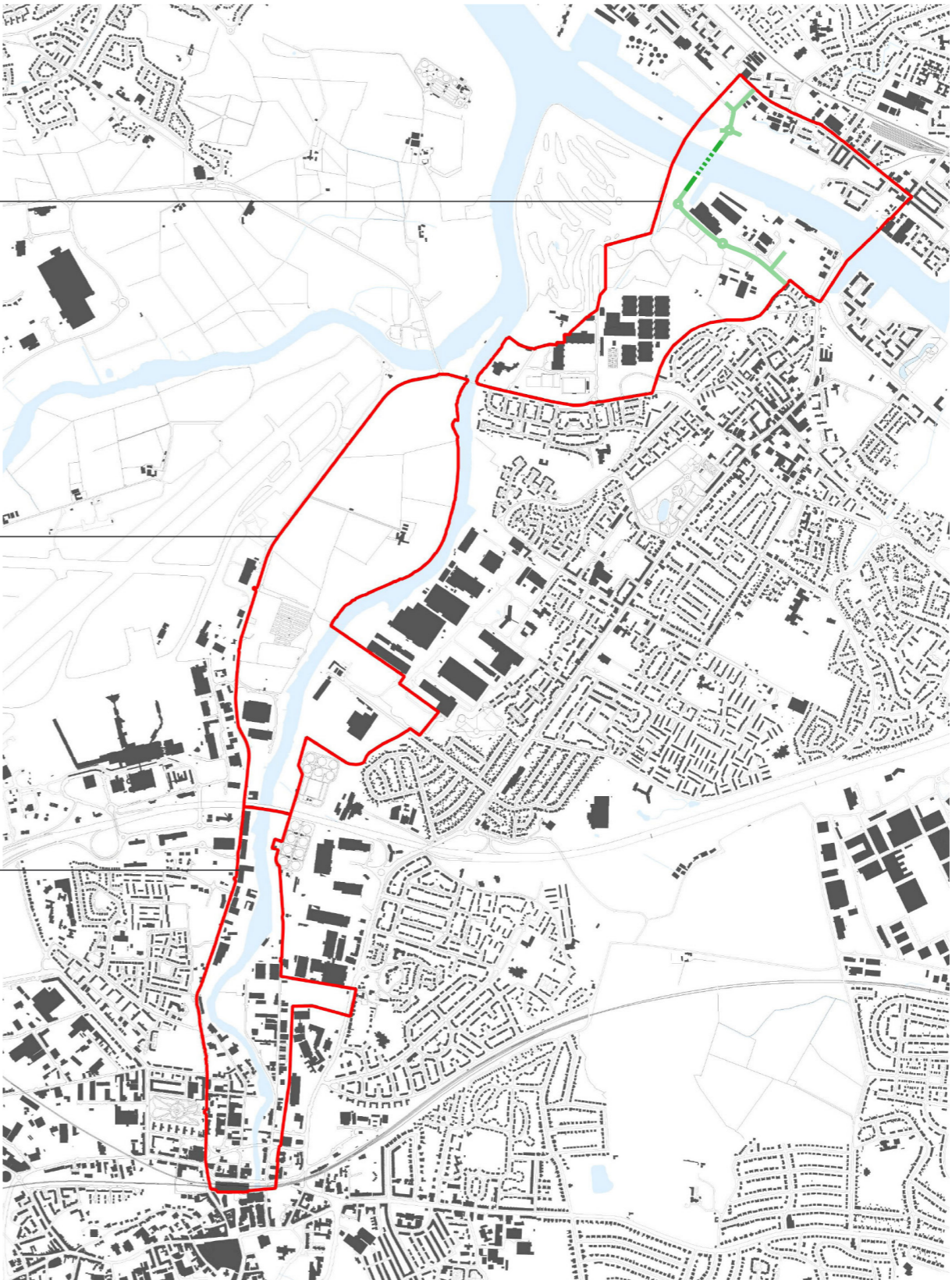


Clyde Waterfront and Renfrew Riverside (CWRR)

Glasgow Airport Investment Area (GAIA) North

Glasgow Airport Investment Area (GAIA) South

-  **New Roads**
-  **Proposed Bridge Crossing**











Background

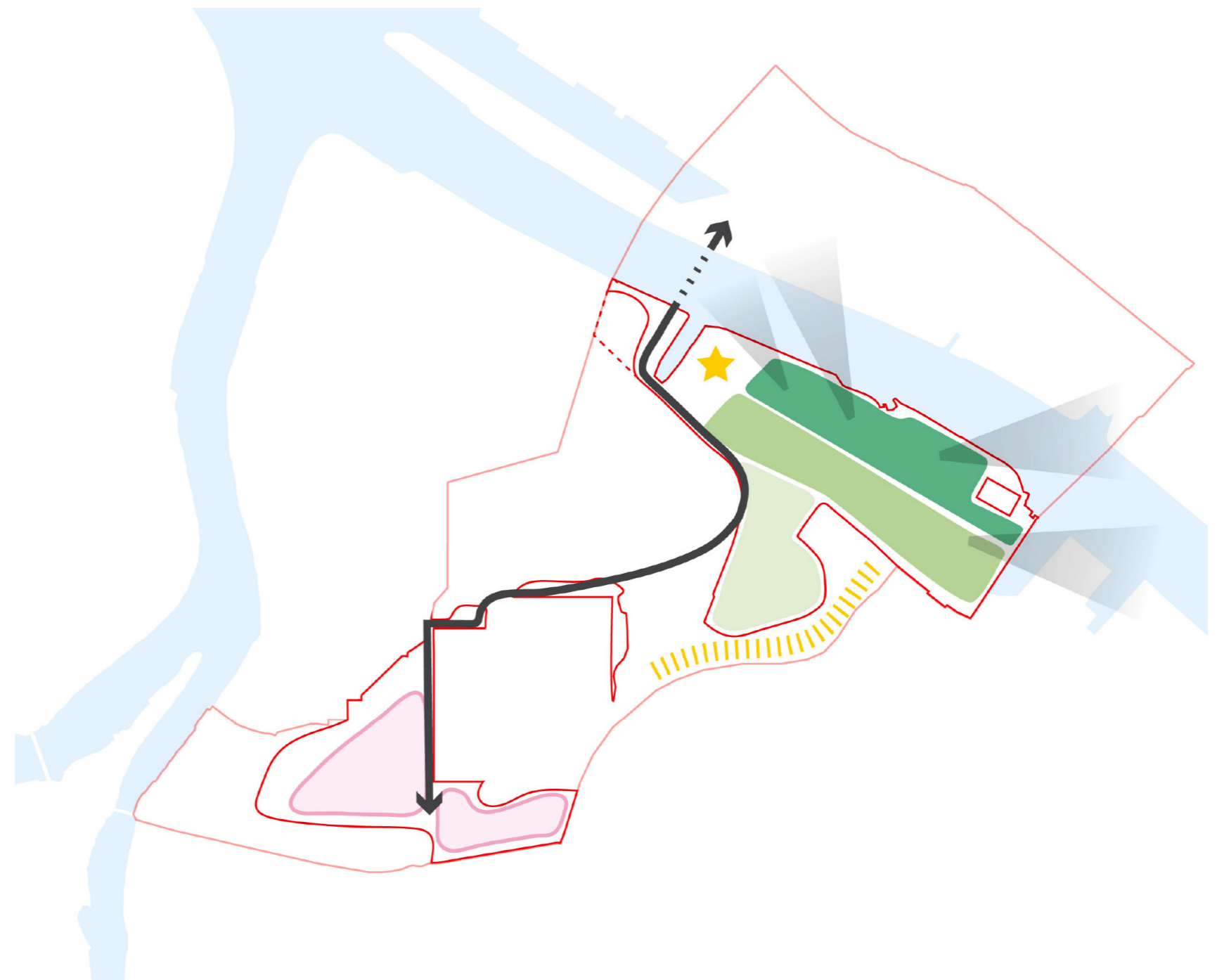
Research and analysis has been carried out by others to determine the most appropriate locations and types of development.

An extract of this research is as follows;

Along the waterfront, high density housing is proposed to take advantage of the good views along the river and the prime waterfront setting. Medium density and low density family dwellings are located south of this. Development is sympathetic to the 'sensitive boundary' of existing residential areas, with low density family dwellings placed adjacent to this.

To the south of the site, two development areas are identified. However, due to the constraint of the existing Major Hazard Site around the Diageo Whiskey Bond, the exact development type is unknown at this stage.

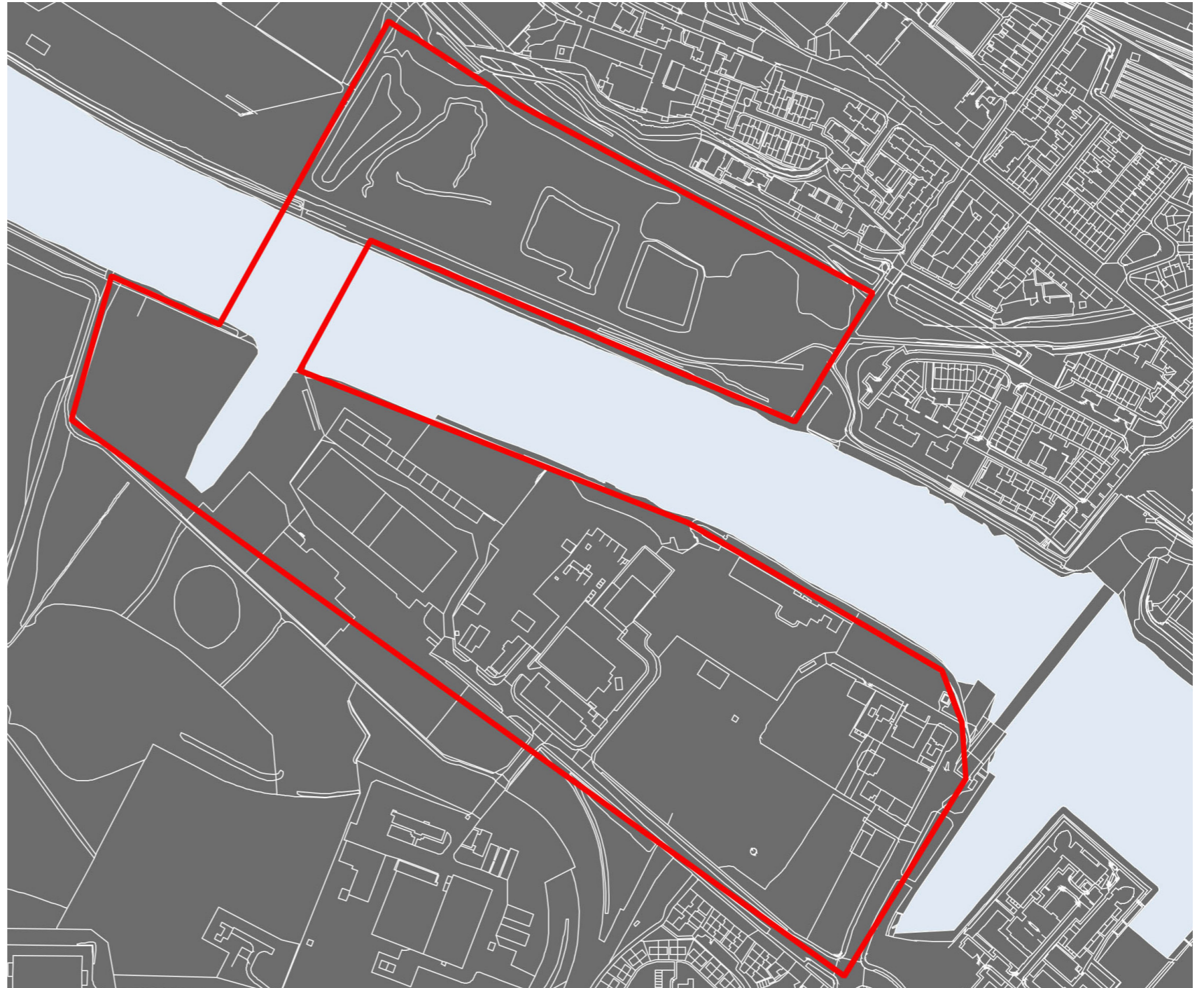
-  Destination / Local Attraction
-  High Density Residential Development Plot
-  Medium Density Residential Development Plot
-  Low Density Residential Development Plot
-  Development Plot (Type TBC)
-  Sensitive boundary by existing housing
-  Views
-  CWRR Site Boundary





Study area

The study area encompasses the bridge site, the control building sites and the two masterplan areas on both the Yoker and Renfrew sides of the Clyde. The southern (Renfrew) side of the study area currently is in use as a range of industrial units, and most notably around the bridge landing area as a scrapyard. The northern (Yoker) side is currently a vacant site, which has a quantity of demolition material. Residential masterplan proposals have been developed for both sites by other consultants.



Site location within context



Current masterplan proposals

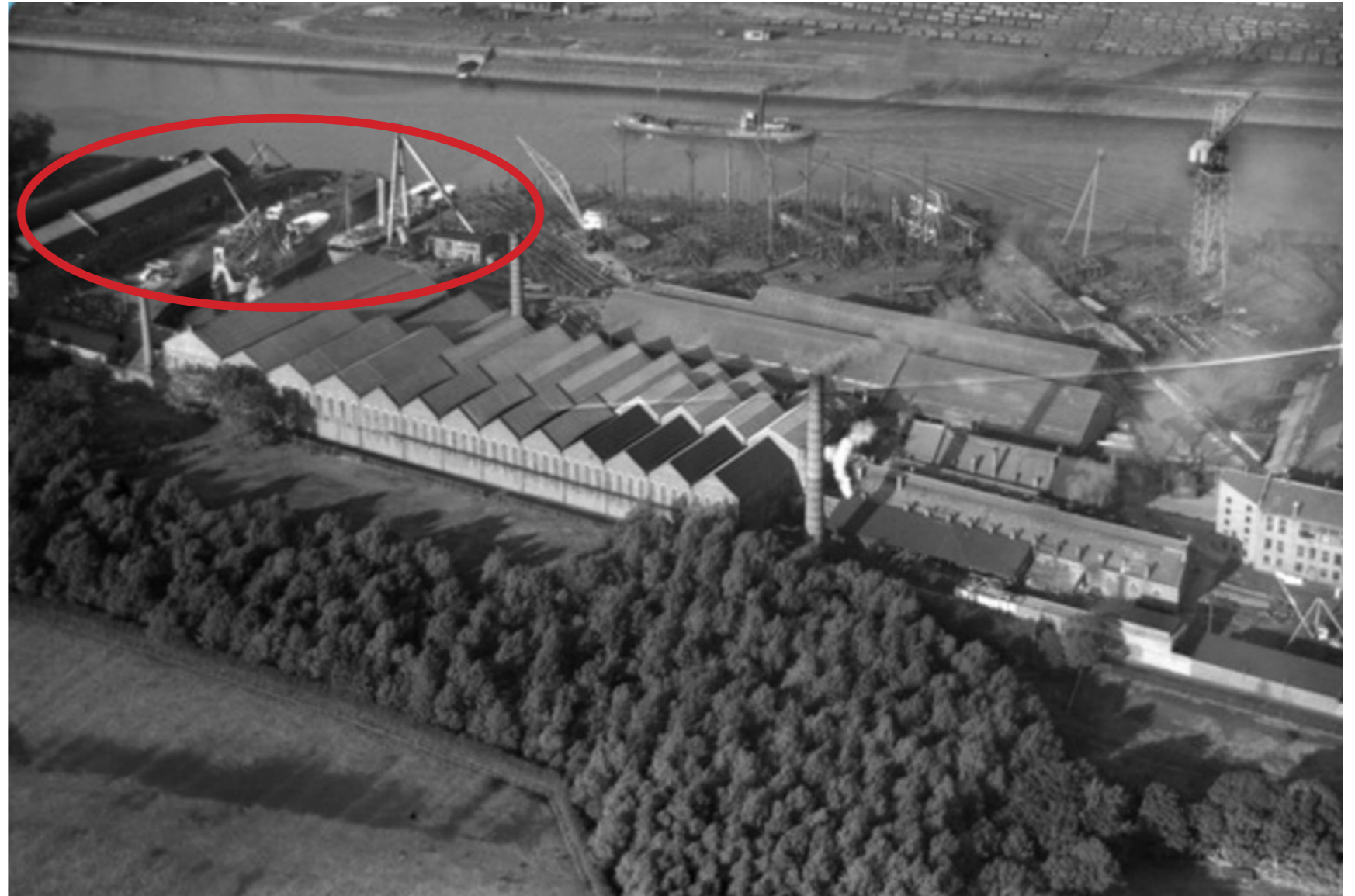
3. Historic Context

The study area is located just a few miles west of Glasgow, and historically was an area of small communities, with Renfrew being a significant settlement and Royal Burgh. The river was obviously of much importance, being the focus for industry, trade and employment.

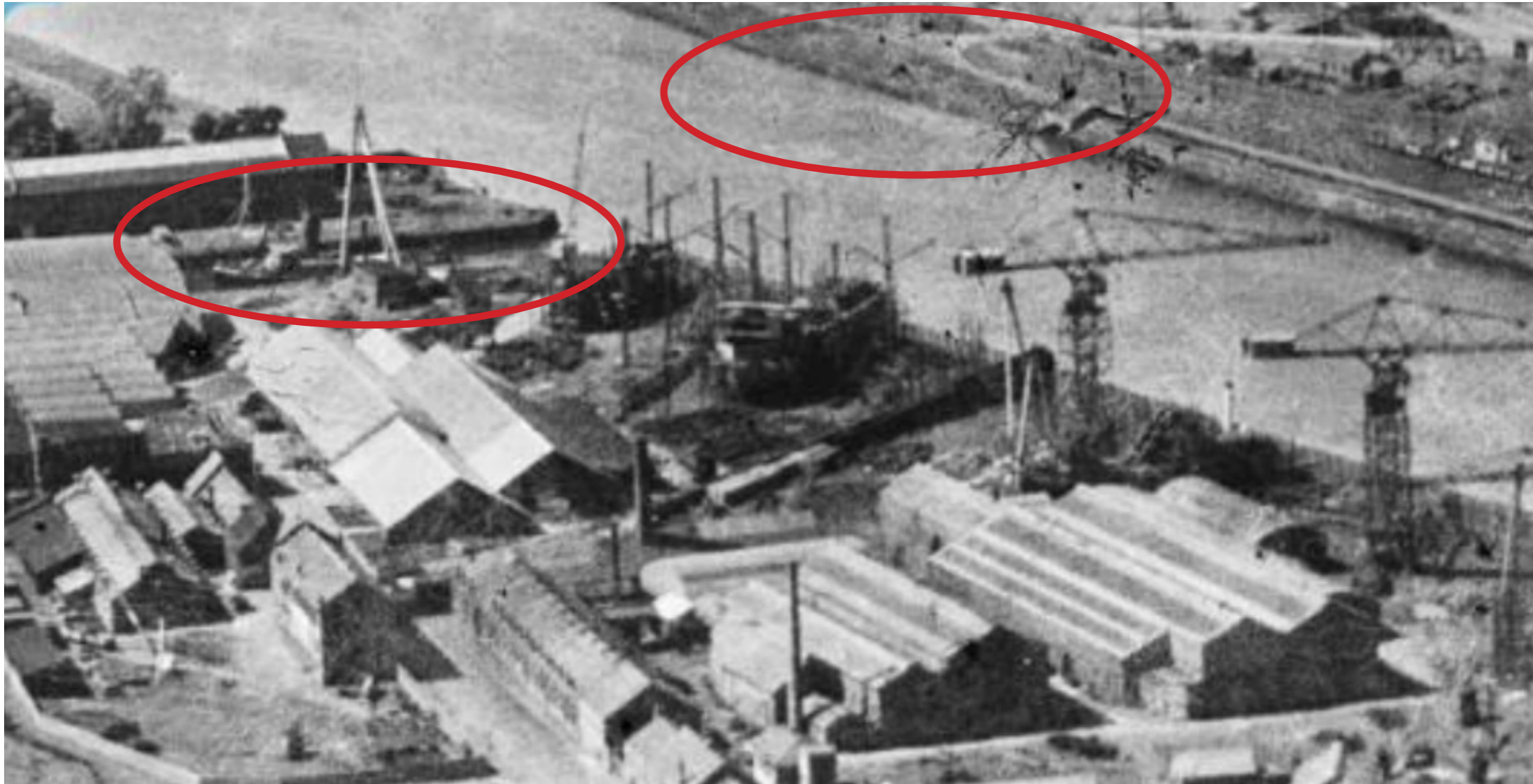
Several large country houses were located in the area, with Renfield (latterly Blythswood) house being one of these. Blythswood House existed as Renfield House for a number of years (potentially from the late 18thC) and was redesigned in 1821. The house was demolished in 1935, leaving behind just the established gardens, which later became the Renfrew Golf Club site (in 1973) after relocating from the Elderslie Estate close by.

Yoker, located on the Yoker Burn- historically formed the district boundary and still does. The Yoker Burn was culverted in 19th C, and still remains so for at least for the last few hundred metres before it reaches the Clyde. This is now visible as an opening adjacent to the boundary of Rothesay Dock. The presence of the Yoker Burn allowed the beginnings of industry with milling and later distilling happening not far from the northern edge of the site.

On the southern edge of the river, adjacent to the Blythswood Estate, a shipyard was established during the early 19th C, with the Henderson, Coulburn and Co, yard, followed by the Lobnitz yard. Boat building had been present on the site from the 1860s, (evident from historic maps of the period). The shipyards, here adjoined by others such as the Simons and Co. yard continued to construct vessels until the 1960s when the Lobnitz yard closed. The dock, brick built sheds still remain, whilst the site is in use as a significant sized scrapyard.



Aerial photo, 1927 with site located



Aerial photo, 1936 with site located



Aerial photo, 1920s



Aerial photo, 1920s

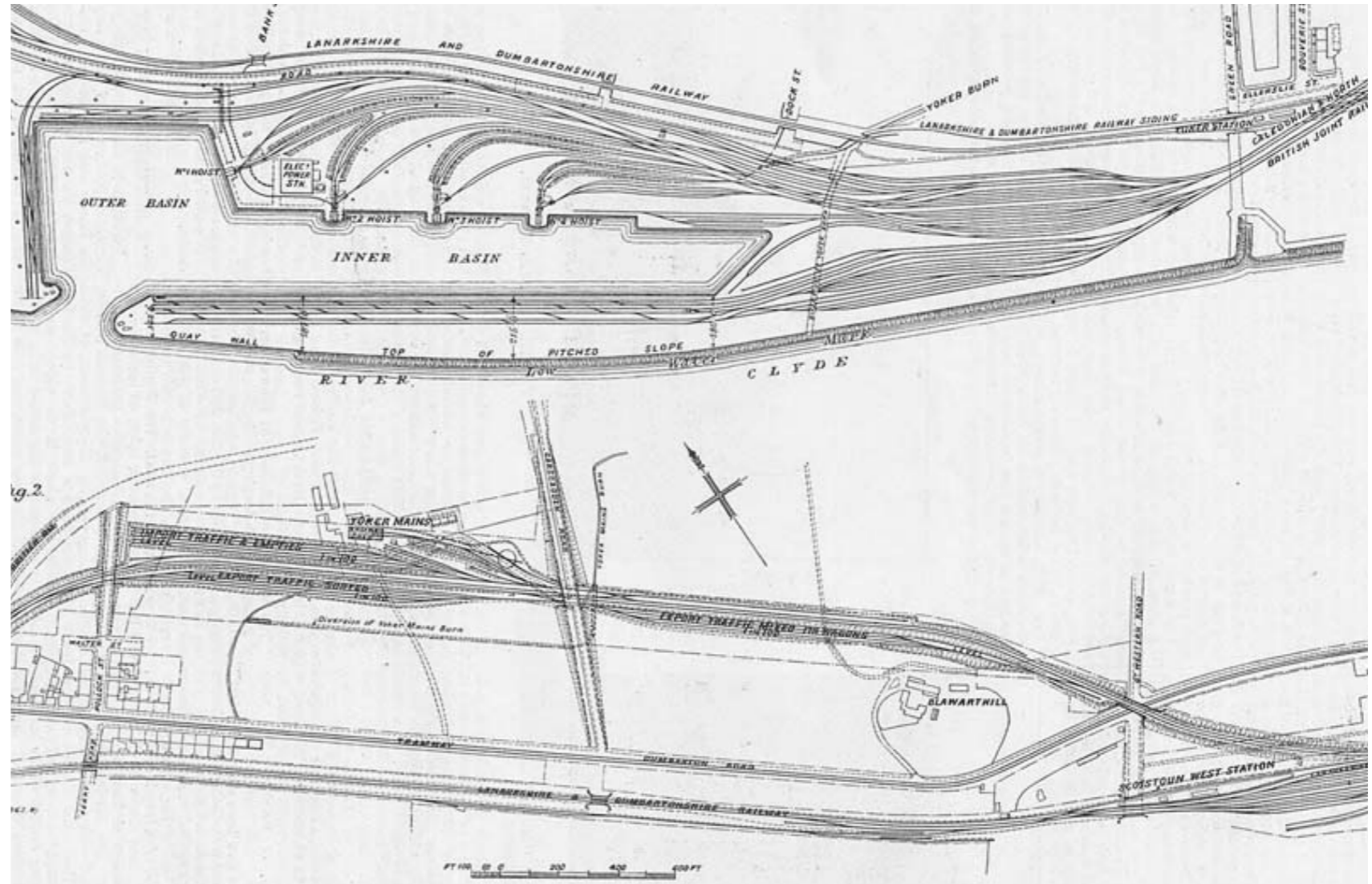


Aerial photo, showing Simons and Lobnitz shipyard and dock

Historic mapping

Through the 19th Century, railways became increasingly important as a means of connecting with river edge. Rail line shifted goods to and from the railways to cranes at the dock edges. In the adjacent Rothesay Dock image, the various rail lines are mapped to show how they connect across the study area to the dockside.

This element could be reflected in potential proposals across the northern site.

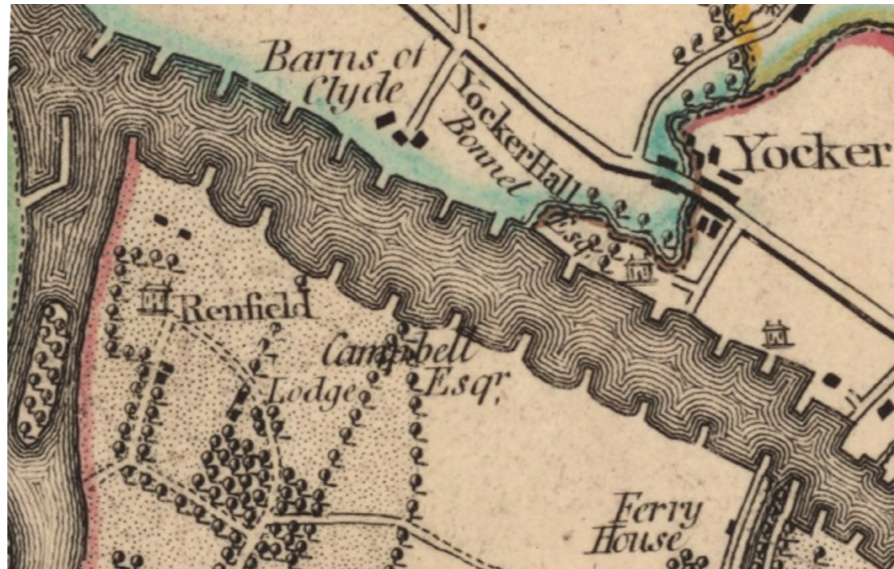


ry. The "Madeira of the North" is | The dimensions, form, and equipment of the | been adopted throughout as the motive power, and 1899, and the work commenced in 1 | s scenic beauty; the dock which bears | dock have been determined with special regard to | as this is the first comprehensive installation of | of the dock is published on this map

Historical Rothesay Dock railway plans



1654



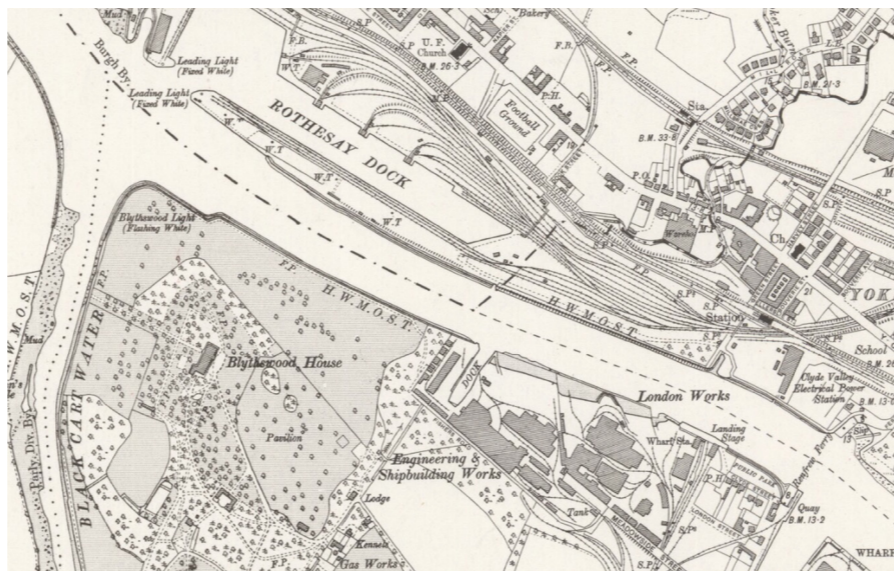
1796



1864



1896



1914



1950

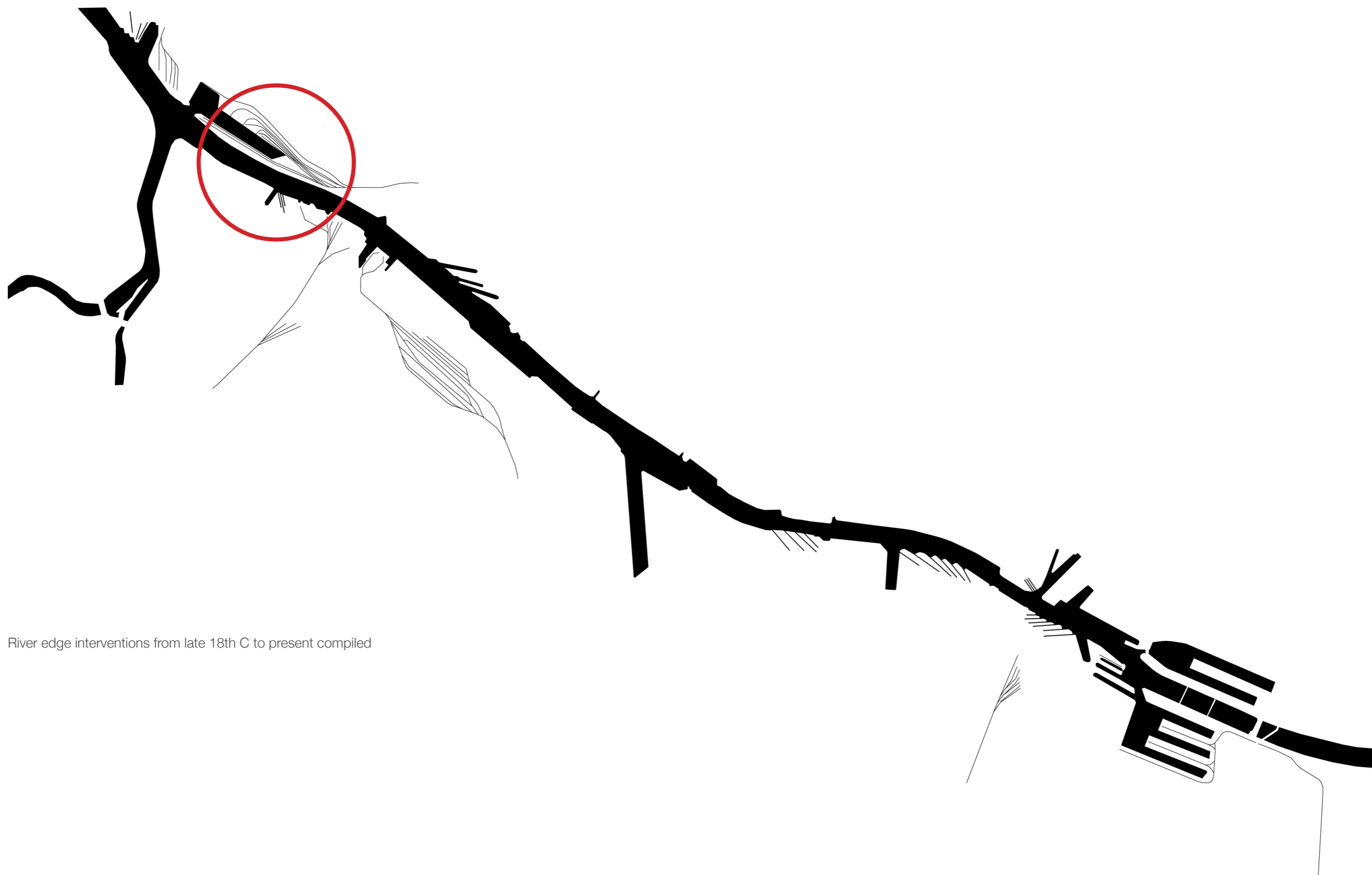
Extracts of maps from historic maps from 1654- 1950

Historic mapping

The presence of these angled slipways in the OS map published in 1864, and which were subsequently extended as evidenced in early 20th C aerial photography are a strong element within the site. It can be noted also, that the dock takes a different form here.



Extract from 1864 OS map



River edge interventions from late 18th C to present compiled

Shipbuilding on site

Shipbuilding was happening on this site from at least the early 19th C. Lobnitz had joined the company Henderson, Coulburn and Co. at this location in the mid 19th C, and later was part of Coulburn, Lobnitz and Co, established in 1874. By the end of the 19th C, the company was named Lobnitz and Co. The company specialised in dredgers and steam engines, including the rock cutting dredger 'Derocheuse' used in the Suez canal.

Simons and Lobnitz was a company formed from two neighbouring yards, joined in 1957, however by 1964 the yard was closed. 1300 vessels were constructed during the years of operation, including a number of minor warships between 1915 to 1945.

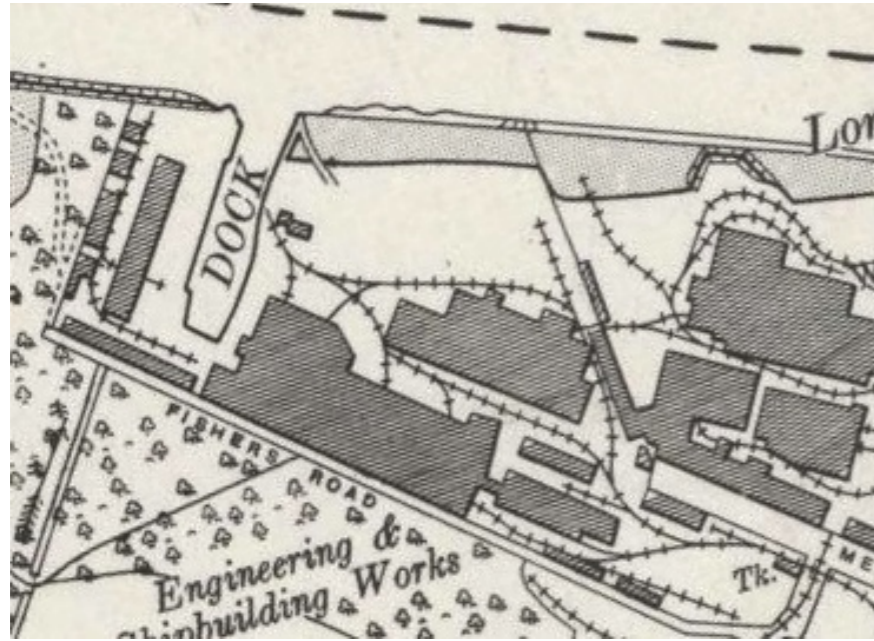
Following the closure of the yard, the site has operated as a scrapyards, which it currently is.



Arched entranceway into building



Arched entranceway into building



1937 map of yard



Present day aerial view of the yard



Arched entranceway into building



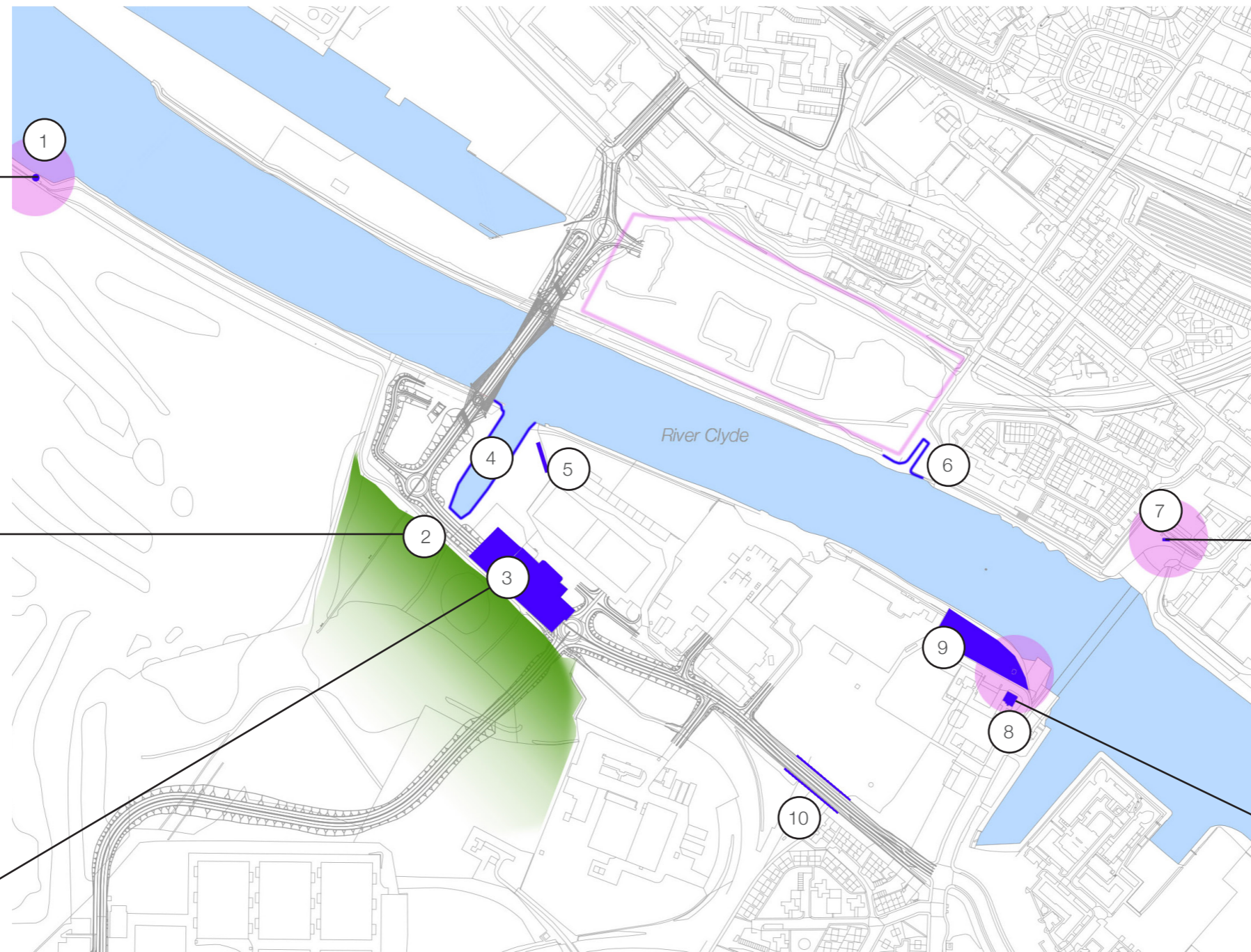
Present day aerial view of the yard, with building highlighted

Heritage elements

A number of elements exist on site that reflect the former uses and heritage of the area, and the river as a whole. Brick masonry, steel and industrial details are all elements that could be translated into any future plans. The archways, roof pitches, brick and masonry could be retained and reused on site, perhaps in gabion walling. Archways could be retained and reconstructed as architectural gateway elements. Materiality could reflect the industrial heritage of the site, through use of cor ten steel, or in situ concrete.

The presence of the small public park space adjacent to the Ferry Inn, sets a precedent for an extended waterfront park.





1. Blythswood Beacon Lighthouse
2. Ancient woodland
3. Former Lobnitz depot building
4. Lobnitz Dock
5. Slipways (visible on aerial photography as vegetation)
6. Small Dock
7. Former ferry building
8. Ferry Inn
9. Public park (with engine of former ferry displayed)
10. Road bridge



Heritage elements visibly present on and around the site

4.0 Analysis

The following outlines the masterplan proposals for the study area and the relationship between these and the proposed bridge.

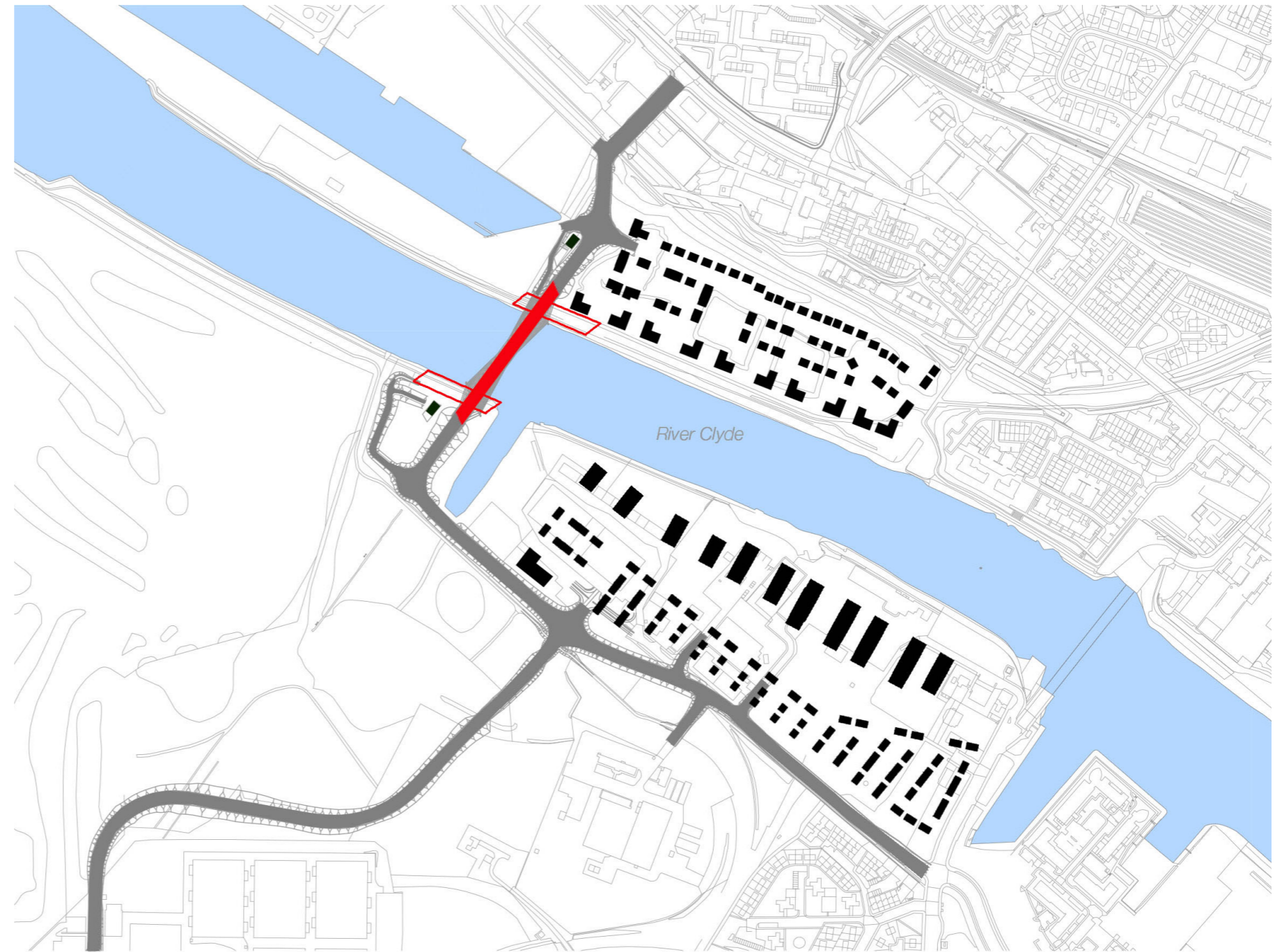
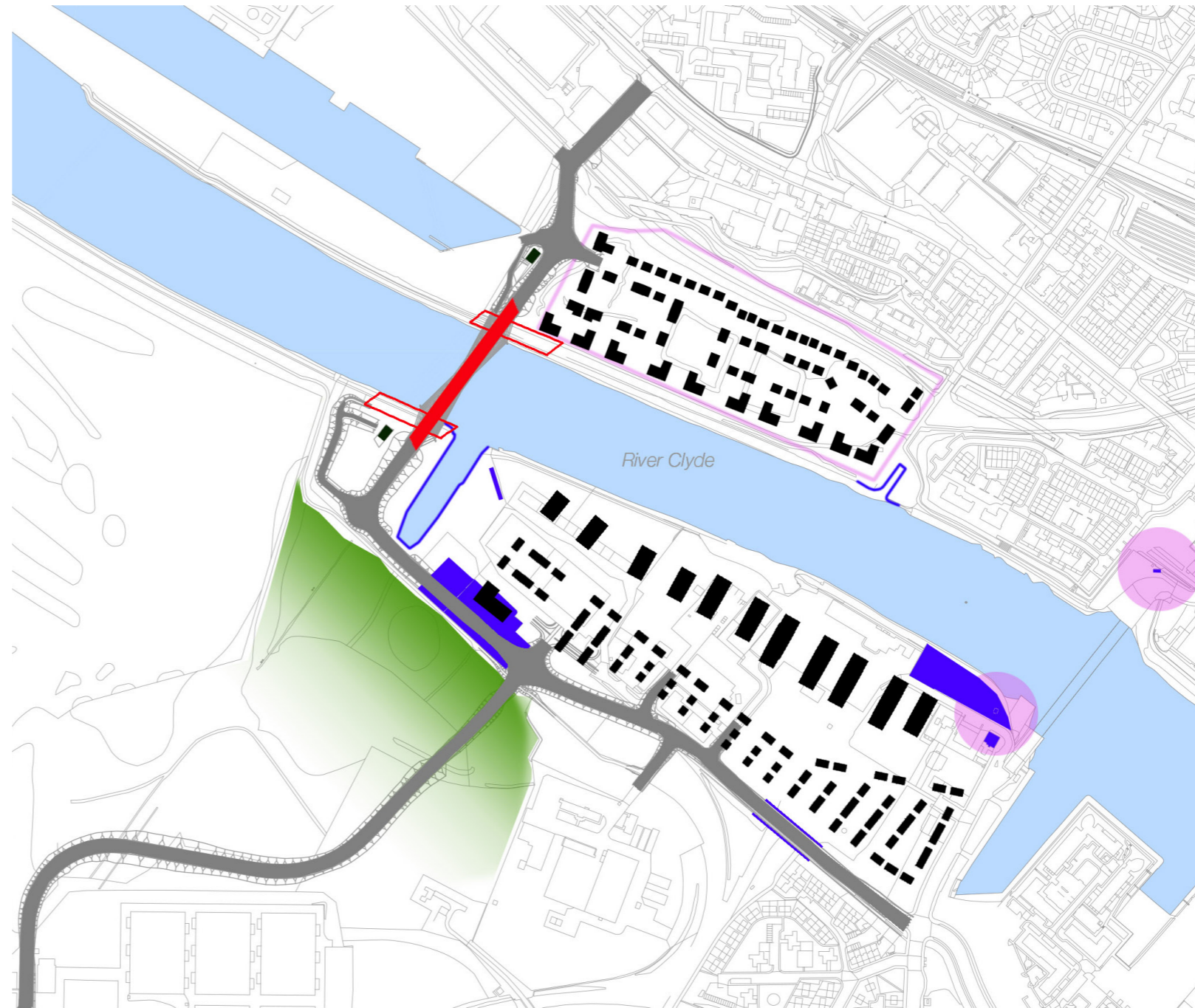


Diagram to show current masterplan configuration

Heritage

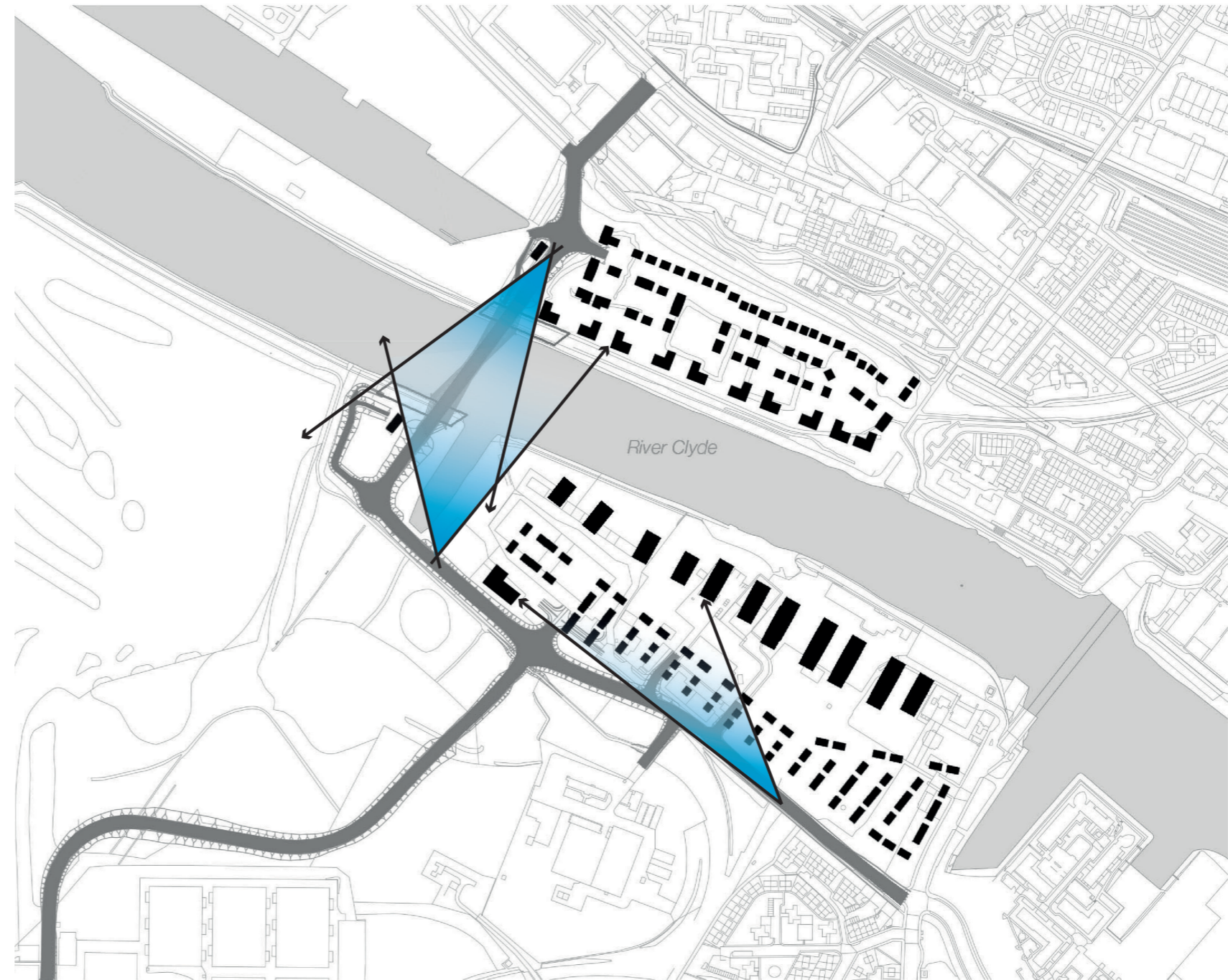
Heritage elements that still exist (or partially exist) on site are overlaid with the current masterplan proposals. These heritage elements, along with forms identified in the historical research have potential to generate forms and layouts for the masterplan, which could be reflected in a potential adjustment to the plans. The forms of the proposed bridge, derived from the forms of cranes on the river, would share a common root with the masterplan proposals if they were derived from the site's industrial heritage.



Existing heritage elements on site and their relationship to the current masterplan

Views

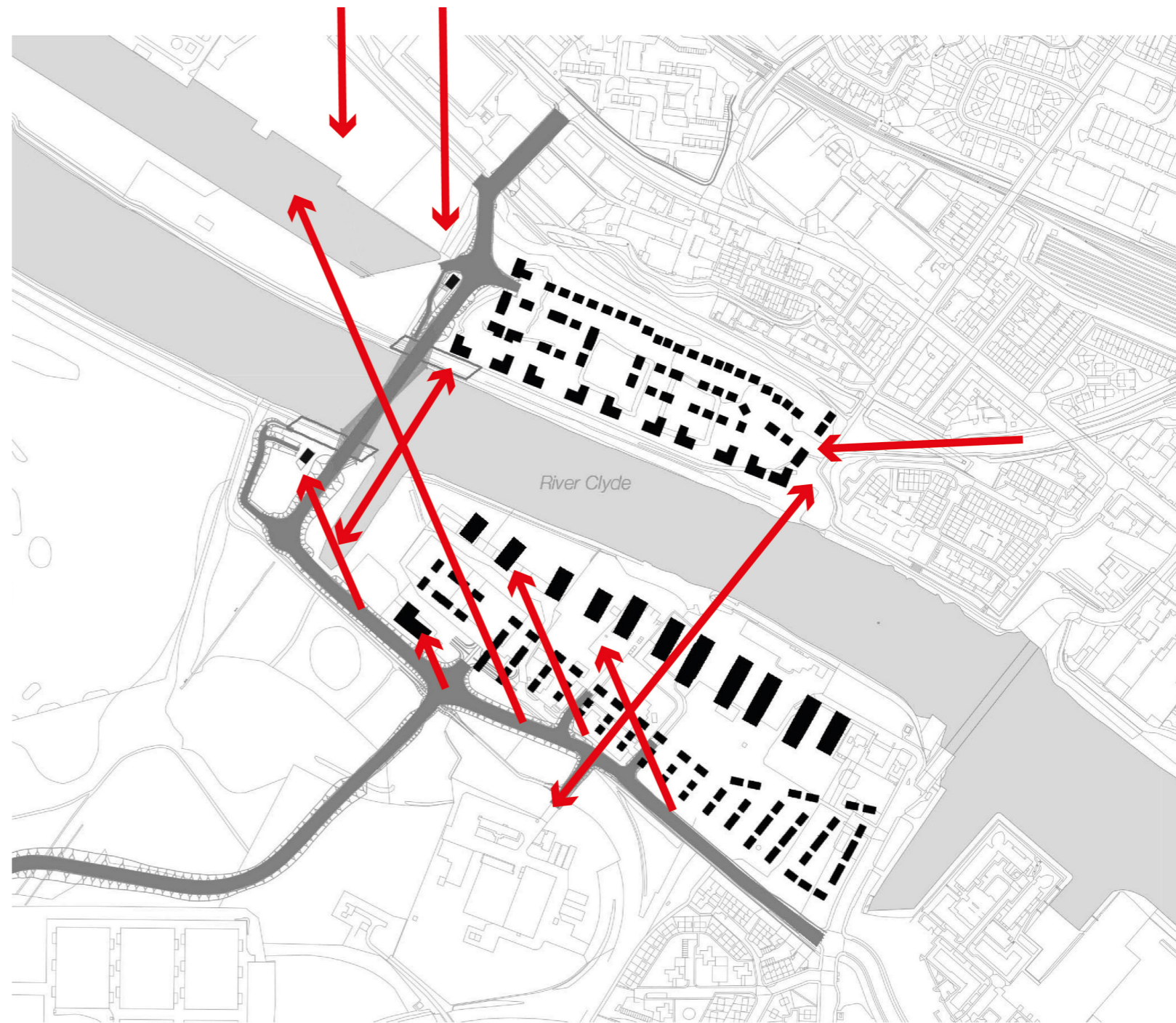
In this diagram it can be seen that potential views from the approach road might be obscured by the location of the buildings here. There is potential for views towards the bridge and the river to be framed and channelled through the built form here, which could be achieved with an adjustment of the orientation of particularly the waterfront blocks.



Views towards bridge are obscured by siting and location of buildings

Axes






In this diagram it can be seen that potential axes from the approach road might be obscured by the location of the buildings here. There is potential for views towards the bridge and the river to be framed and channelled through the built form here, which could be achieved with an adjustment of the orientation of particularly the waterfront blocks. There is also an opportunity to create an axis across the river, joining the two masterplan sites together.

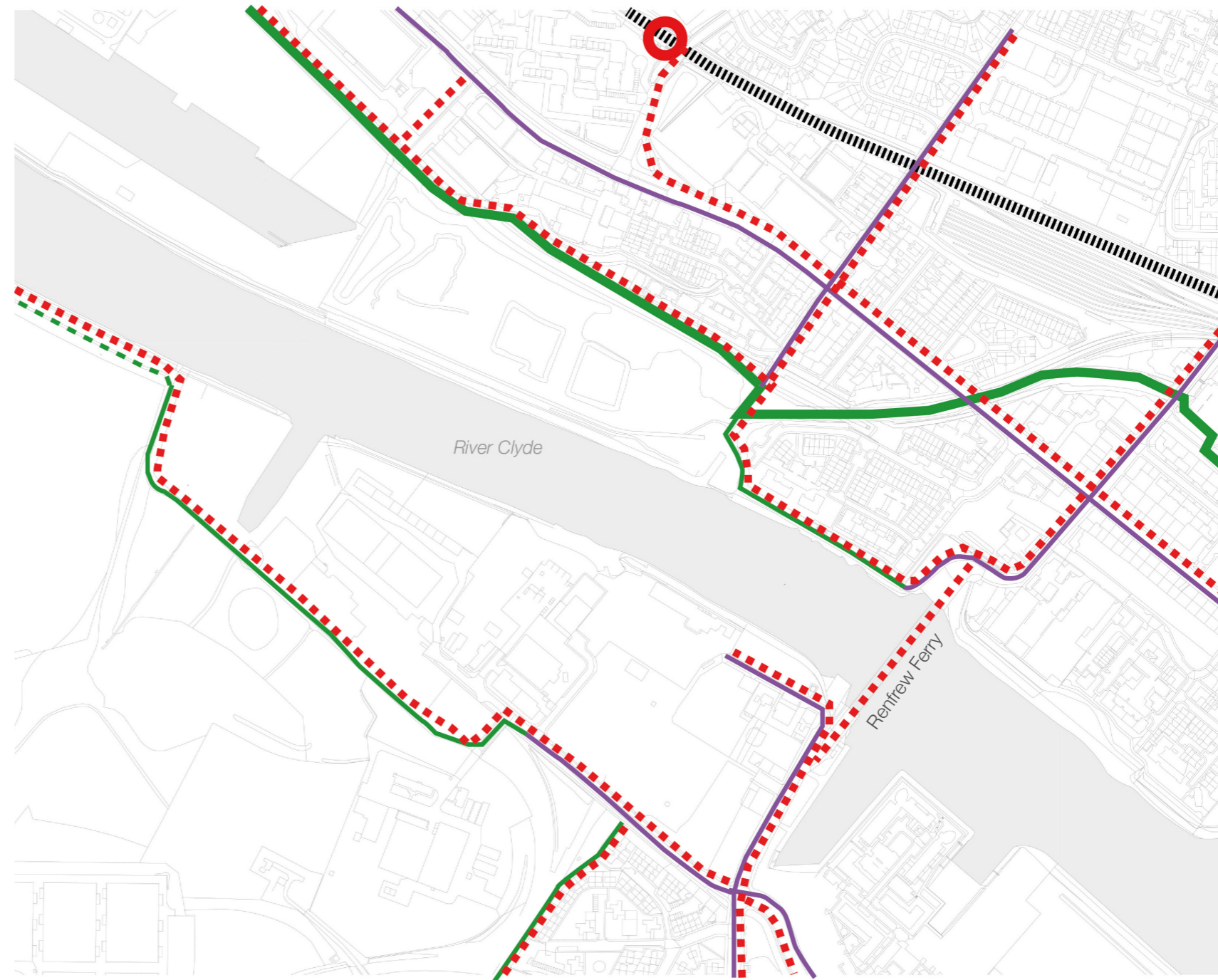


Potential axes and view corridors and their relationship to current masterplan. Views towards the bridge are obscured by the proposed buildings

Existing routes

There are a number of established existing pedestrian routes running close to the site, including the Fishers Rd, which runs along the southern boundary. It is key that in any future development, connectivity is improved, with a particular focus on ensuring pedestrian connections across the river via the proposed bridge. There is also a marked lack of any routes running alongside the river itself, including the area around the existing dock (adjacent to the bridge site).

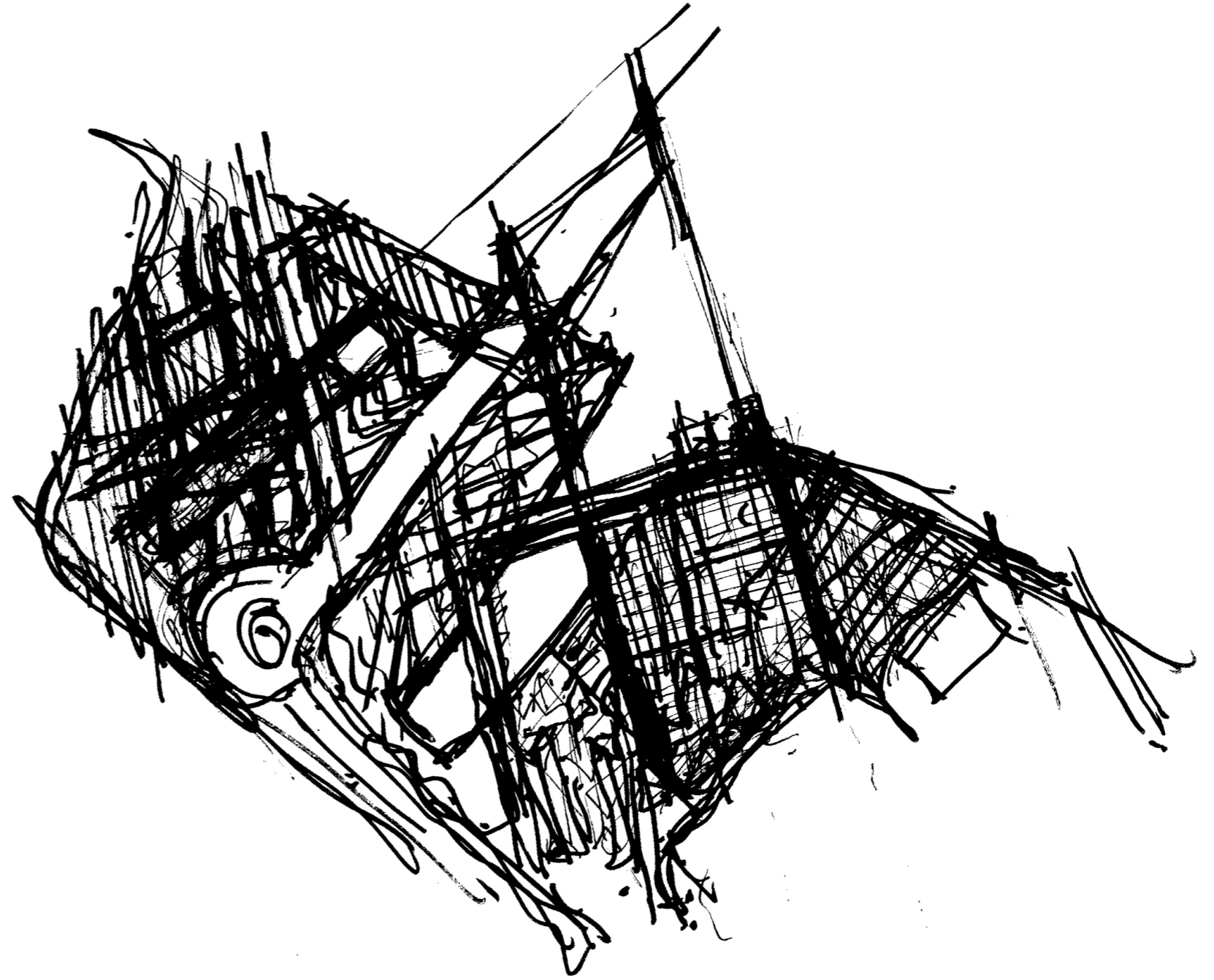
-  Existing pedestrian paths
-  Existing traffic- free route not on the National Cycle Network
-  Existing on road route not on the National Cycle Network
-  Railway line
-  Existing traffic free route on the National Cycle Network

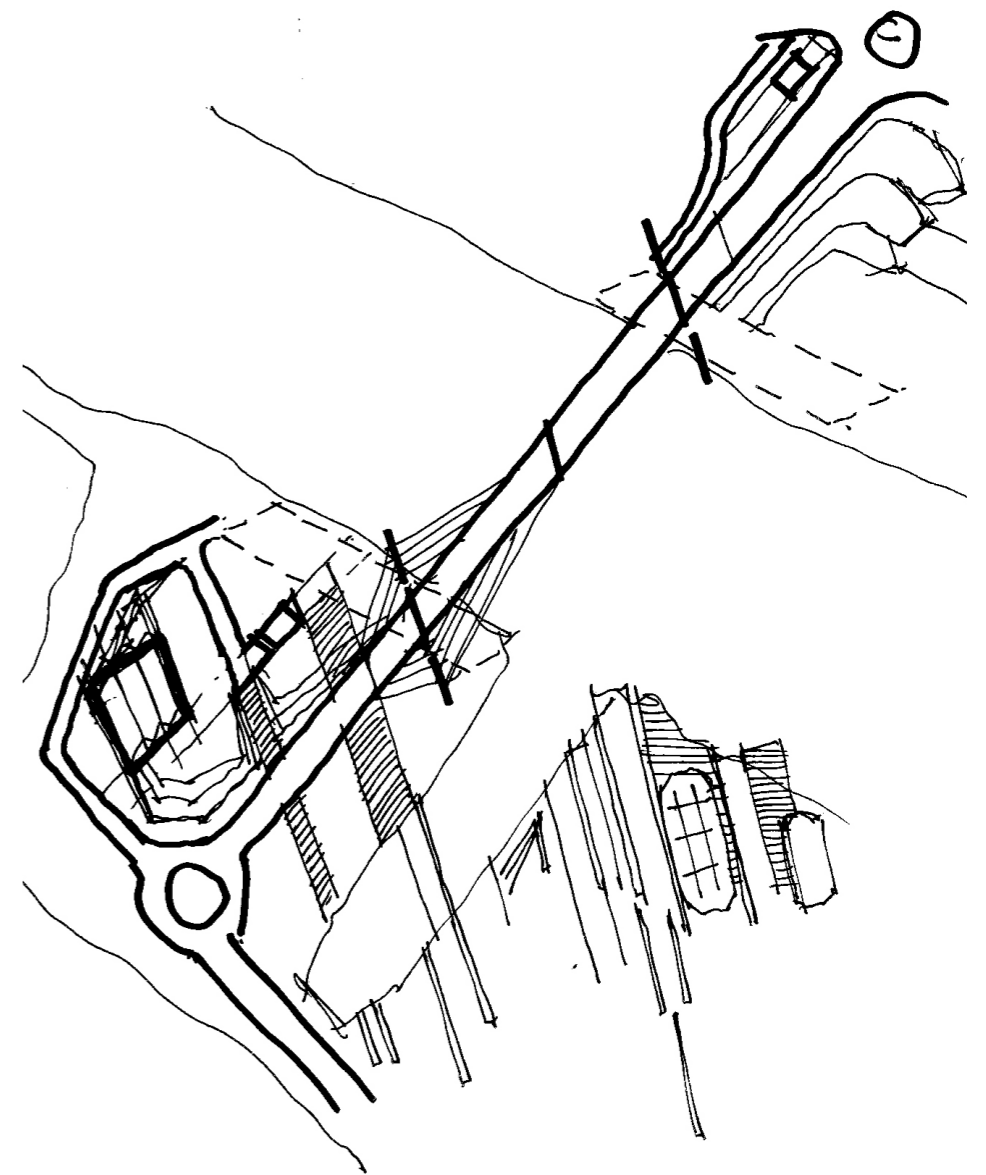
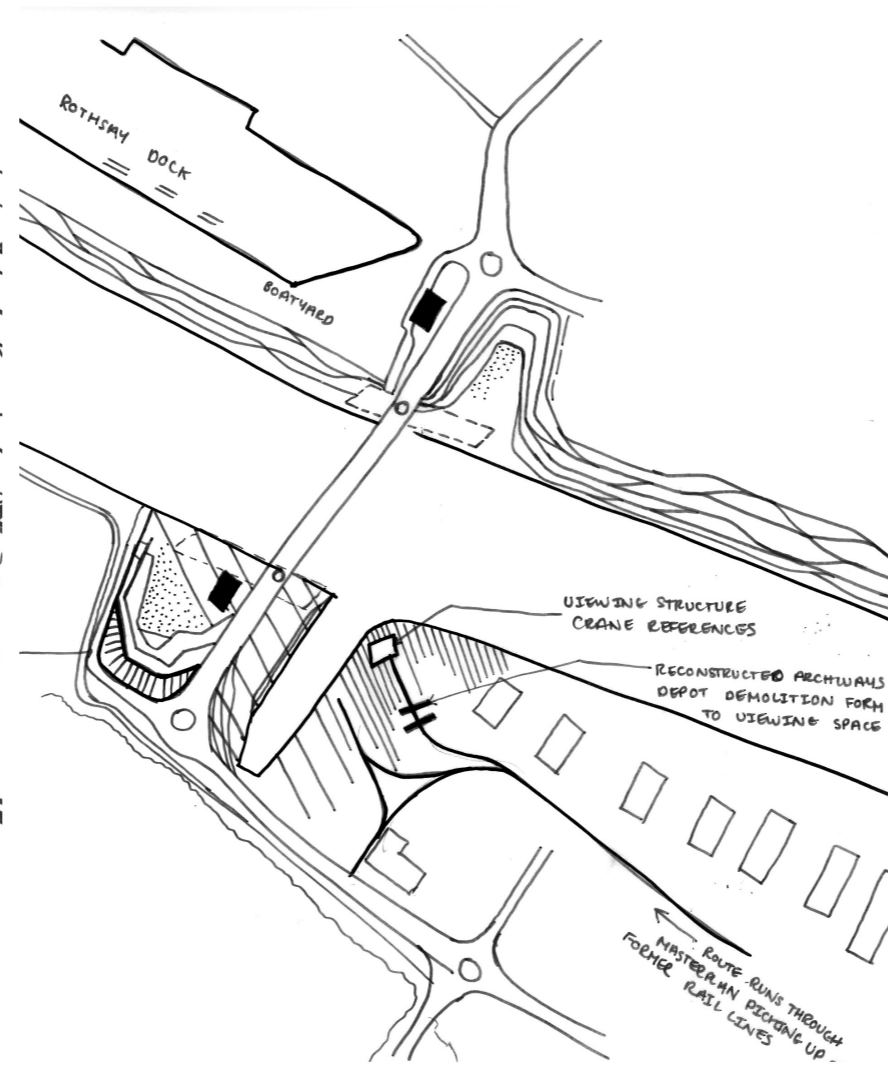
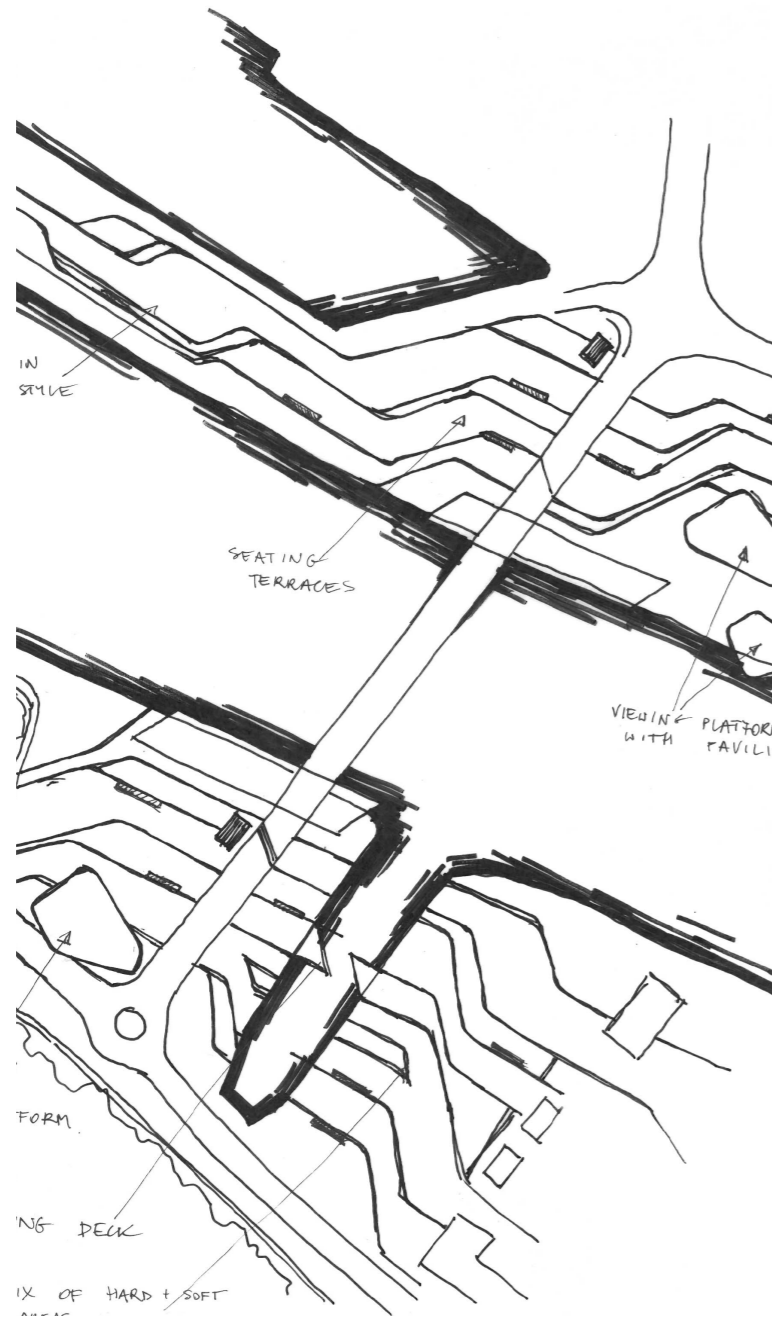




5. Concept development

The site concept is developed from a recognition of the site heritage, as a means of reflecting on the former use of the site and bringing it into the present.





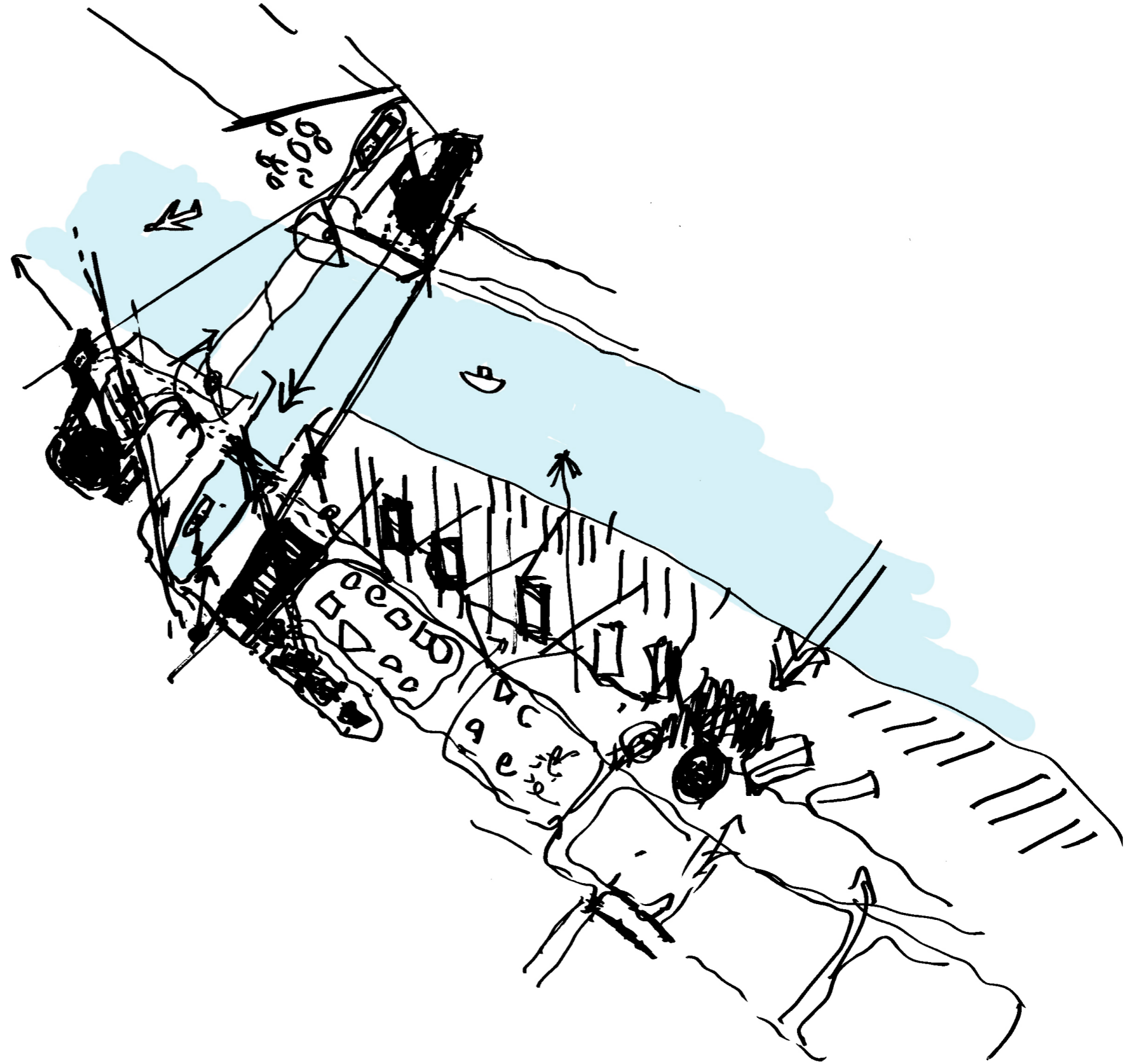
Exploratory sketches

6. Proposals

The intention is to create a connective landscape, which draws together the proposed bridge with the masterplan proposals. The aim is to celebrate the bridge crossing, creating views across from the approach.

View lines connect from the road across the development towards the bridge, with gateway residential buildings located on either side of the bridge.

The use of the industrial heritage of the site as part of the generator for the masterplan means that there is a common inspiration for both the bridge and the masterplan.



Concept sketch

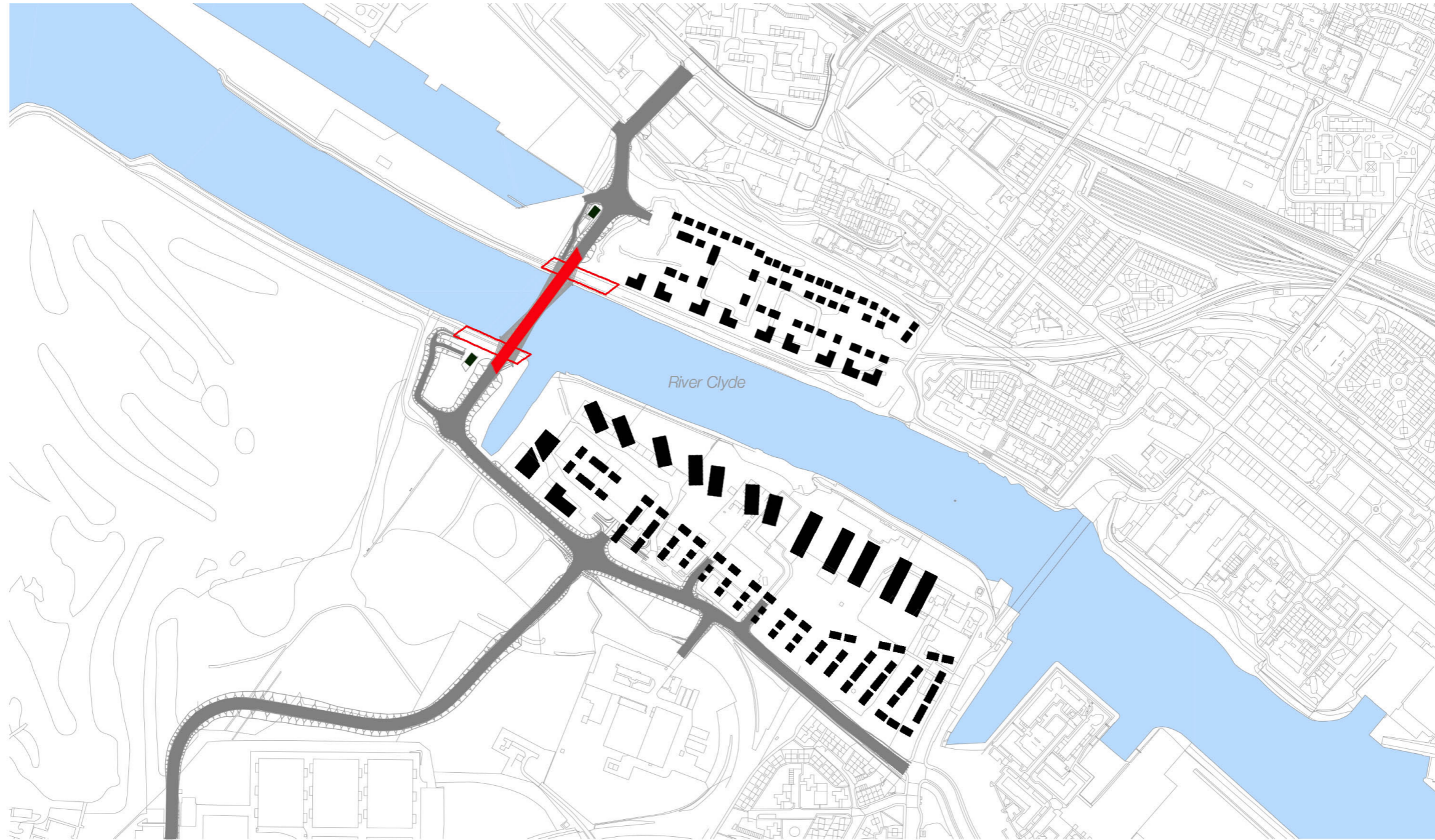
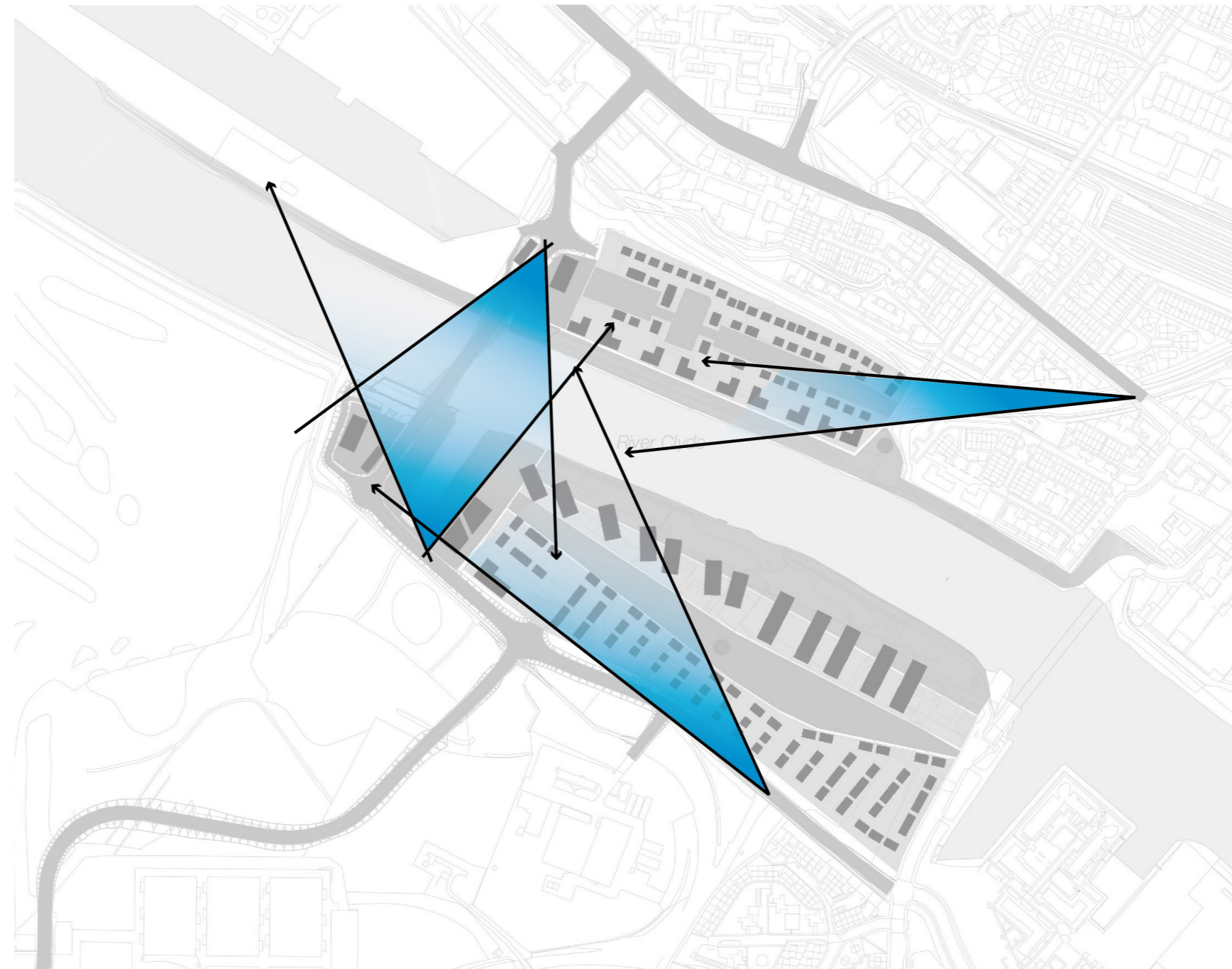


Diagram of proposed masterplan configuration

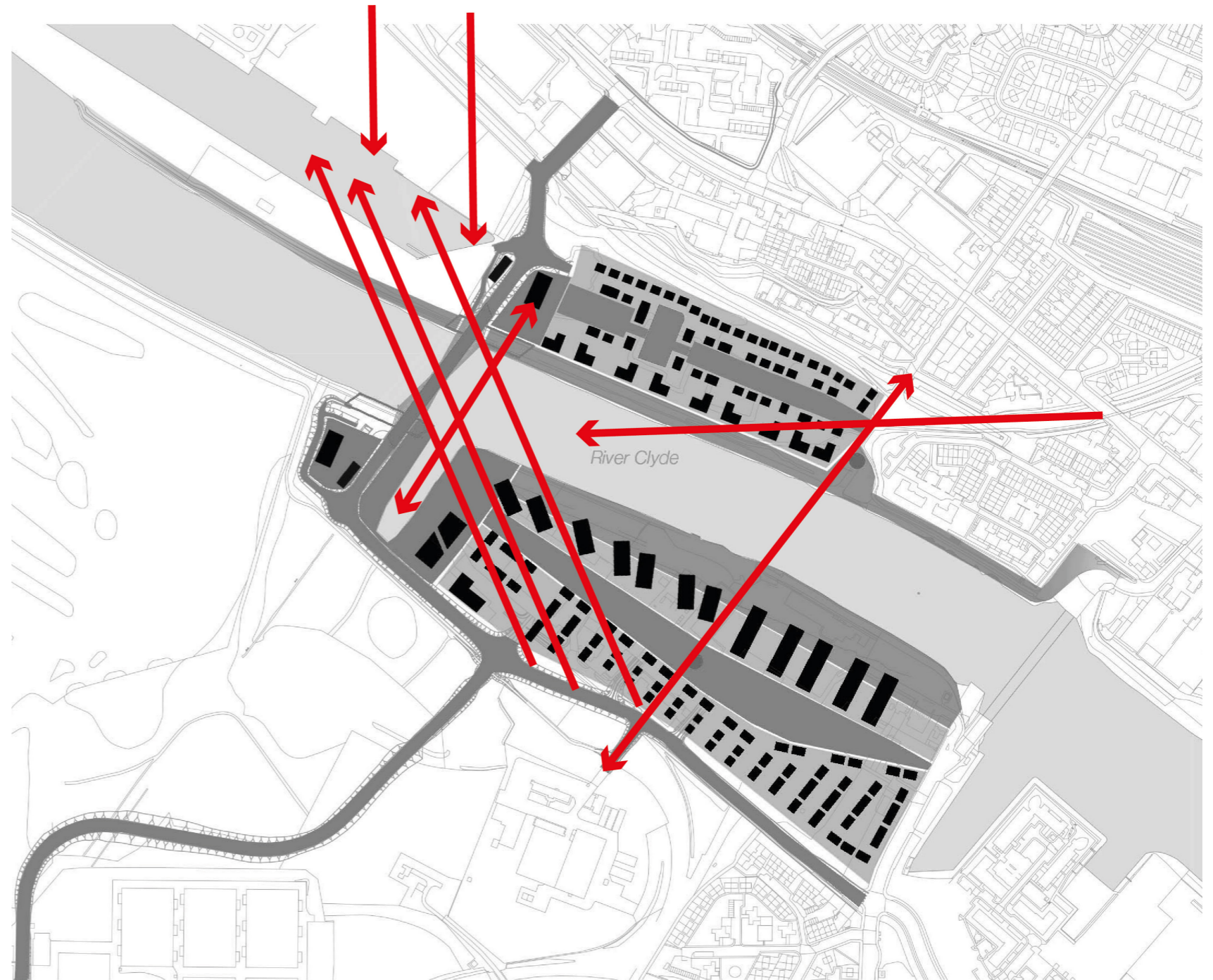
Views

Views are framed and channelled through the adjusted buildings towards the bridge.






Axes

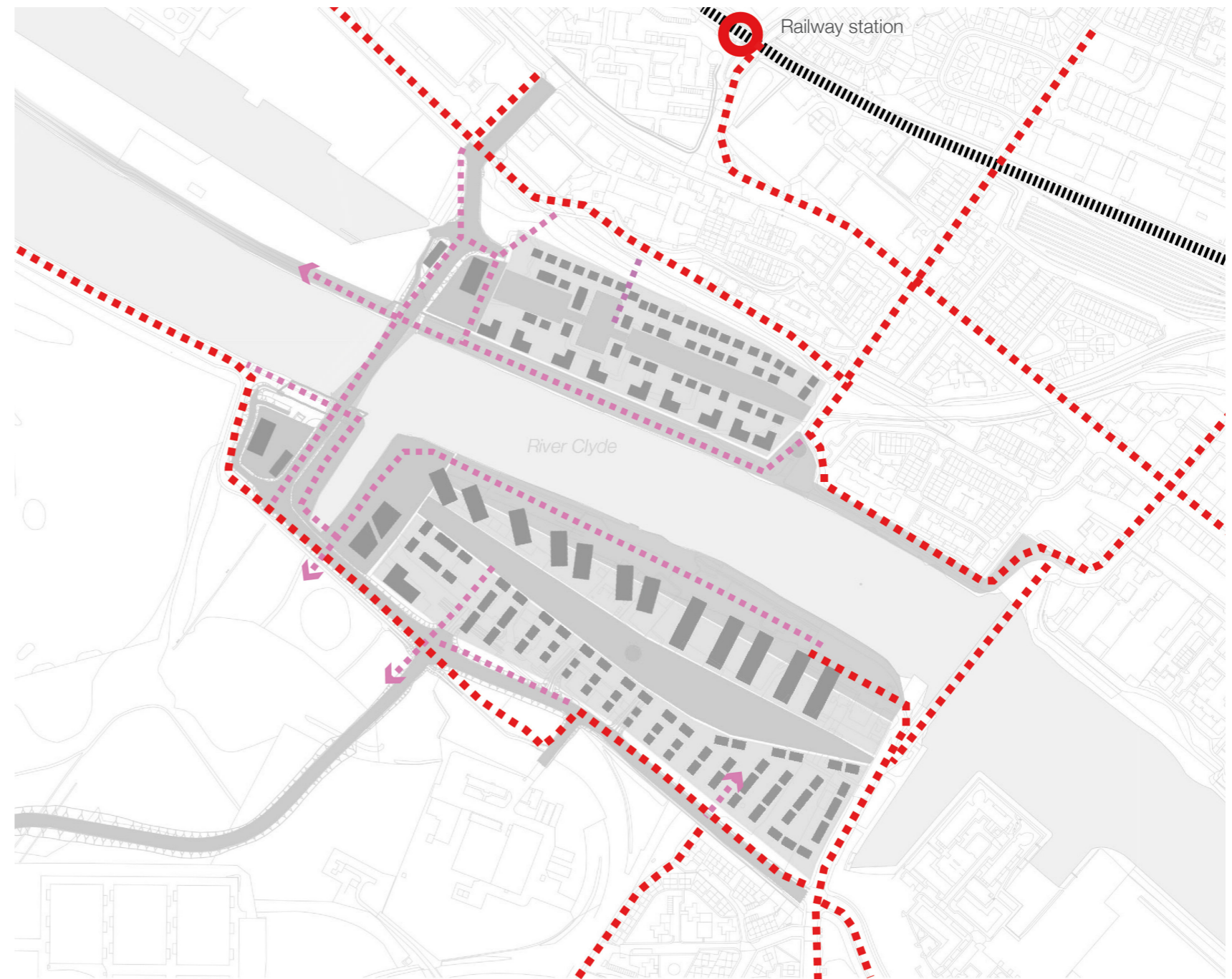
A series of strong axes are created reflecting the former shipyard and slipways, channelling views towards the bridge. An axis is created that spans the river, connecting with Greenlaw Rd/ Hawick St.



Pedestrian routes







Routes are created that connect to the existing pedestrian routes close to the site. Routes are created that run alongside the river and adjacent to the dock, allowing greater interaction with the water's edge. These also create some permeability through the site from the bridge approach road.

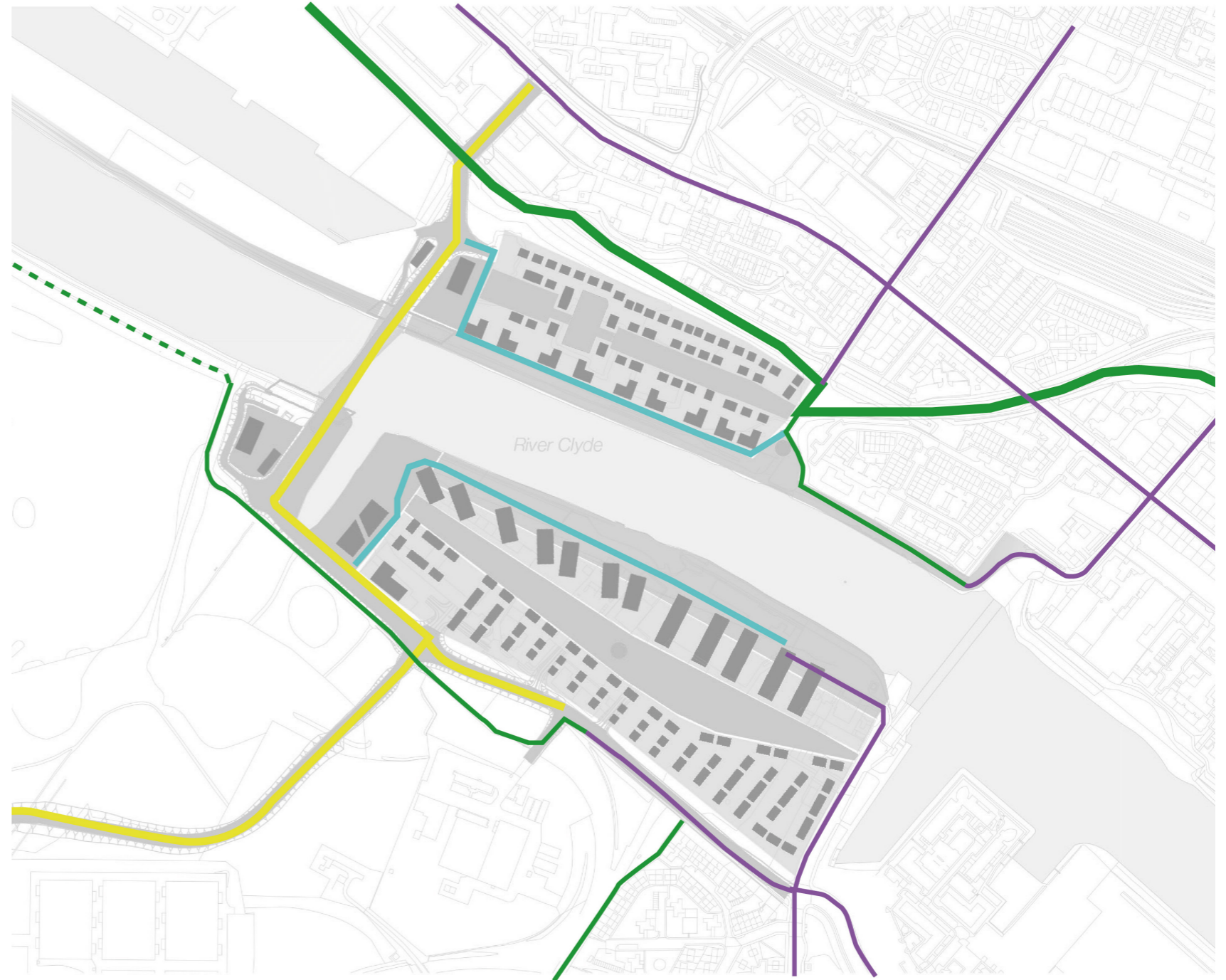
-  Railway line
-  Existing pedestrian paths
-  Proposed pedestrian paths



Other routes









Cycle routes should allow connectivity along the river edge, linking into the wider network.

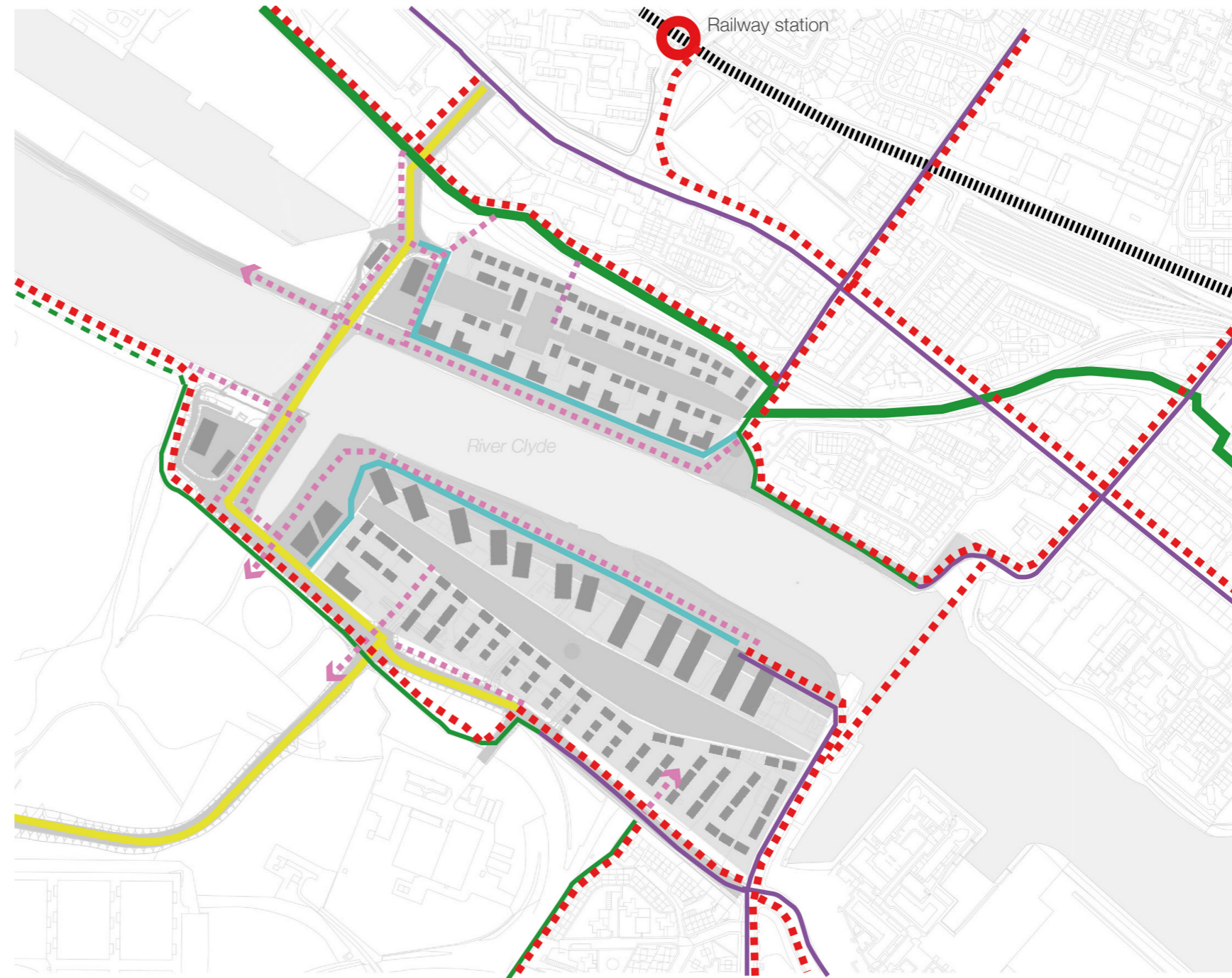
-  Existing on road route not on the National Cycle Network
-  Existing traffic-free route not on the National Cycle Network
-  Proposed on road cycle route
-  Proposed traffic free cycle route
-  Railway line
-  Existing traffic free route on the National Cycle Network



Routes

A layered approach should enable connectivity throughout, whilst considering privacy of residents within the masterplan areas. There should be clear routes along the river edge which could be public, with more semi private areas located in those areas further away from the river frontage.

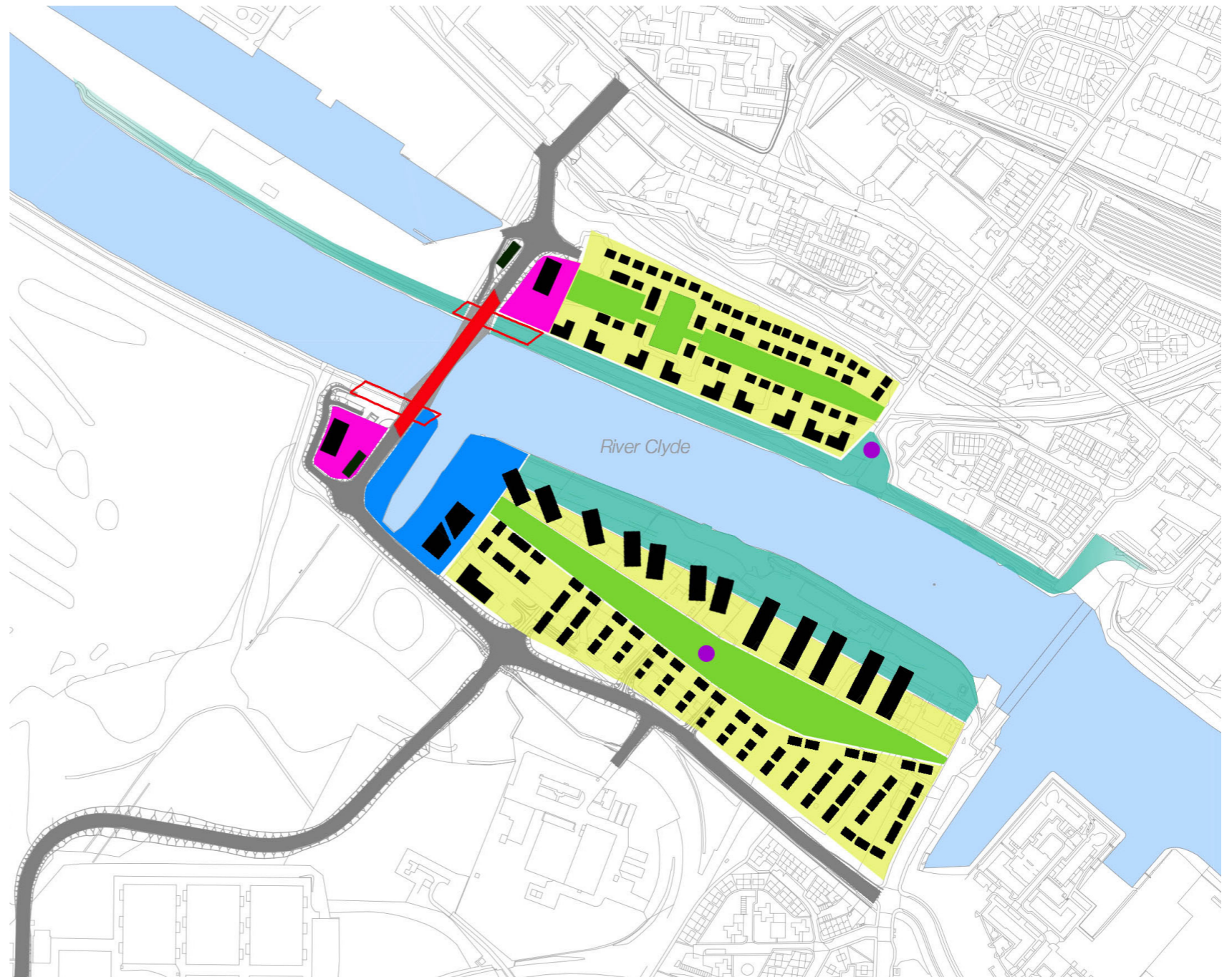
-  Existing pedestrian paths
-  Proposed pedestrian paths
-  Existing on road route not on the National Cycle Network
-  Existing traffic-free route not on the National Cycle Network
-  Proposed on road cycle route
-  Proposed traffic free cycle route
-  Railway line
-  Existing traffic free route on the National Cycle Network

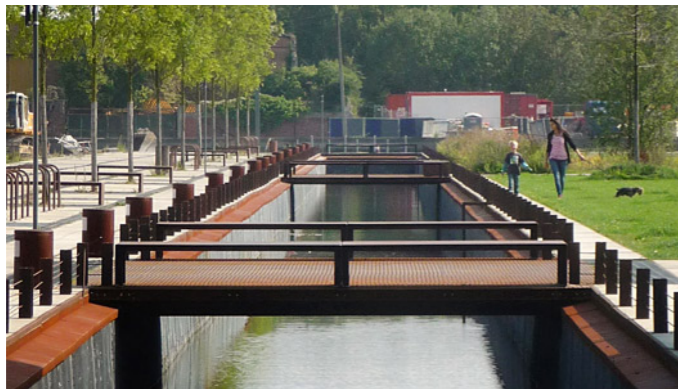
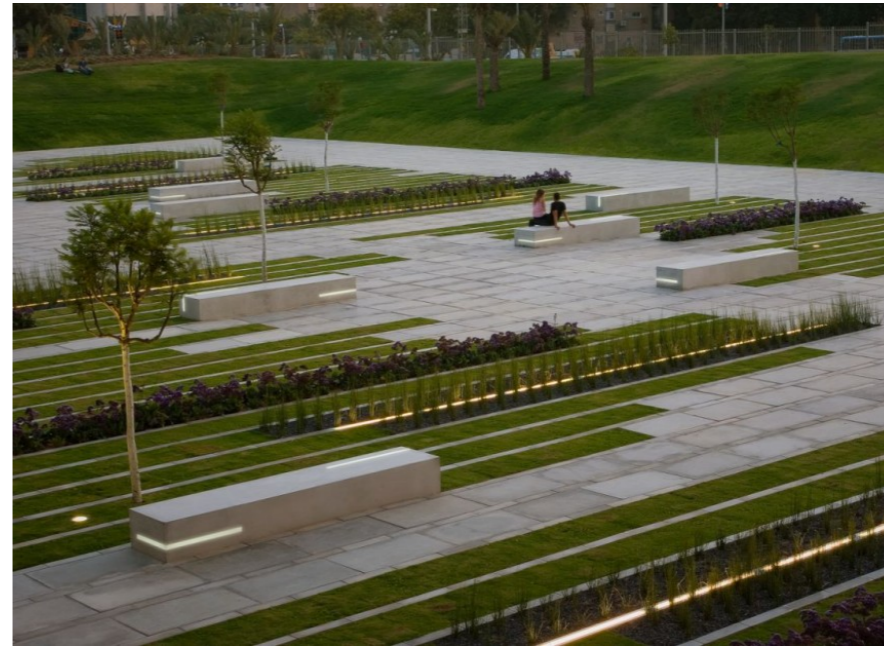
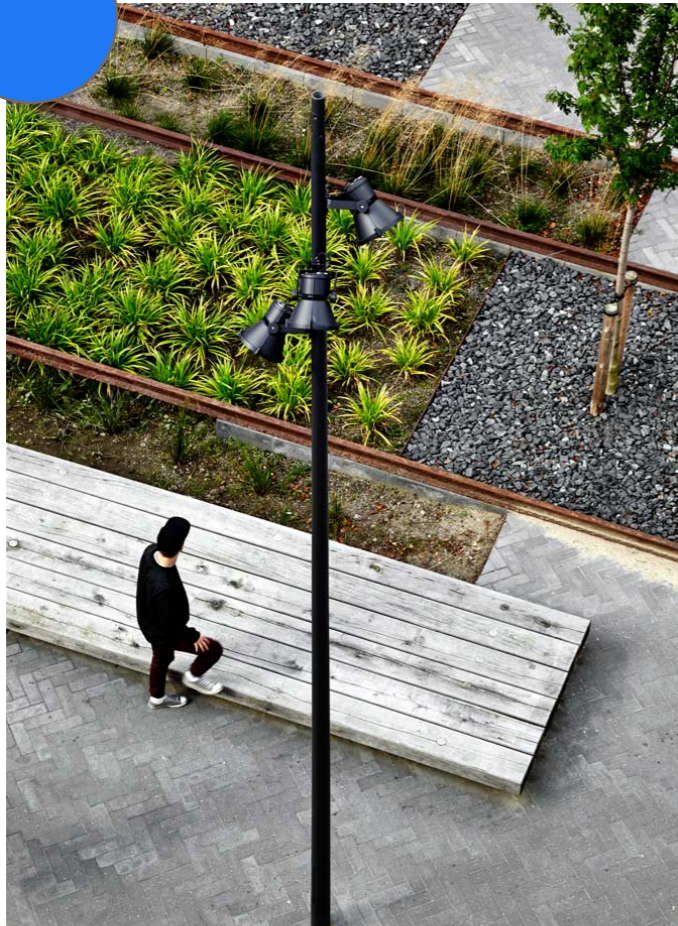


Proposed zoning

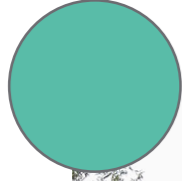
The adjusted masterplan could potentially be characterised in the following zones;

-  Dock plaza and heritage centre
-  Waterfront
-  Park
-  Residential areas
-  Gateway

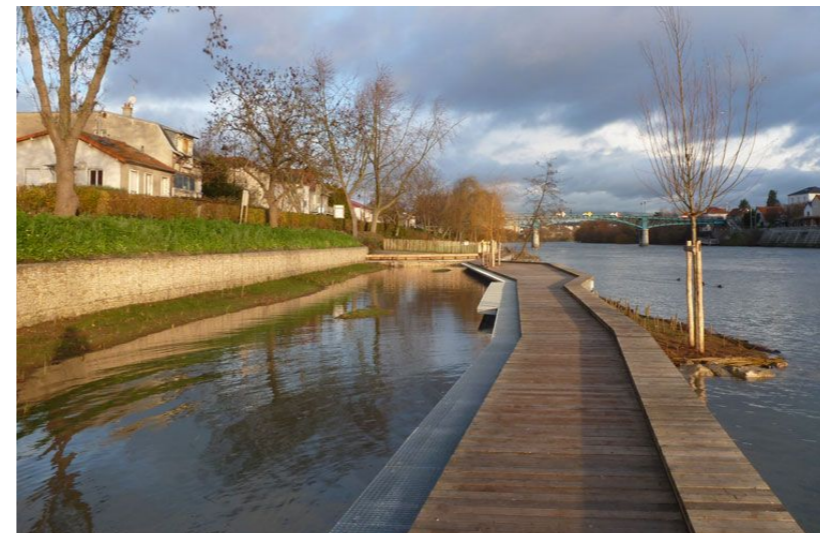




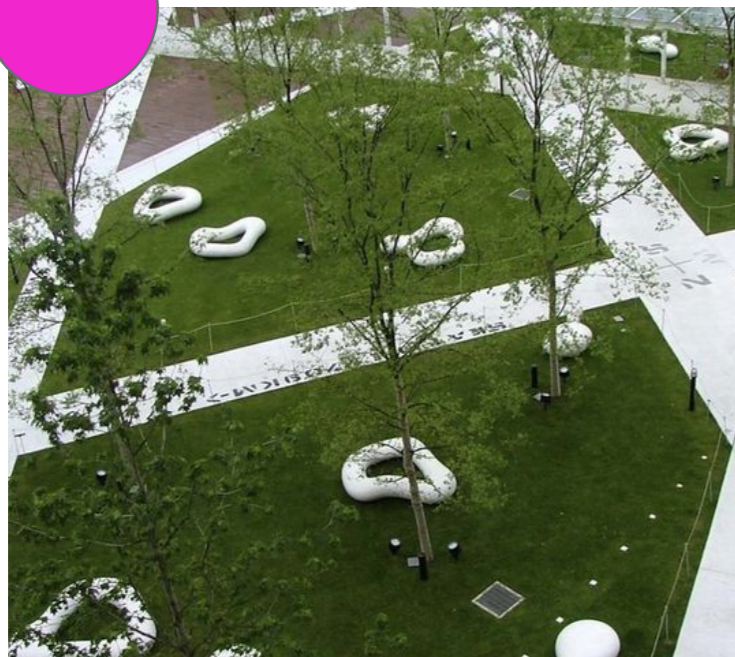
Dock plaza and Heritage Centre



Waterfront



Residential park/ residential development



Gateway residential

7. Landscape strategy

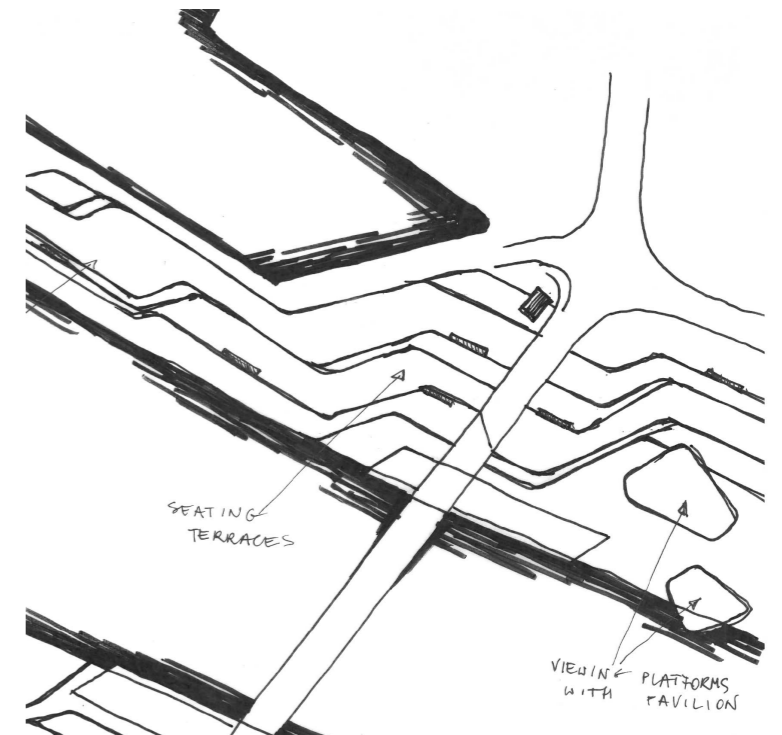
The landscape strategy takes its cue from the former history of the site, drawing on the abundance of former railway lines to the north of Clyde, and the shipyard slipways to the south.

To the north, sweeping lines of the former rail lines are reflected in the form of terracing that create the level change towards the river edge. A central parkland area is created running parallel with the river, which forms an amenity space for the residential development. View corridors through the residential development creates a visual connection with the opposite river edge. A waterfront edge is created along the river frontage which allows great views along the river and towards the proposed bridge.

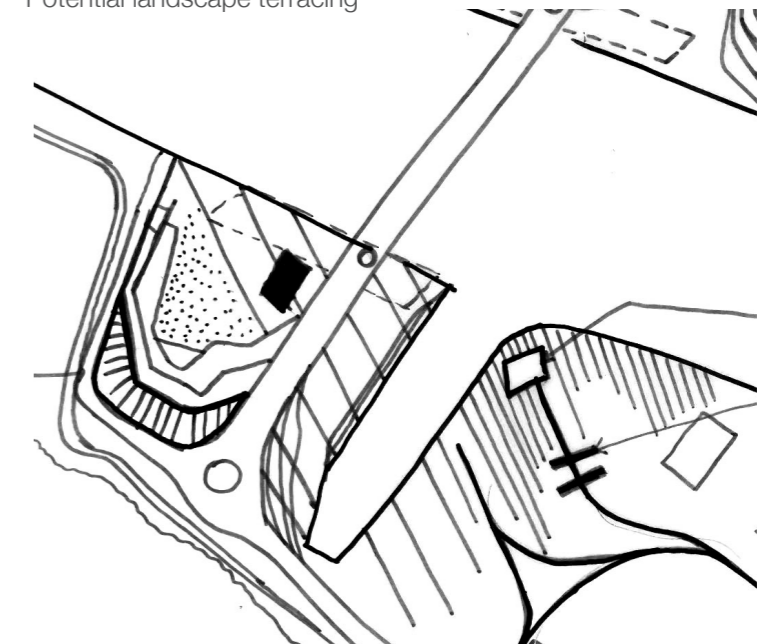
To the south, a mixed parkland is created along the river edge, with a central parkland space providing a significant amenity space for local residents. Views are angled through the proposed residential buildings, allowing changing views of the river and the bridge. A hard landscape plaza area around the Lobnitz Dock reflects the heritage of the site, with retention of existing features such as the capstans, and introducing materials with an industrial feel. The gateway residential building and control building share a terraced amphitheatre space, with terracing leading from the access road to the river edge. This connects to the waterfront, allowing a connection along the river edge and beneath the bridge, so allowing a direct link between the Fishers Rd and the proposed Dock plaza.



Former railway lines and slipways

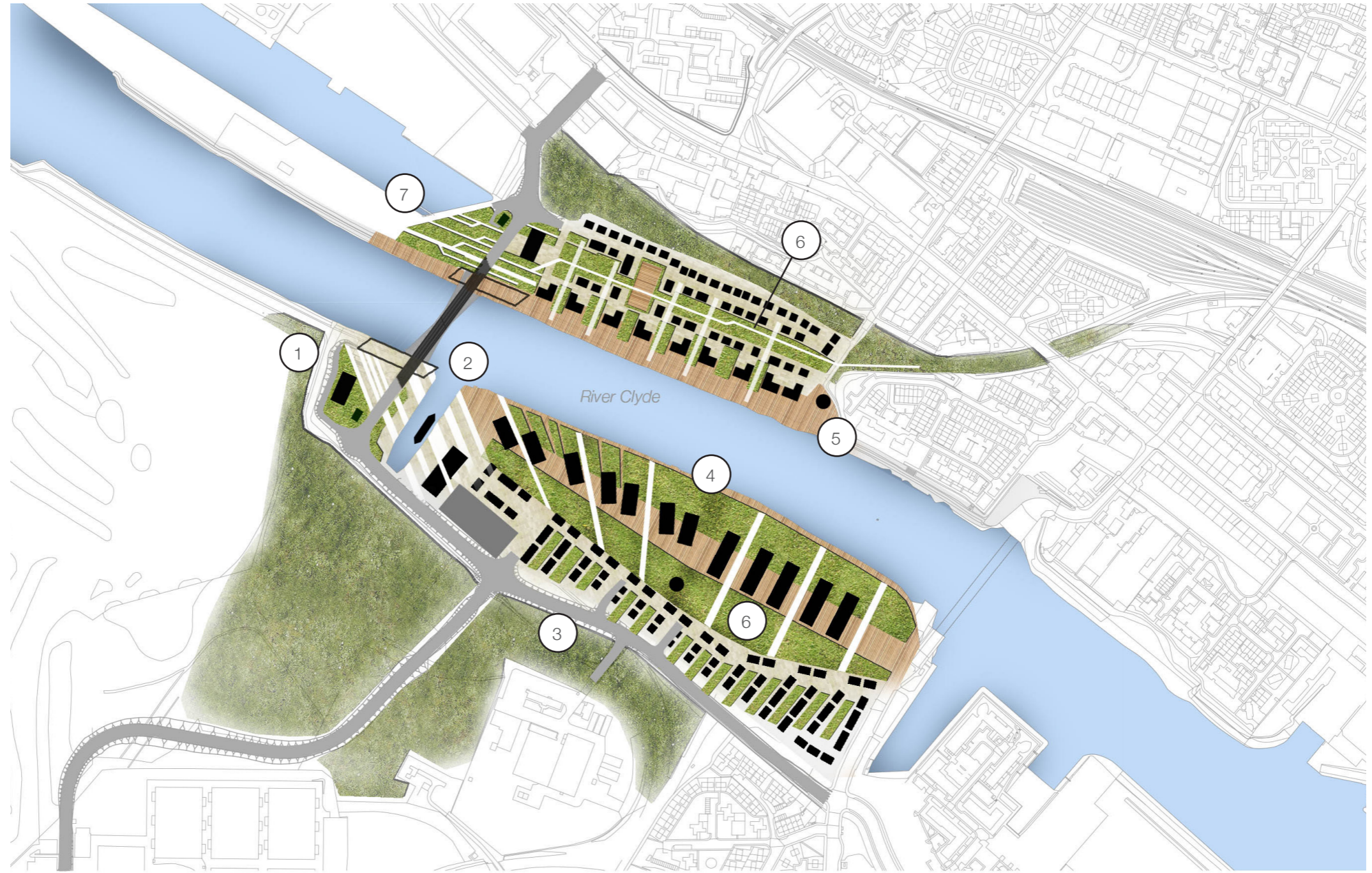


Potential landscape terracing



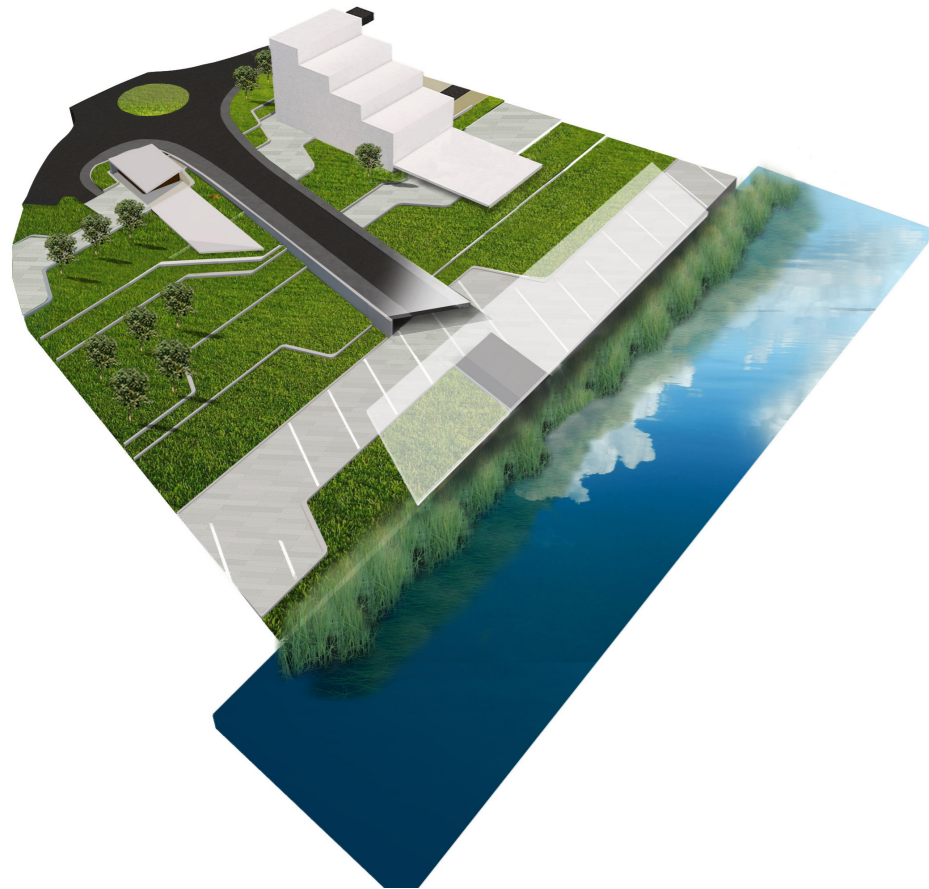
Landscape structure reflecting slipways and rail lines

1. Terraced landscape connecting control building and gateway residential
2. Dock plaza
3. Garden spaces within residential area
4. Waterfront parkland
5. Northern waterfront walkway
6. Central amenity parkland
7. Terraced landscape encompassing control building and the gateway residential development

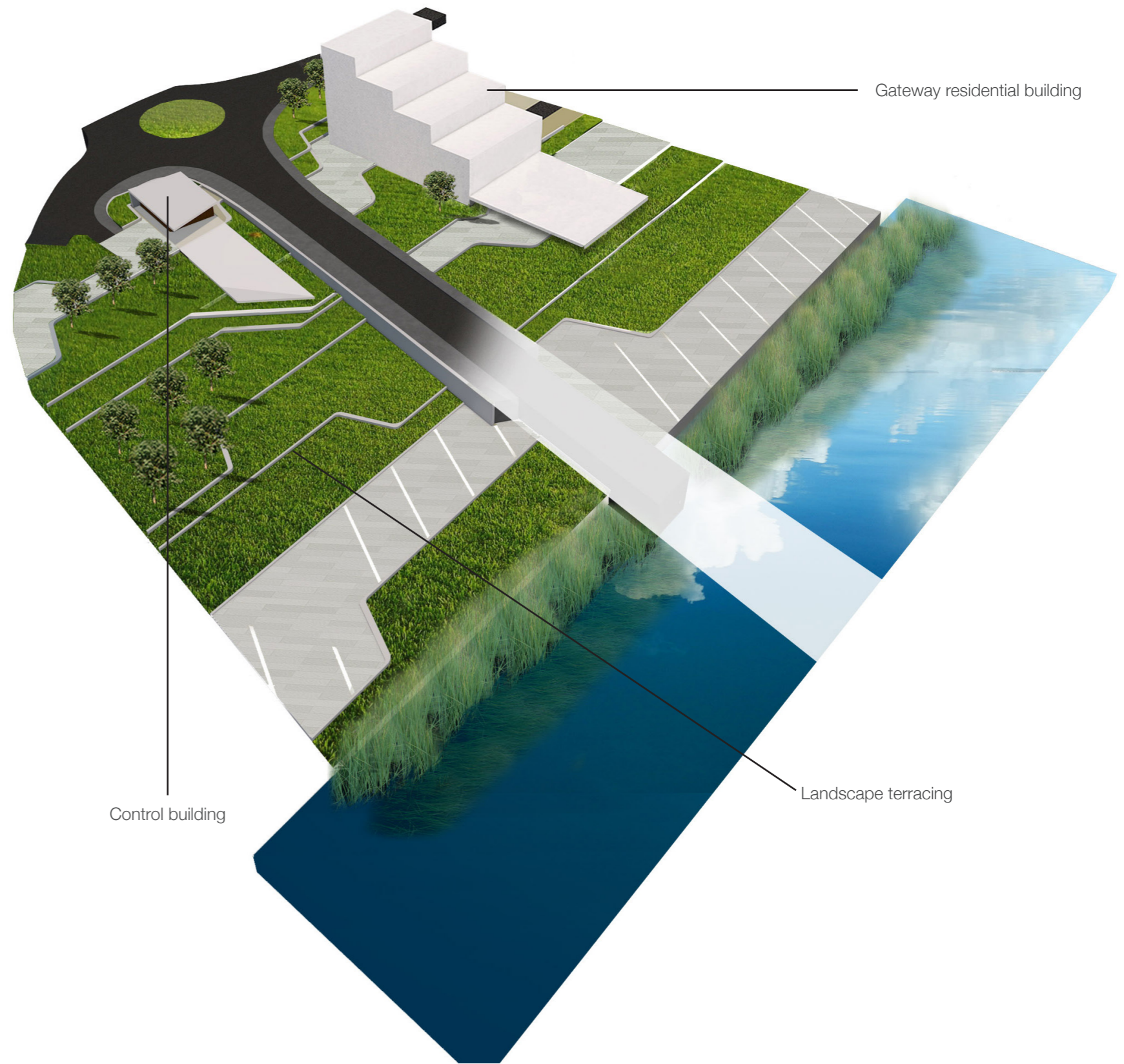


North side

The northern side of the river would include a gateway residential building, along with the proposed control building for the bridge itself. Landscape terracing breaks up the level change between the proposed road and the water's edge (whilst taking into consideration the fact that the area is within flood zone). A terraced parkland landscape, with potential waterside walkway reflects the forms of the former railway lines that connected to the Rothesay Dock.



North side with bridge open



North side with bridge closed



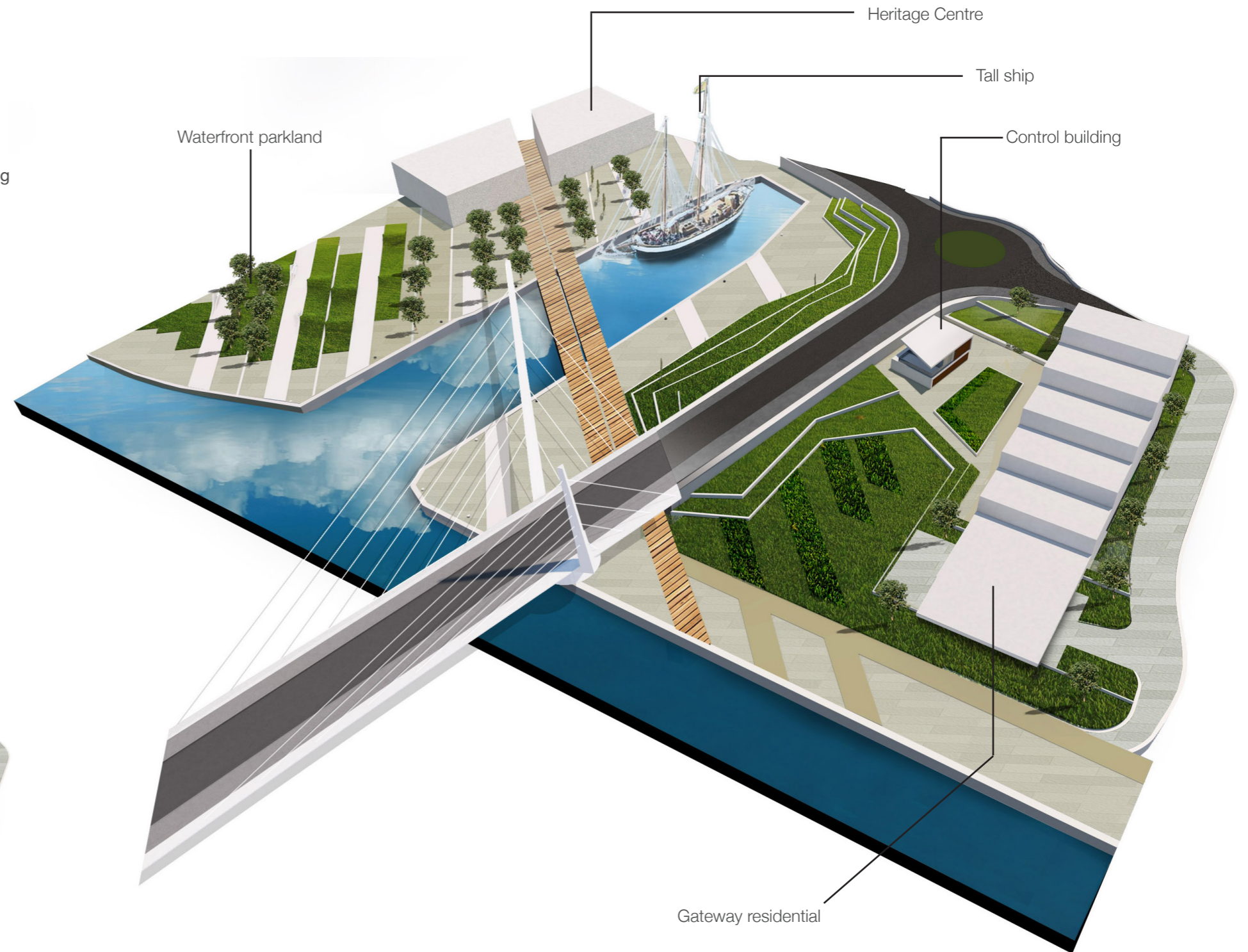
North side sketch layout plan

South side

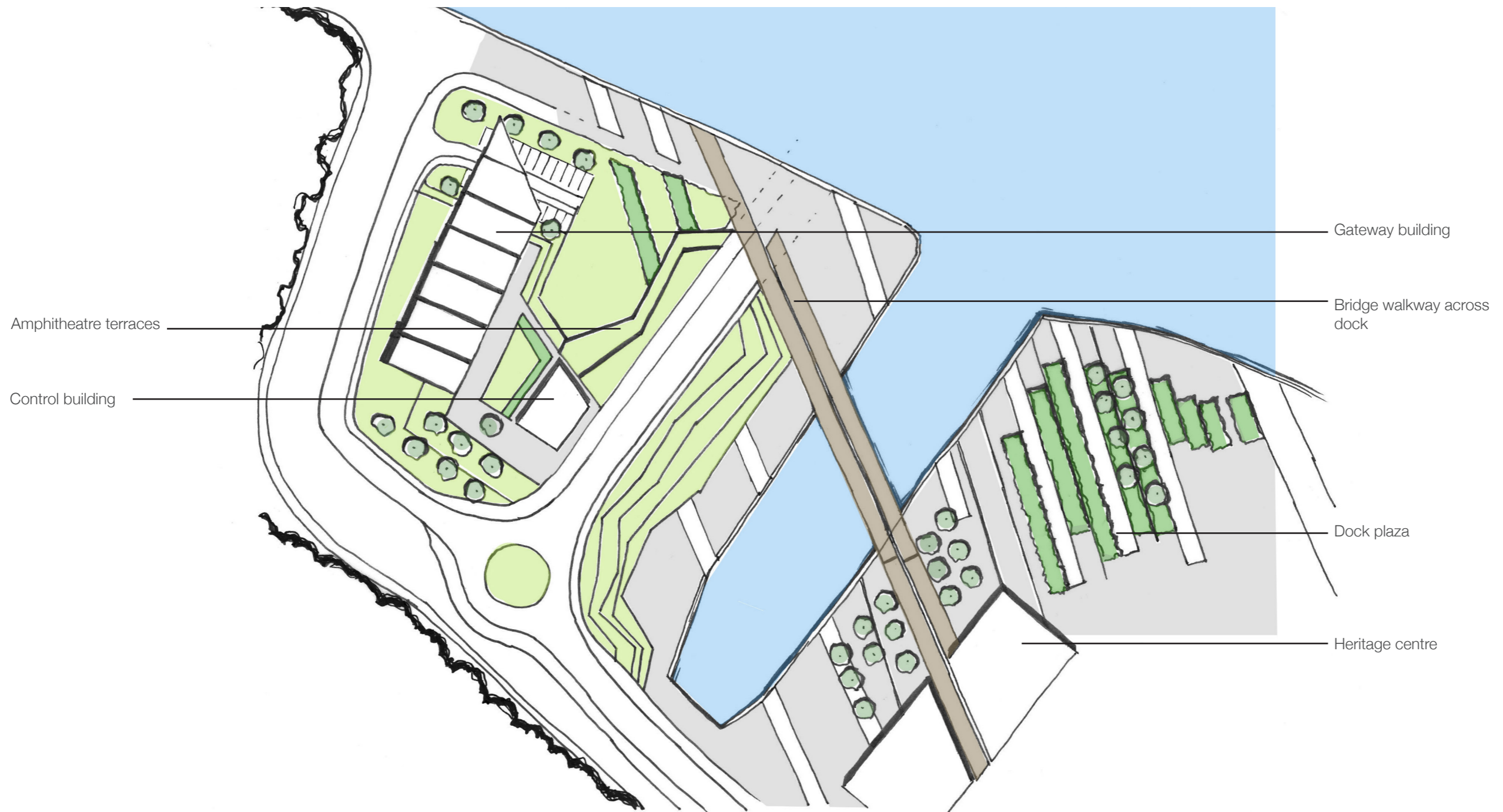
The south side of the river would include a gateway residential building, along with the proposed control building for the bridge itself. A Heritage Centre could form a focus for the dock plaza area with a footbridge linking across the dock itself. The waterfront and dockside plaza spaces reflect the site history with bands of tree planting and surfacing that echoes the former slipways that were located here. Terracing could bridge the level change between the dockside and bridge approach road, which could make use of gabions filled with reclaimed brick resulting from the demolition of the former depot buildings here.



South side with bridge open



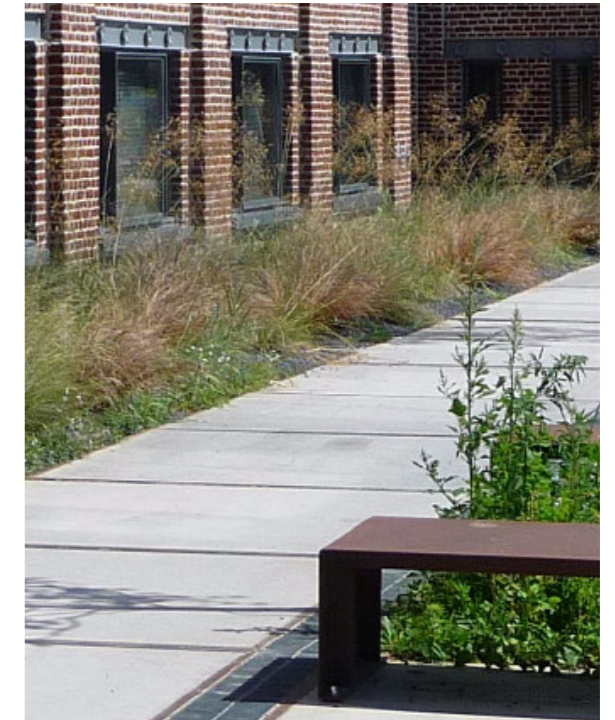
South side with bridge closed



South side sketch layout plan

Materiality

The proposed landscape design and materiality could reference the rich industrial history of the site, with use of cor ten steel, weathered timber and reclaimed demolition material.

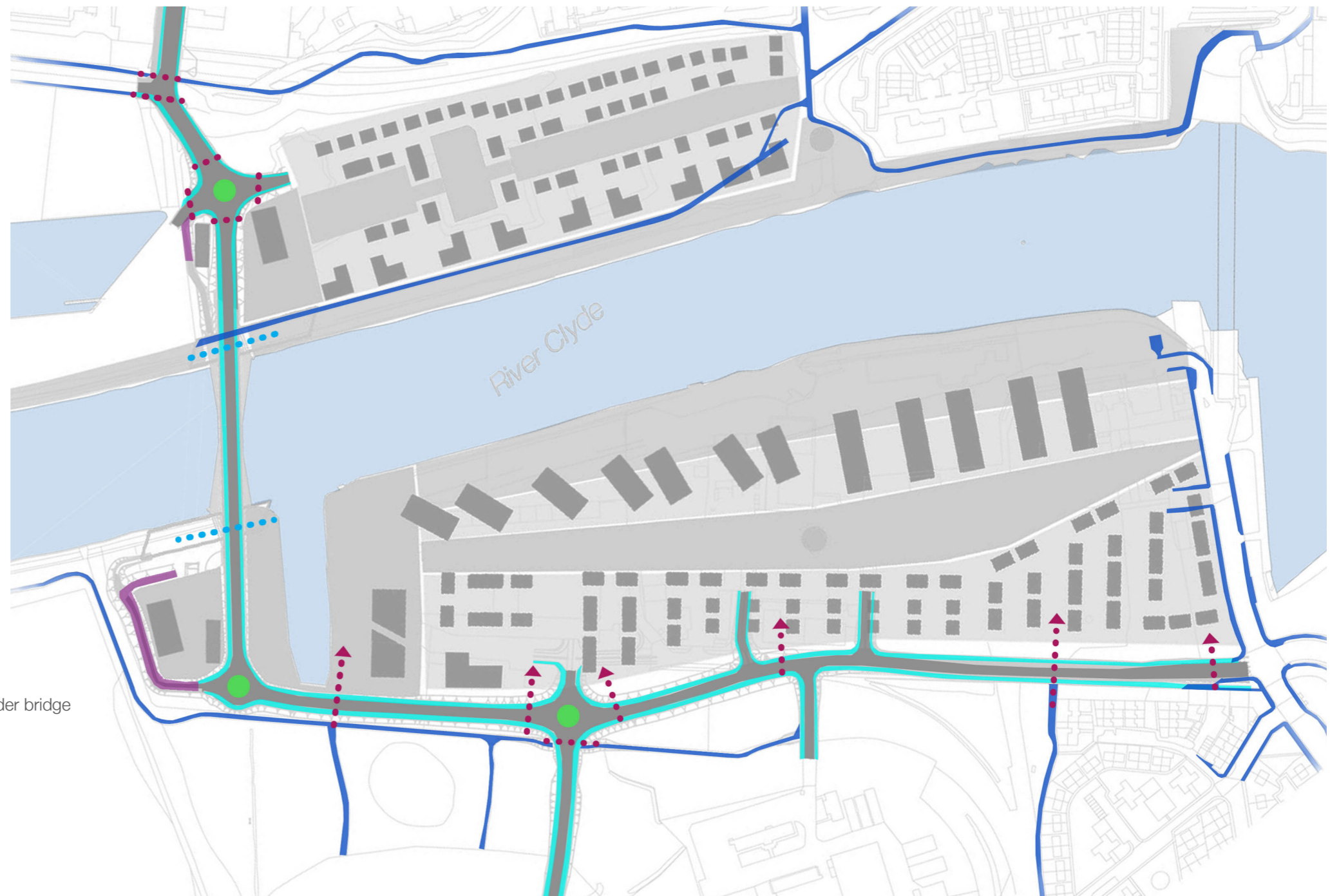




8. Roads

There is potential for the street leading to the bridge itself to become not only a connection to the bridge, but also an attractive street in itself. It will offer excellent changing views of the bridge itself, across the residential development and the proposed Dock Plaza space. The use of considered planting and hard landscape treatments, along with the addition of crossings will ensure that the road does not become a barrier between the residential development and the adjacent woodlands.





- Proposed pedestrian crossing point
- Proposed pedestrian connection under bridge
- Existing pedestrian paths
- Proposed pedestrian paths
- Proposed shared surface

Diagram to show pedestrian and vehicle routes

Road types

-  Nodes
-  Proposed pedestrian connection under bridge
-  'Boulevard'
-  Existing road over railway bridge
-  Bridge approach
-  Pedestrian connection under bridge
-  Proposed shared surface

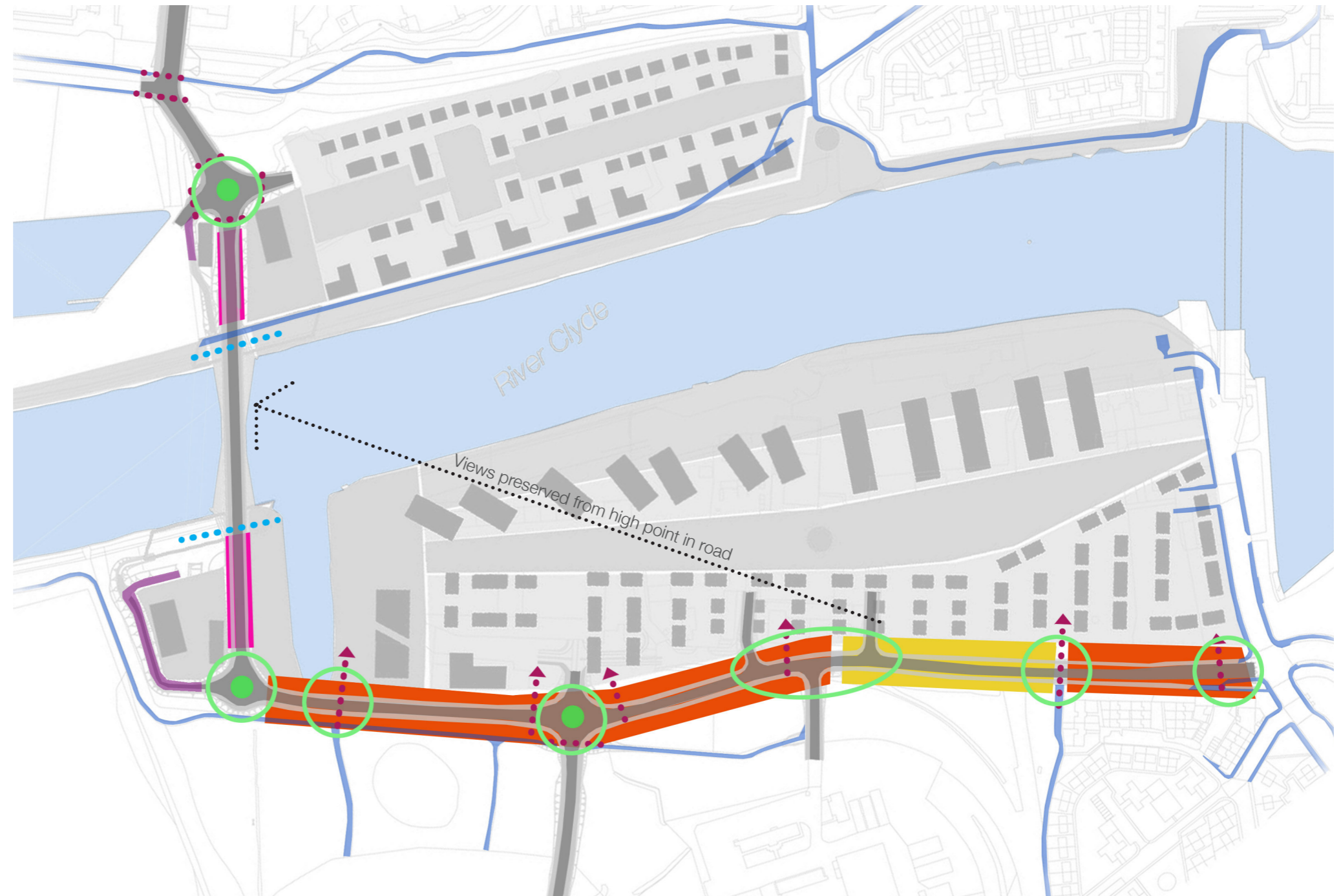
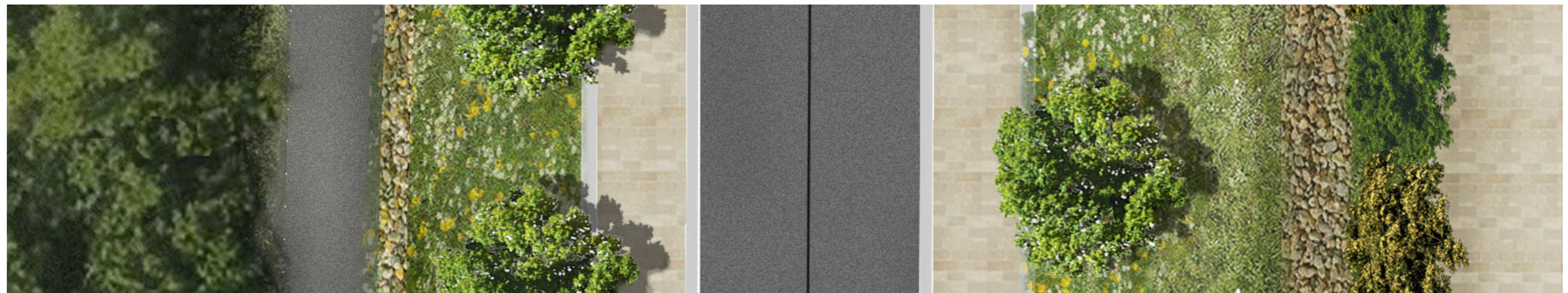
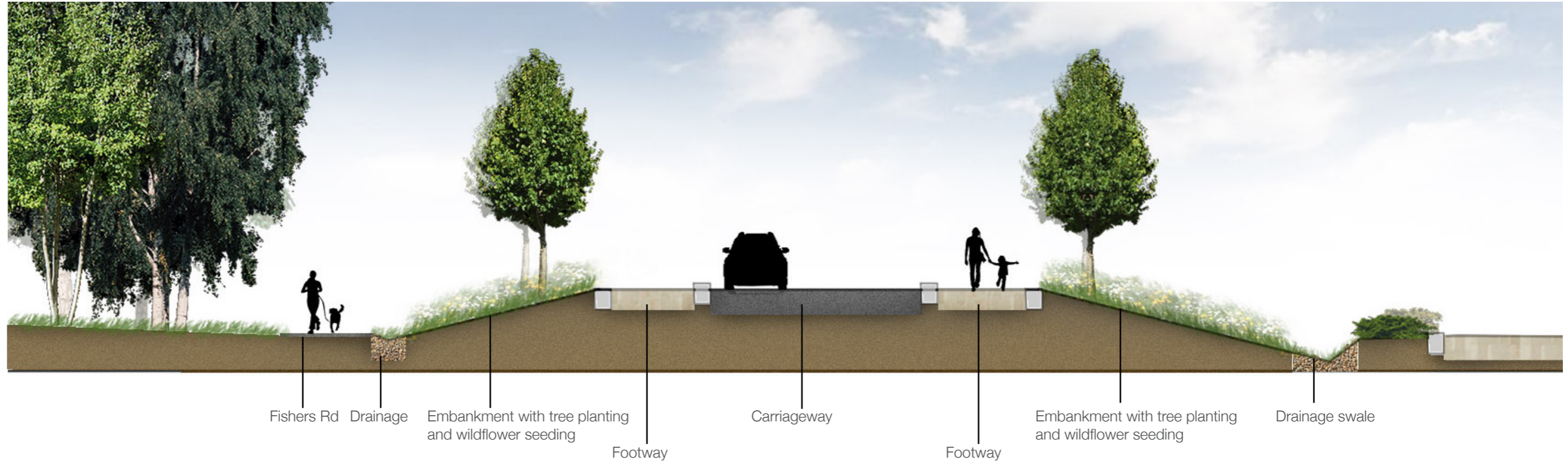


Diagram to show pedestrian and vehicle routes

Road section as currently proposed



Street design, with Fishers Rd route adjacent

Road sections

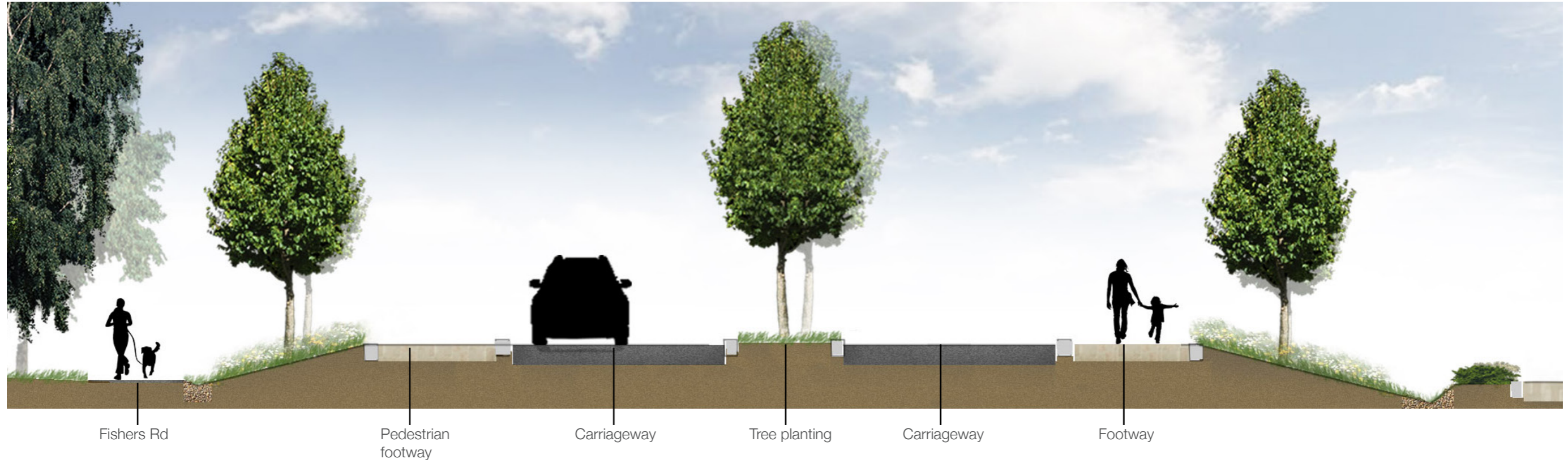
The following illustrates potential street treatments for these route types (Note: these potential treatments work within the established overall road widths established in the current roads design);

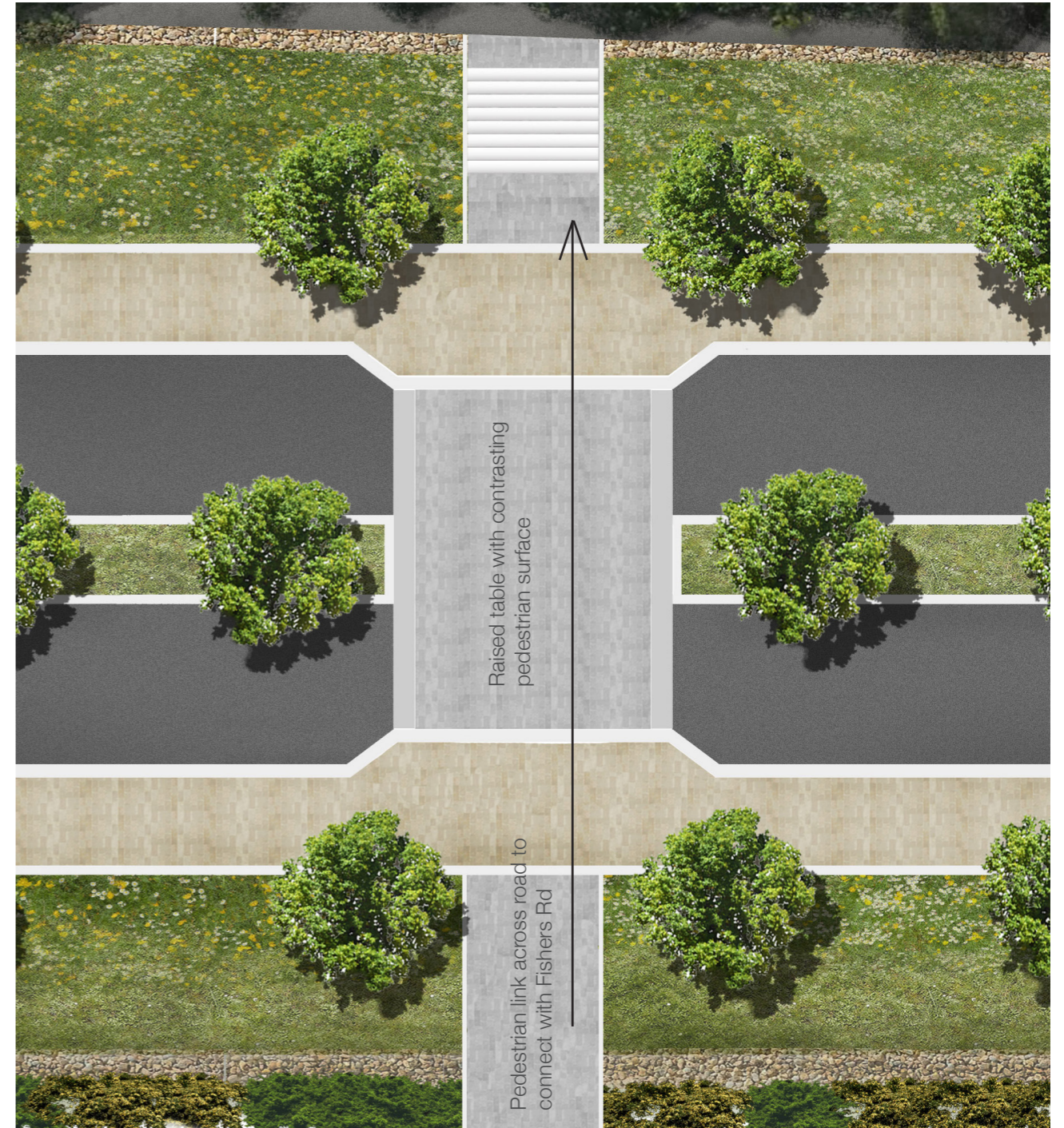
1. 'Boulevard'
2. Node/ crossing
3. Bridge



'Boulevard'

Boulevard section

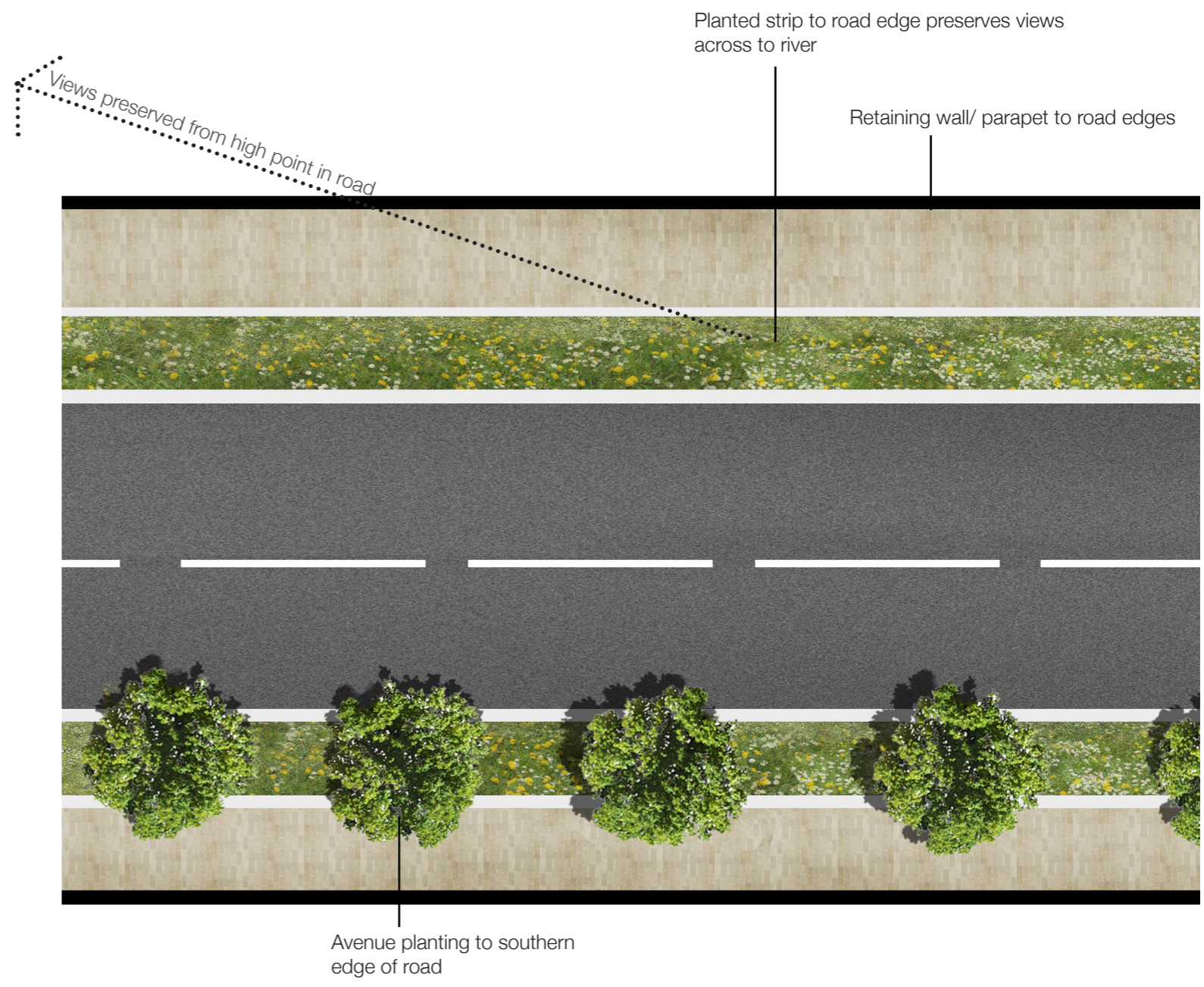




Crossing/pedestrian node treatments

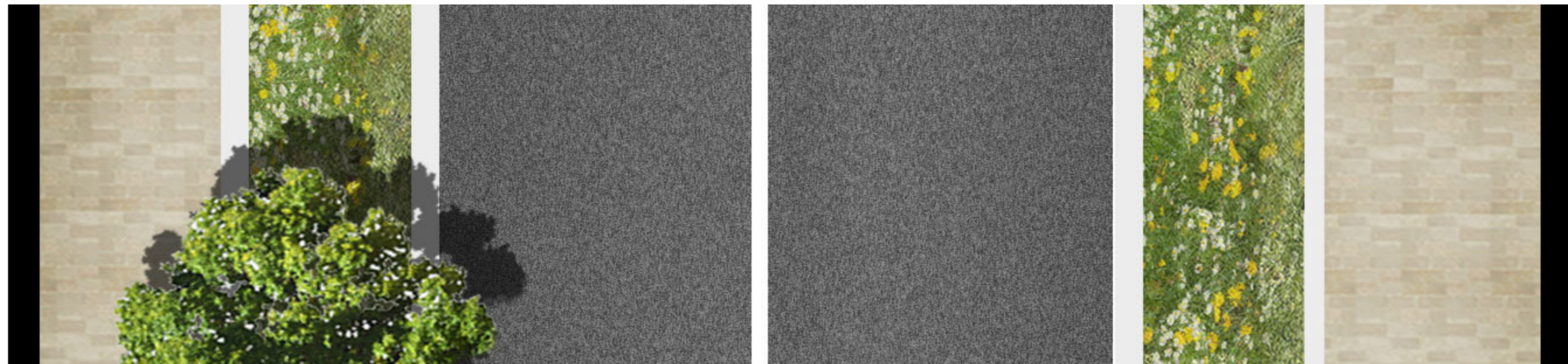
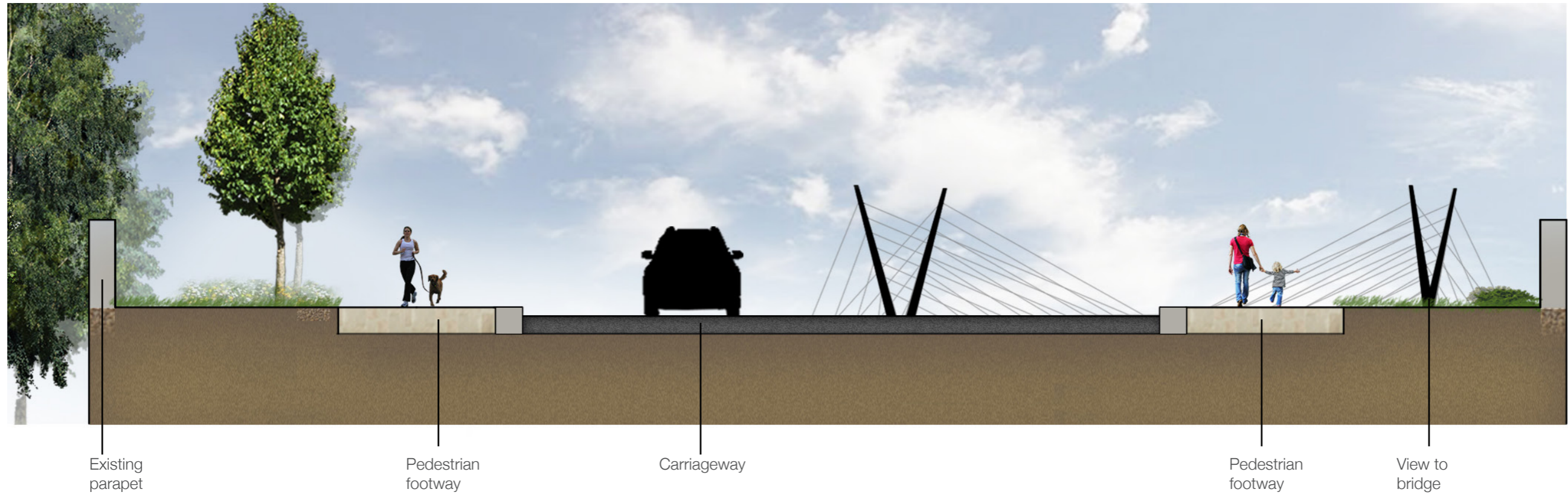
Pedestrian link section



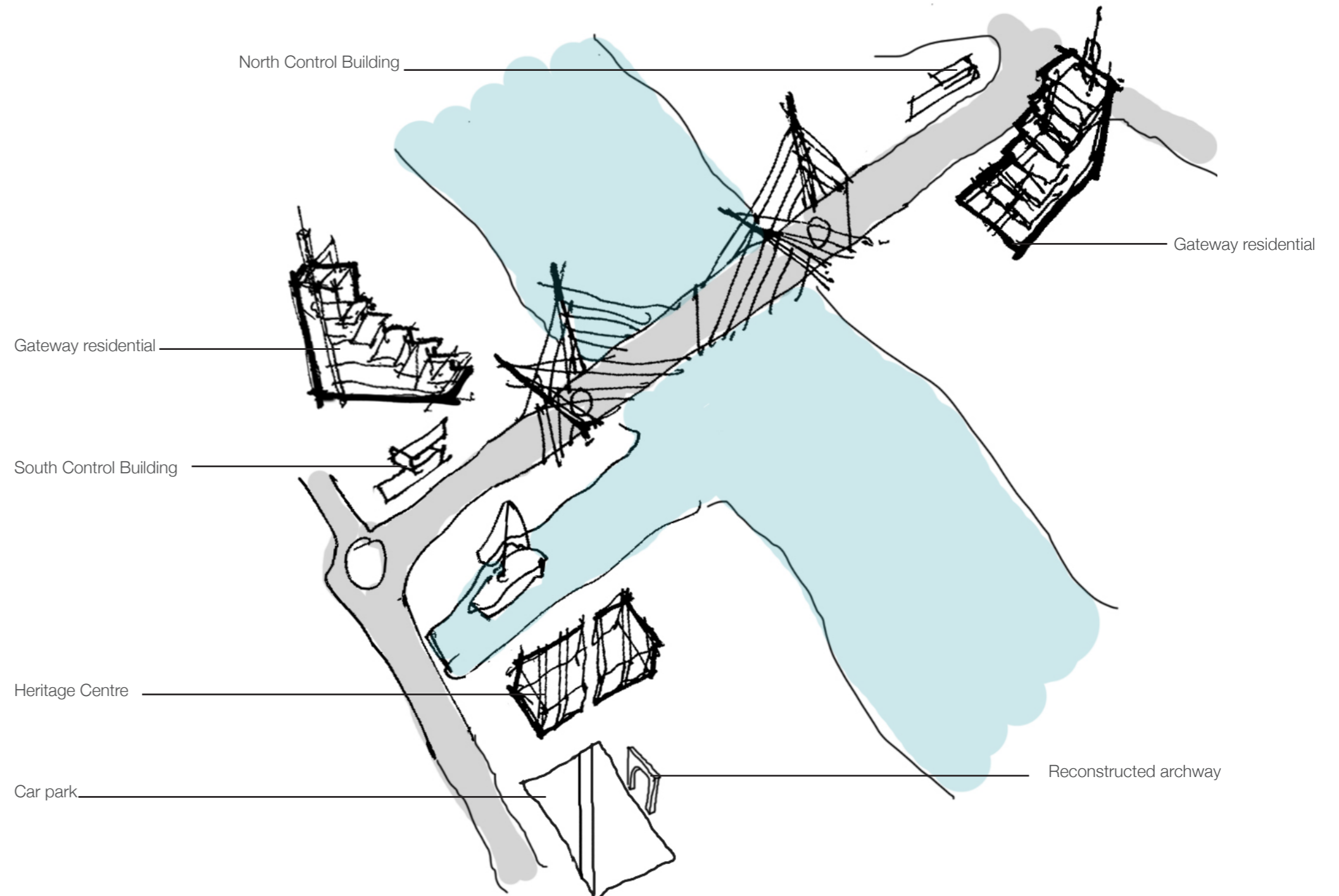


Existing railway/ road bridge

Railway bridge/ road high point

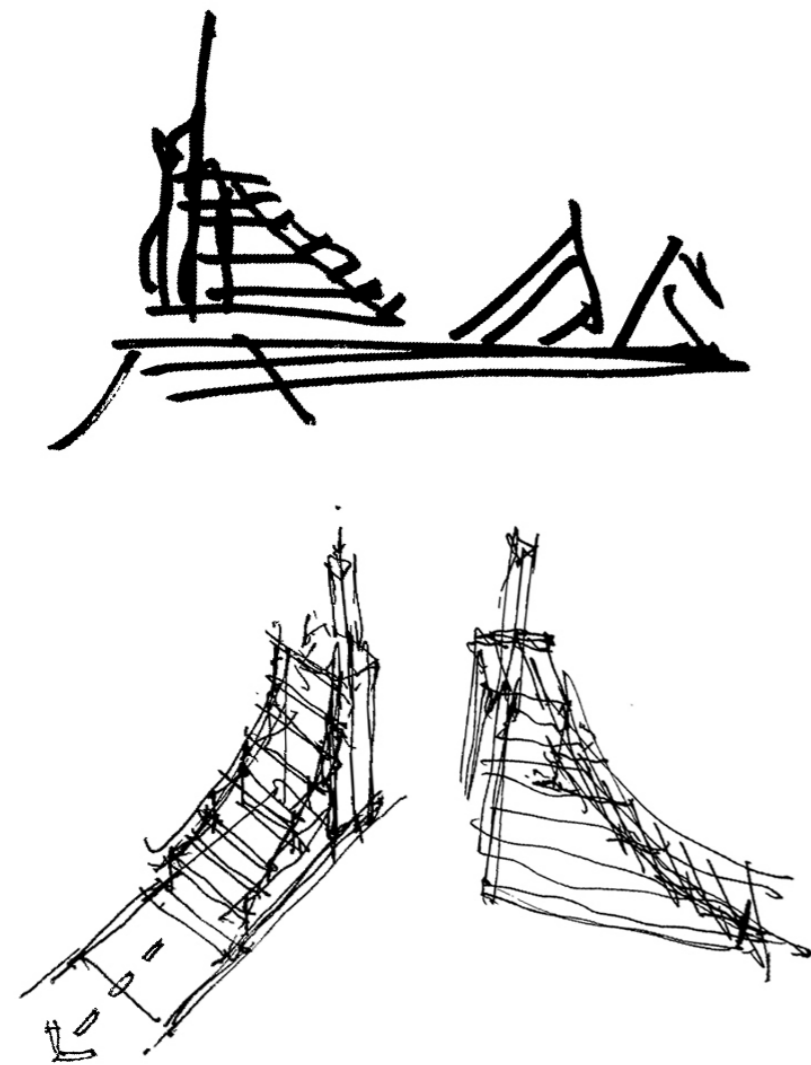


9. Key buildings



Gateway residential

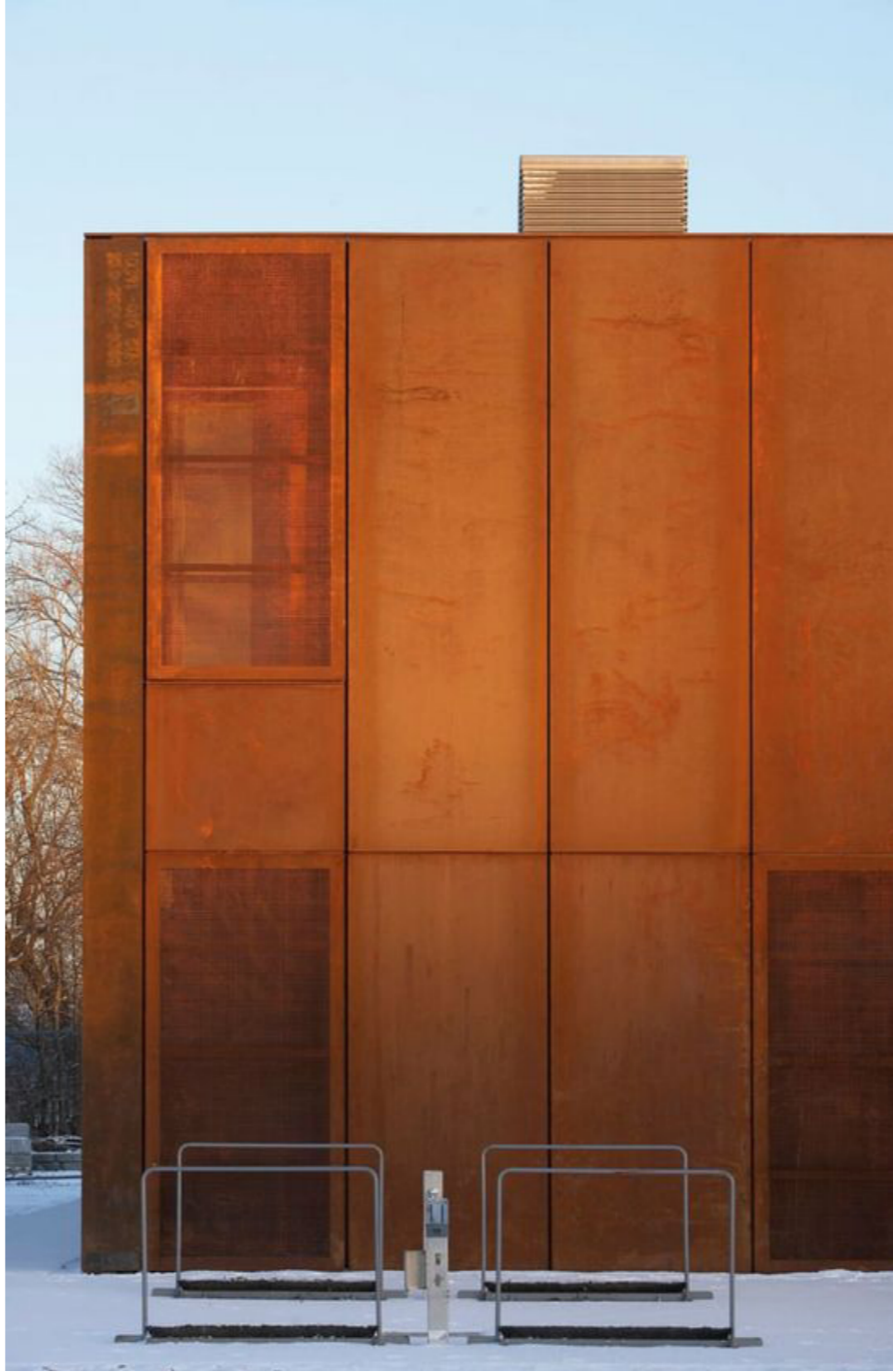
Key residential buildings form distinctive 'gateways' for the bridge, forming a landmark focus for the site.



Heritage Centre

The Heritage Centre building located at the Dock Plaza can take inspiration from the industrial history of the area, with use of materials such as corten steel and industrial details.









10. Bridge proposals

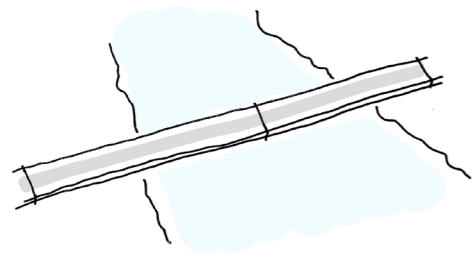
The Clyde Waterfront and Renfrew Riverside regeneration project will see the construction of an aspirational 'twin leaf' opening bridge over the River Clyde. It will link the north and south banks of the River, between the town of Renfrew and Yoker, a western district of Glasgow approximately 5 miles west of the City Centre. The bridge will accommodate vehicles, pedestrians and cyclists, as well as maintaining shipping and ferry routes along the River.

The crossing will create an important connection between the communities and businesses on both sides of the river and unlock the potential for future development and economic growth. New roads and

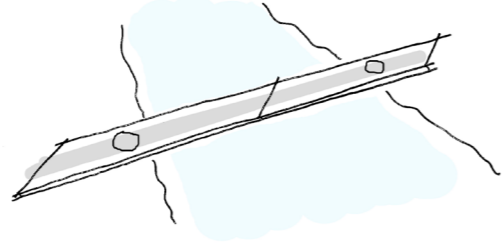
improved infrastructure will provide enhanced access to underused and derelict land in the local area, as well as increase travel options throughout Renfrewshire, Clydebank and the wider City Region. The bridge is constructed using a modern cable suspension system and celebrates the River Clyde's shipbuilding heritage in its design. As the bridge opens and closes, the vertical masts rotate similar to resemble the turning motion of cranes on the Clyde. The bridge will create a local point of interest, with place making opportunities at landing areas for locals and visitors alike.



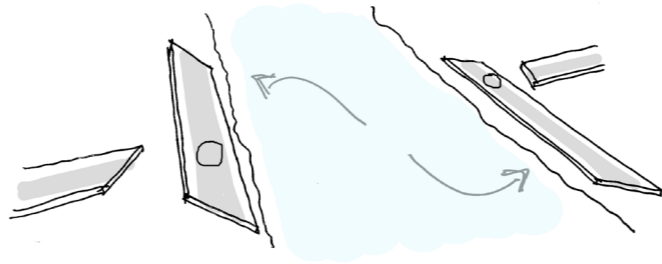




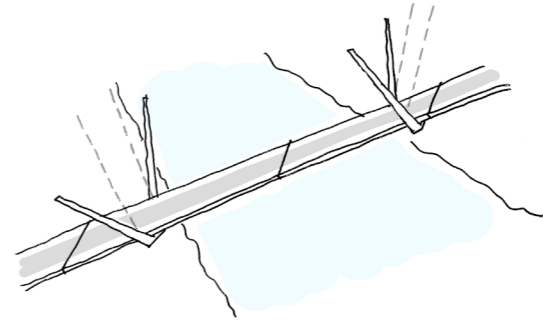
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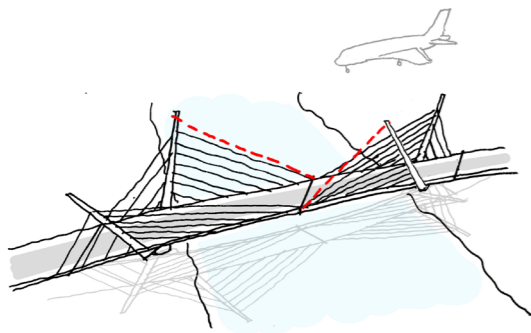
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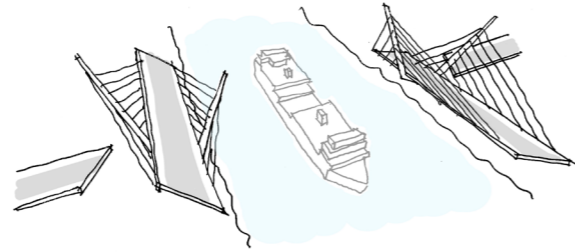
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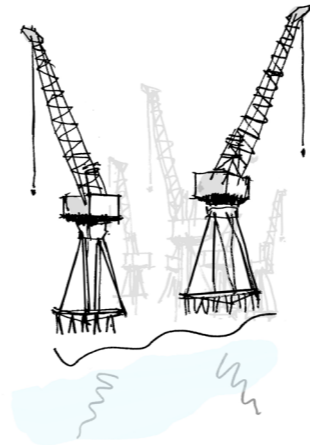
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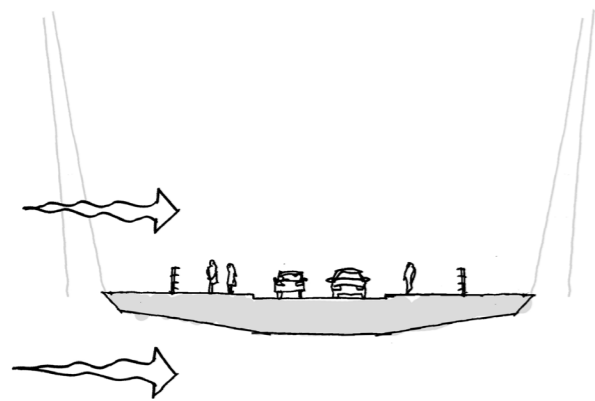
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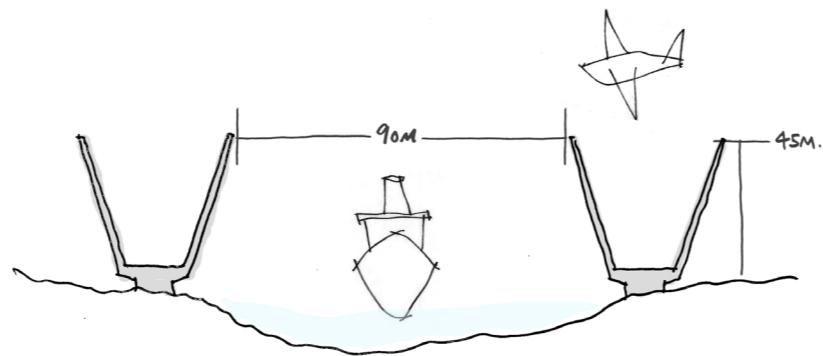
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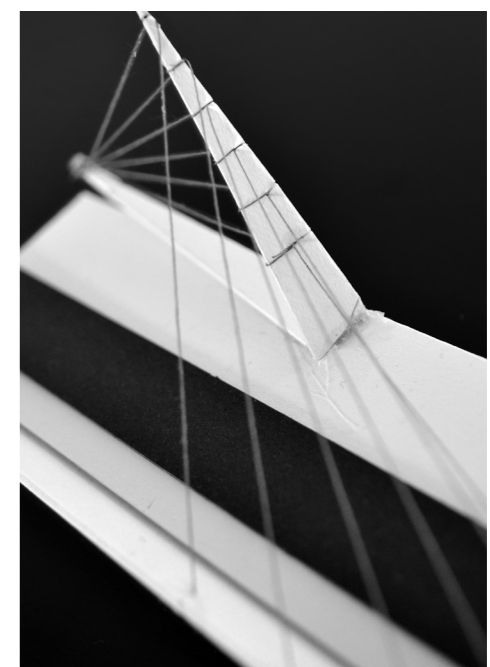
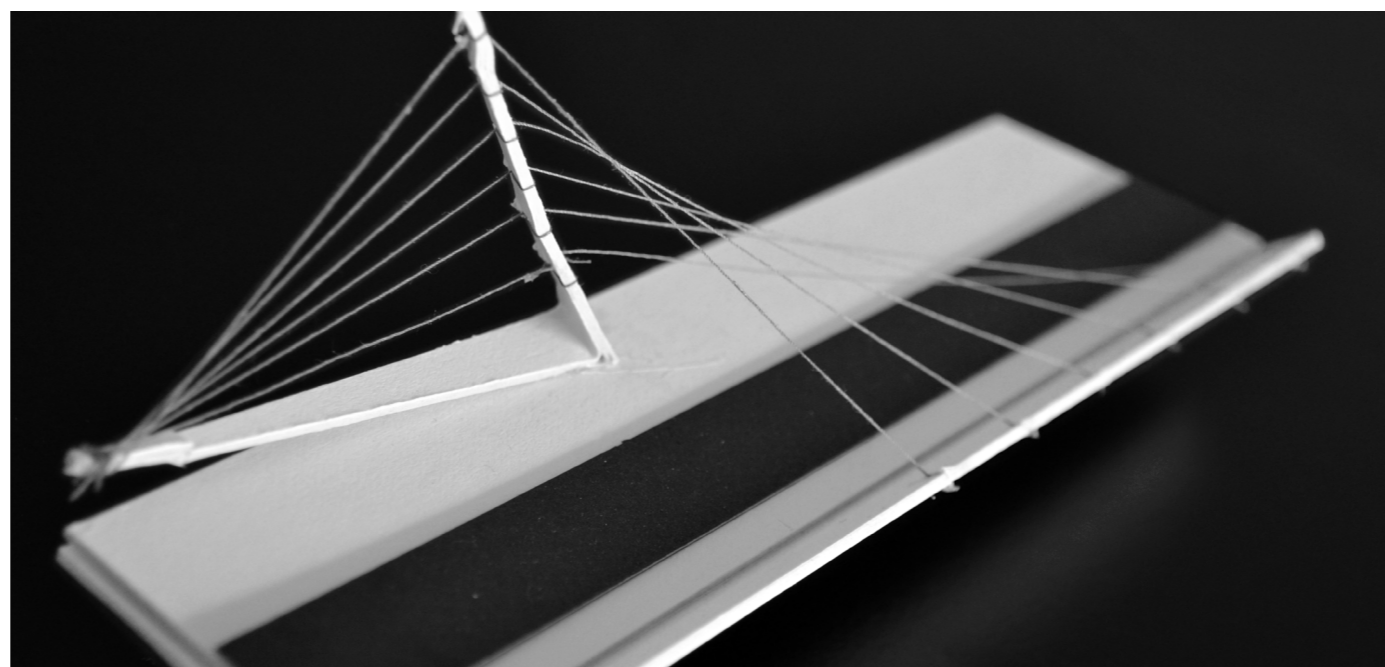
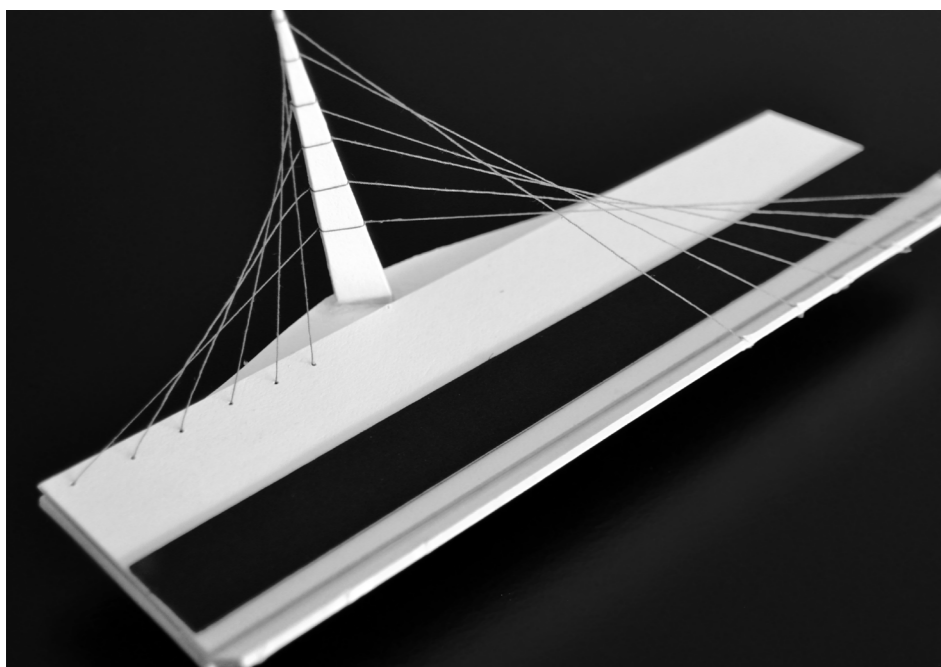
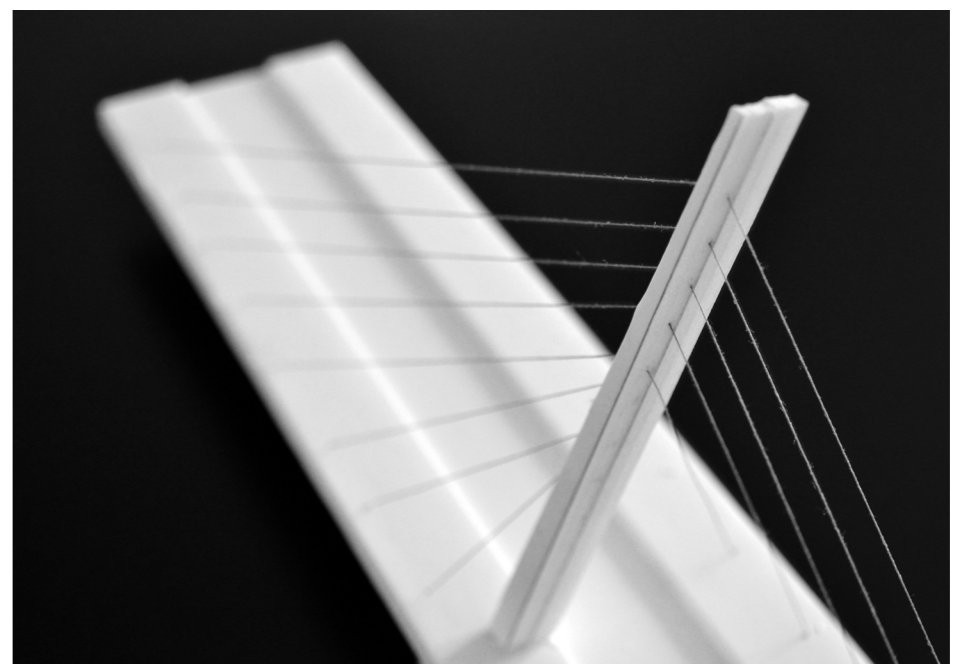
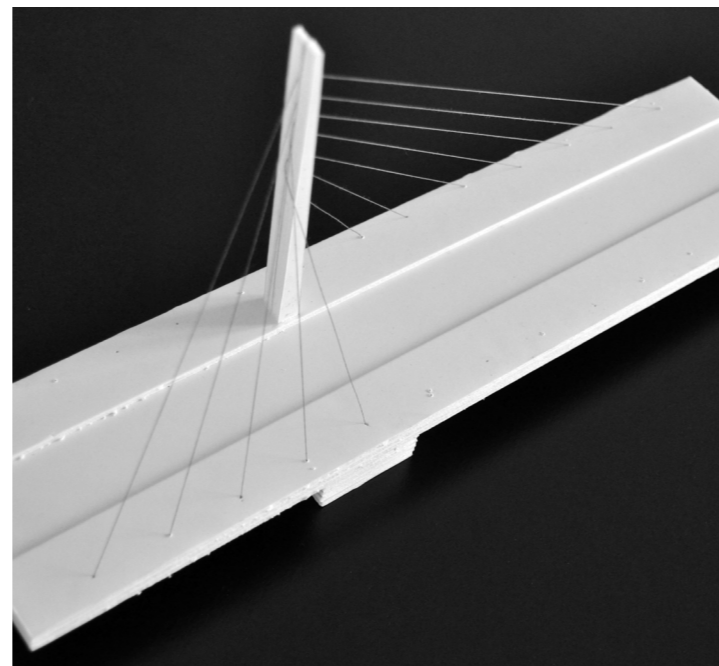
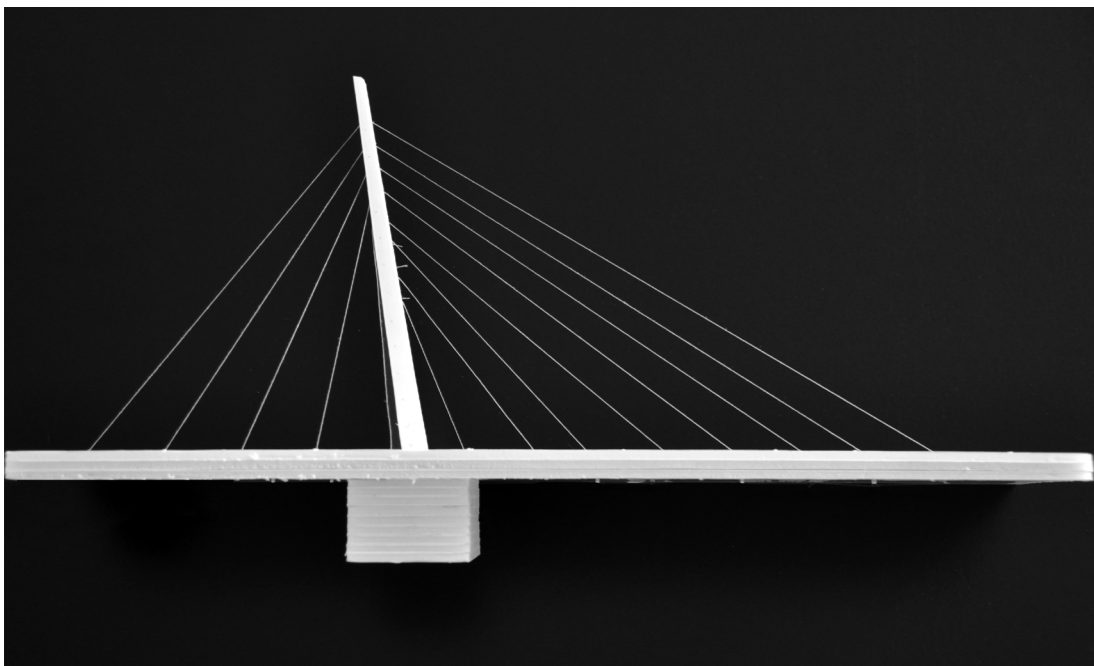
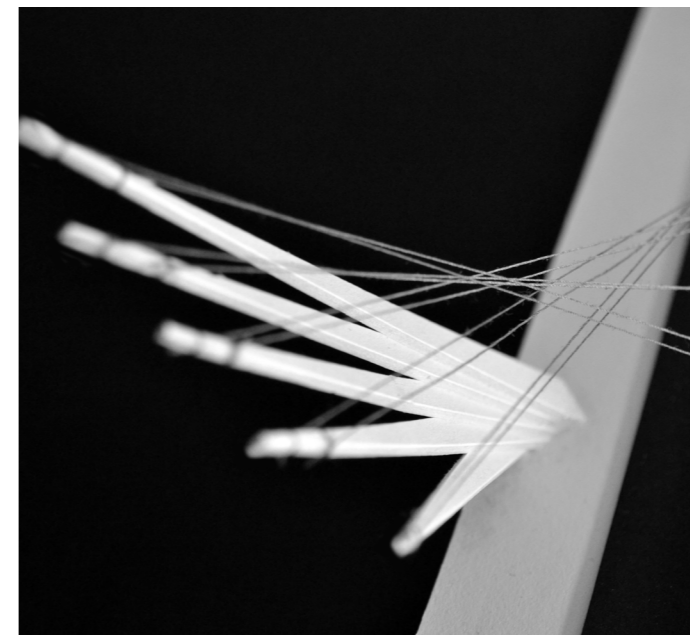
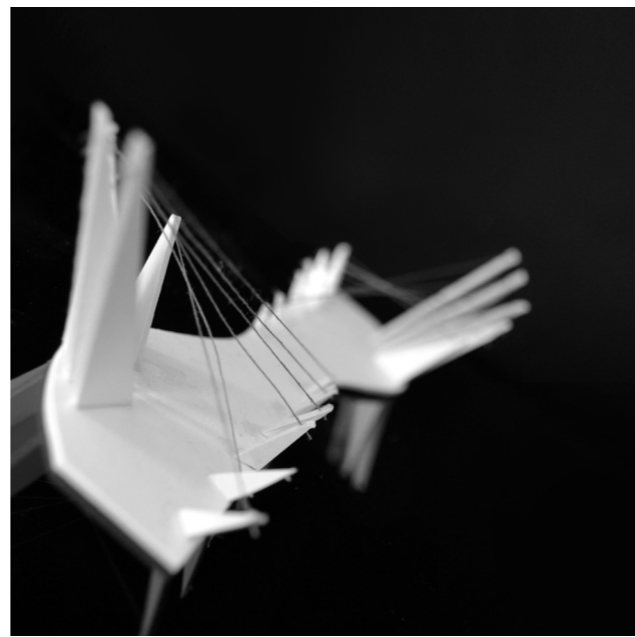
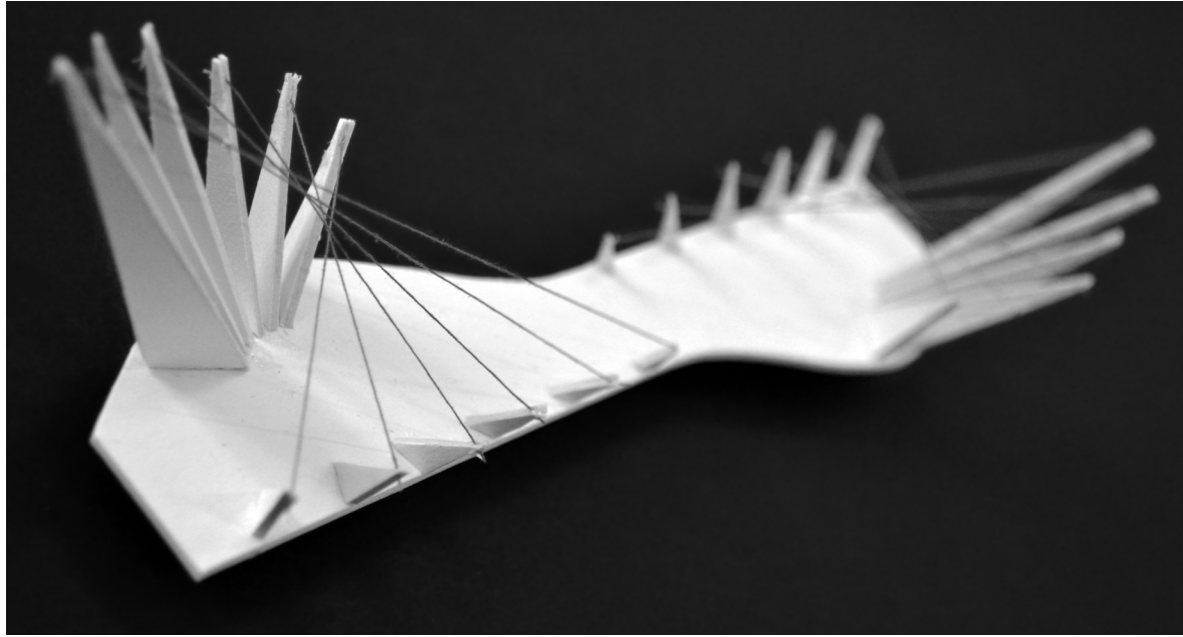
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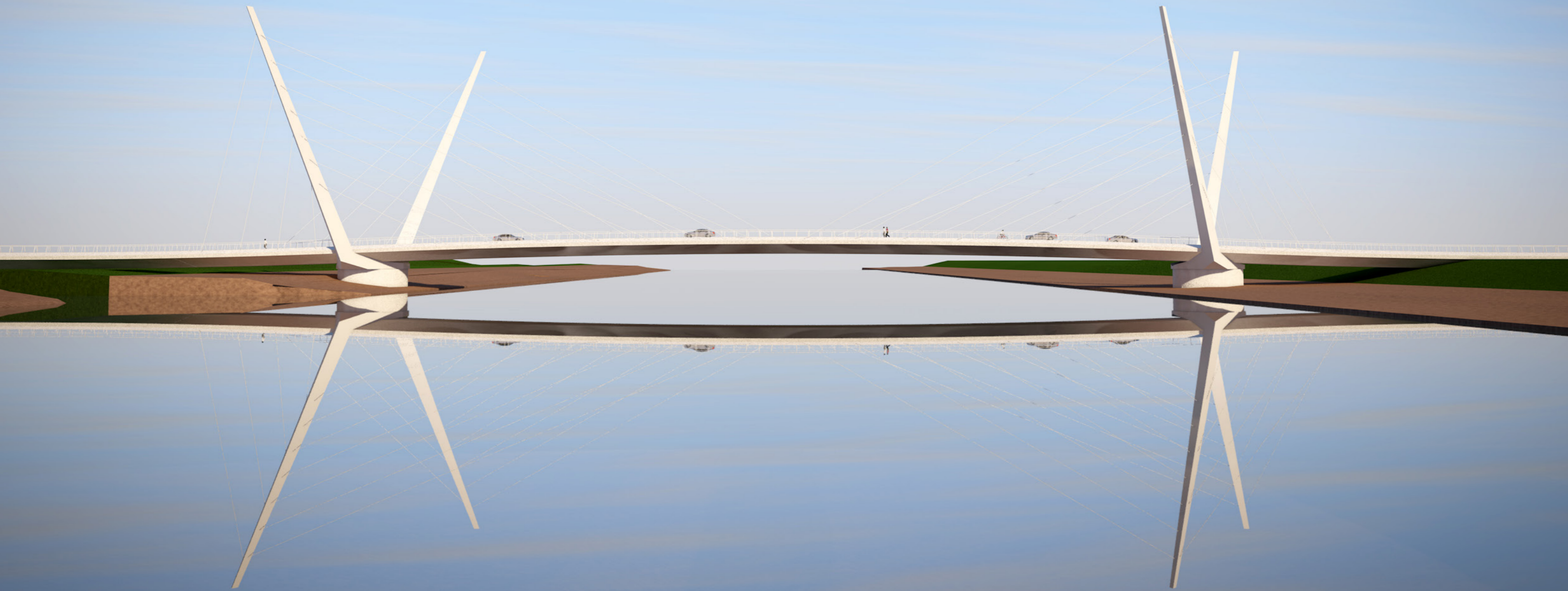
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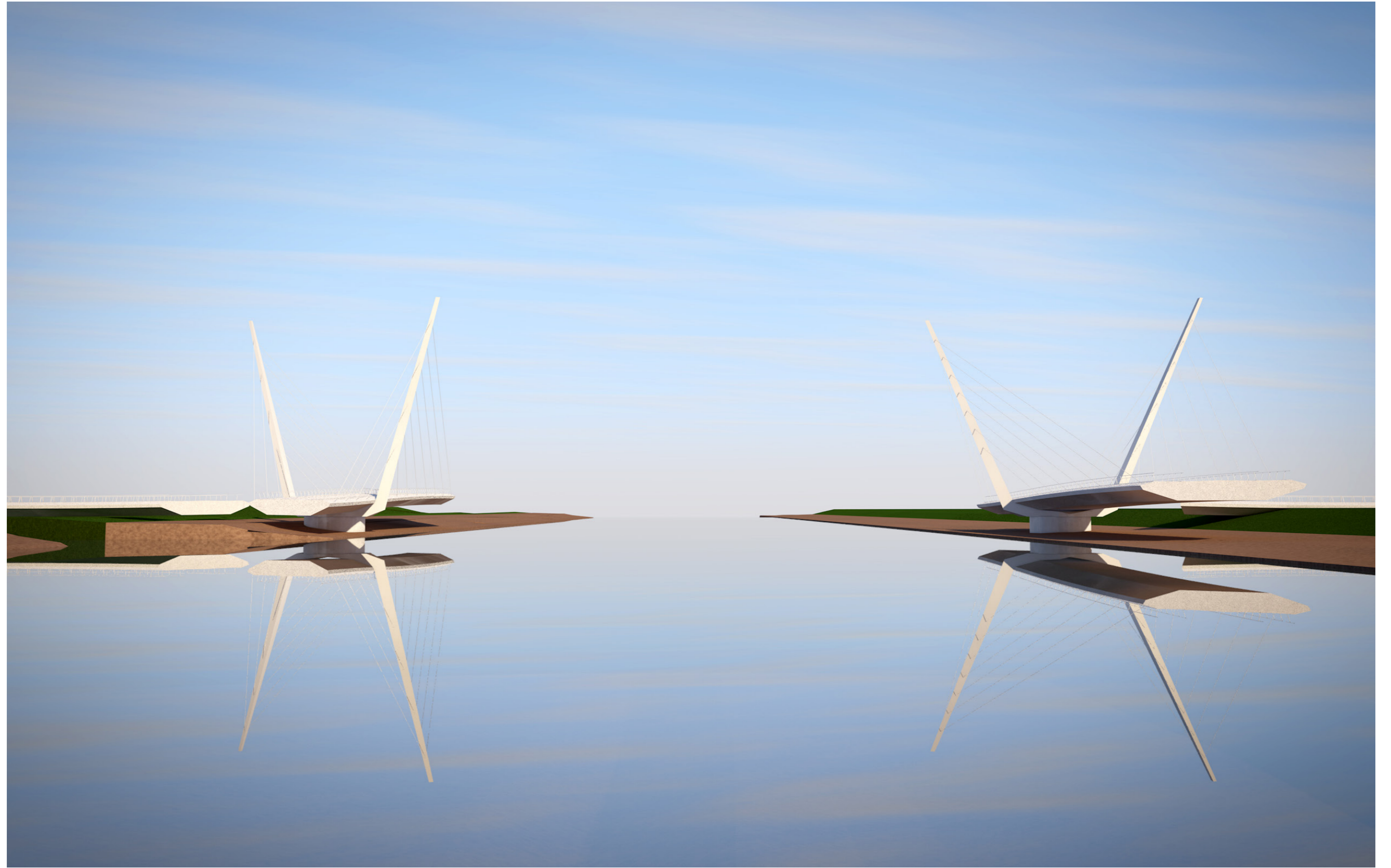


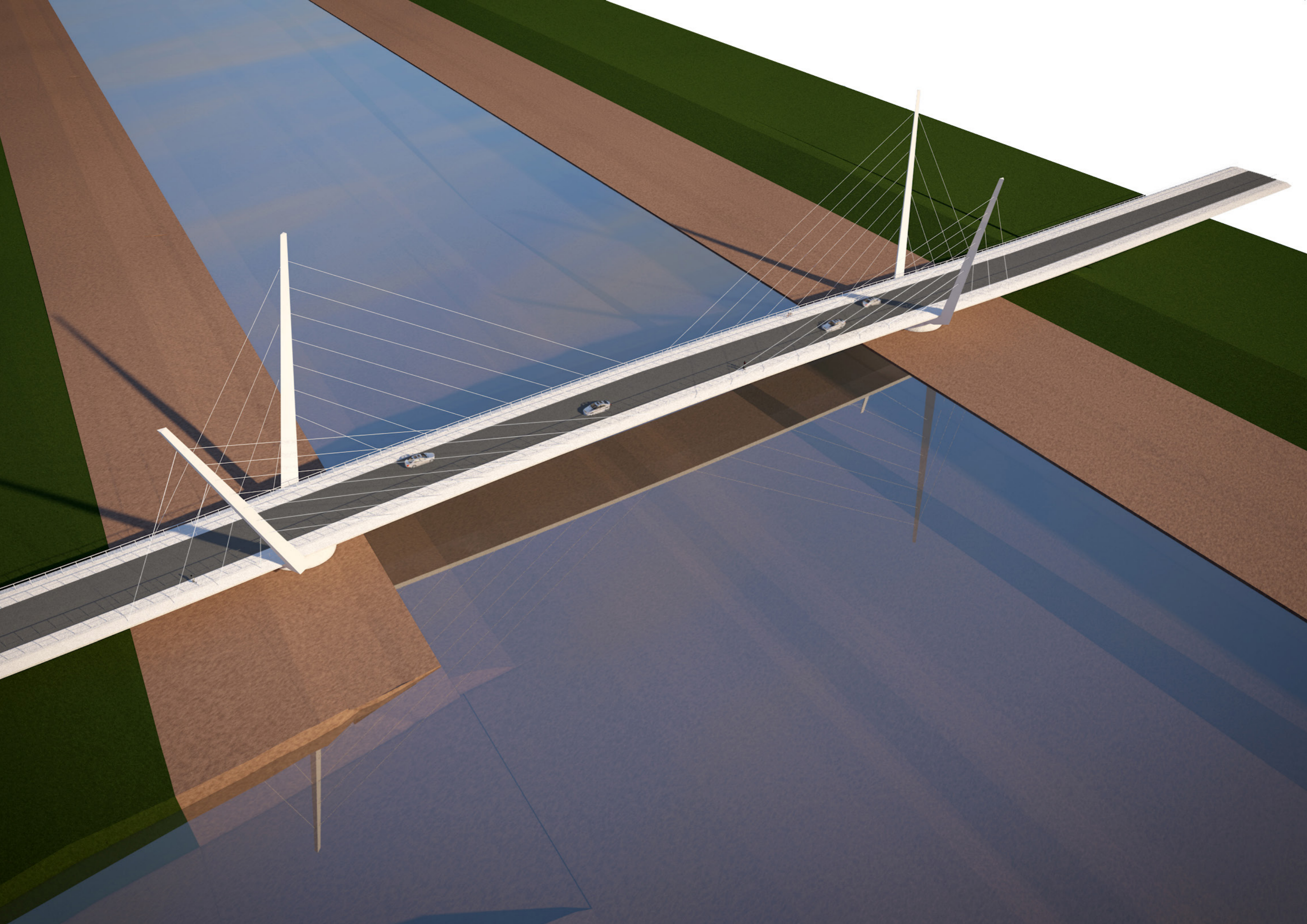
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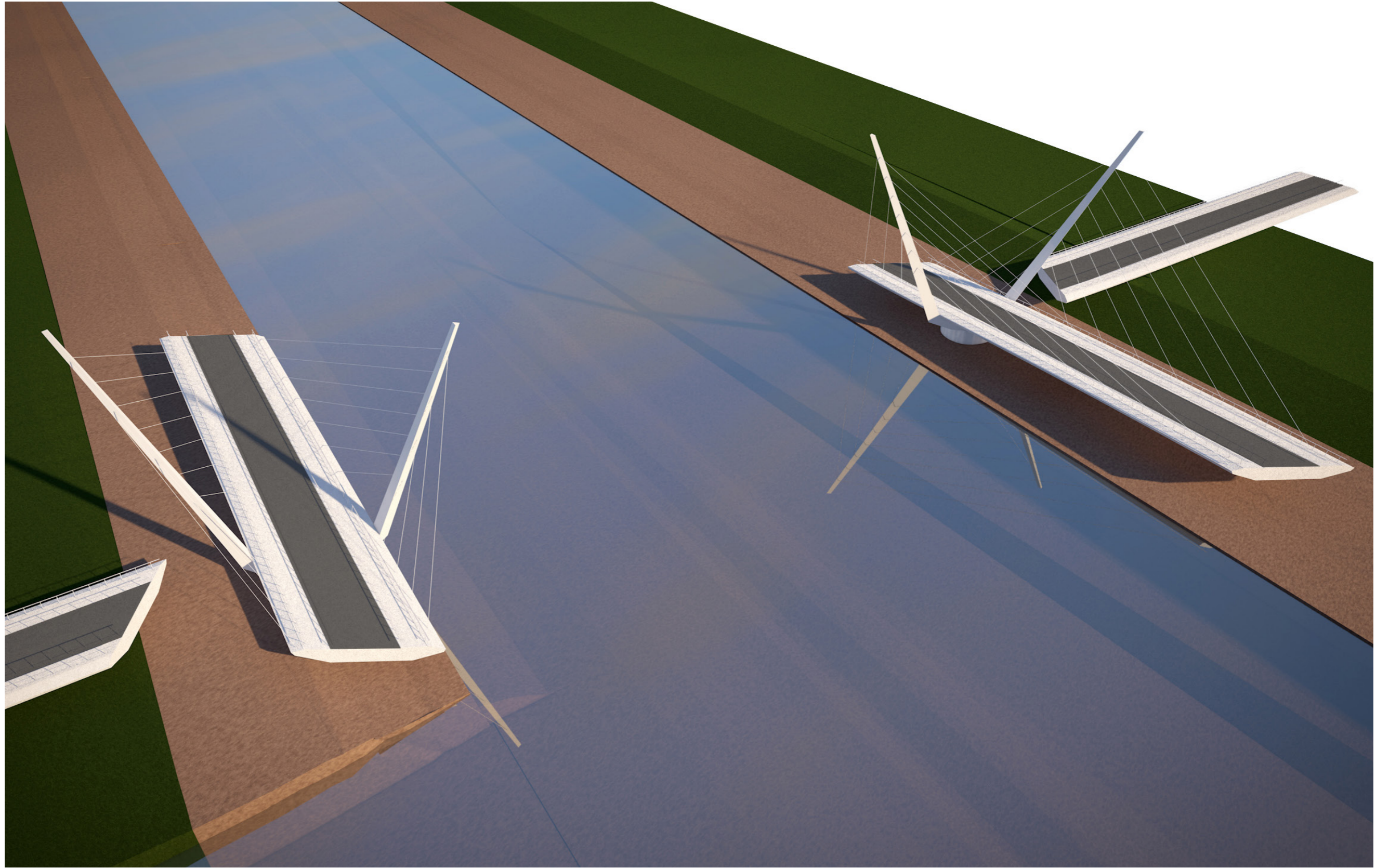


Concept development

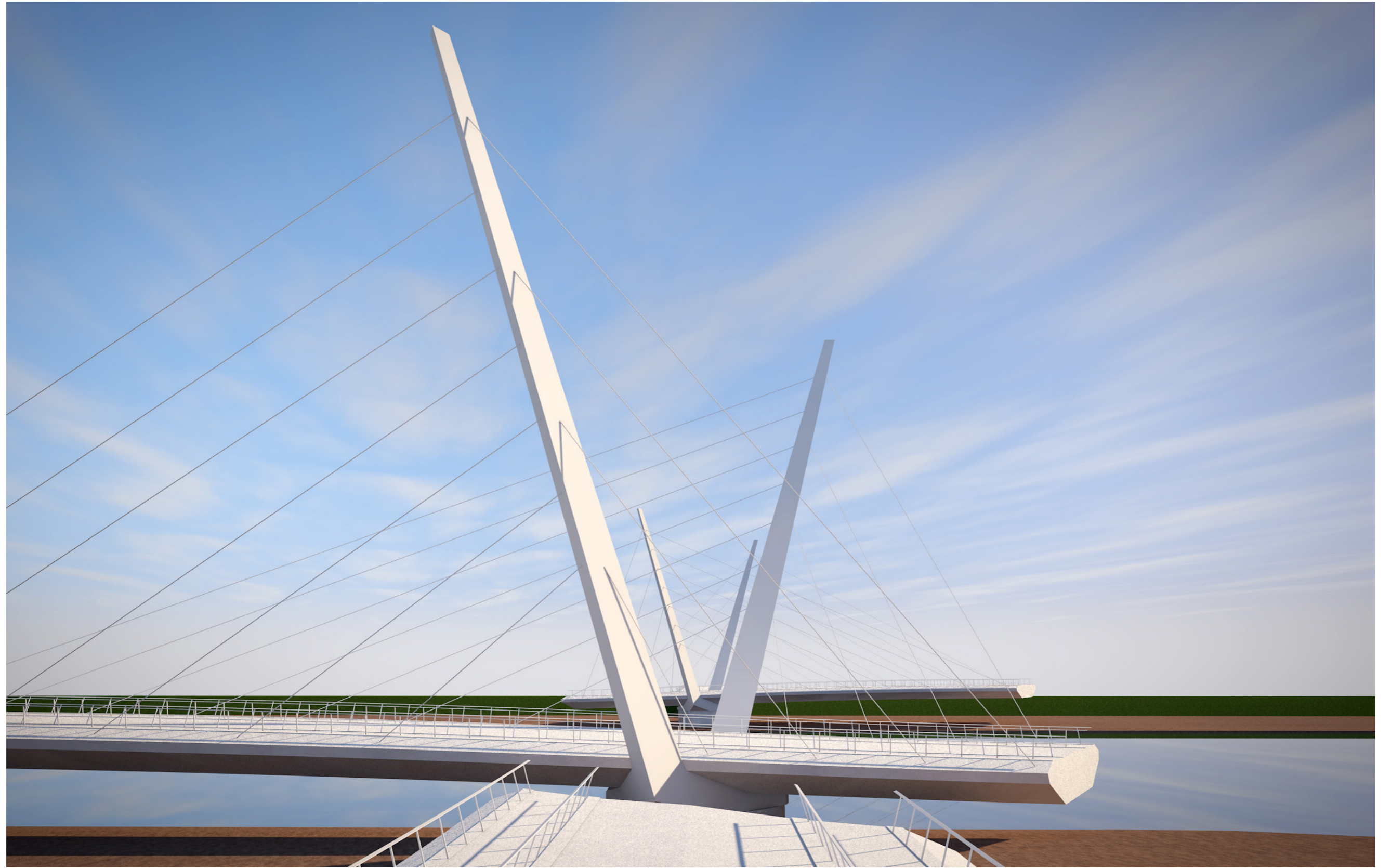


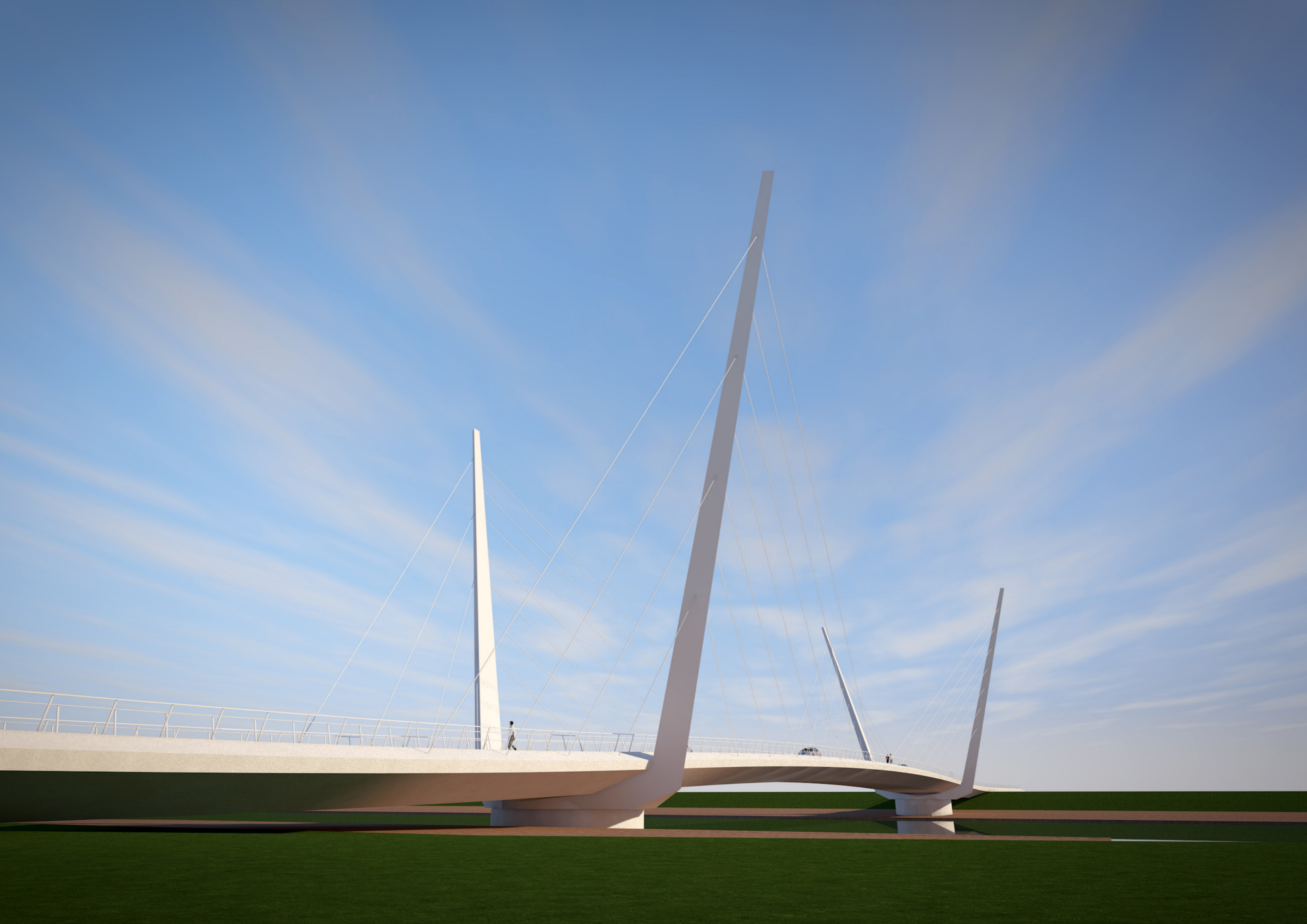


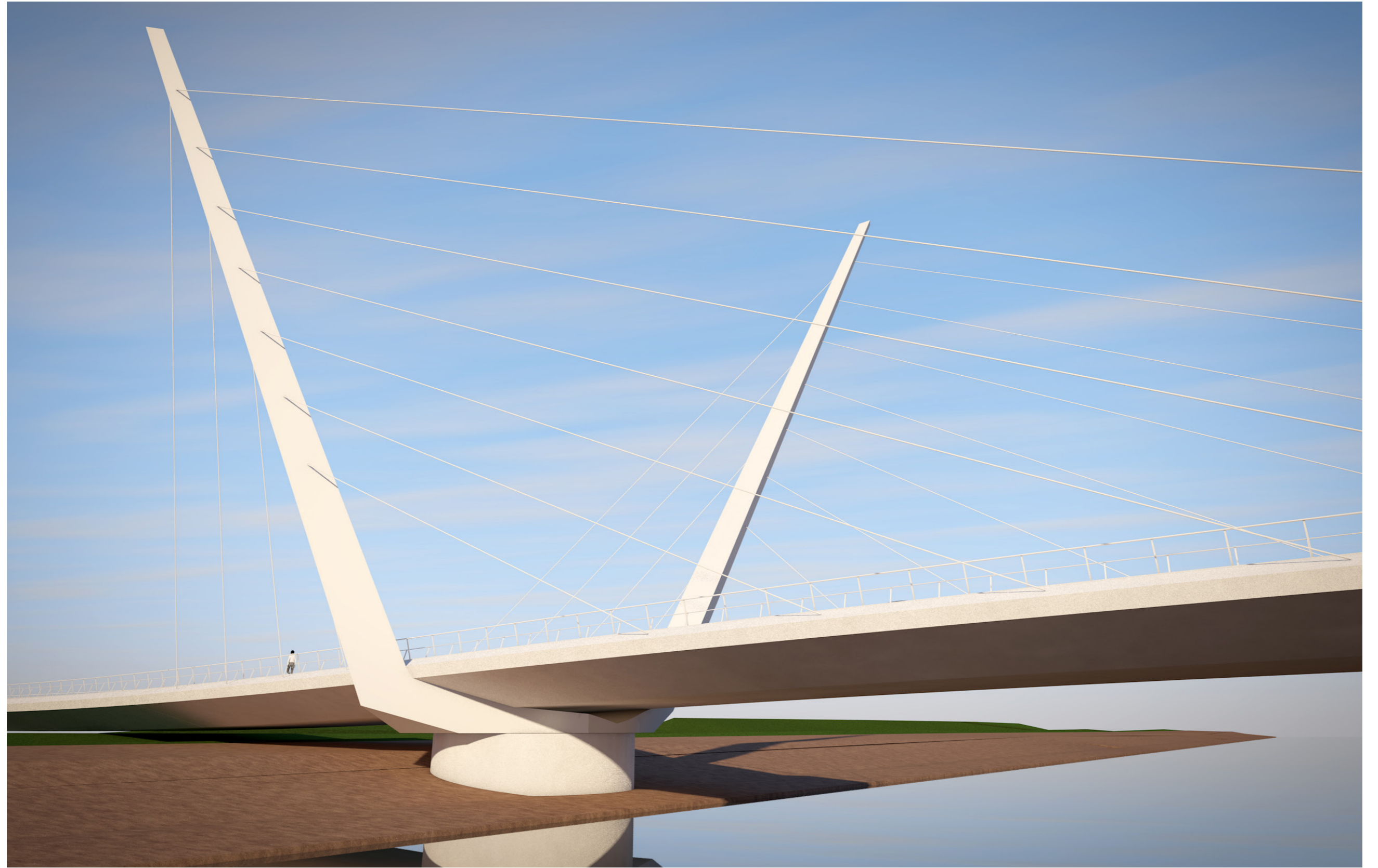


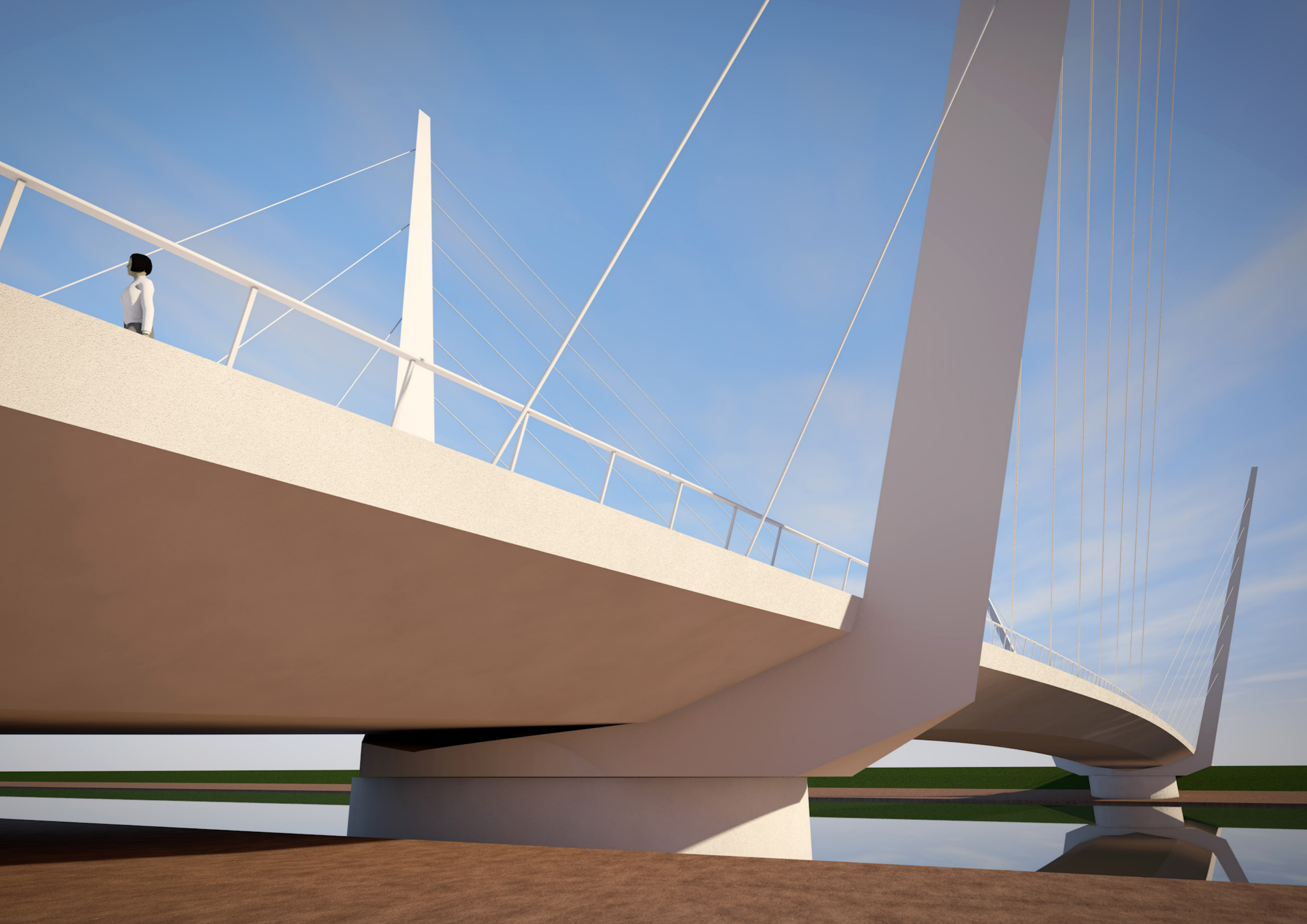


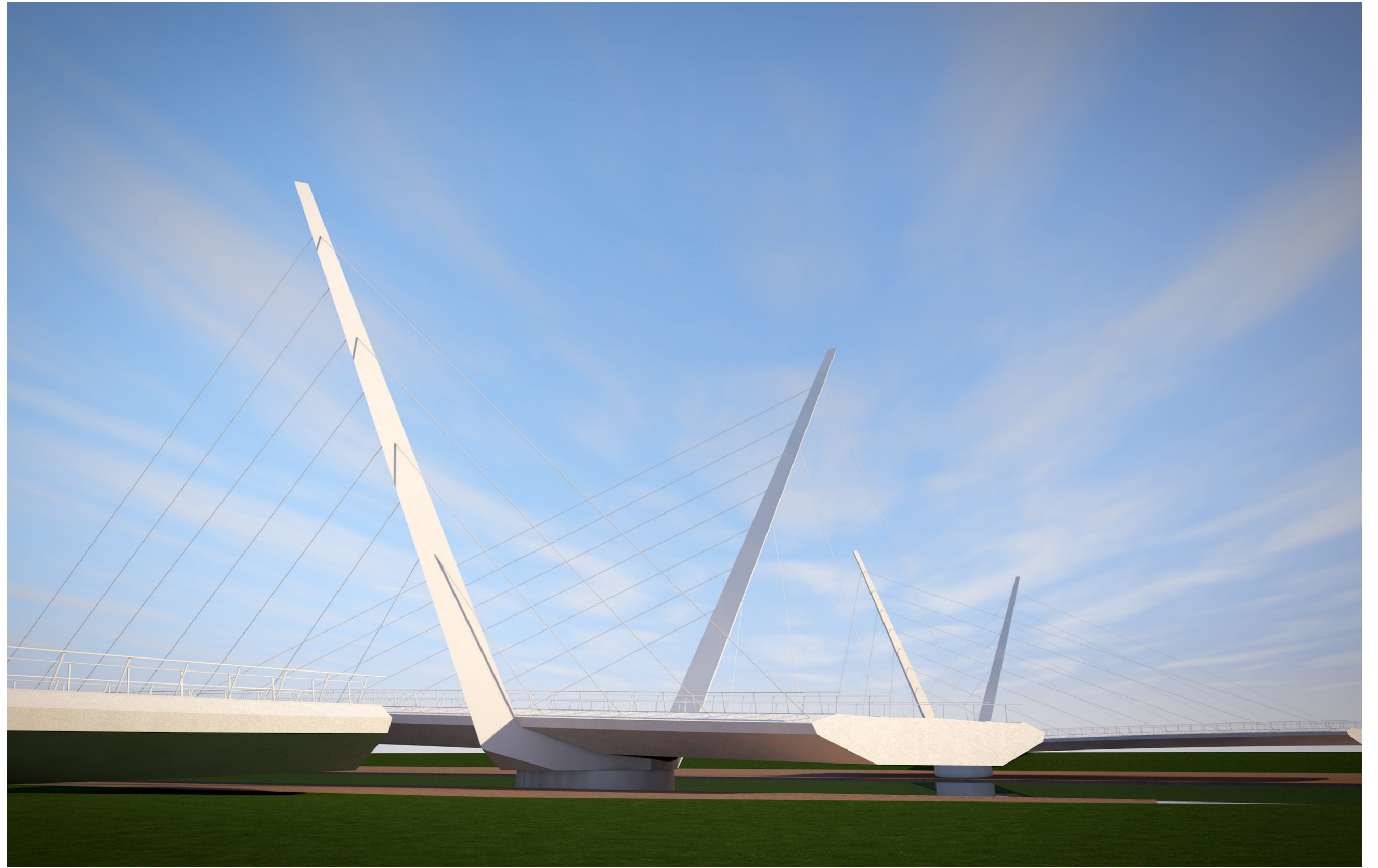










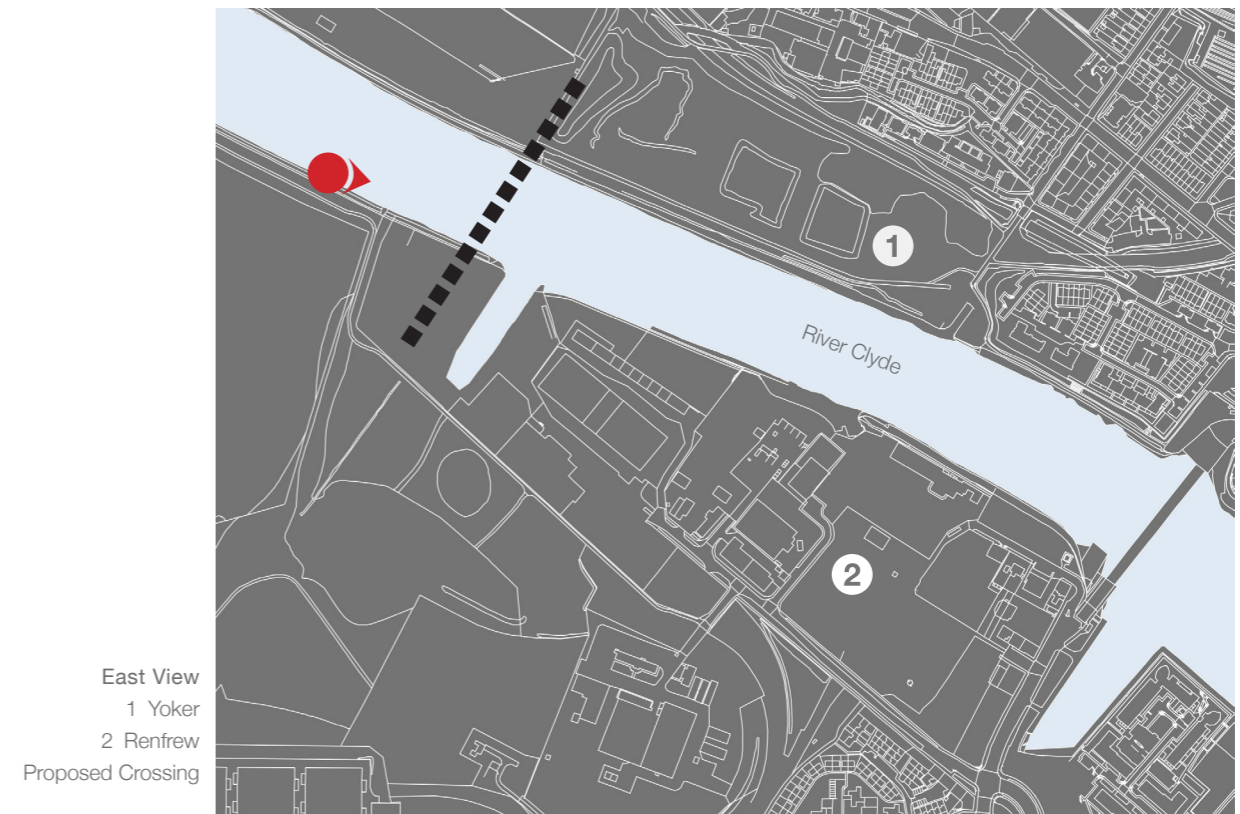


Bridge in context

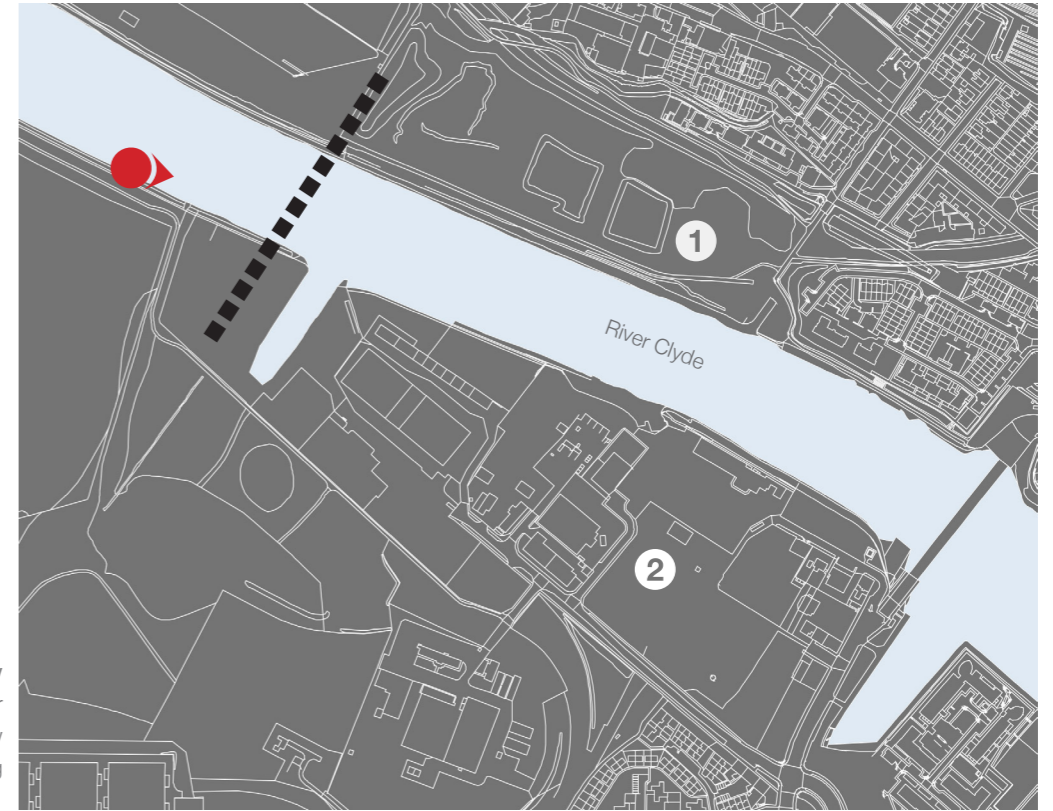


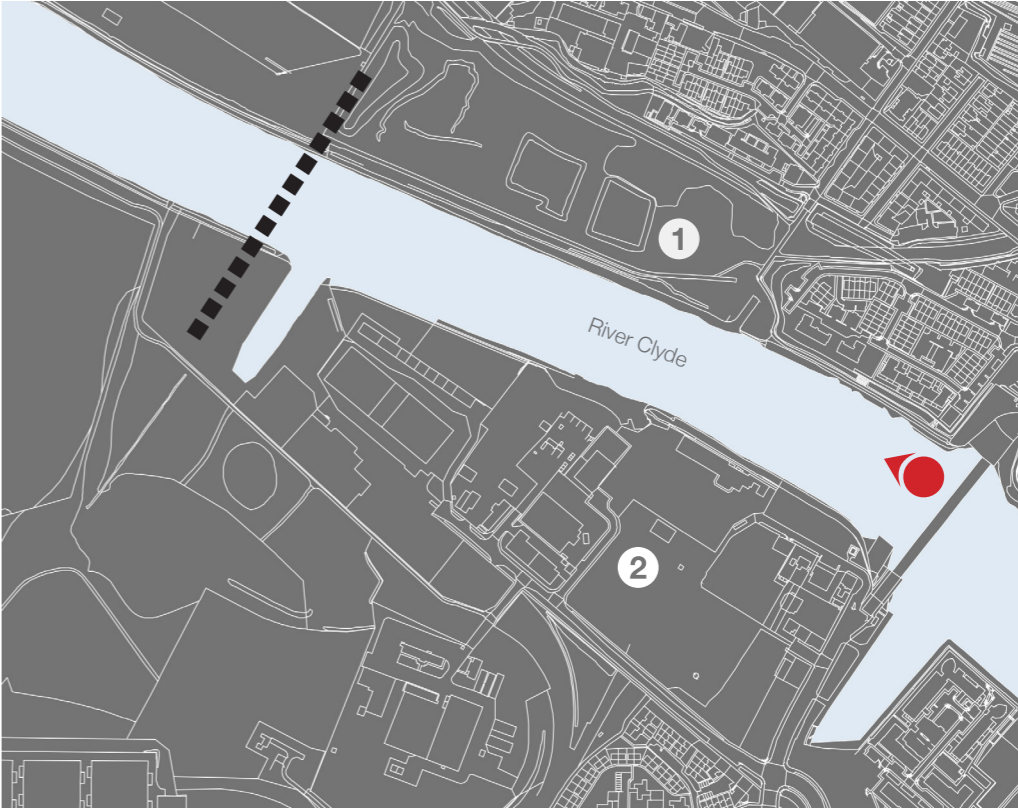


Bridge in context



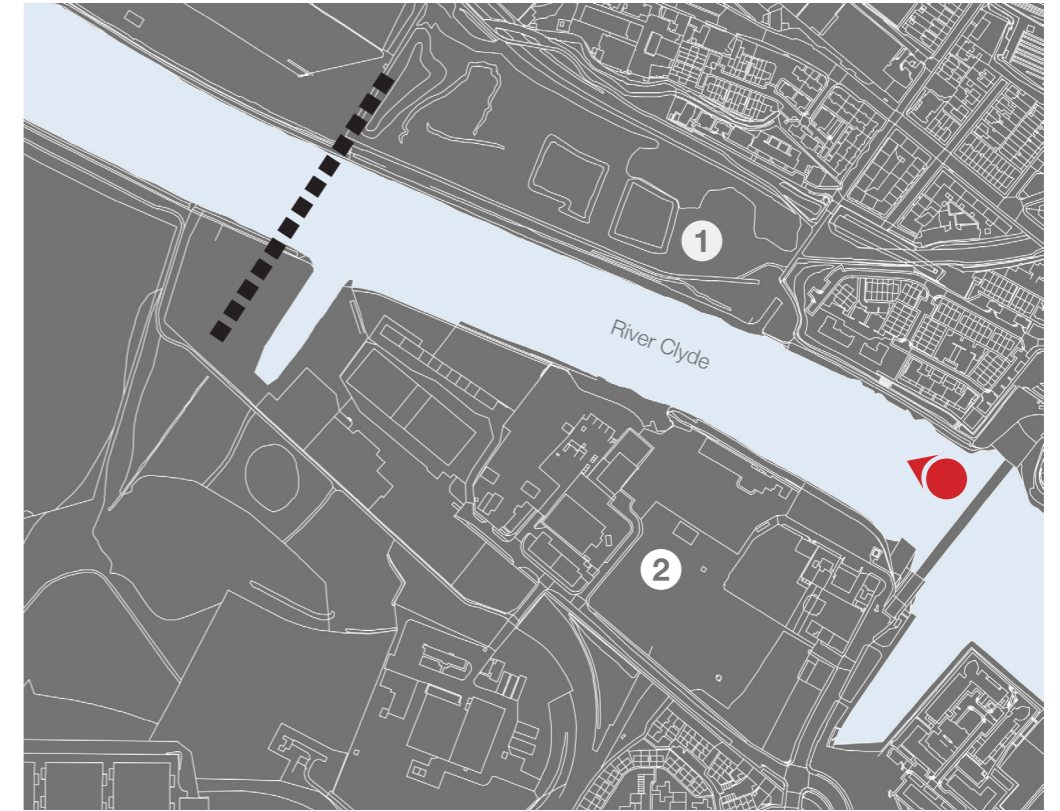
East View
1 Yoker
2 Renfrew
Proposed Crossing





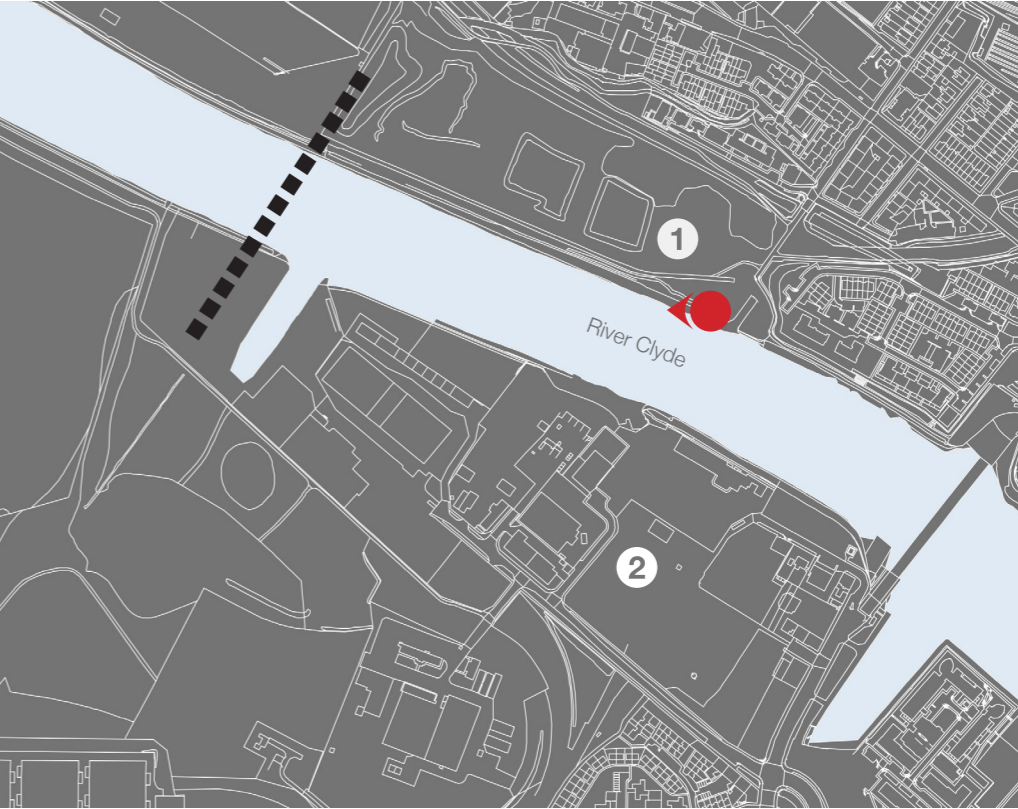
West View From Ferry
1 Yoker
2 Renfrew
■■■ Proposed Crossing





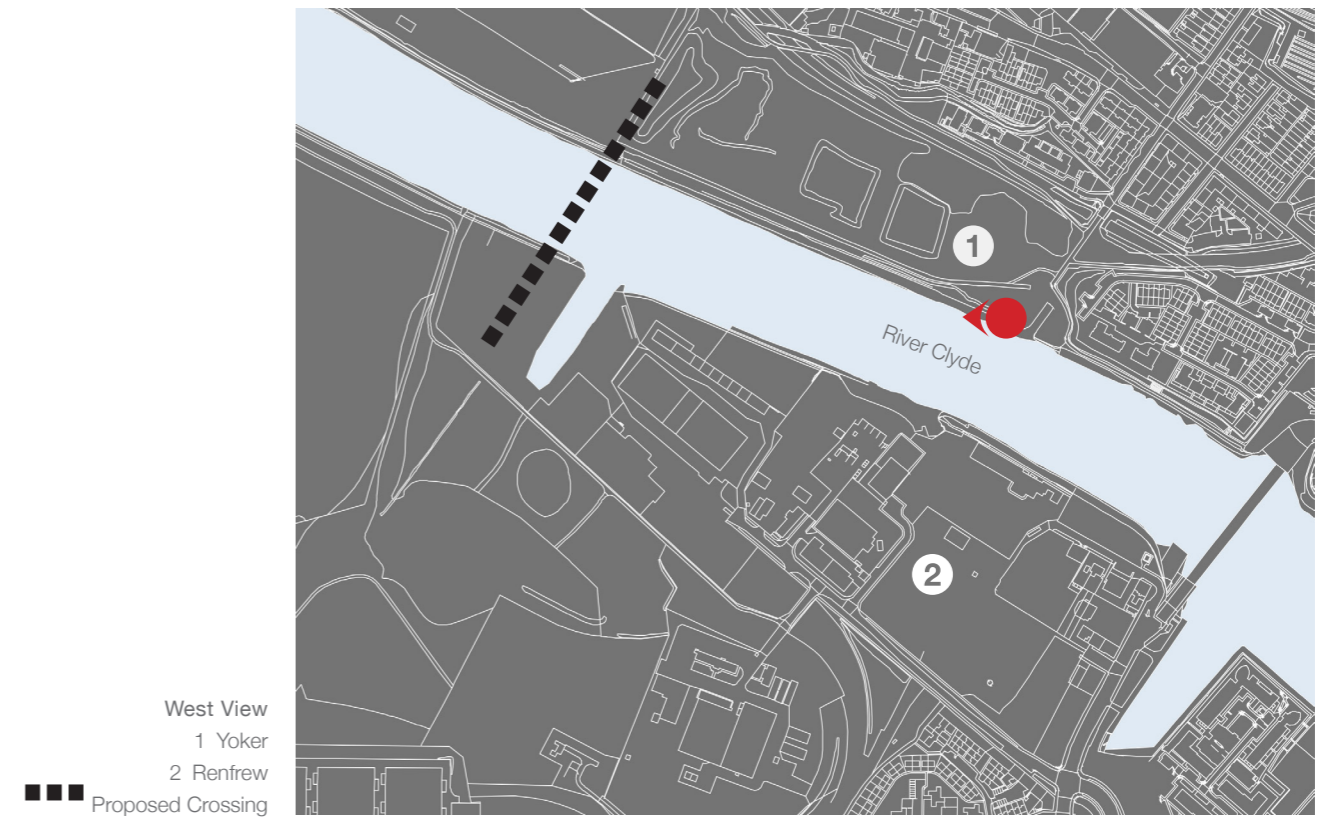
West View From Ferry
1 Yoker
2 Renfrew
■■■ Proposed Crossing



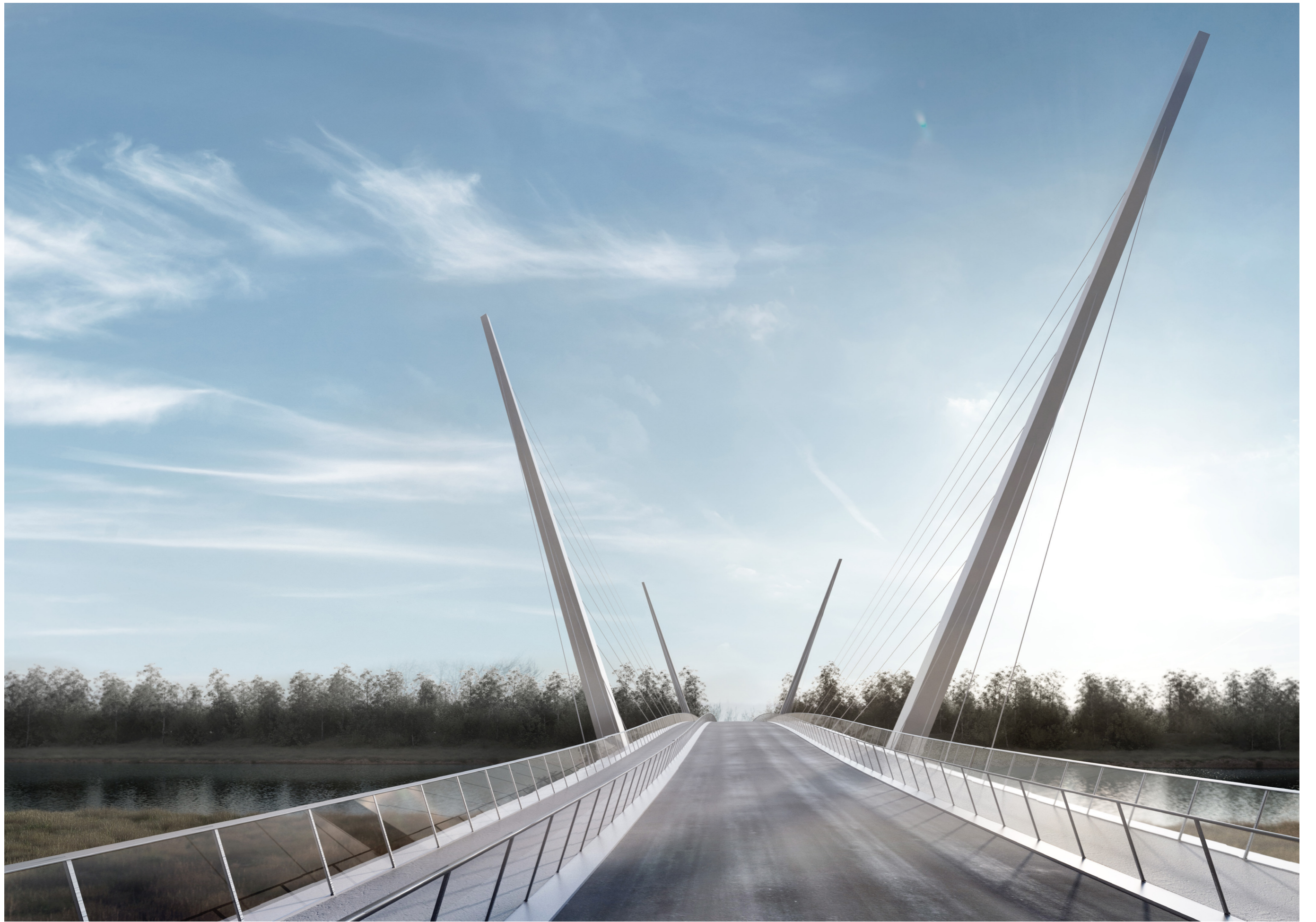


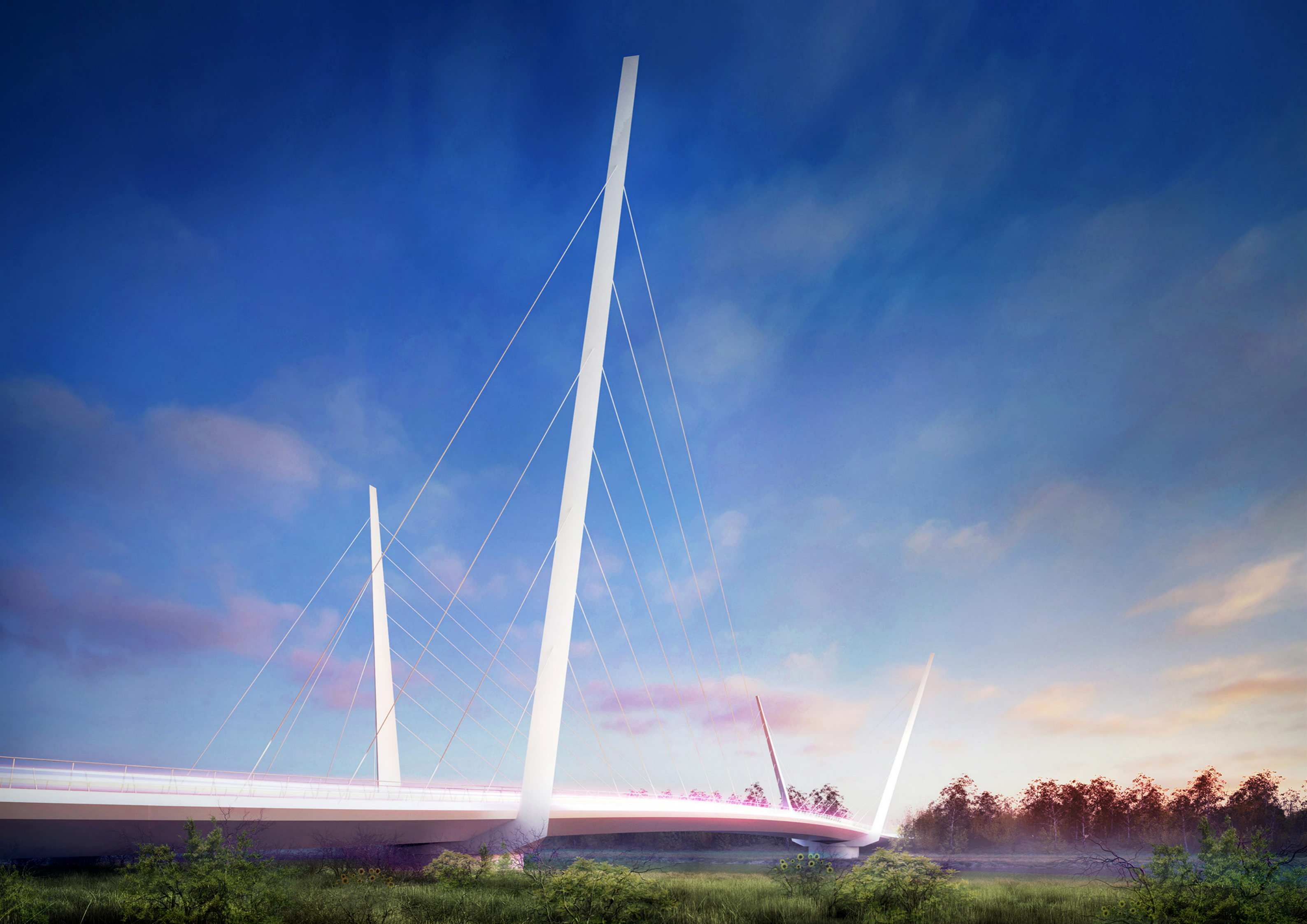
West View
1 Yoker
2 Renfrew
Proposed Crossing









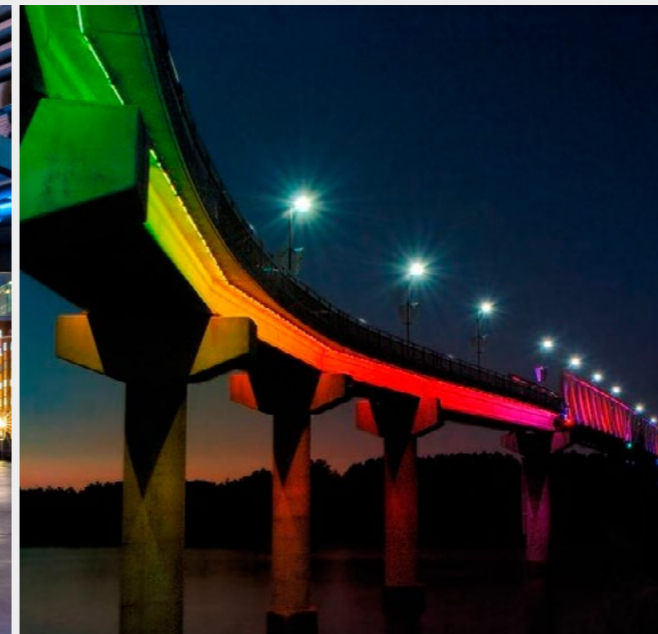


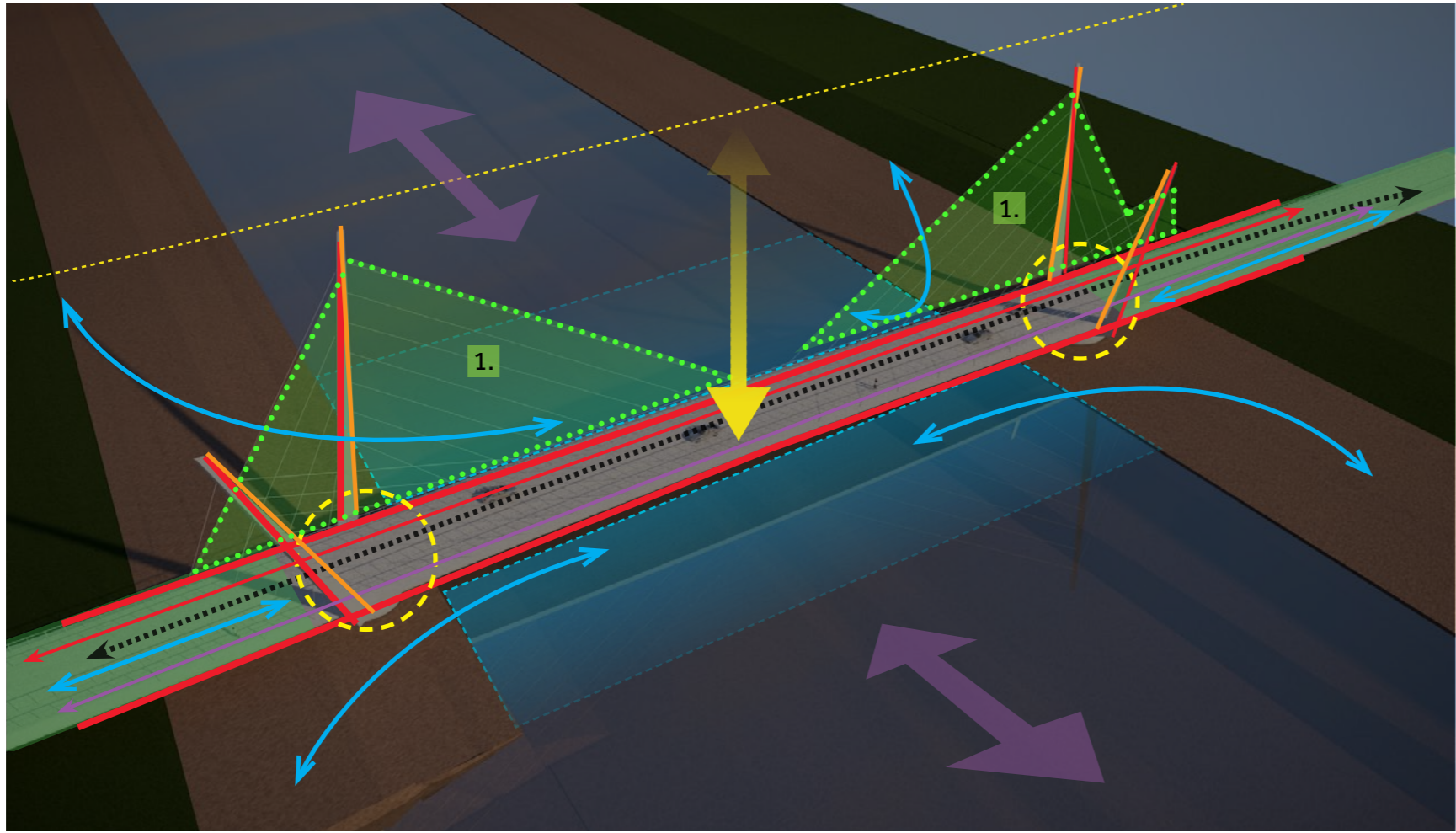




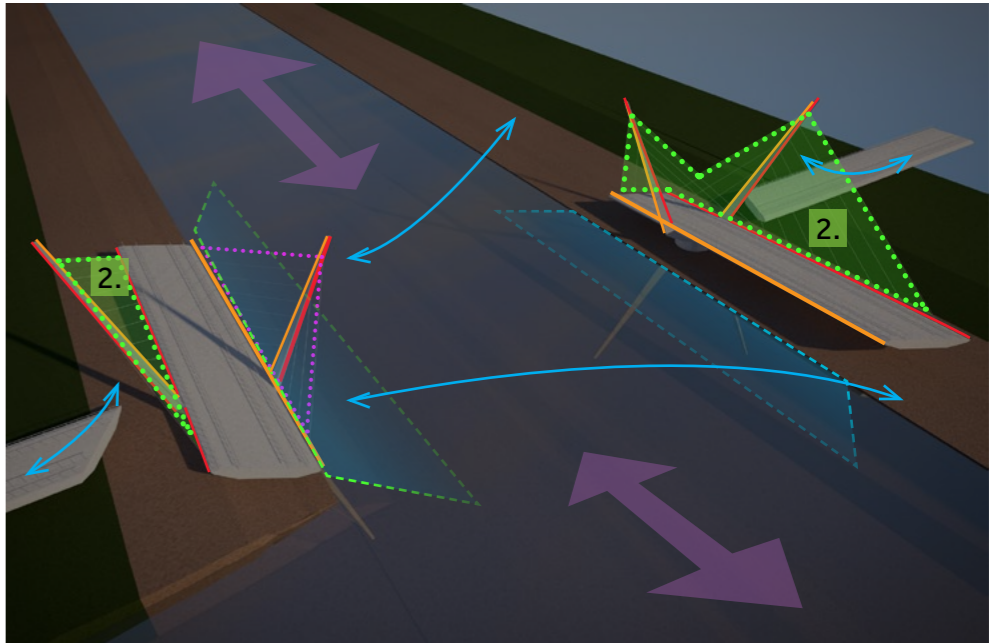


11. Lighting strategy





AERIAL VIEW CLYDE BRIDGE WHEN CLOSED - KEY CONSIDERATIONS



AERIAL VIEW CLYDE BRIDGE WHEN OPEN - KEY VIEWS

KEY:

- Main views
 - Vehicular routes
 - Cycle path
 - Pedestrian pathway
 - Main views up & down river
- Key elevations
 - Secondary elevations
 - Elevation of cables perceived to cross when viewed from riverbank
 - Elevation of cables perceived to cross when viewed from roadway
 - Pivot points
- Reflection of light on water
 - Waiting areas when bridge is open
 - Lighting to have cut off point with no spill above horizontal axis that may distract aviation

ROADWAYS & PATHWAYS

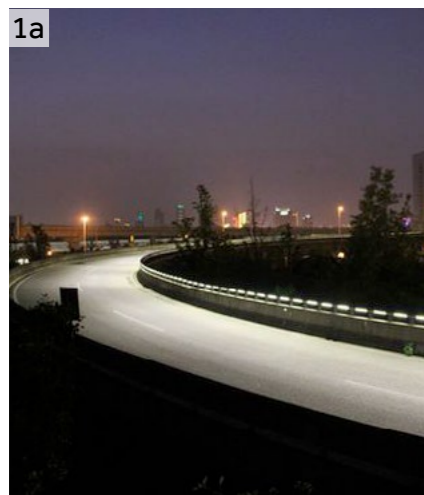
0574.CRTP.01 REV D



PERSPECTIVE VIEW - ROAD AND PATH LIGHTING INTEGRATED



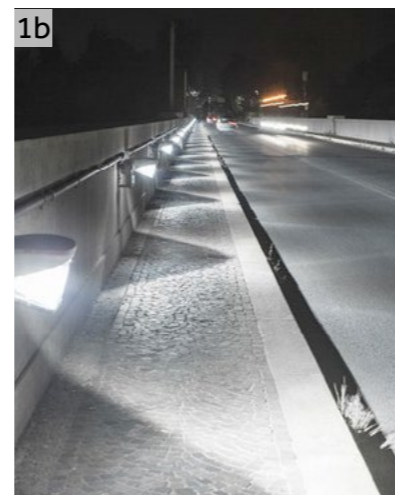
PERSPECTIVE VIEW - ROAD AND PATH LIGHTING BOLLARDS



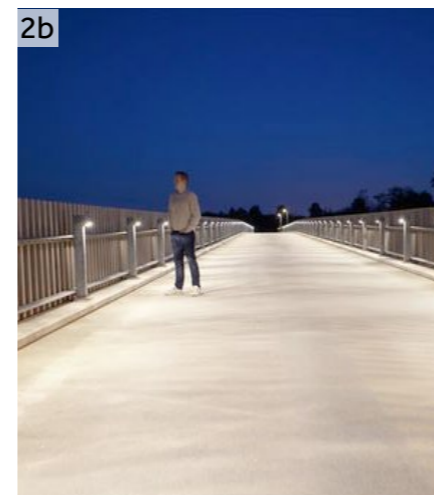
ROAD LIGHTING:
Integrated low level lighting in crash barrier



PEDESTRIAN LIGHTING:
Integrated low level lighting to handrail



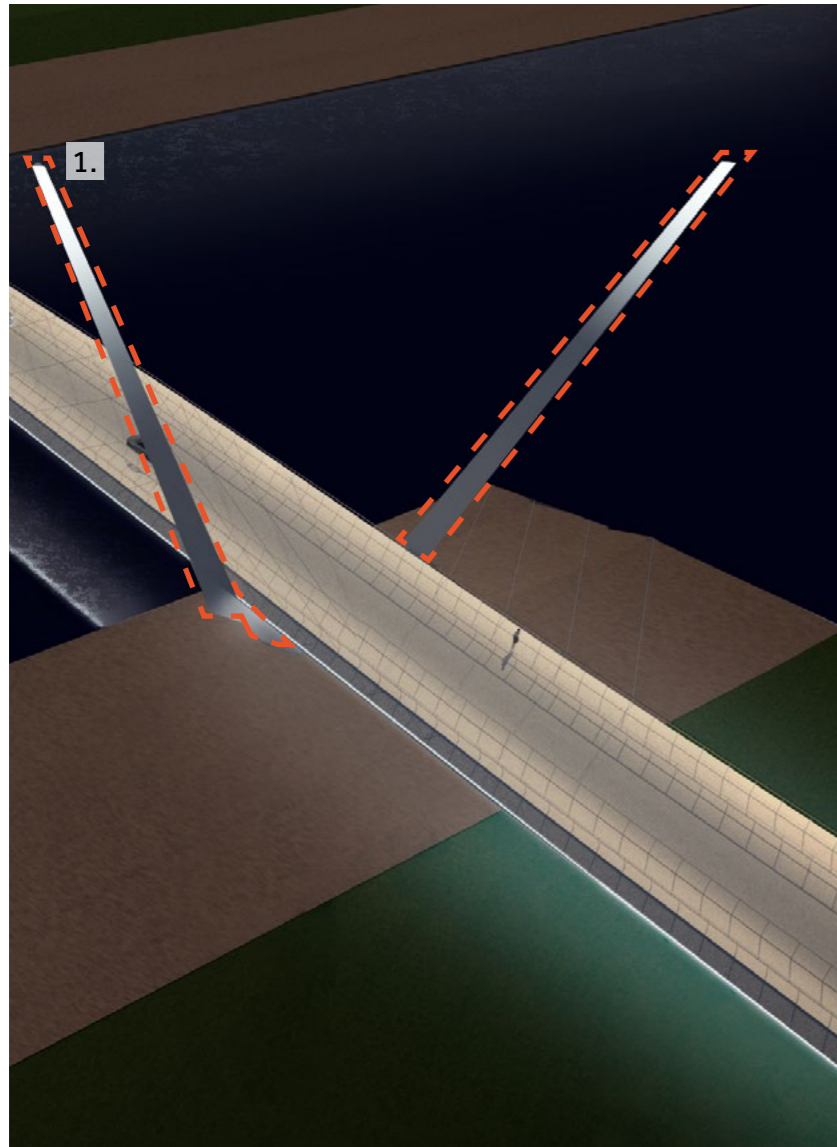
ROAD LIGHTING:
Surface mounted low level lighting



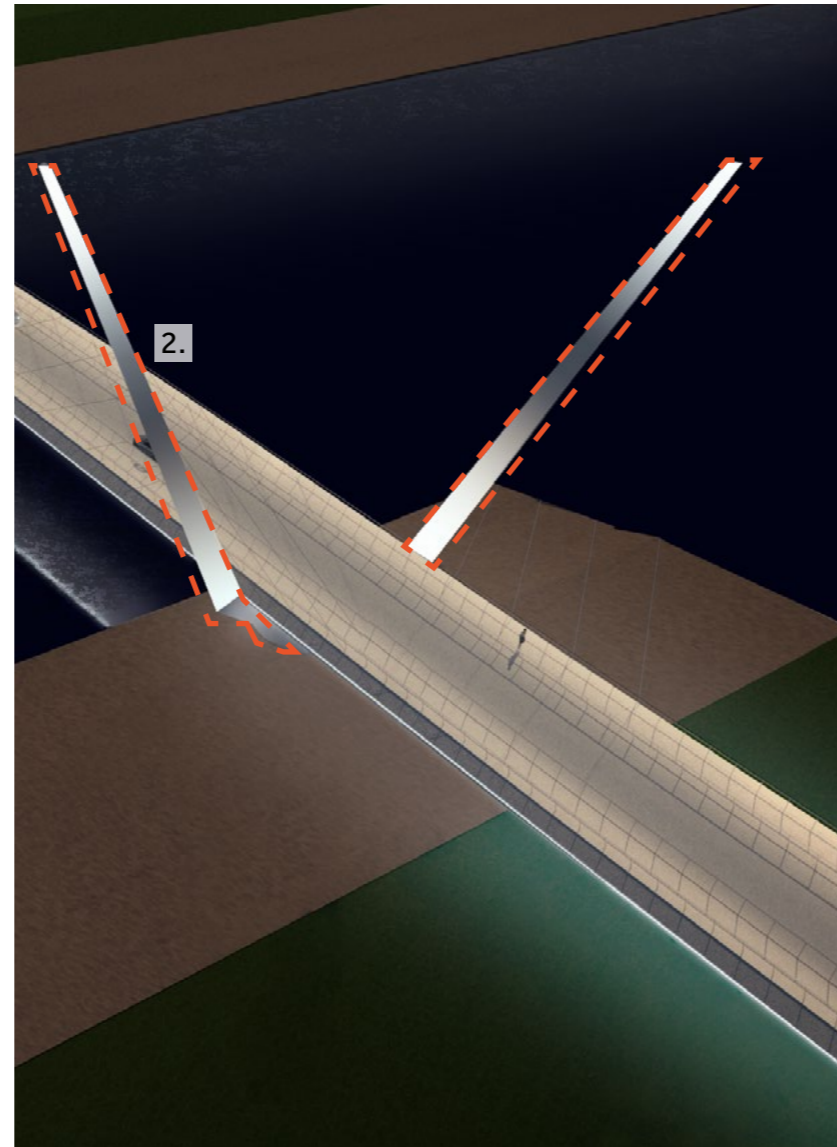
PEDESTRIAN LIGHTING:
Discrete low level bollards lighting

TOWERS - OPTIONS

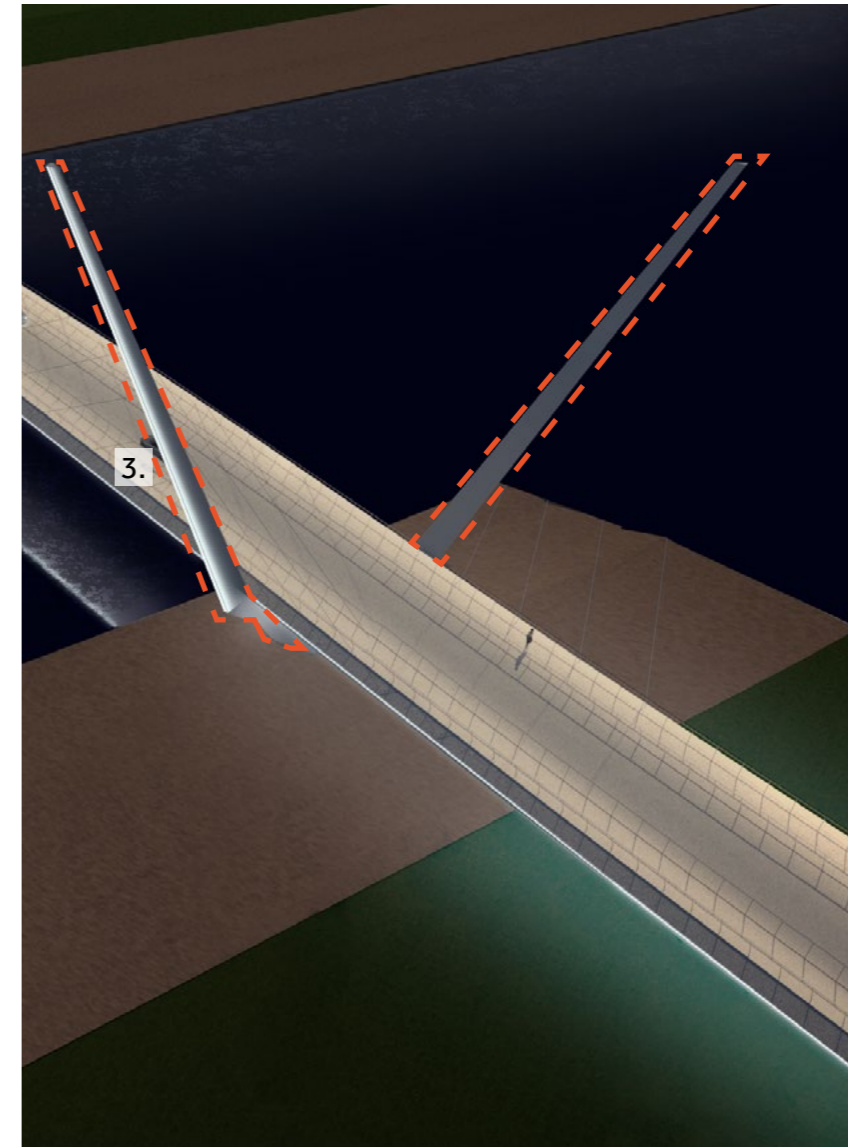
0574.CRTP.01 REV D



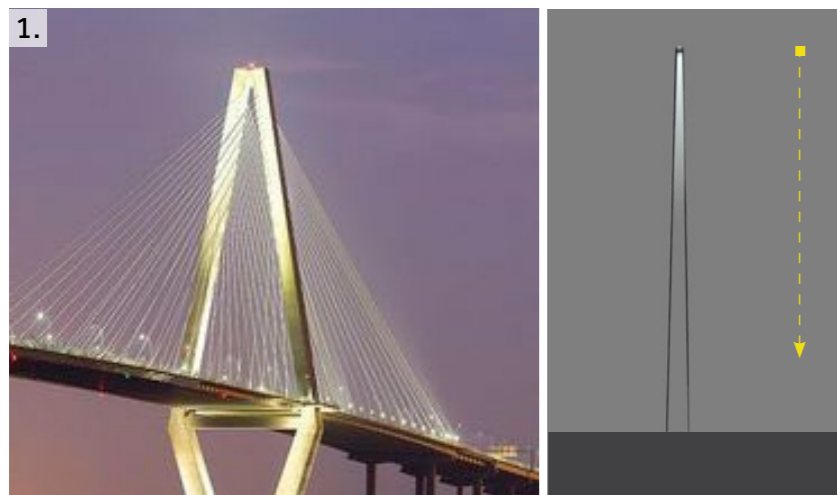
AERIAL VIEW TOWERS - TOP ILLUMINATION ONLY



AERIAL VIEW TOWERS - TOP & BOTTOM ILLUMINATION



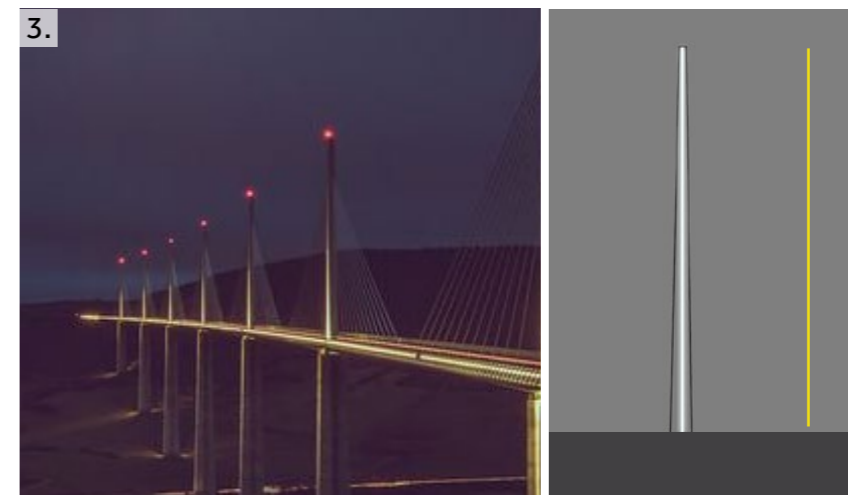
AERIAL VIEW TOWERS - LINE OF LIGHT



NARROW BEAM SPOTLIGHT FROM TOP



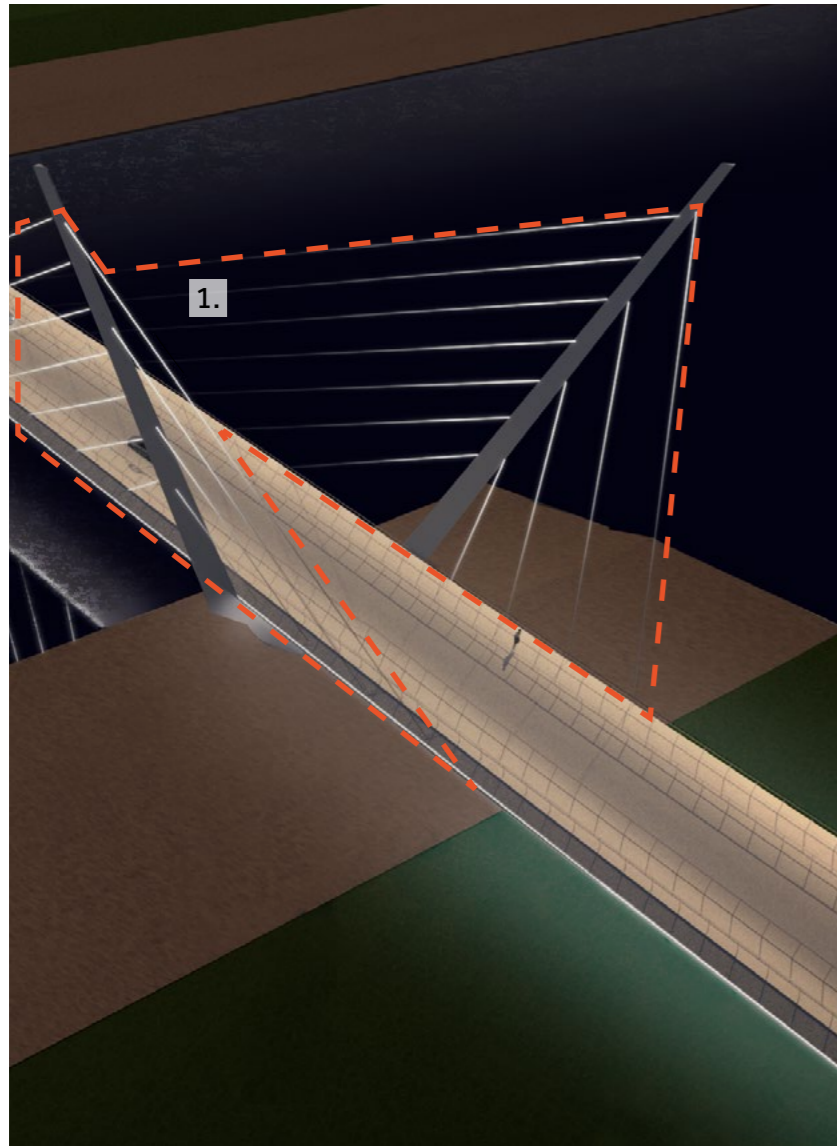
NARROW BEAM SPOTLIGHT FROM TOP & BOTTOM



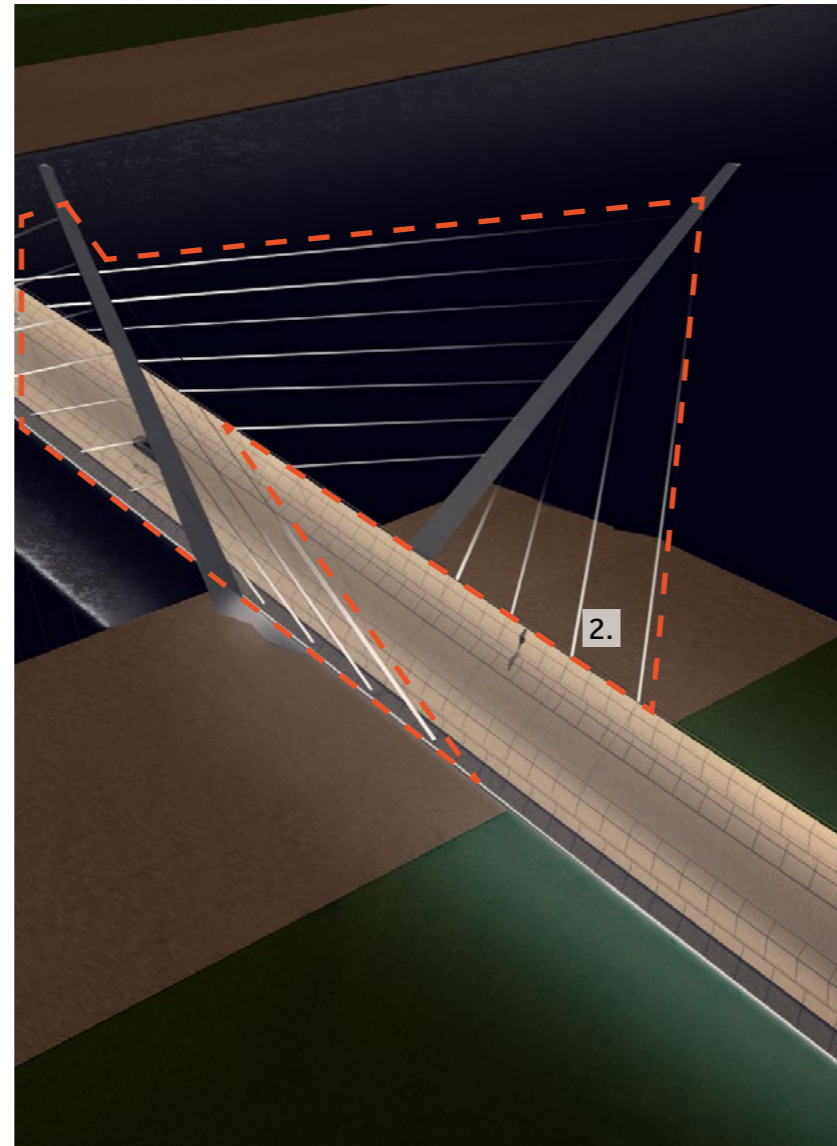
LINEAR LUMINAIRES CREATING A LINE OF LIGHT

STAYS - OPTIONS

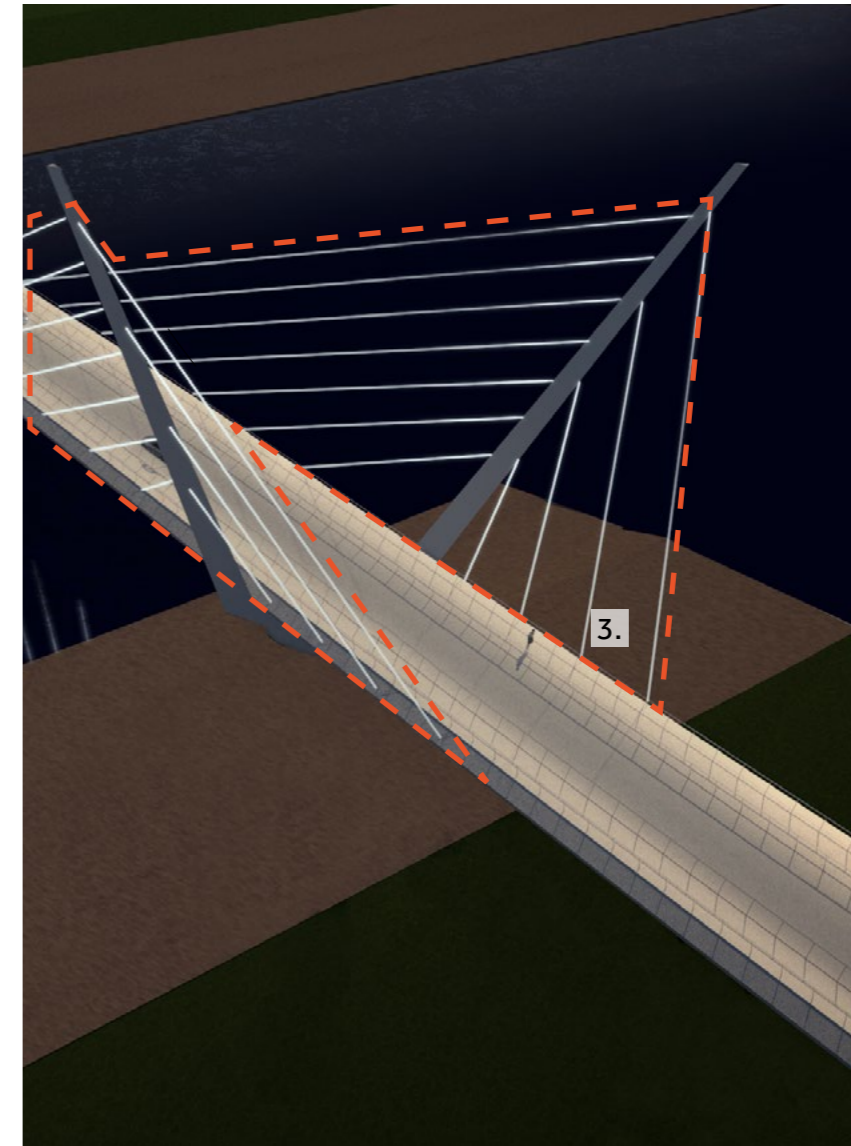
0574.CRTP.01 REV D



AERIAL VIEW STAYS - WASHING LIGHT DOWN



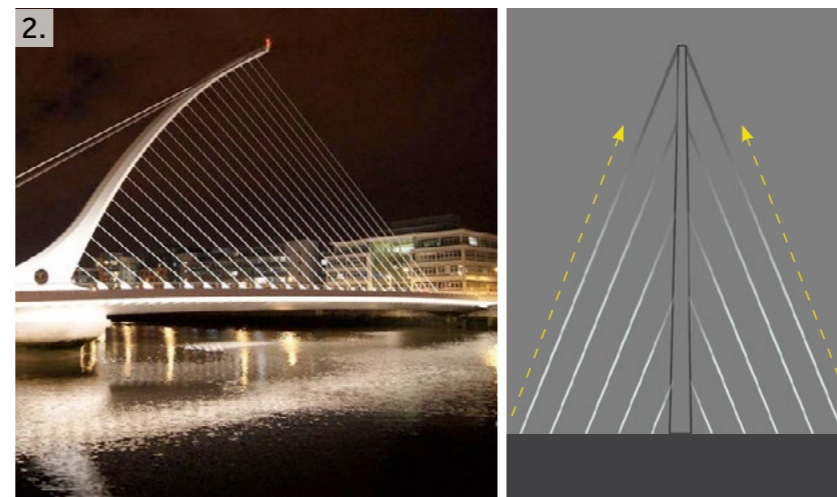
AERIAL VIEW STAYS - UPLIGHTING



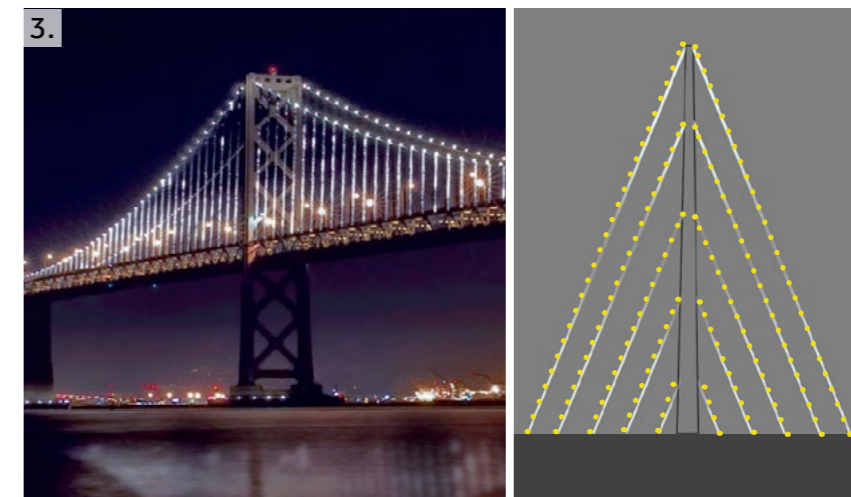
AERIAL VIEW STAYS - ADDRESSABLE LUMINAIRES



1.
WASHING LIGHT DOWN
Allows for a high level of control with no possibility of upwards light pollution.



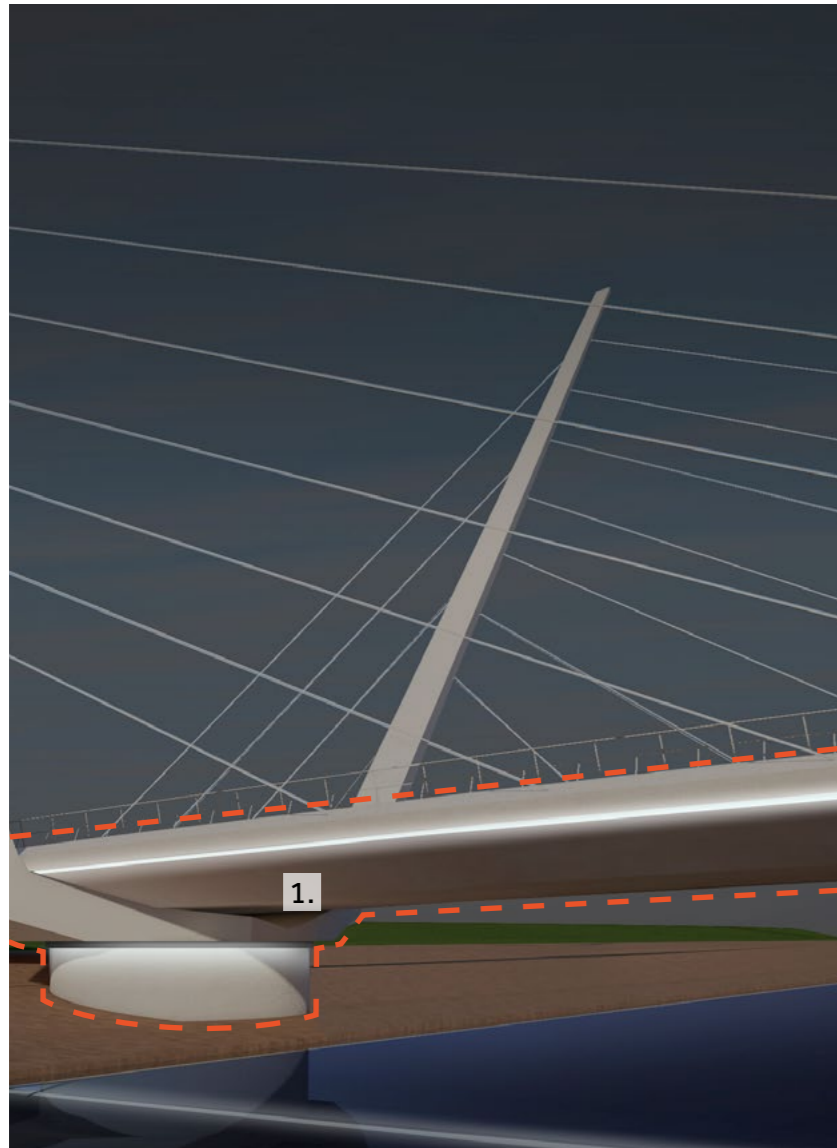
2.
UPLIGHTING
Special consideration required to prevent any possibilities of nuisance light given the proximity to flight paths



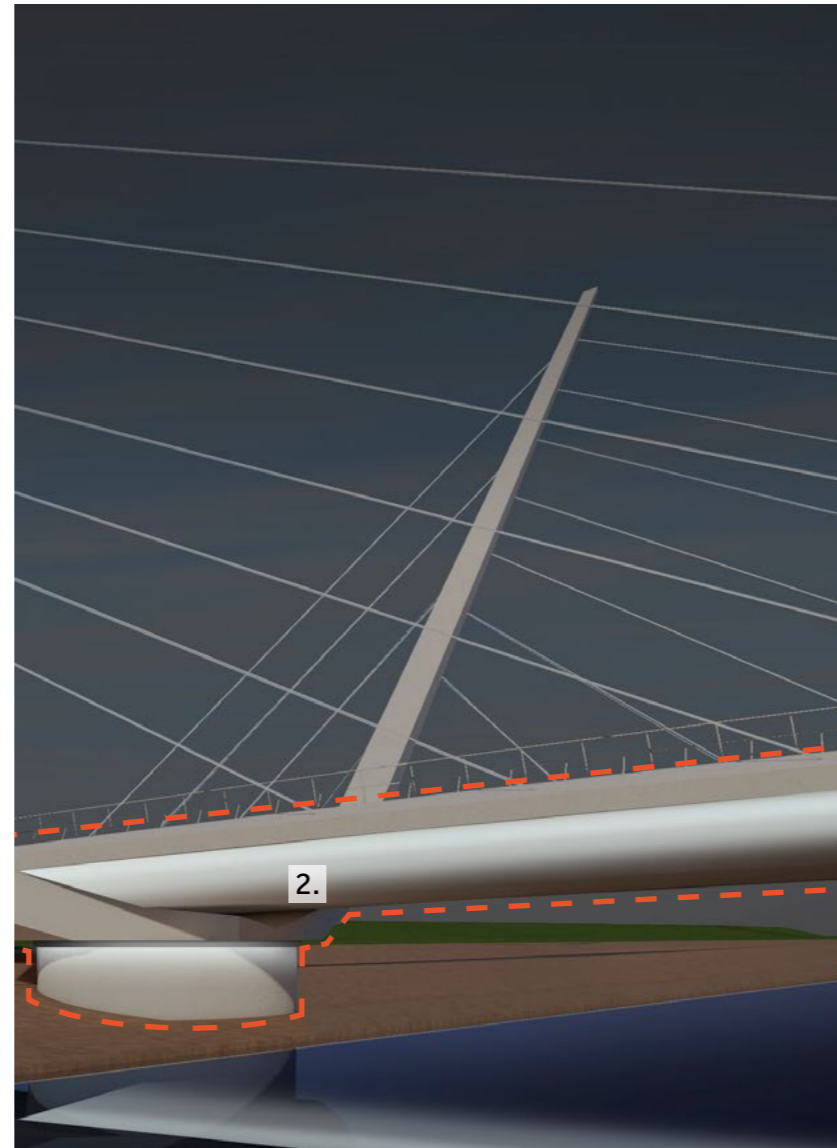
3.
ADDRESSABLE LUMINAIRES MOUNTED ON STAYS
Luminaires mounted on the stays create a visual plane and allowing dynamic effects to be utilised.

UNDER BRIDGE - OPTIONS

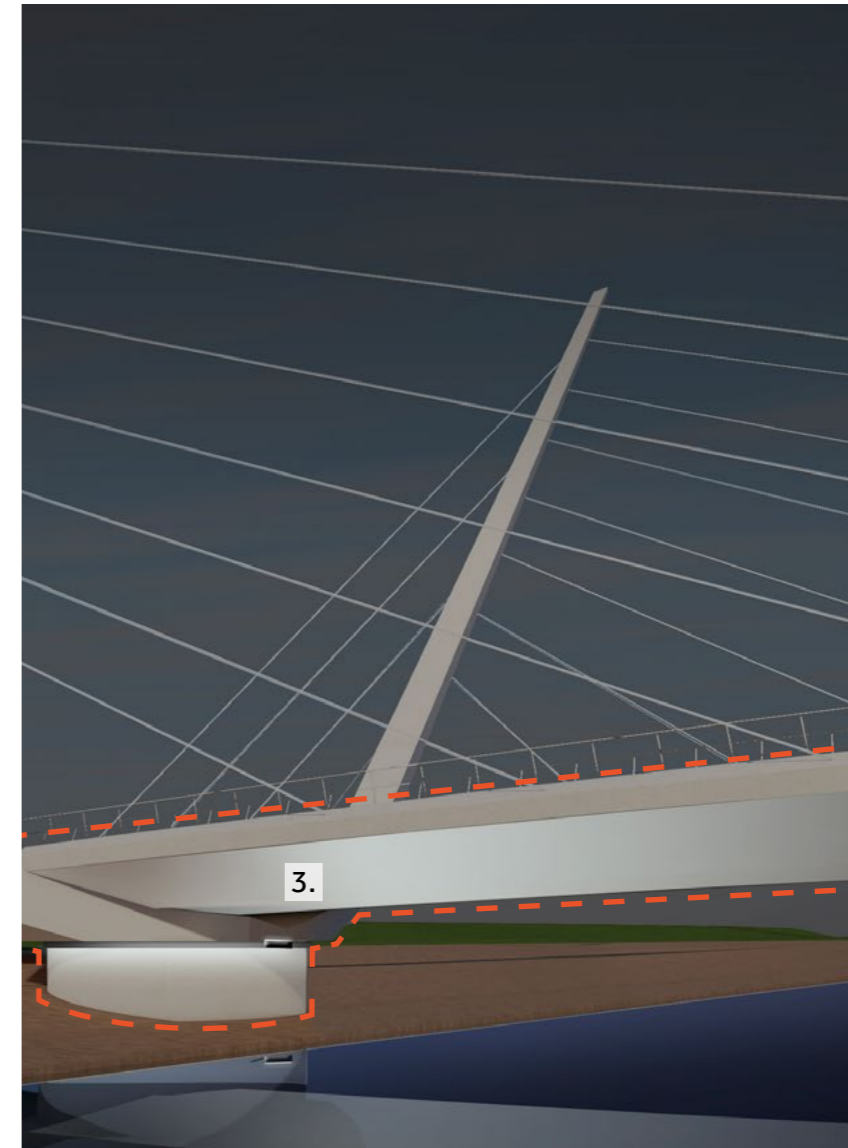
0574.CRTP.01 REV D



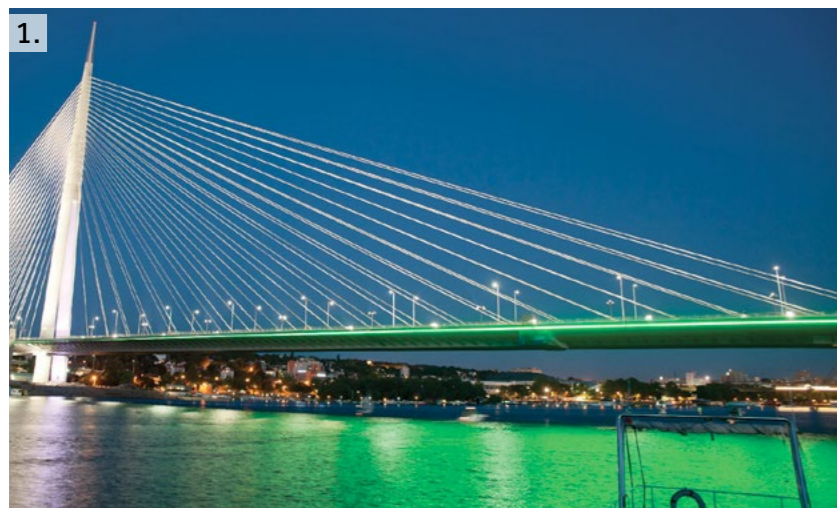
RIVER VIEW UNDER BRIDGE - LINE OF LIGHT (DIRECT VIEW)



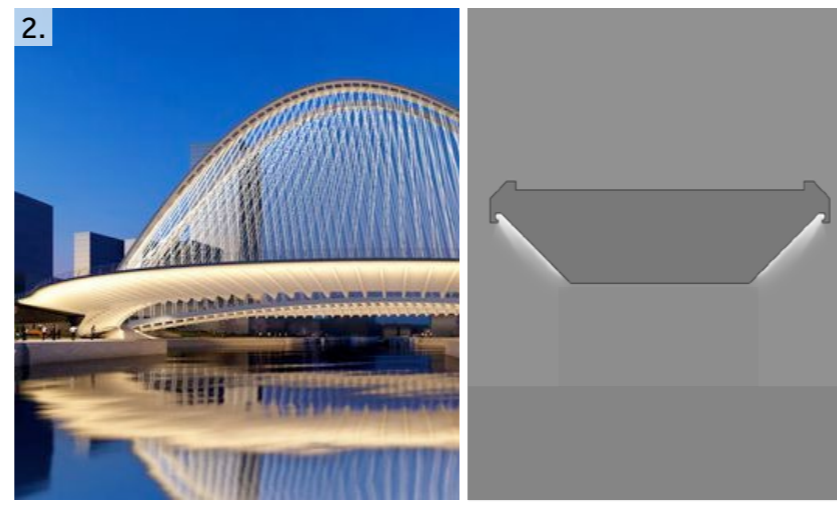
RIVER VIEW UNDER BRIDGE - WASHING LIGHT UNDER BRIDGE



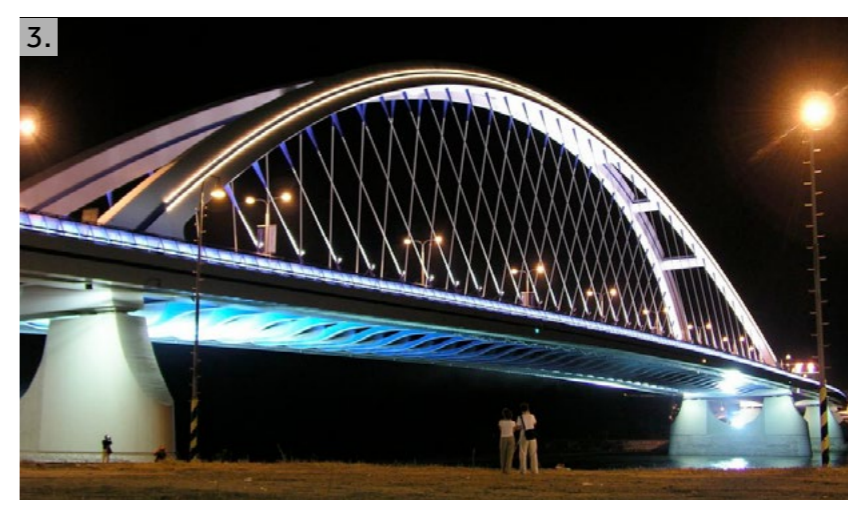
RIVER VIEW UNDER BRIDGE - FLOODLIGHTING



LINE OF LIGHT ACROSS UNDERSIDE OF BRIDGE



INTEGRATED LUMINAIRES WASH LIGHT TO THE UNDER OF THE BRIDGE



FLOODLIGHTING FROM EITHER SIDE OF PIVOT POINTS

KEY CONSIDERATIONS: LIGHTING TO ROADS & PATHWAYS

0574.CRTP.01 REV D



CLUTTERED APPEARANCE



CLASH BETWEEN EXISTING AND FEATURE LIGHTING

CLUTTER

Use of column lighting may clutter the overall design, hence it is recommended to provide functional light through low level medians either integrated into the handrail or crash barrier.

LIGHT POLLUTION

Controlled lighting used locally to where it's required along with the use of clever optics will be utilised to minimise light pollution and disturbances to aviation.

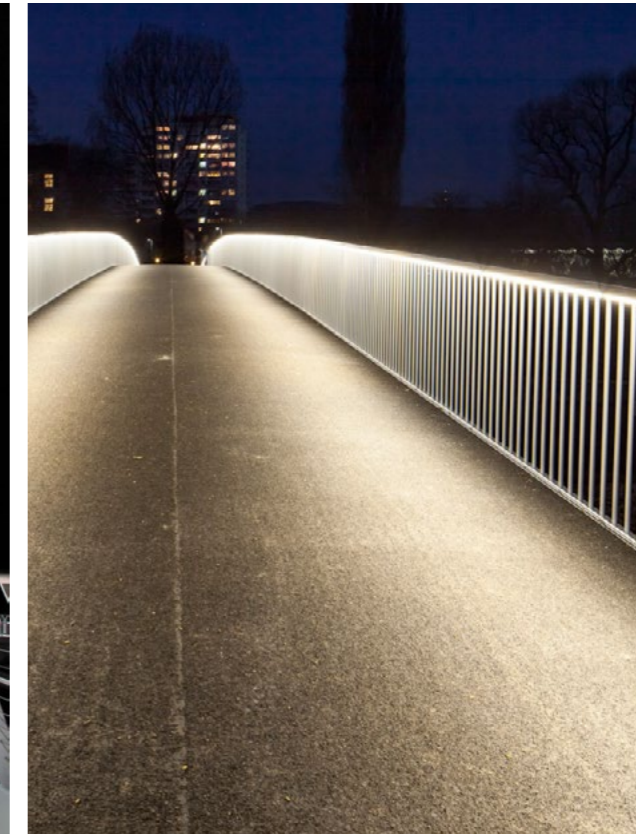
AVIATION

Minimise the possibility that lighting could be confused for approach or runway lights or could dazzle pilots on approach. Lighting to be controlled with no spill above the horizontal.

INTEGRATION

Existing street lighting on and approaching the bridge should be the same colour temperature. Retrofit of traditional SON lamps with LED lamps recommended for complete integration of the bridge and its urban landscape.

CLEAN AND DEFINED LIGHTING TO FUNCTIONAL AND FEATURE ELEMENTS



OPTION 4: LINE OF LIGHT & RGB WASH OF LIGHT

0574.CRTP.01 REV D



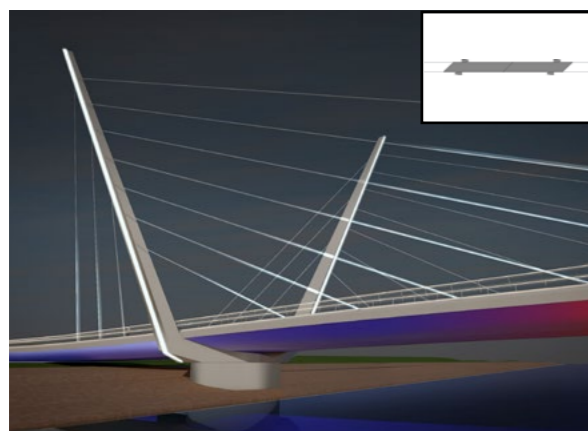
PERSPECTIVE VIEW CLYDE BRIDGE LIGHTING STRATEGY OPTION 4

CHANGING PERCEPTION

Colour change luminaires mounted at the base of the stays to allow for various effects to be utilised.

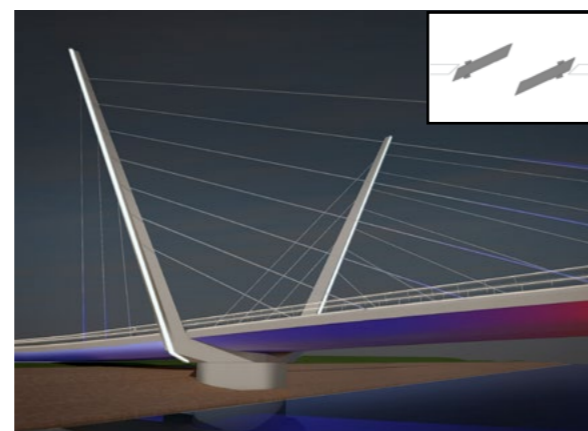
When closed the lighting prioritises the long views. In particular the towers and the floating effect of the bridge.

The transition phase introduces movement of the bridge and this is reflected by the bleed of colour up the cable stays. This effect gradually changes back to the subtle white uplighting, when the bridge reaches its closed position.



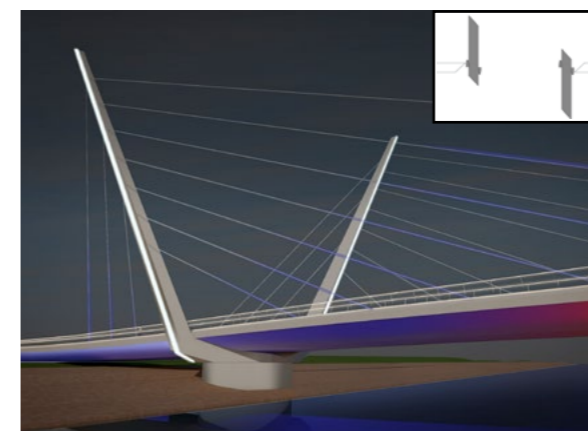
BRIDGE CLOSED

Wash of RGB lighting to underside of bridge with subtle white uplighting to cables. The towers are the primary focus, with a crisp line of light on the outer edge.



TRANSITION PHASE

RGB lighting begins to bleed up the cable stays throughout the transition phase.

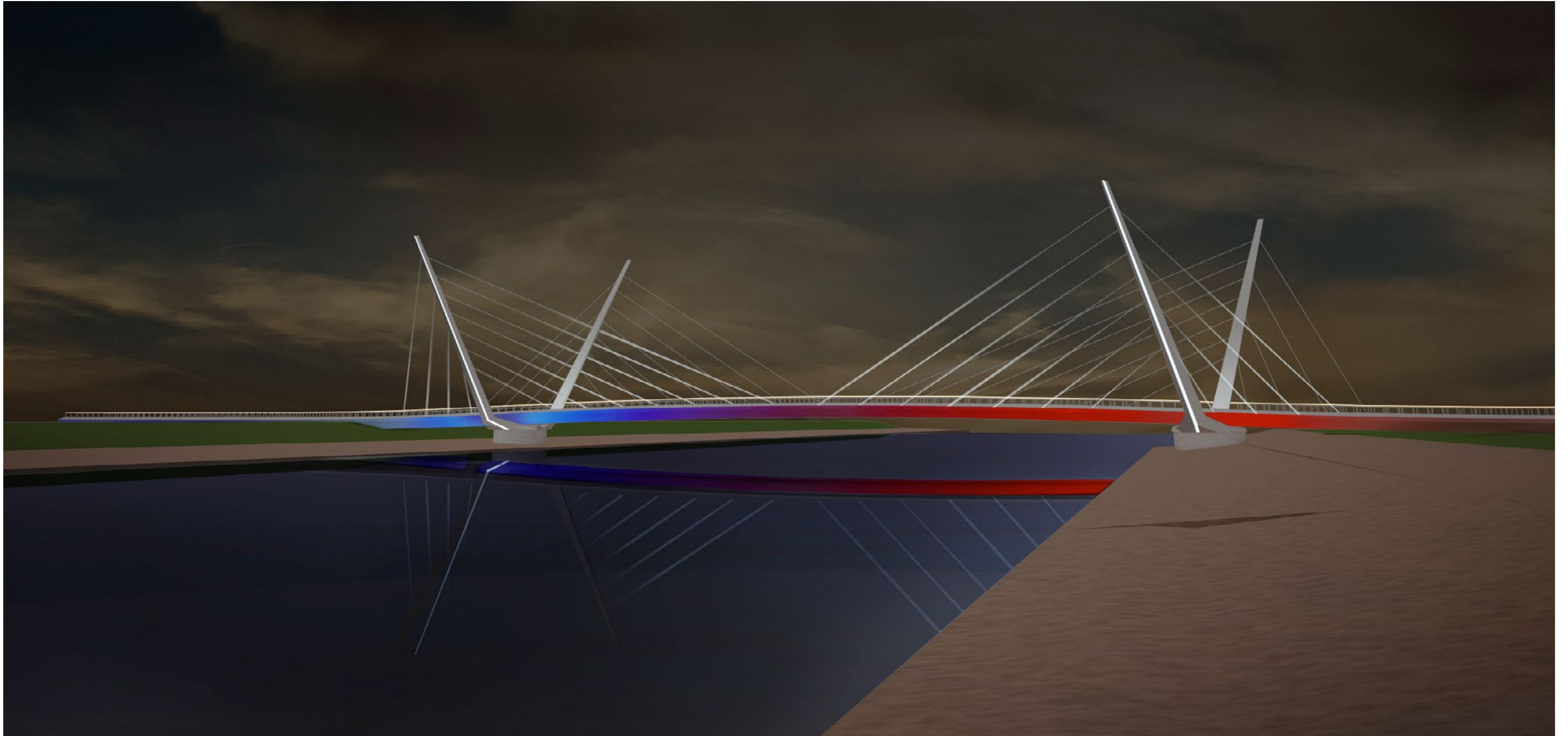


BRIDGE OPEN

Coloured lighting to cable stays signifies the open state of the bridge.

OPTION 4: LINE OF LIGHT & RGB WASH OF LIGHT

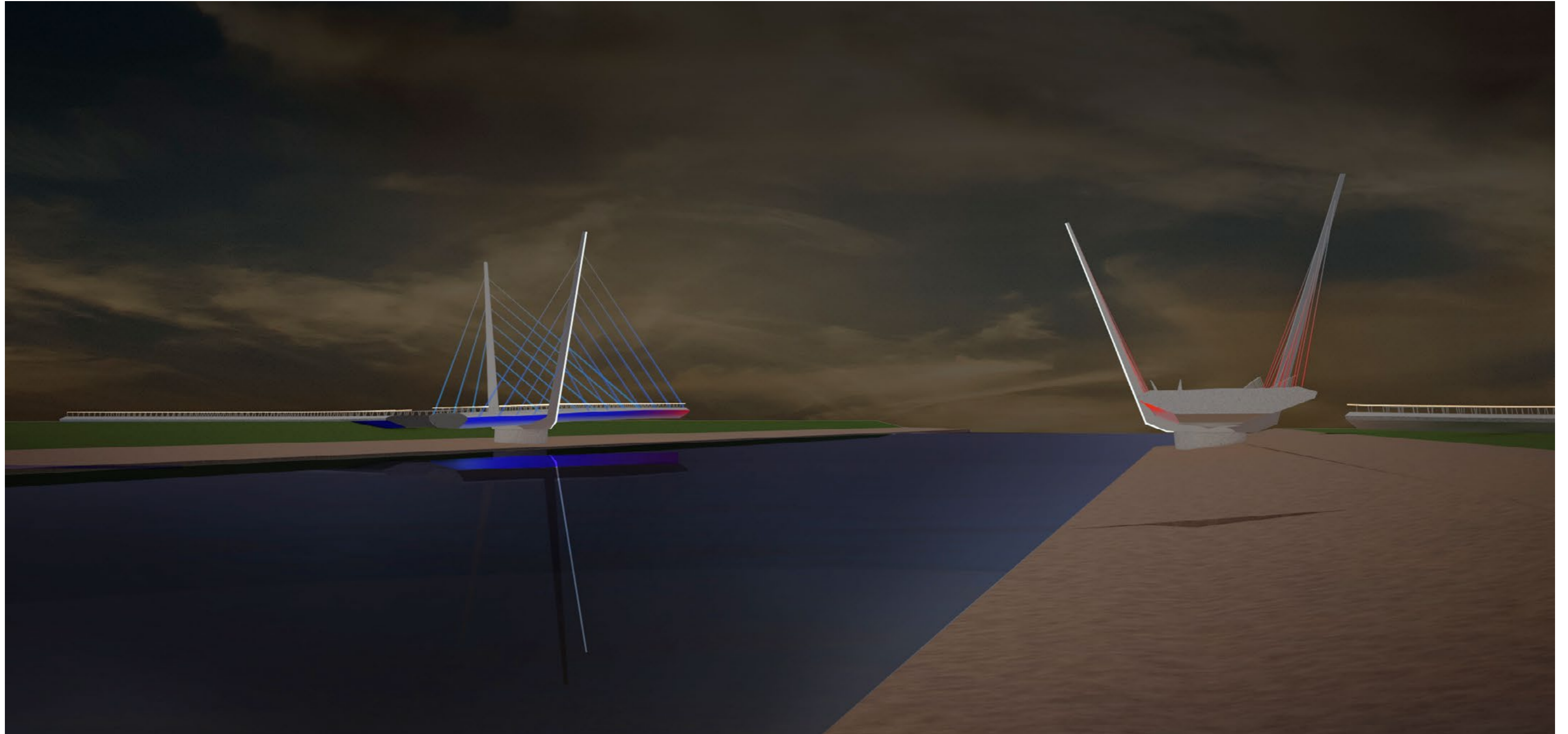
0574.CRTP.01 REV D



PERSPECTIVE VIEW LIGHTING STRATEGY OPTION 4 - CLOSED

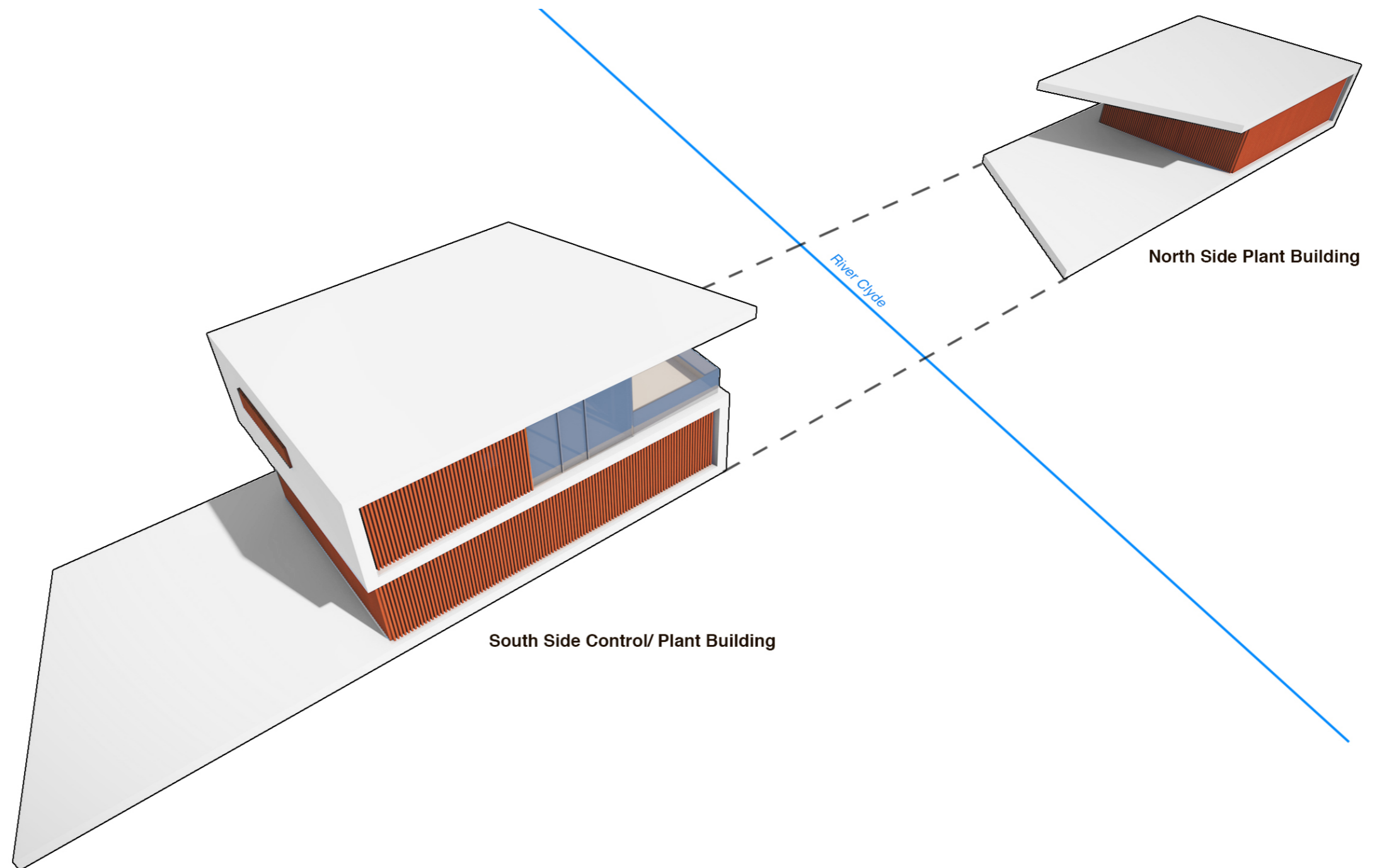
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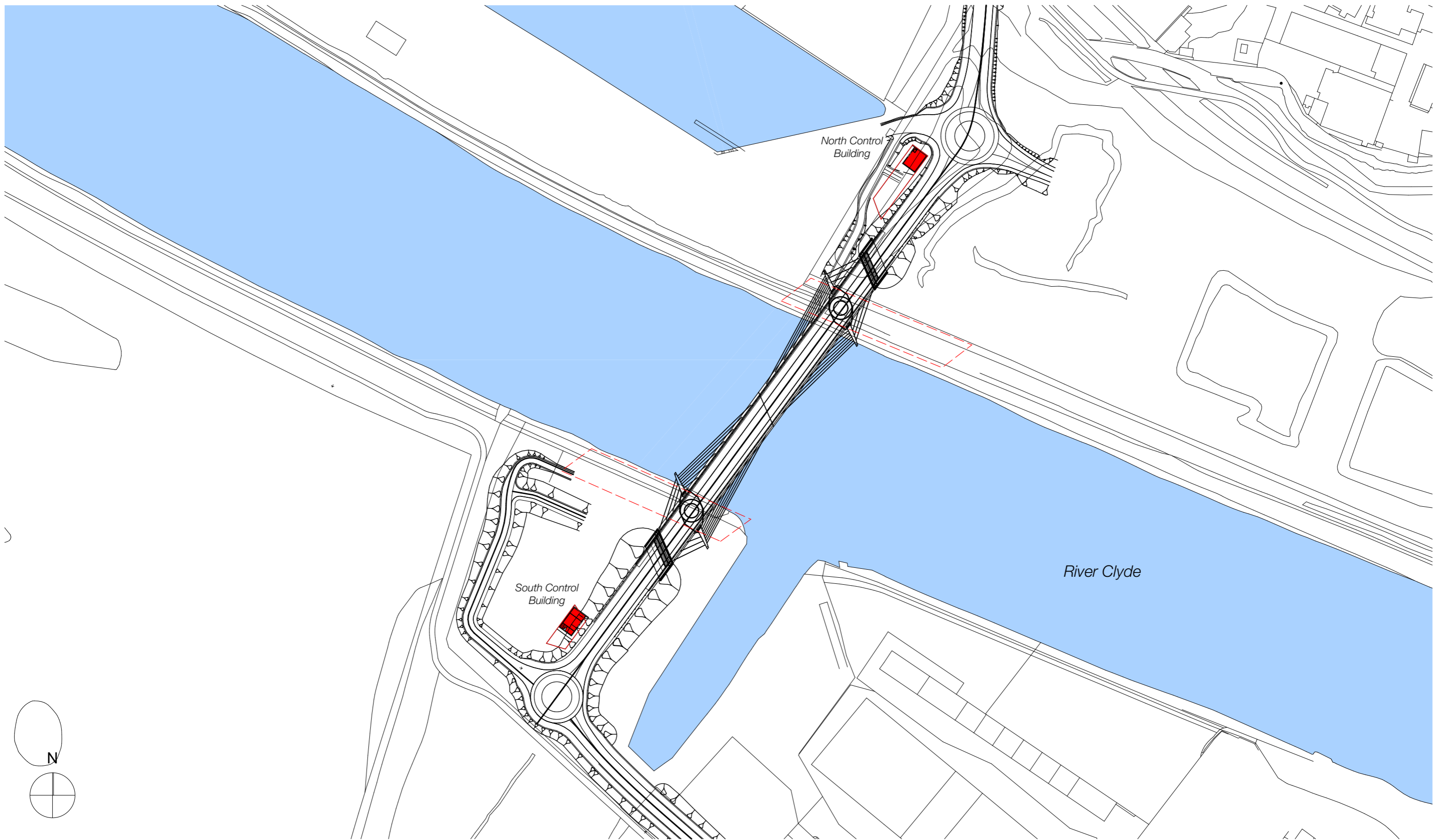
0574.CRTP.01 REV D



PERSPECTIVE VIEW LIGHTING STRATEGY OPTION 4 - OPEN

12. Bridge control buildings





Control Building Locations

scale 1:2000



90a George Street Edinburgh EH2 3DF
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Project Title
CWRR - Clyde Bridge

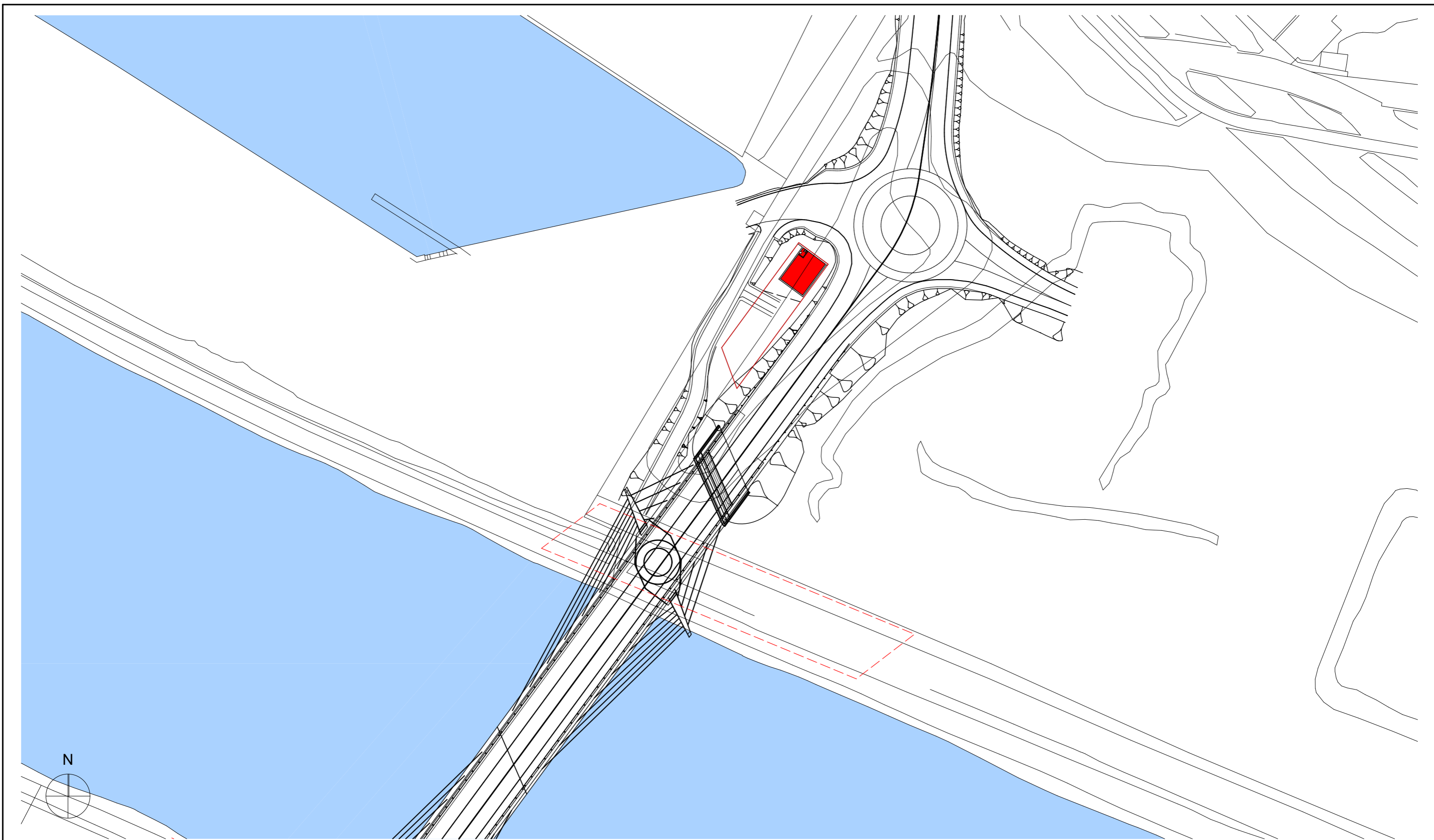
Status
CONCEPT

Drawing Name
CWRR - Clyde Bridge : Control Buildings

Drawing No.
1684 A-PP-0111

Scale @ A3
As Shown

Issue No. Issue Date
Revision 24/05/2017



North Side Control Building

scale 1:1000



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Project Title
CWRR - Clyde Bridge

Status
CONCEPT

Drawing Name
CWRR - Clyde Bridge : North Side Control Building

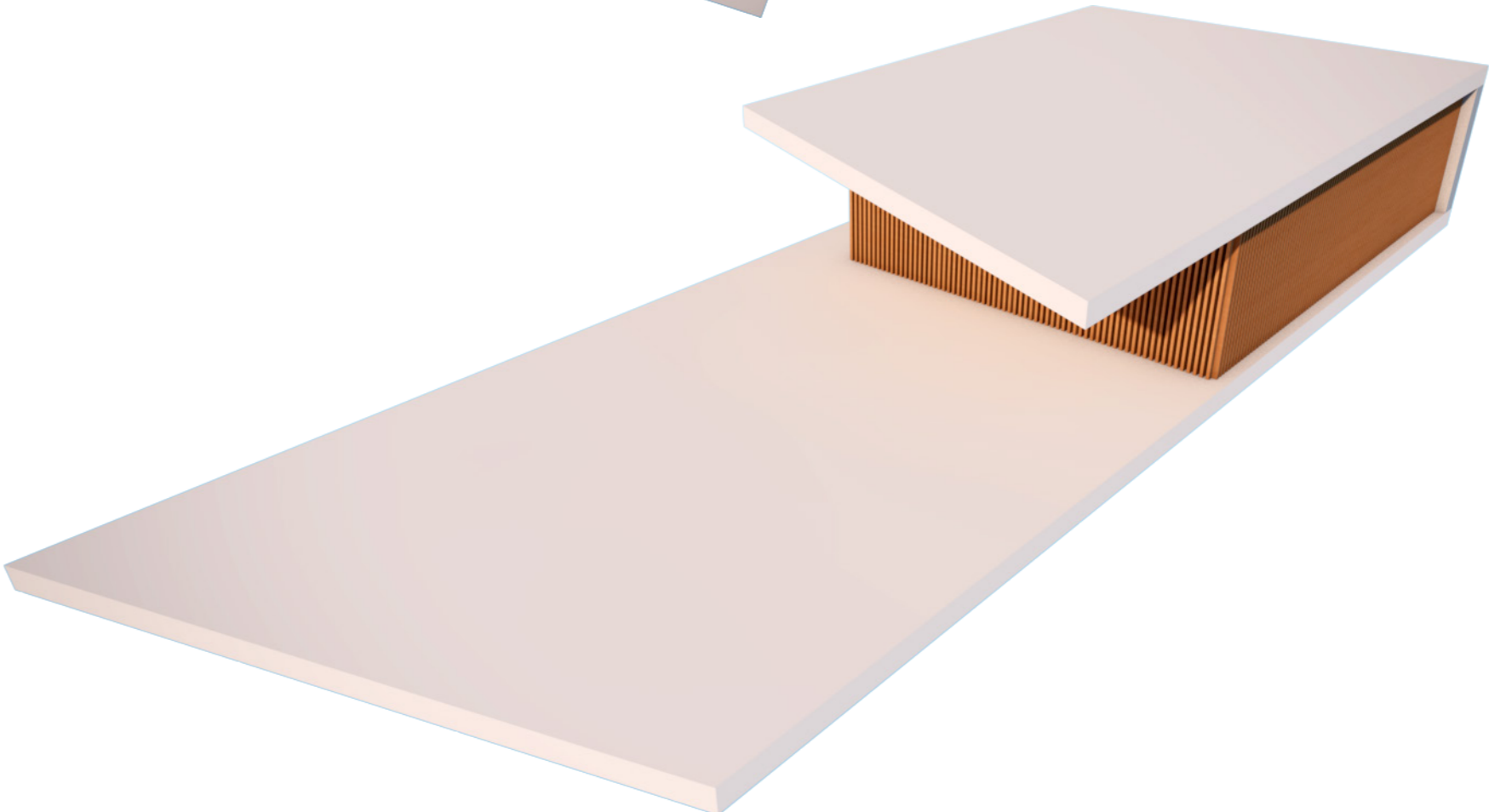
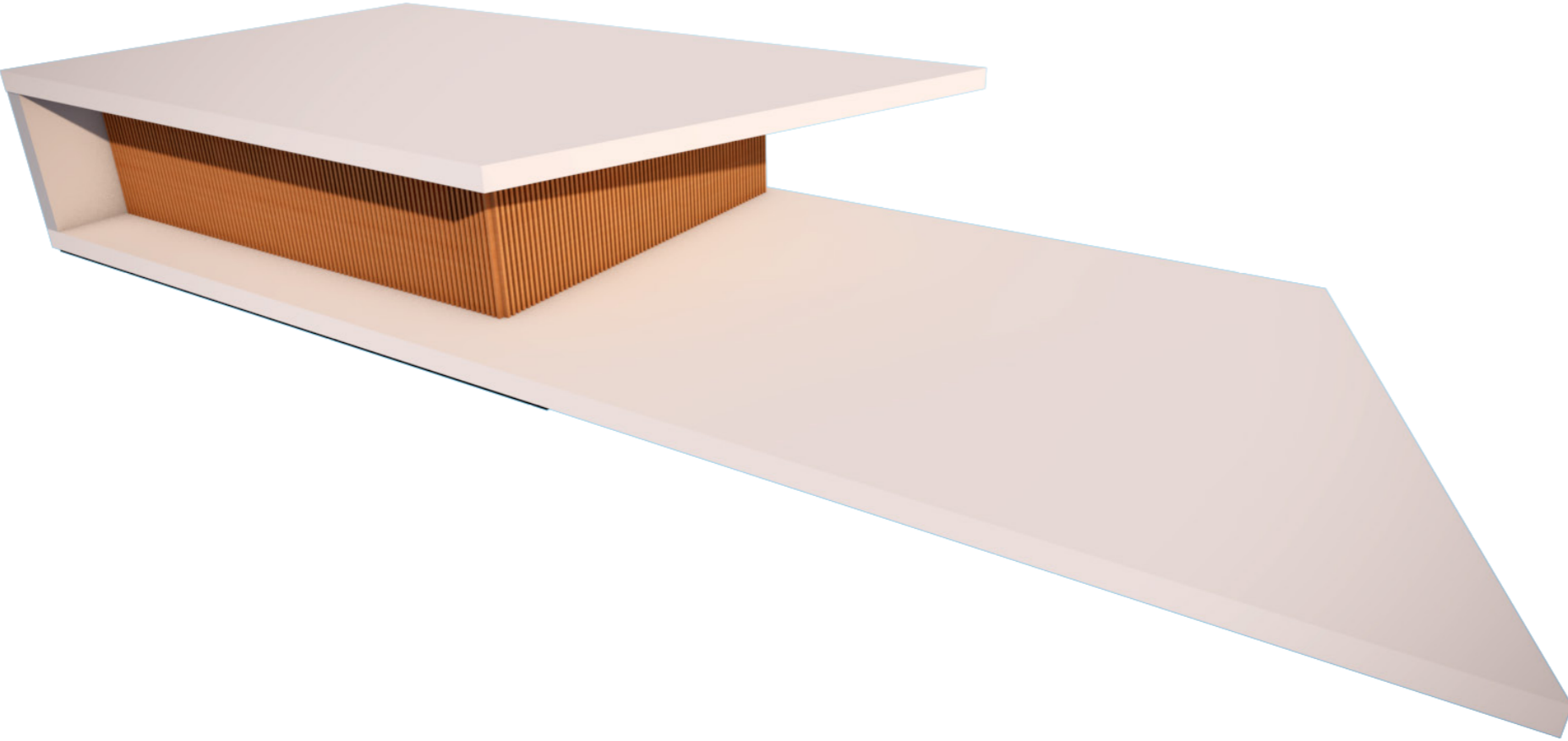
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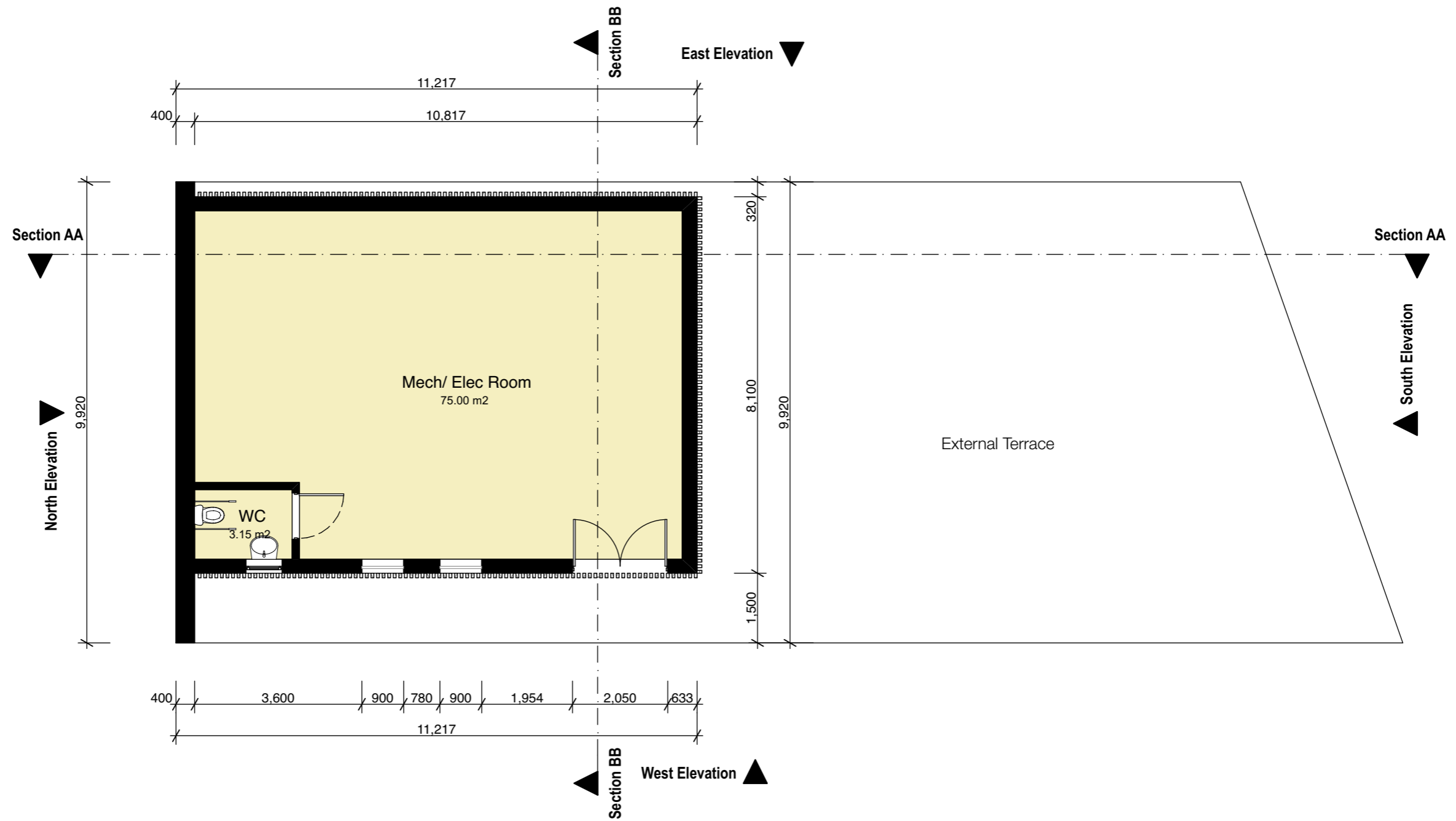
Scale @ A3
As Shown

Issue Date
24/05/2017

Issue No.

Revision





2.

Level 1

scale 1:100



90a George Street Edinburgh EH2 3DF
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Project Title
CWRW Bridge Crossing

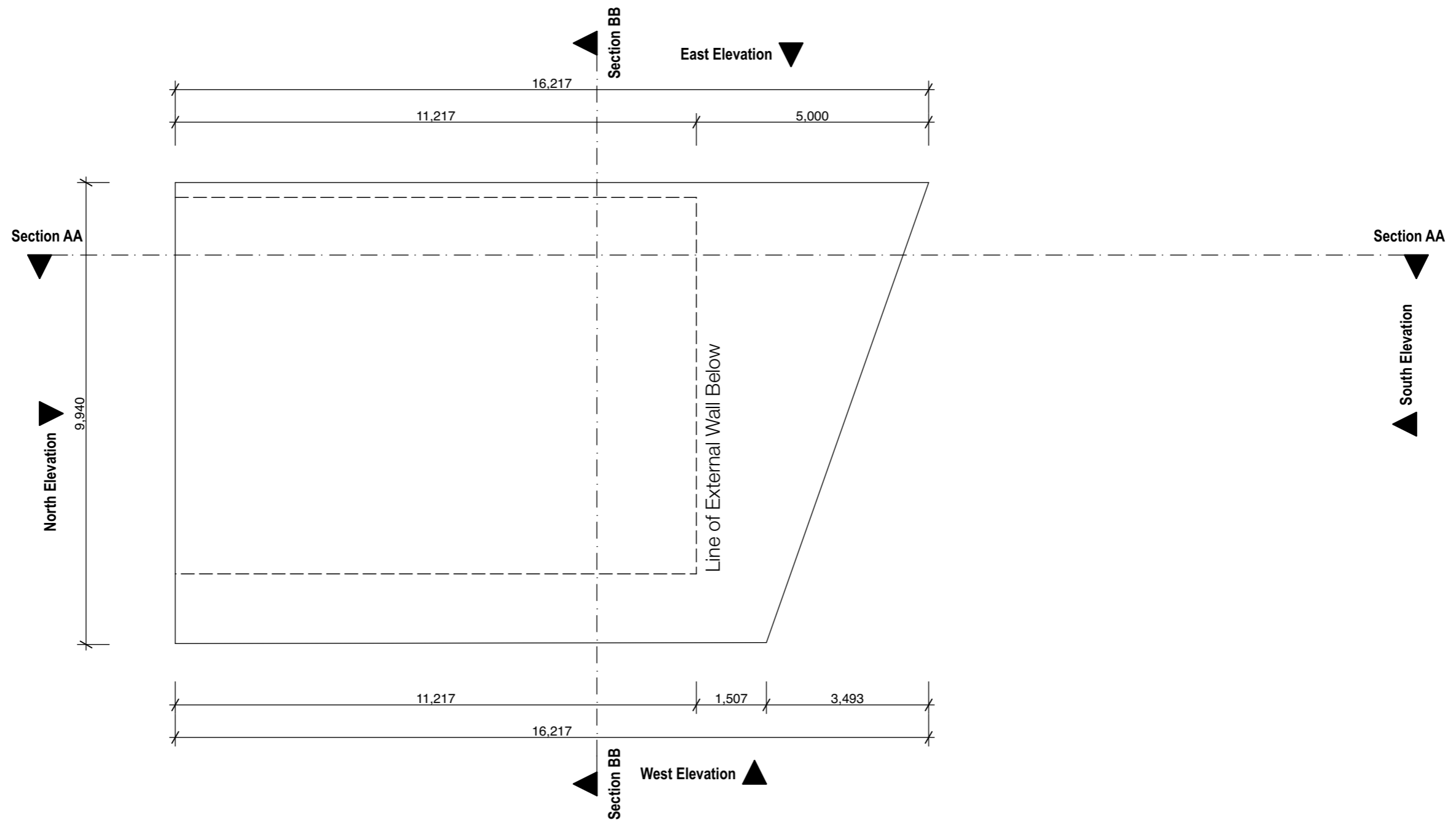
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Drawing No.
1684 A-PP-0112

Scale @ A3
As Shown


Issue Date
08/05/2017

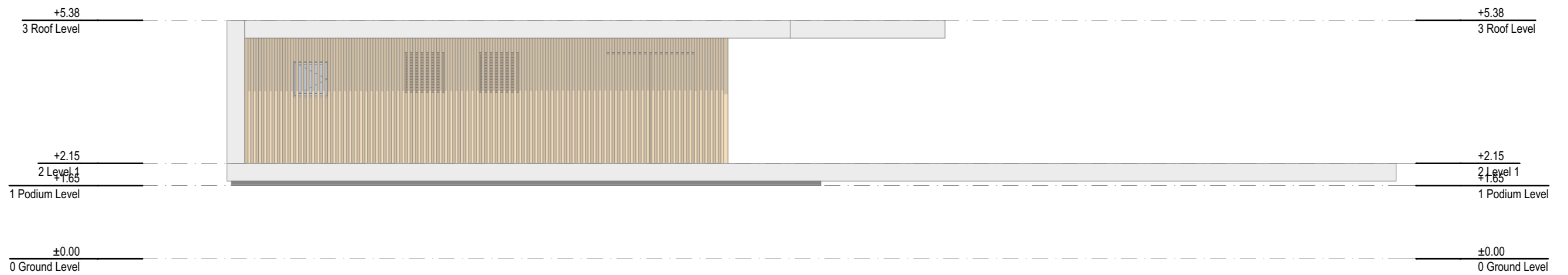


3.

Roof Level

scale 1:100

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	Status DRAFT CONCEPT	Drawing No. 1684 A-PP-0113	Issue No.	Revision



E-00_00-01

West Elevation

scale 1:100



90a George Street Edinburgh EH2 3DF
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Project Title
CWRW Bridge Crossing

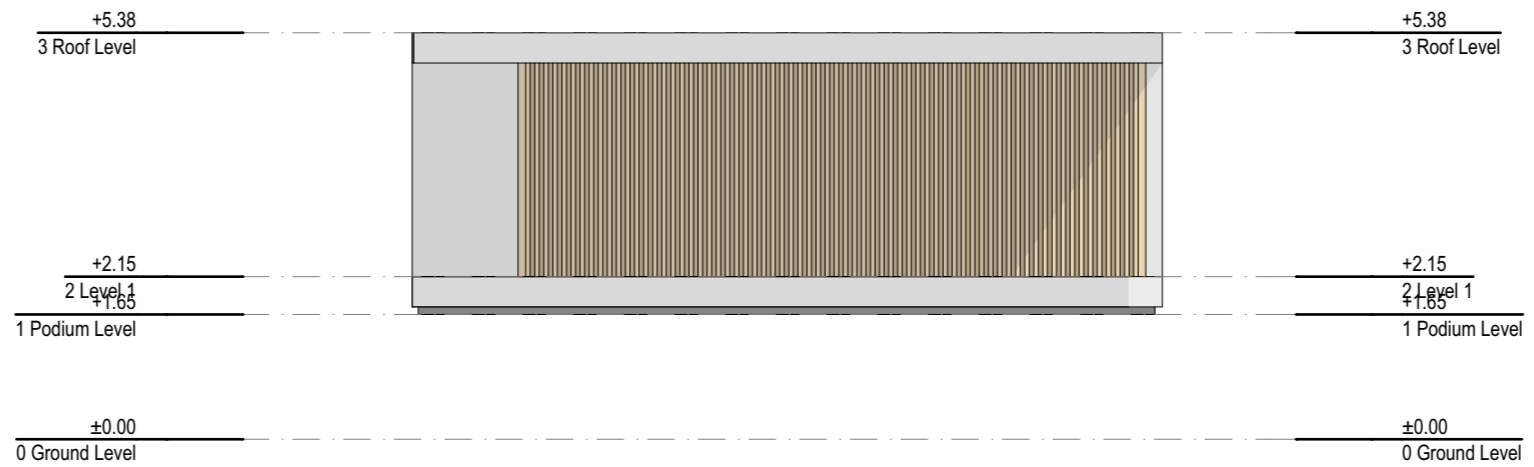
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North Side Control Building: West Elevation

Drawing No.
1684 A-PP-0201

Scale @ A3
As Shown

Issue Date
08/05/2017



E-00_00-04

South Elevation

scale 1:100

kettle
collective

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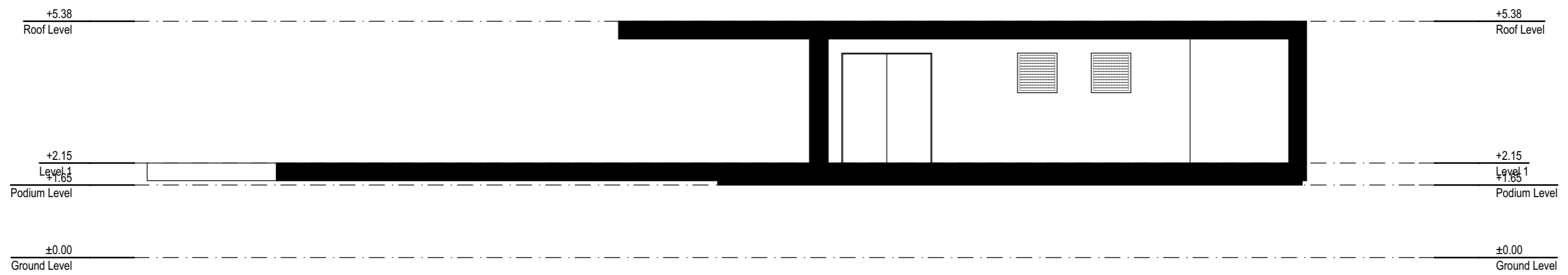
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CWRW Bridge Crossing

Status
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Drawing Name
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Drawing No.
1684 A-PP-0204


Scale @ A3 As Shown	Issue Date 08/05/2017
Issue No.	Revision

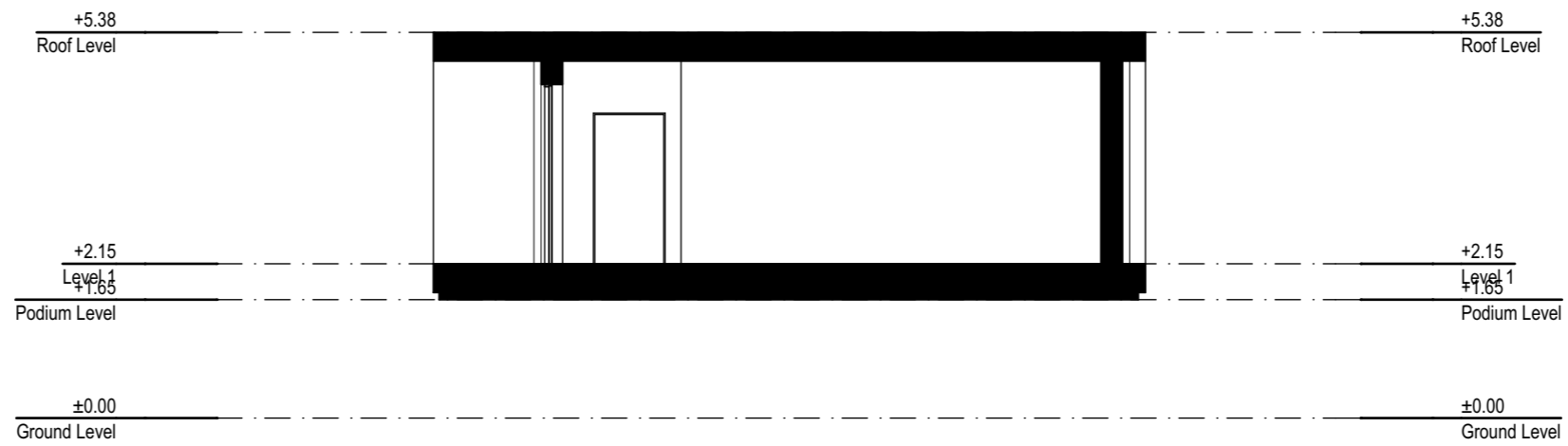


S-35_00-01

Section AA

scale 1:100

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	Status DRAFT CONCEPT	Drawing No. 1684 A-PP-0301	Issue No.	Revision



S-35_00-02

Section BB

scale 1:100



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Project Title
CWRW Bridge Crossing

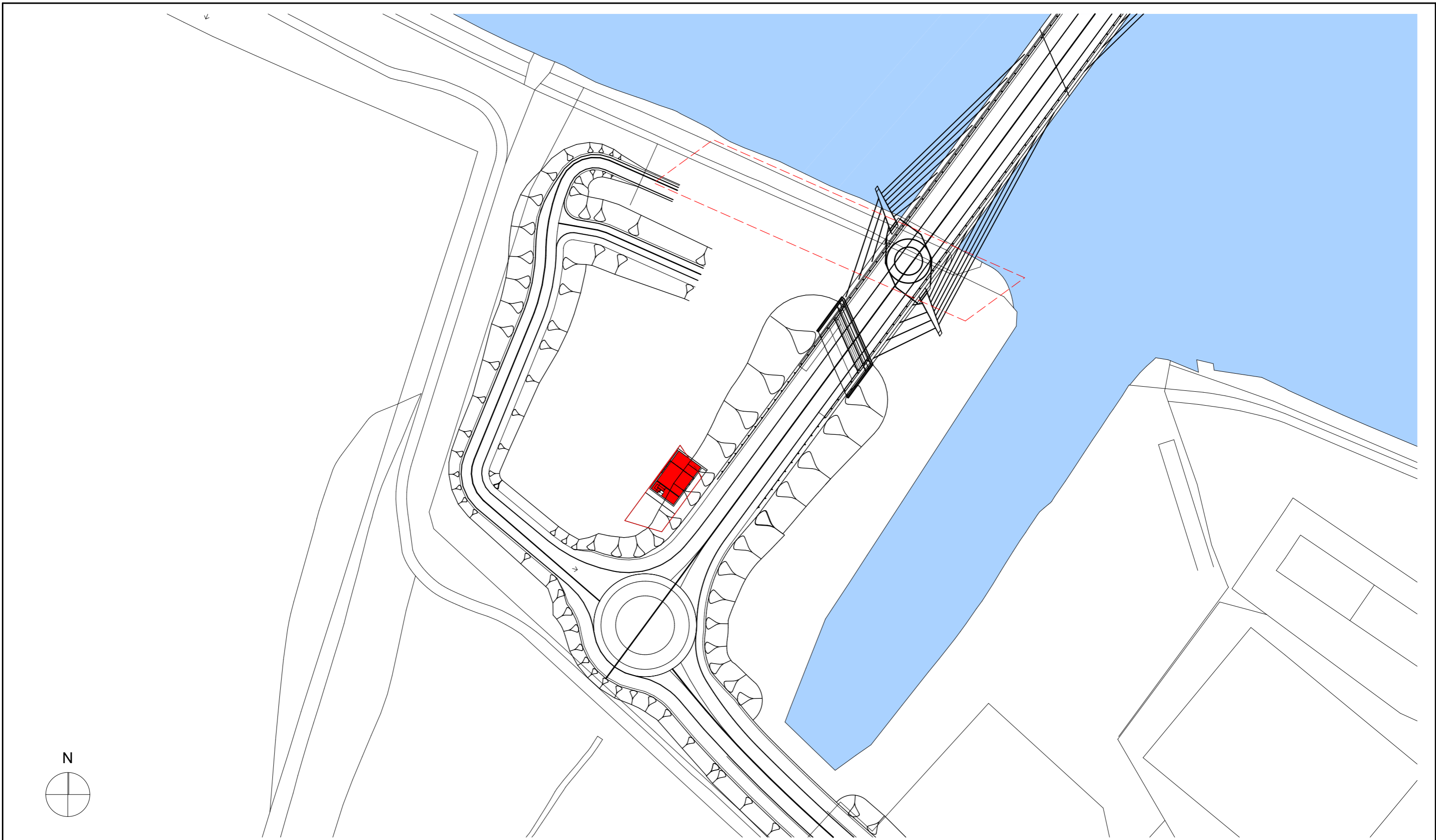
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Drawing Name
North Side Control Building: Section BB

Drawing No.
1684 A-PP-0302

Scale @ A3
As Shown

Issue Date
08/05/2017



South Side Control Building

scale 1:1000



90a George Street Edinburgh EH2 3DF
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Project Title
CWRR - Clyde Bridge

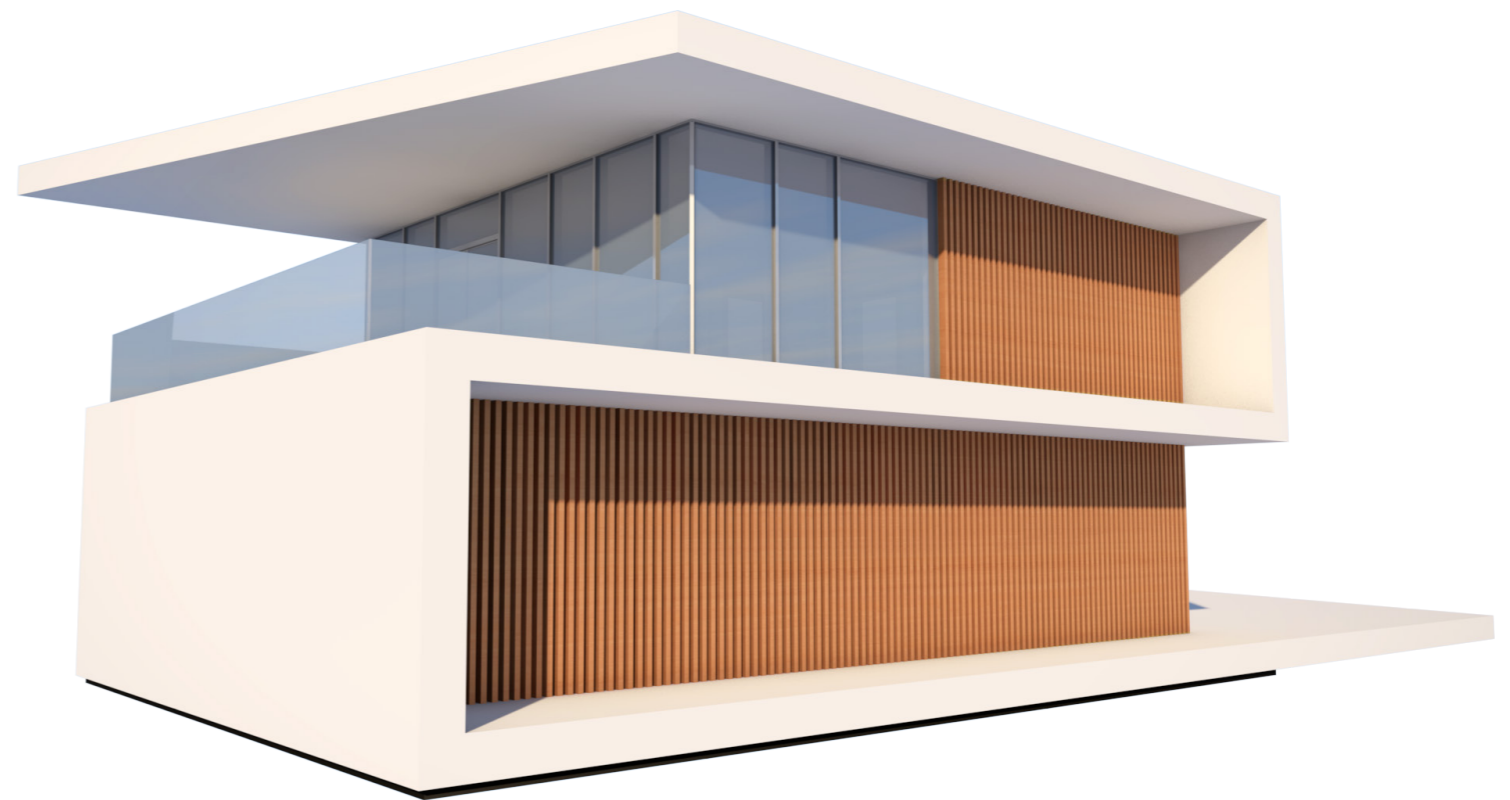
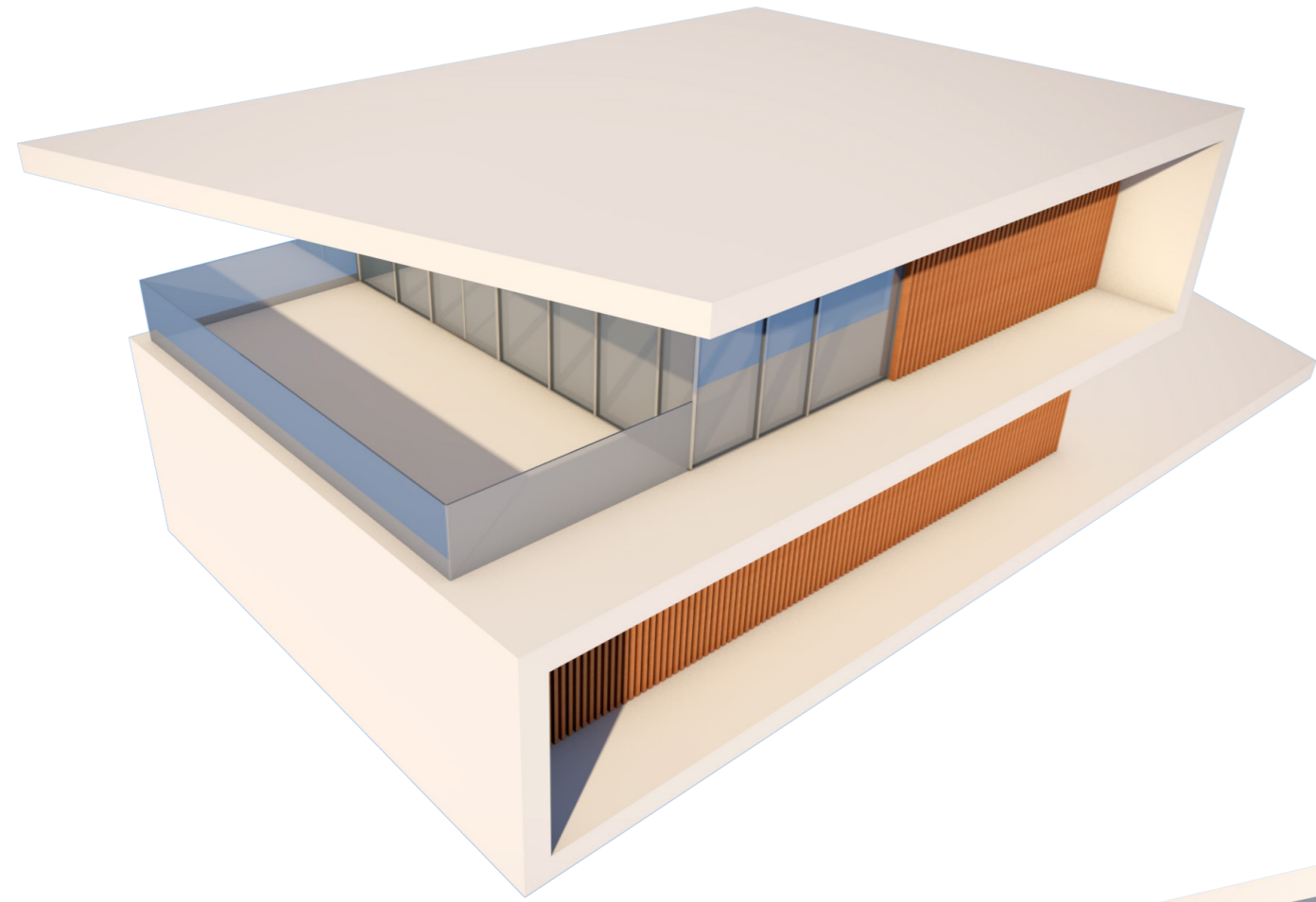
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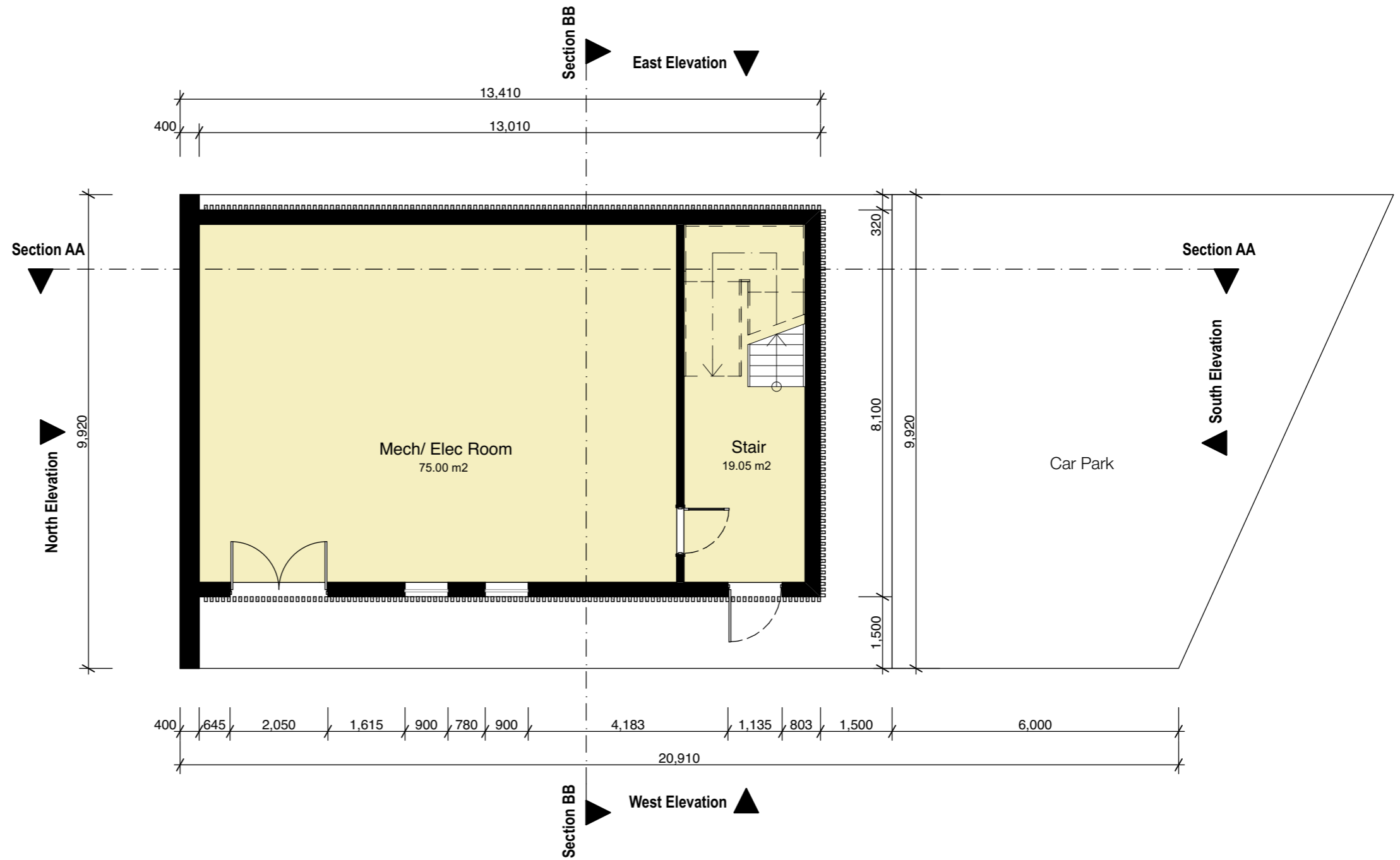
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Drawing No.
1684 A-PP-0115

Scale @ A3
As Shown

Issue No. Issue Date
Revision 24/05/2017





2.

Level 1

scale 1:100

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Project Title
CWRW Bridge Crossing

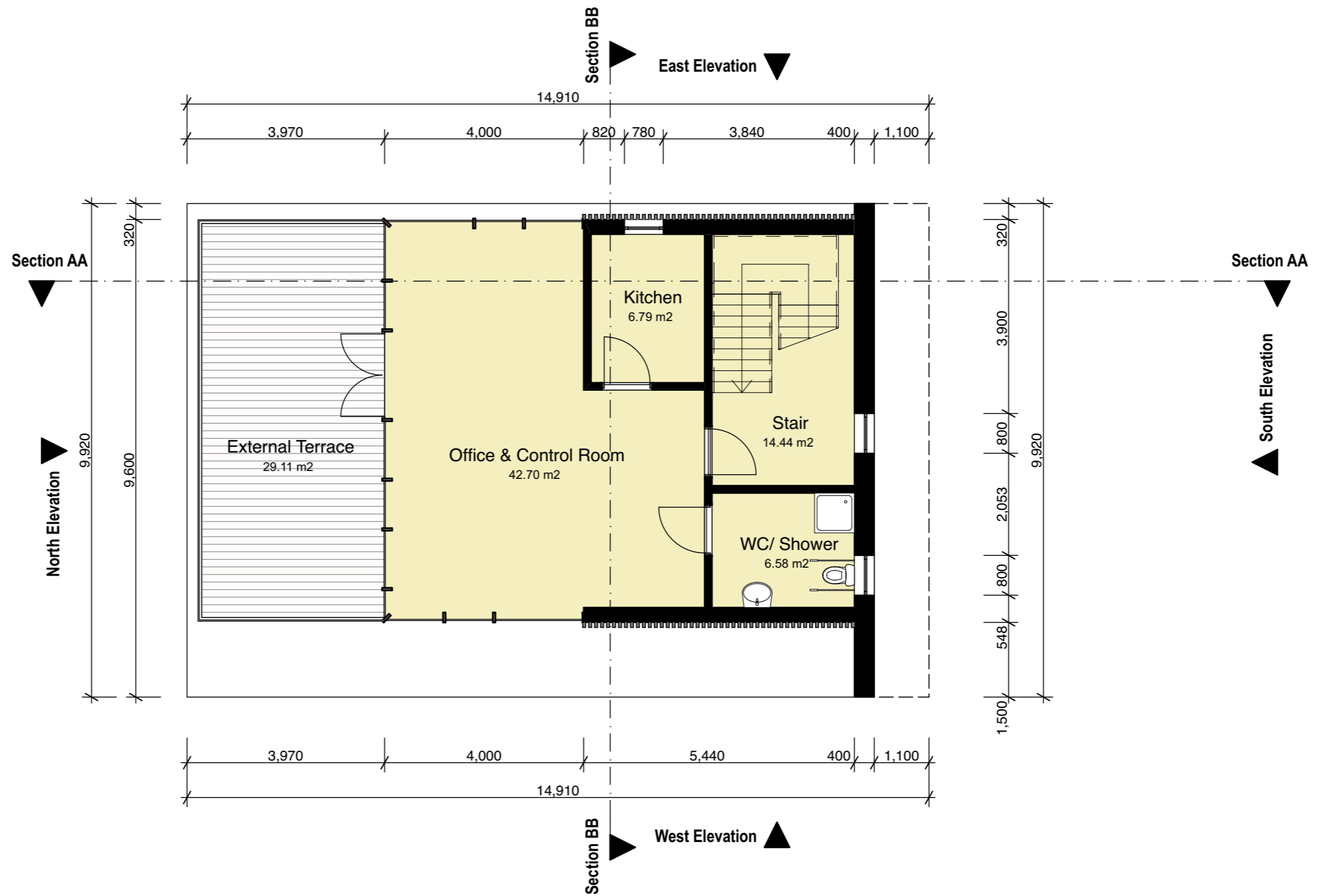
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Drawing Name
South Side Control Building: Level 1 Floor Plan

Drawing No.
1684 A-PP-0112

Scale @ A3
As Shown
Issue Date
08/05/2017

Issue No.
Revision



3.

Level 2

scale 1:100



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Project Title
CWRW Bridge Crossing

Status
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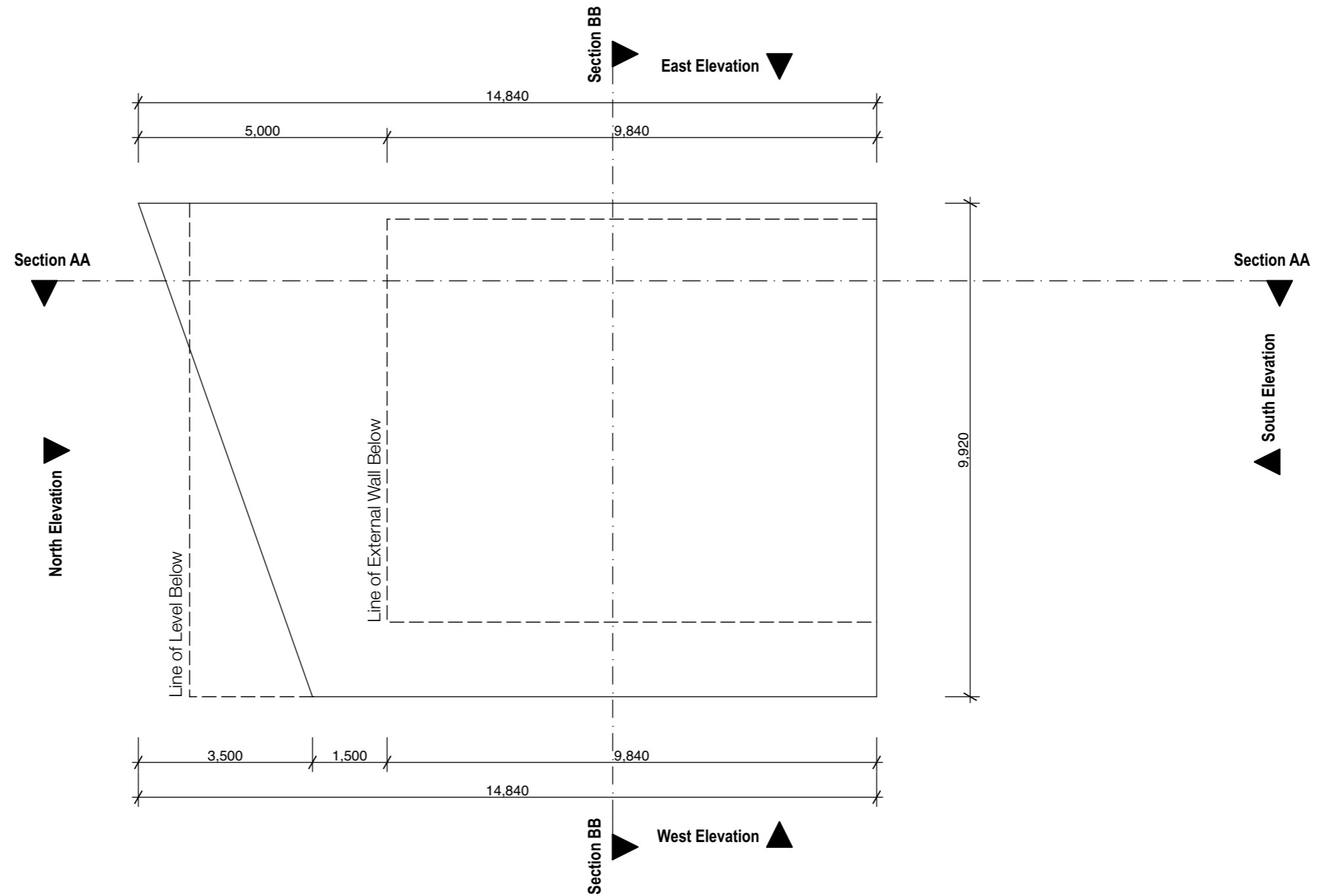
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Drawing No.
1684 A-PP-0113

Scale @ A3
As Shown

Issue Date
08/05/2017

Issue No.
Revision



Roof Level

4.

scale 1:100

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Project Title
CWRW Bridge Crossing

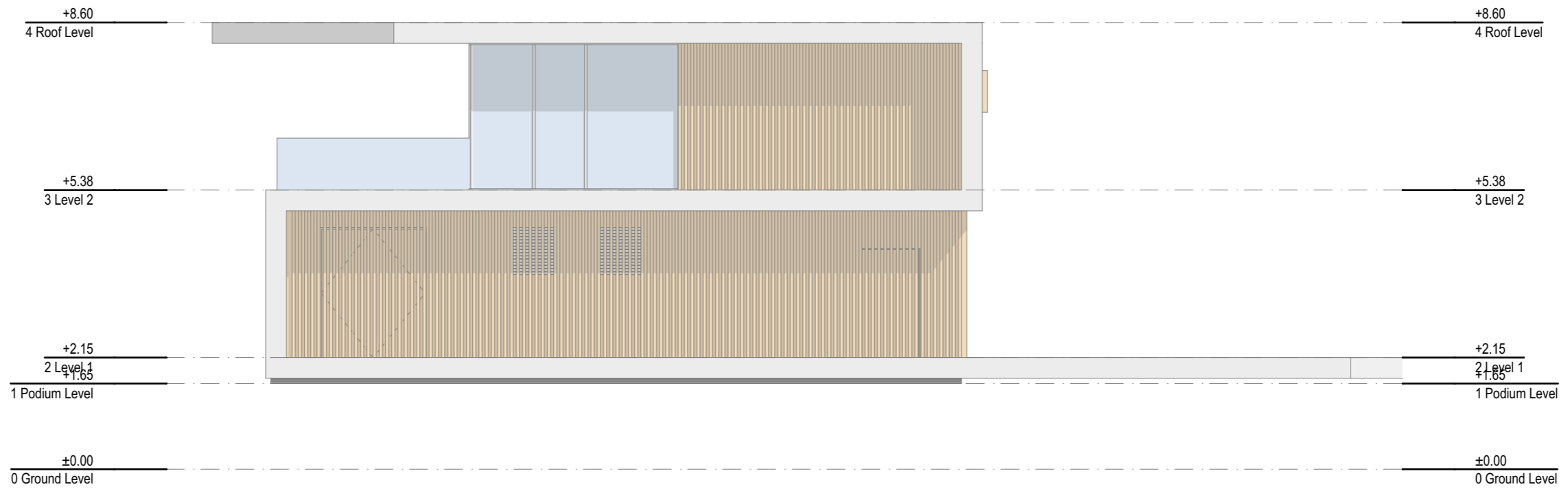
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Drawing Name
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Drawing No.
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Scale @ A3
As Shown
Issue Date
08/05/2017

Issue No.
Revision



E-00_00-01

West Elevation

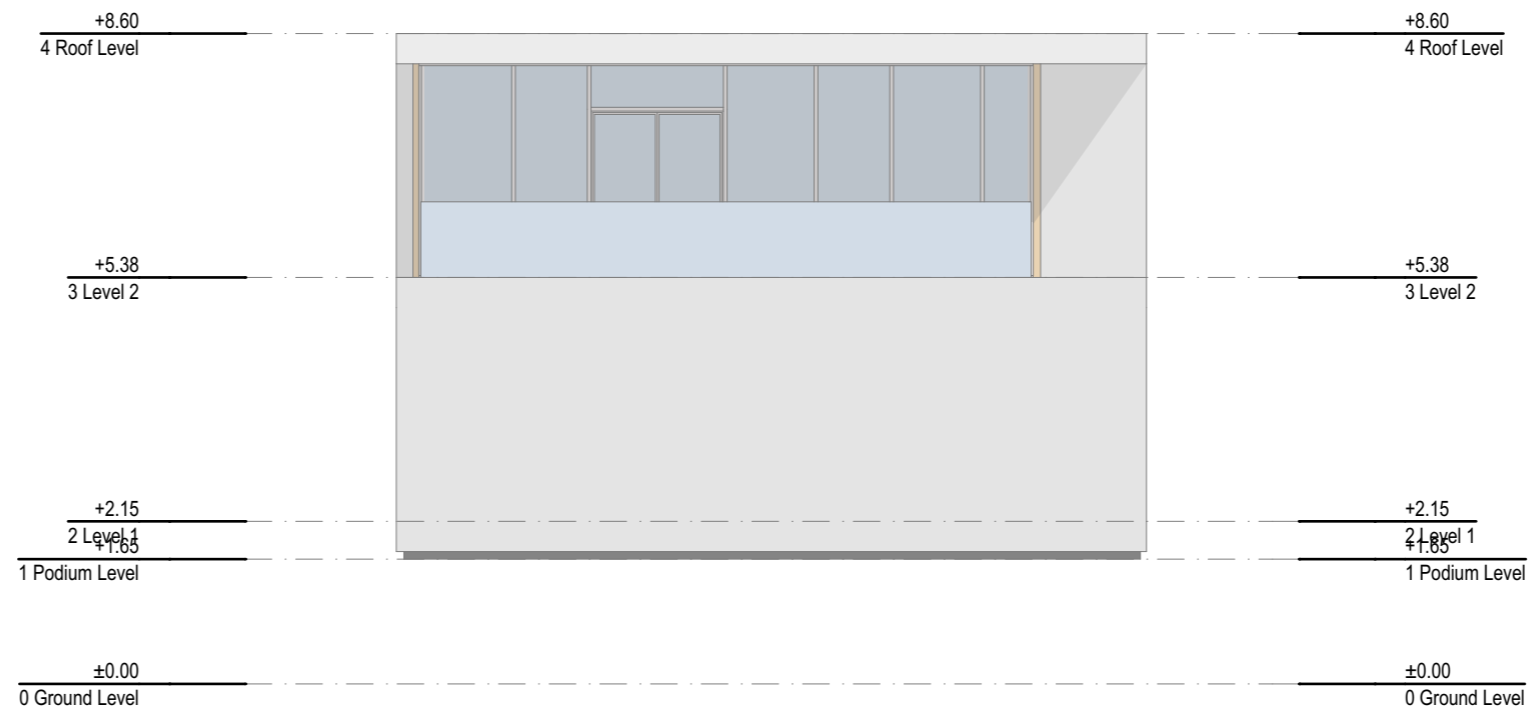
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Project Title
CWRW Bridge Crossing
Status
DRAFT CONCEPT

Drawing Name
South Side Control Building: West Elevation
Drawing No.
1684 A-PP-0201

Scale @ A3 As Shown	Issue Date 08/05/2017
Issue No.	Revision



E-00_00-03

North Elevation

scale 1:100



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Project Title
CWRW Bridge Crossing

Status
DRAFT CONCEPT

Drawing Name
South Side Control Building: North Elevation

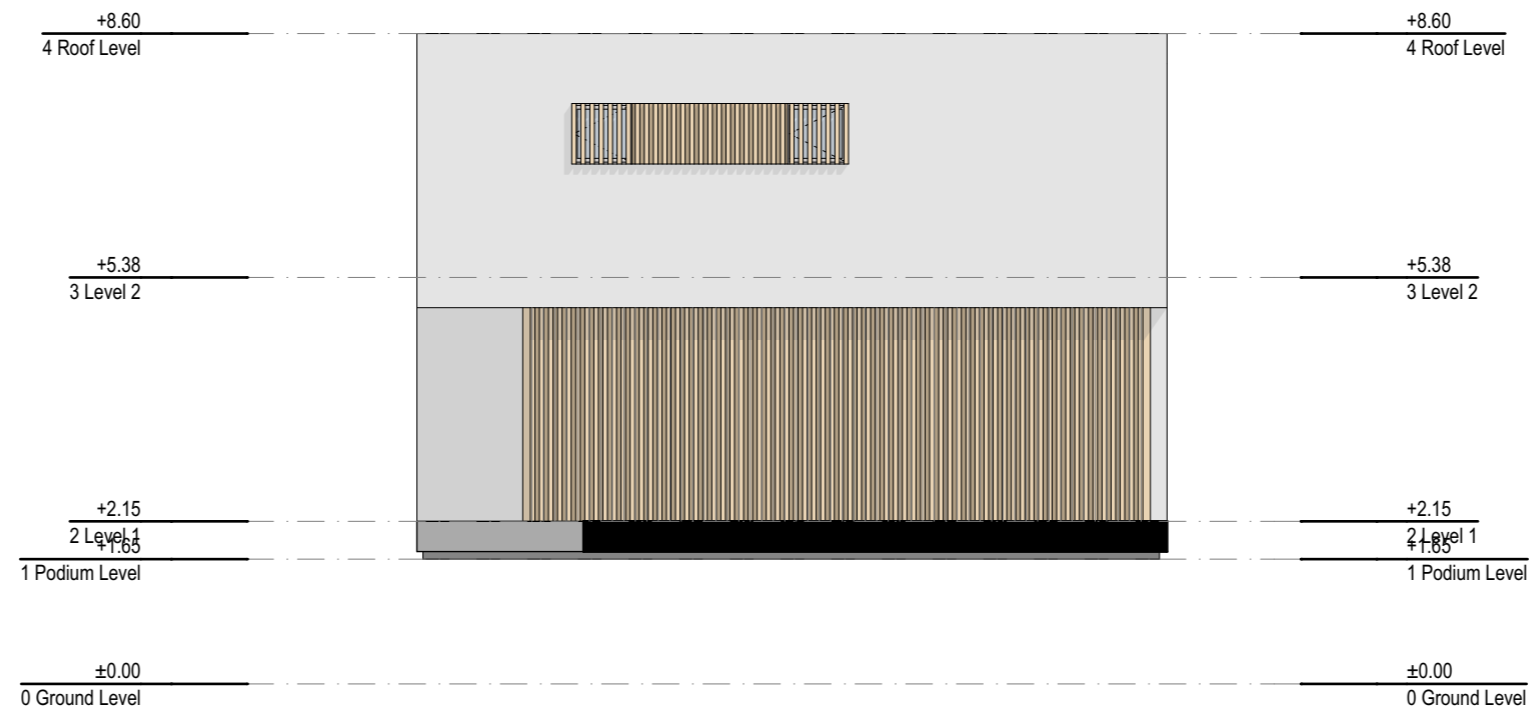
Drawing No.
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Scale @ A3
As Shown

Issue No.

Issue Date
08/05/2017

Revision



E-00_00-04

South Elevation

scale 1:100



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Project Title

CWRW Bridge Crossing

Status

DRAFT CONCEPT

Drawing Name

South Side Control Building: South Elevation

Drawing No.

1684 A-PP-0204

Scale @ A3

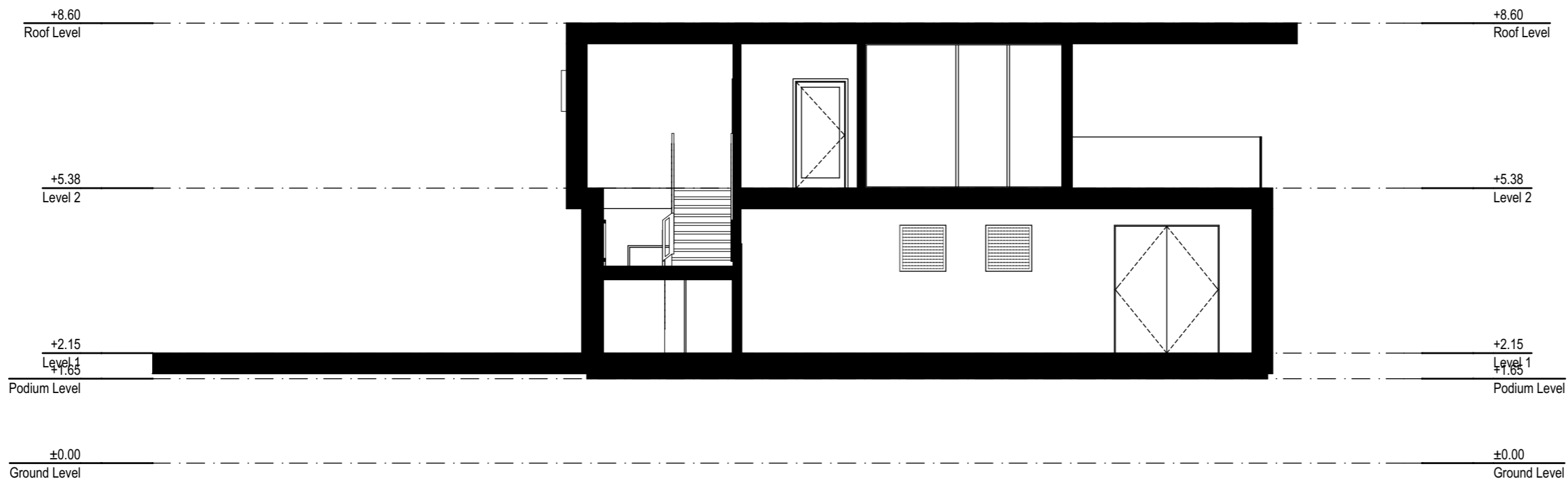
As Shown

Issue Date

08/05/2017

Issue No.

Revision



S-35_00-01

Section AA

scale 1:100



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Project Title
CWRW Bridge Crossing

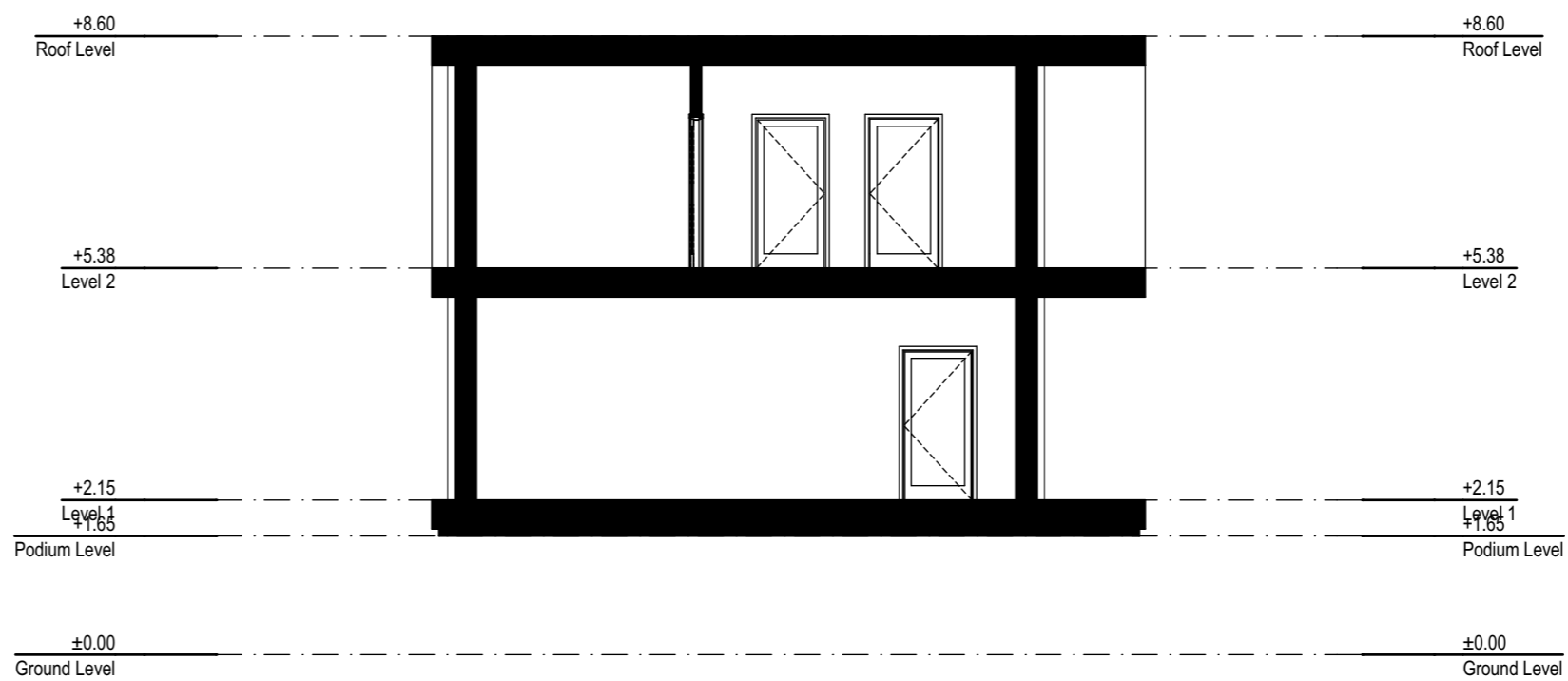
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Drawing Name
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Drawing No.
1684 A-PP-0301

Scale @ A3
As Shown

Issue No. Issue Date
Revision 08/05/2017



S-35_00-02

Section BB

scale 1:100



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Project Title
CWRW Bridge Crossing

Status
DRAFT CONCEPT

Drawing Name
South Side Control Building: Section BB

Drawing No.
1684 A-PP-0302

Scale @ A3
As Shown

Issue No. Issue Date
Revision 08/05/2017

kettle
c o l l e c t i v e

Architecture
Urban Design
Interiors



The Glasgow City Region City Deal

CLYDE WATERFRONT RENFREW RIVERSIDE SUPPORTING DOCUMENTS

DESIGN AND ACCESS STATEMENT

July 2017

Issue	Date	Reason for Issue	Prepared		Checked		Approved	
S1/S2	13.04.17	Suitable for Co-ordination	MB	18.04.17	TOL	18.05.17		
S3	05.05.17	Suitable for Internal Review & Comment	RMcL	04.06.17	CC	26.06.17		
S6	01.06.17	Suitable for PIM Authorization	CC	26.06.17	MB	29.06.17	RMcL	29.06.17
BIM REFERENCE - 117086-SWECO-EGN-00-SP-EN-00050								

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1.1 Purpose of the Design and Access Statement

The proposed development described within this Design and Access Statement (DAS) supports a detailed planning application for the proposed Clyde Waterfront Renfrew Riverside (CWRR) development.

The proposed development responds to the design, planning and technical requirements set out within the City Deal Tender brief. Sweco is the lead consultant appointed by Renfrewshire Council City Deal Team to prepare the application for CWRR.

This DAS explains and illustrates the design principles, and constraints, within the project area which have determined the selected design and layout of the CWRR proposals. During the selection and design development process, issues relating to access for all users, including the disabled and those of restricted mobility, have been considered and measures included to accommodate such users.

This document forms part of a comprehensive package of information submitted with the Planning Application for the CWRR proposals, which includes the following other supporting documents:

- Environmental Statement;
- Planning Statement;
- Pre-Application Consultation Report;
- Planning Applications and Drawings;
- Marine Licence and supporting information; and
- Retail & Economic Impact Assessment.

1.2 Background

Renfrewshire Council is playing a key role in delivering three of the biggest Glasgow City Region City Deal infrastructure investments: the CWRR project; the adjacent Glasgow Airport Investment Area project (GAIA); and the Airport Access Project (AAP) in partnership with Glasgow City Council. These projects, together with Glasgow City Region City Deal projects being progressed by the seven surrounding local authorities, aim to transform local and regional connectivity resulting in job opportunities through business growth and inward investment.

The CWRR indicative study area is shown in **Figure 1.1** below.

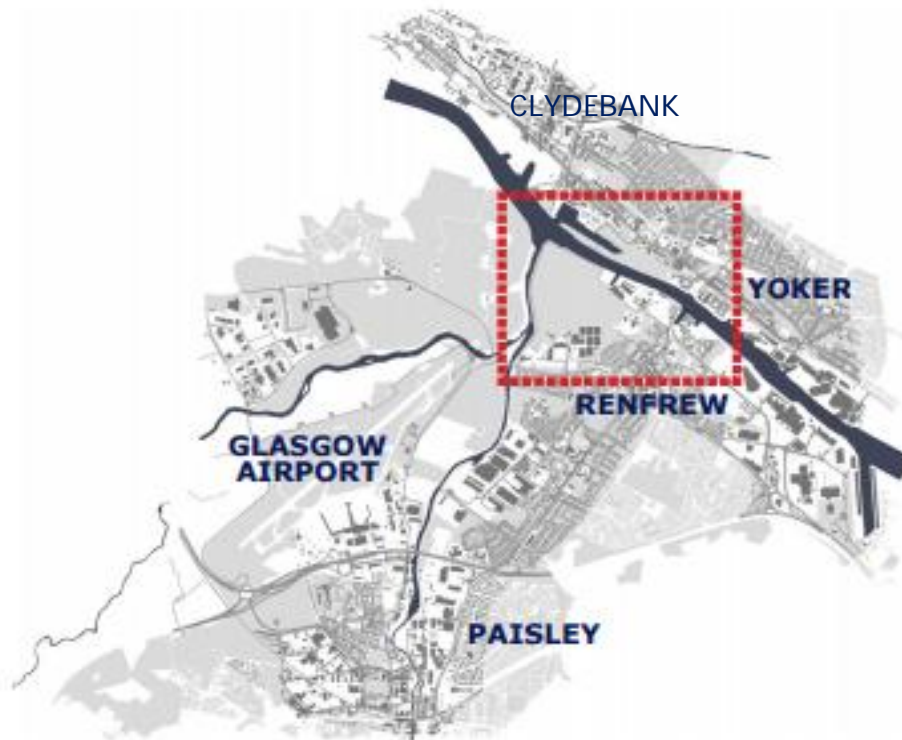


FIGURE 1.1: THE CWRR INDICATIVE STUDY AREA

A crossing over the River Clyde linking Renfrewshire with Yoker and Clydebank, has been under consideration for many years, with a Ferry currently providing the only local link. It is anticipated that providing an opening bridge, that can accommodate river traffic, vehicles and non-motorised users (NMUs) could deliver economic growth and land-use regeneration within the local area but also within the wider Glasgow City Region. Analysis by independent consultants on behalf of the Glasgow City Region member authorities, identified CWRR as the highest performing project included in the City Deal, in relation to its contribution to economic growth (GVA) for the Region.

City Deal funding provides the mechanism to enable this project to be brought forward, taking cognisance of the complex consenting regime (crossing three local authority boundaries) while recognising the importance of the economic activities on the River Clyde.

Through National and Local Government funding, City Deals give local areas specific powers and freedoms to help the region support economic growth, create jobs or invest in local projects. These common objectives of City Deals have influenced the project aims of CWRR.

1.3 Aims

The CWRR project aims to regenerate the Clyde Waterfront as an attractive riverside and urban area that supports existing and promotes new residential, industrial, commercial, business, retail and leisure opportunities. The project will deliver infrastructure and environmental improvements with the objective of facilitating:

- The regeneration of the waterfront as an attractive, vibrant and sustainable urban area by improving access to key development sites, which with private sector investment will provide new housing, business and employment opportunities;
- Improved access for communities north and south of the River Clyde to key residential, employment, healthcare, education, leisure and retail sites for all modes of transport, including improved opportunities for leisure and active travel alongside and across the river;
- An enhanced local environment through the use of high quality landscaping to encourage following high quality development and regeneration;
- Optimised operation of the local road network, resulting in improved journey time reliability and safety; and
- Improved access to and enhanced local green space.

The aims were used to transcribe objectives for the CWRR project, and the infrastructure proposed, and these are provided in **Section 1.4** below.

1.4 Objectives

The proposal objectives were agreed during a series of workshops involving Renfrewshire Council; SYSTRA (transport modelling consultants); 5plus Architects (masterplanning consultants); and Sweco. These objectives formed the start of the optioneering process and informed the design and layout of the proposed infrastructure.

<p>Local (<i>project specific</i>)</p>	<ul style="list-style-type: none"> • Provide local connectivity to employment, health, leisure & education facilities and transport links; • Improve accessibility to development sites; • Minimise adverse impact on Blythswood green space; and • Optimise opportunity for development while taking account of the impact on existing residences, businesses and operations.
<p>Masterplanning</p>	<ul style="list-style-type: none"> • Maximise the visibility and usage of the waterfront to encourage development and regeneration; • Flexibility and optimisation of development space; • Use the crossing location as a focal point; and • Optimise and connect communities to green space.
<p>Sustainability</p>	<ul style="list-style-type: none"> • Facilitate opportunities for cultural and learning through the project; • Connect opportunities for environmental improvements with community benefit wherever possible; • Adopt and record sustainable resource management in design and construction; and • Minimise whole life carbon associated with the project.
<p>Transport Planning</p>	<ul style="list-style-type: none"> • Improve local connectivity between communities north and south of the Clyde to employment opportunities, healthcare, education, transport interchanges and leisure; • Provide a significant change to sustainable transport opportunities; • Optimise the operation of the local road network through reliable journey times and safety; and • Maintain navigation on the River Clyde for leisure and commercial (e.g. Prince's Dock aspirations, access to KGV and BAE at Scotstoun).

Table 2.1: Proposal Objectives

1.5 Summary of Proposals

The proposed development includes a new road crossing over the, east to west running, River Clyde, as well as other associated ancillary development. These include new road links to connect the crossing to the existing road network at Dock Street (leading to Glasgow Road) in Clydebank, north of the river, and Meadowside Street (leading to Ferry Road and Kings Inch Road) and Argyll Avenue (leading to Inchinnan Road) ('Renfrew Northern Development Road') in Renfrew, south of the river.

The development also includes Inchinnan Road Cycle Link which provides a cyclist only segregated route between the roundabout at the junction of Argyle Avenue and Inchinnan Road, to a point adjacent to the eastern abutment of the Bascule Bridge over the White Cart. Cycle provision will also extend from the junction of Dock Street and Glasgow Road in Clydebank to Yoker Rail Station.

The proposed development will also include bridge control and plant buildings; a new culvert for the Yoker Burn; a retaining wall for the road adjacent to Lobnitz Dock; and variable message signs to enable information on bridge closures to be communicated to road users.

Further information on the proposed development is provided in **Chapter 6 – Proposed Development**.

1.6 Programme

The project is phased as follows:

Period	
October 2015	Appointment of lead consultants
January 2016 – June 2016	Options generation, appraisal, sifting and selection process
	Public exhibition events
July 2016 – December 2016	Design of preferred option
	Public exhibition events
March 2017	Proposal of Application Notices (PAN) submitted
April 2017	Consultation with Elected Members and Local Community Groups
May 2017	Public exhibition events
June 2017	Submission of planning application
June 2017 onwards	Consideration by the Planning Authorities* and decision on application
2018	Start construction**
2020	Complete construction; roads and bridge open**

Table 2.2: Indicative Project Programme

*Renfrewshire Council Planning Portal <http://pl.renfrewshire.gov.uk/online-applications>
 Glasgow City Council Planning Portal <https://publicaccess.glasgow.gov.uk/online-applications/>
 West Dunbartonshire Council Planning Portal
https://www.west-dunbarton.gov.uk/uniform/dcssearch_app.asp

** Dates dependant on Planning Application outcomes and timescales

1.7 Applicant and Design Team

Renfrewshire Council City Deal Team (the 'applicant') is intending to apply to Renfrewshire Council, Glasgow City Council, West Dunbartonshire Council and Marine Scotland (the competent authorities) for planning consent and marine licences for the proposed infrastructure and associated works for the Clyde Waterfront and Renfrew Riverside project.

2 Policy and Design Guidance

2.1 Introduction

Since 2009, Regulation 13 of The Town and Country Planning (Development Management Procedure) (Scotland) Regulations 2008 provides that certain scales and types of planning application require either a mandatory DAS, or a mandatory Design Statement where certain criteria are met.

The Scottish Government's hierarchy of development (see <http://legislation.data.gov.uk/sdsi/2009/9780111001714/data.htm?wrap=true>) provides the criteria below;

6. Transport and Infrastructure Projects

"Construction of new or replacement roads, railways, tramways, waterways, aqueducts or pipelines....

The length of the road, railway, tramway, waterway, aqueduct or pipeline exceeds 8 kilometres".

While the project is not of a scale which requires a Statement, the project team have elected to provide one to aid clarity of the application for any party wishing to review its content.

The national, regional and local policy and guidance documents which informed the design of the proposals are set out below.

2.1.1 National Policy

National Planning Framework 3, 2014

Scotland's third National Planning Framework (NPF3) sets the spatial expression of the Scottish Government's Economic Strategy and of its plans for infrastructure investment, together with its ambition to create great places that support sustainable economic growth across the Country.

The Glasgow City Region City Deal programme sits well with the spatial strategy set out in NPF3 and with the four key visions outlined in the framework (Scotland will be a "successful, sustainable place/ low carbon place/ a natural resilient place/ a connected place"). NPF3 notes the importance of the Glasgow City Region to the Scottish economy and, through City Deal, Renfrewshire Council is driving the potential for employment and economic development.

Section 5 of NPF3 notes the importance of Glasgow Airport as a national development and a gateway location for investment, including business related development. The CWRR project links with the airport, through its connection to the adjacent GAIA City Deal project, and it also improves connectivity to the area around Glasgow Airport and the Investment Area for locations north of the River Clyde.

Strategic Transport Projects Review, 2008

The Strategic Transport Projects Review (STPR) notes the importance of connectivity and the role that transport infrastructure investment can play in maximising potential and reducing disparities.

This project is consistent with these aims and also the similar objectives set out in Section 5 of NPF3, "Connected Places". The improved connection across the River Clyde and the other improved infrastructure links, provide direct opportunity for economic development and unlock opportunities in areas which will generate local employment options and improve social conditions.

Infrastructure Investment Plan, 2015

The Infrastructure Investment Plan (IIP) sets out the Government's priorities and aims for major infrastructure investment. By improving: connections across the River Clyde; traffic routes around Renfrew; public transport reliability; increasing modal shift and generating economic development opportunity, this project meets the Governments four priorities. The priorities are stated as: delivering economic growth, managing transition to low carbon, supporting delivery of efficient public service, supporting employment opportunity.

National Transport Strategy, 2016 and Scottish Government's Economic Strategy, 2015

The CWRR project will help to achieve the following three key strategic outcomes, first published in the 2006 National Transport Strategy and maintained subsequent to its refresh in 2016:

Improved journey times and connections between our cities and towns and our global markets to tackle congestion and lack of integration and connections in transport;

Reduced emissions to tackle climate change, air quality, health improvement; and

Improved quality, accessibility and affordability of transport, to give choice of public transport, better quality services and value for money, or alternative to car.

The City Deal programme and this project, with their emphasis on stimulating economic growth, are also well aligned with the Scottish Government's Economic Strategy which aims to increase sustainable economic growth. The transport system is seen as a key enabler of such sustainable economic growth, and is said to connect individuals, communities and businesses with their economic future.

2.1.2 REGIONAL POLICY

Proposed 2016 Glasgow and Clyde Valley Strategic Development Plan

The proposed 2016 Glasgow and Clyde Valley Strategic Development Plan has been submitted to Scottish Ministers for approval. The Plan is expected to be approved in the summer of 2017. Clydeplan is the operating name for the Glasgow and Clyde Valley Strategic Development Planning Authority, they will support the lead authorities in the development of the City Deal Programme and related projects. The plan supports the lead

2(5)

authorities working within the agreed assurance framework process in the preparation of specific business cases.

The proposed 2016 plan recognises the numerous challenges faced within the City Region for Economic Growth and Policy 3 provides support for the City Deal projects. The spatial development strategy focuses on a “Development Corridor” sitting parallel to the River Clyde and encompassing the project area. The focus of this corridor is to “reconnect the adjacent communities to the River Clyde, and connections across it; recycle and reuse vacant and derelict land; generate large-scale economic activity maximising opportunities for sustainable travel to work and home”.

The project is aligned with the policy of Placemaking, new development should contribute towards the creation of high quality places across the city region.

The Glasgow and Clyde Valley Strategic Development Plan, 2012

The Glasgow and Clyde Valley Strategic Development Plan 2012 (SDP) sets out the spatial development strategy for the region. This project is being developed to reflect the SDP’s spatial development strategy and support its spatial vision and strategy. The project will support the 5 key components: Economy; Urban fabric; Infrastructure; Environment and Energy of the SDP’s spatial vision. Clydebank Riverside is identified as a Strategic Economic Investment Location (SEIL) in the SDP and Clyde Waterfront is identified as core component of the spatial development strategy and a strategic development priority.

This project will directly assist in providing increased connectivity to the Waterfront and Riverside zones and act as a major enabler for delivery of the vision for these areas. Glasgow Airport Investment Zone is also identified as a SEIL in the SDP and, although it does not directly link to the airport investment zone, this project has the potential, when taken together with other complementary City Deal projects, to assist in the development of the airport investment zone, by better connecting the communities north of the River Clyde to Glasgow Airport.

This project and its interaction with planned and potential mixed use developments in a well-connected location will support the NPF3 vision for sustainable communities along Clyde Waterfront. It is also worth noting that the project, through delivery of enhanced greenspace and active travel measures will assist in delivery of the SDP’s vision for the green network and for sustainable transport.

Regional Transport Strategy 2014

Strathclyde Partnership for Transport’s (SPT) Regional Transport Strategy (RTS) identifies four key transport outcomes across the SPT area. Close liaison takes place between the Council and SPT on delivery against these objectives, monitored through a Single Outcome Agreement with SPT. The RTS aims to deliver improvements in: reliable travel/ improved connectivity / access for all / reduced emissions.

The project aids all of these outcomes. The proposed bridge over the Clyde will provide a local connection for communities north and south of the River Clyde, which are currently only connected via, the pedestrian only, Renfrew Ferry. The project will also provide improved transport options, travel route options, relief of currently congested residential, commercial and retail areas, as well as improved links to existing business areas for a wider catchment area.

2.1.3 LOCAL POLICY

Renfrewshire Local Development Plan, 2014

The Renfrewshire Local Development Plan 2014 (LDP) sets out the spatial strategy that will facilitate investment and guide the future use of land in Renfrewshire. Work has commenced on the next LDP; a Main Issues Report (MIR), setting out the main changes since the adoption of the current LDP, including the main issues that have emerged since adoption as well as setting out the Council's preferred options and alternatives for development across Renfrewshire, has been published and consultation undertaken. The proposed LDP, taking cognisance of representations to the MIR, is being prepared.

The 2014 LDP makes specific reference to the importance of Intu Braehead/ Renfrew Riverside as a key strategic investment area, where "better connectivity and proposed commercial facilities will benefit the area as an employment centre". The CWRR project will directly improve connectivity to these areas from a wider geographic area, maximising the impact and effectiveness of these large employment centres.

The Renfrew Northern Development Road is specifically noted within the LDP as a requirement to aid the plan to achieve several of the policies, such as Policy I1 Connecting Places and Policy I3 Potential Transport Improvements enhancing pedestrian, cycle and vehicular networks.

The LDP also lists Glasgow Airport Investment Zone and Westway Business Park as important economic investment locations. The CWRR project, together with the GAIA project, improves connectivity to these locations.

The area to the west of Ferry Road, Renfrew is recognised in the LDP as an opportunity for transition from previously underused industrial use to business or residential use. The project improves connectivity of this area, enhances the public realm and increases the potential for that transition to be achieved.

Local Transport Strategy, 2007

The Renfrewshire Council Local Transport Strategy (LTS) sets five key objectives, to:

Regenerate the local economy;

Extend opportunities for all;

Ensure a healthy and sustainable environment;

Improve community safety and security and increase connectivity between settlements and services; and

Encourage integration of services and an integrated approach by public bodies whilst achieving best value.

This project will deliver against these aims by providing opportunity for economic regeneration, extending access to opportunities across the city region, and improving connectivity while endeavouring to enhance the environment in the project area.

The LTS recognises the absence of good walking and cycling connections between Paisley, the Airport, then on to Renfrew and promotes an action to improve these links. CWRR will enhance active travel elements, which will also build on the desired outputs and outcomes that are set out in the Council's Outdoor Access Strategy and Core Path Plan.

The LTS also notes the need for the Renfrew Northern Development Road (RNDR), which forms part of this project, stating that the RNDR is "essential to provide an alternative route for through traffic" to relieve town centre congestion. Further there is recognition that "major development at Renfrew Riverside requires integration and transport links". The LTS also highlights the potential for future extensions of Fastlink to Renfrew and beyond and this project will assist in freeing up congested road space for future public transport interventions such as Fastlink.

2.1.4 Glasgow City Region City Deal Objectives 2015

The City Deal aims to close the economic "output gap" of the Glasgow City Region with top performing European Cities and ensure economic growth benefits all residents. This infrastructure is aligned fully with the strategic objectives of City Deal in order to maximise the potential for economic growth through supporting the delivery of an improved transport network, improved public transport, the promotion of key development and regeneration sites in the project area and to deliver the maximum growth in GVA across the City Region. Analysis by independent consultants on behalf of the Glasgow City Region member authorities, identified CWRR as the highest performing project included in the City Deal, in relation to its contribution to economic growth (GVA) for the Region.

Its proximity to the GAIA project, and the connectivity it provides between currently disengaged communities on each side of the River Clyde, will aid that project to maximise the beneficial outcomes for these communities. Additionally the West Dunbartonshire City Deal project, Exxon, is reported to aim to provide 5,750 jobs within the City Region. The CWRR project will aid the delivery of these outcomes by improving accessibility in this local area.

3 SITE APPRAISALS

3.1 Overview



The CWRR project area has been evaluated in terms of connectivity; current and proposed land use; socio-economics; and its physical character.

For context, both **Figures 3.1** and **3.2** show the development boundary for the CWRR and GAIA projects.

Figure 3.1: Site Location

3.2 Location

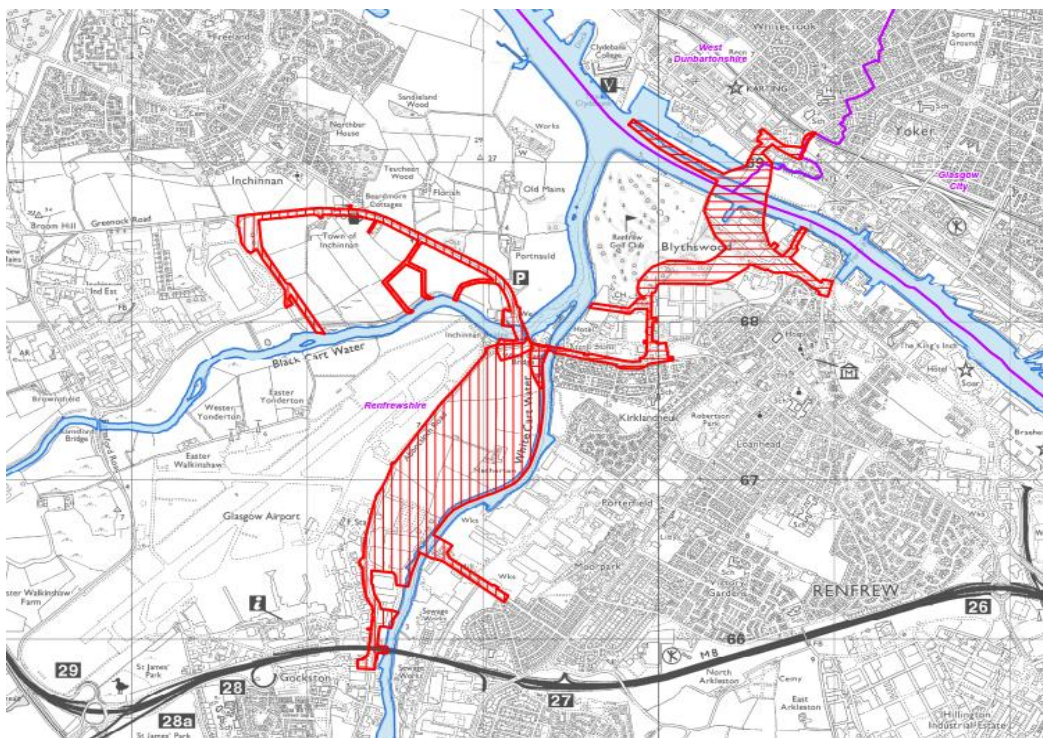


Figure 3.2: The Clyde Waterfront and Renfrew Riverside Project Area

The CWRR project area includes parts of Renfrew, Yoker and Clydebank, and, as such, crosses the local authority boundaries of Renfrewshire Council, West Dunbartonshire Council and Glasgow City Council (boundaries as shown in **Figure 3.2**).

The project area is bounded by Glasgow Road, Clydebank to the north of the River Clyde and by Inchinnan Road, Renfrew to the south. To the east, the project area is surrounded by residential properties on both sides of the river. Rothesay Dock forms the western boundary to the north of the river, with Renfrew Golf Club and the River Cart to the west south of the river.

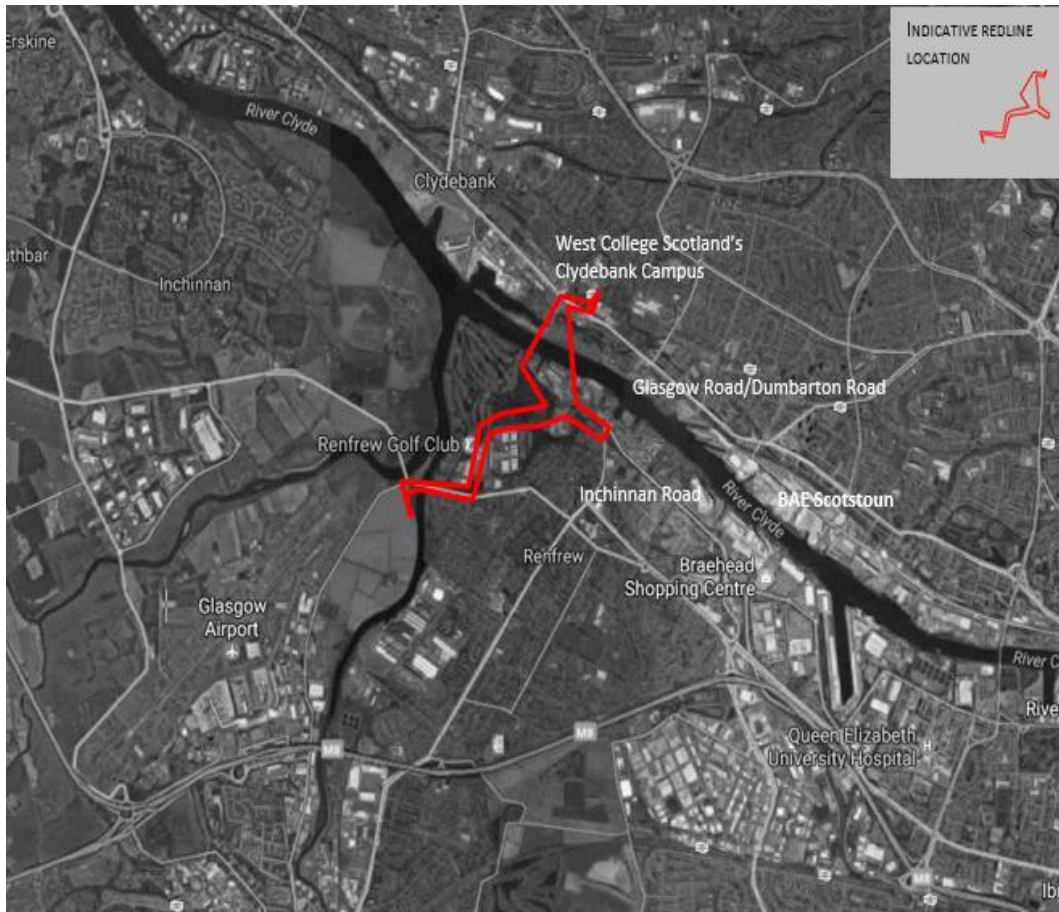


Figure 3.3: The Clyde Waterfront and Renfrew Riverside Project Area

In relation to local landmarks, the project area lies to the northeast of Glasgow Airport; to the east of West College Scotland's Clydebank Campus; to the west of Intu Braehead and the Queen Elizabeth University Hospital and south west of BAE Scotstoun. These are shown alongside the project area in **Figure 3.3** above.

3.3 CONTEXT

3.3.1 Land Use

The former county town of Renfrew, on the south bank, has been linked with Yoker in Glasgow, on the north of the River Clyde, by a ferry crossing for more than two centuries. The River Clyde supports a network of ports which service industrial centres. It also accommodates river traffic heading to and from King George V dock and other riverside destinations such as the nearby shipyards at Scotstoun and Govan.

The project area includes extensive urban land associated, in particular, with the towns of Renfrew, Clydebank and the Yoker area. Land use is primarily residential with discrete industrial and commercial centres, such as Clyde Street north of the River Clyde and Meadowside Industrial Estate to the south. There is noticeable evidence of the area's industrial past, with many demolished and vacant former industrial sites; disused railway alignments; and unmanaged/ undeveloped open spaces.

The open spaces within the project area provide amenity, landscape and nature conservation interest, and are recognised to be of particular local importance. National Cycle Route (NCR) 7, to the north of the River Clyde, is lined and surrounded by greenery. Renfrew Golf Club; the banks of the White Cart Water; and the area of woodland referred to as Blythswood can all be found to the south of the river. Blythswood (in part) is designated as a Site of Importance for Nature Conservation (SINCs) and is also, in part, designated as ancient woodland. Their importance in this context and also to the local community, has been understood and taken into account in the development of the proposal design. Land use in the CWRR project area is outlined in **Figure 3.4**.

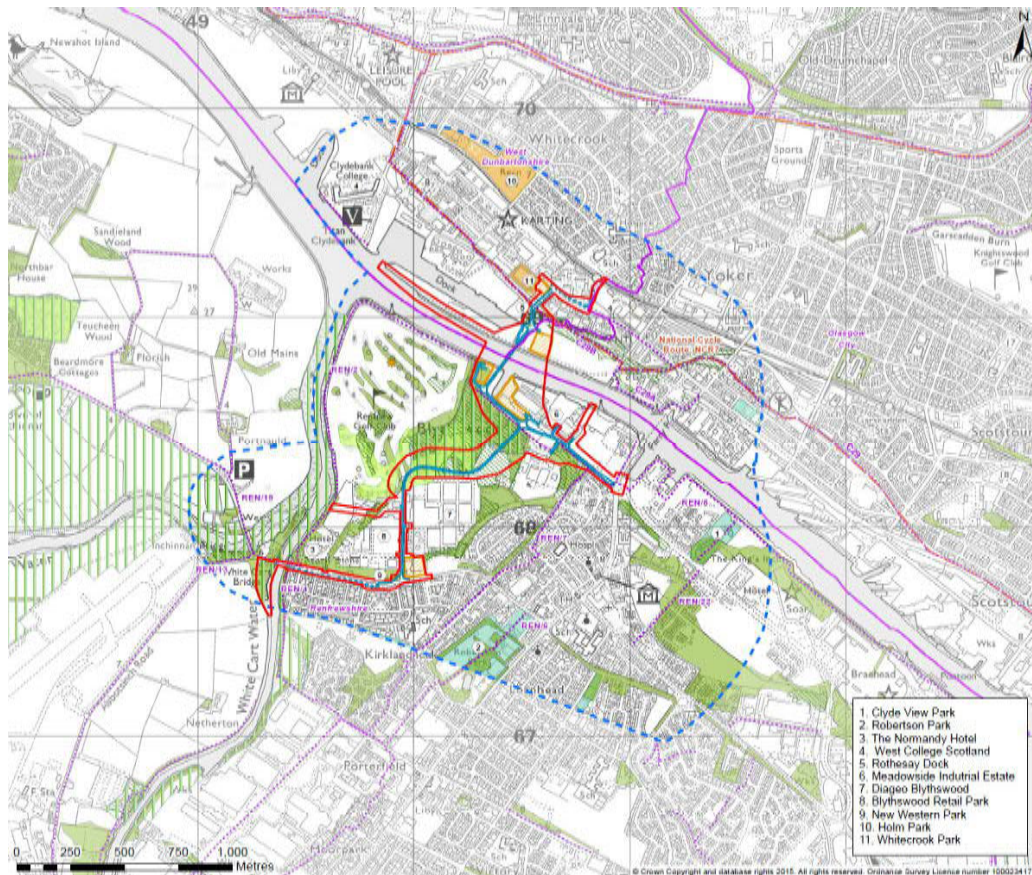


Figure 3.4: Land Use in the Clyde Waterfront and Renfrew Riverside Project Area

It should also be noted that much of the project area within Renfrewshire is designated a Transition Area in the Renfrewshire Council LDP, adopted in 2014, and, as such, may be considered by the Council for various alternative uses. Based on discussions with stakeholders and taking cognisance of land use changes in the surrounding area, it is suggested that some of the area would be appropriate for residential development. Such residential development is thought to vary in scale and density, with the most dense development occurring along the Clyde Waterfront, and development of a lower density towards Renfrew. To aid development of the project design, in particular the location of proposed infrastructure, an indicative masterplan was compiled to identify possible details of future development plots. The masterplan study examined the historical and environmental context of the project area as well as opportunities and challenges for following development. The masterplan included the appropriate ratio of development space to open space that is required for infrastructure, public realm and landscaping.

3.3.2 Socio-economic

The Glasgow City Region benefits from numerous economic assets, successful universities and research institutes, and a skilled workforce. The city and the wider region, however, also face numerous challenges that have acted as barriers to economic growth. In the area of the project, a socio-economic study undertaken to aid development of the designs found evidence that:

- There is a lower proportion of people in the higher occupational categories than both Glasgow and national figures, with local skills being more focused on trades, support and service sector roles;
- The economic activity rate of the area is lower than the national levels, and also exhibits a higher rate of unemployment than Glasgow City. The claimant rates for North Renfrew are comparable with the figures for Glasgow City, which are significantly higher than national values. Clydebank & Yoker exhibit a considerably greater rate than this, approaching double the national average in both measures;
- The study area has a higher proportion of employees in lower employment categories than both Glasgow City and the national level;
- The study area performs relatively poorly in terms of educational attainment, with approximately one third of residents having no qualification and only around 17% achieving Level 4 or above qualifications. These values are far below the Scottish average, and also lag Glasgow City in terms of Level 4 qualifications;
- Deprivation is a serious issue within some parts of the study area, particularly in Clydebank & Yoker which includes two zones within the top 5% most deprived in Scotland. Qualitative comparison with the SIMD 2012 outputs suggests deprivation is an ongoing problem in some parts of the study area;
- Household car ownership in North Renfrew and Clydebank & Yoker is significantly lower than the Scottish average, suggesting a high dependency on public transport for access to key services and employment;
- The study area Census travel-to-work (TTW) by car figures are considerably lower than the Scottish average, although higher than the Glasgow City values. Public transport mode share is considerably higher than the Scottish average, with North Renfrew having a greater dependency on bus as a result of not having a direct rail link;
- The Census 2011 TTW flow data highlights that there is very little commuting across the river - this clearly demonstrates the severance issues between these two large areas of economic activity; and
- The study area has a range of allocated employment land as well as vacant and derelict land. However, developer interest in these sites has been limited to date, particularly to the north of the river. The River Clyde is seen to give rise to severance issues and the property market is considered very local in nature.

3.4 EXISTING TRANSPORT INFRASTRUCTURE

3.4.1 Pedestrians and Cyclists

Pedestrians and cyclists are currently accommodated on a network of core paths and cycle routes throughout the project area. These are outlined in **Figure 3.5**.

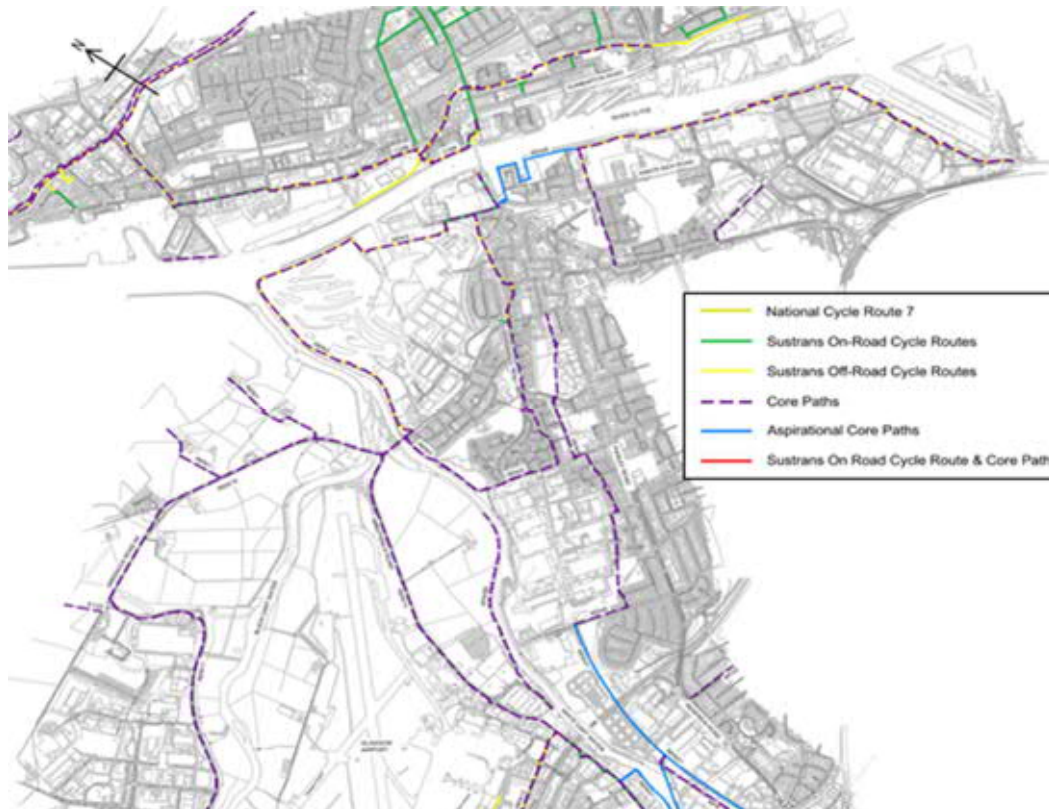


Figure 3.5: Existing and Future Walking and Cycling Provision in the Project Area

To the north of the River Clyde, NCR 7 forms an arterial east-west route through the project area, following the route of a disused railway alignment. In addition to this, on-road cycle routes have been highlighted by Sustrans in predominantly residential areas.

In Renfrew, the footpath and cycle path network though more extensive, is of varying quality and fragmented in a number of locations. Renfrew town centre is reasonably well connected to locations including Intu Braehead Shopping Centre, Inchinnan Business Park, Glasgow Airport and Paisley by core paths. Both the core path and cycling network, however, are currently largely leisure based in format. This is due to the variable quality of the current infrastructure and the lack of direct routes for commuters. The routes can be seen to vary in form, accessibility, and quality, and include shared use foot/cycle ways, footpaths, and retro-fitted on-road cycle routes.

Overall, there is a predominance of east-west walking and cycling transport corridors, with the existing Renfrew Ferry providing the only crossing point of the River Clyde in the area. The Erskine Bridge and Clyde Tunnel, located out with the study area, provide crossings of the River Clyde for non-motorised users, however lengthy diversions are required from the local area to access both. Accordingly, cycling journeys made between Clydebank, Yoker and Renfrew are restricted by the absence of a local crossing of the River Clyde. This means that destinations on the opposite bank of the river fall outside the 30 minute walking time and 30 minute cycle time defined to be reasonable by planning policy.

3.4.2 Public Transport

The Renfrew Ferry provides a pedestrian ferry service between Yoker and Renfrew and runs from 06:30 to 21:30 hours Monday to Saturday, and from 10:00 to 18:30 hours on Sundays. A half hourly service is provided during off-peak periods, with an on-demand service implemented at peak periods.

Both Renfrew and Yoker are well served by buses to Glasgow. Yoker is also served by rail with trains terminating at locations that include Glasgow City, Cumbernauld, Dumbarton Central and Motherwell.

Other than the Renfrew Ferry, public transport services are constrained by the lack of a river crossing in the area, resulting in no direct vehicular service between Yoker, Clydebank and Renfrew. Current travel options require services to pass through the Clyde Tunnel and at least one public transport interchange.

3.4.3 Motorised Users

The primary existing transportation corridors of the A814 Dumbarton Road and A8 Inchinnan Road, to the north and south of the Clyde respectively, follow an east-west direction due to the limited crossing points over the River Clyde in and around the project area. The nearest crossing points are the Erskine Bridge (approximately 6.5km to the west of the Renfrew Ferry Terminal) and the Clyde Tunnel (approximately 4km to the east of the Terminal), both of which experience significant congestion during peak periods.

3.5 Project Constraints

The design and layout of the proposals has been dictated by a number of existing physical and technical constraints and proposals for future development in the area. These factors include:

- River Clyde and the associated river use;
- Blythswood;
- Existing land owners and businesses;
- Areas of future residential and industrial development with current planning consent (including Turnberry, North Clyde Relief Road, Peel Ports Railway Reservation);

- The existing and predicted flows of vehicular traffic and the capacity of the connecting road network;
- Public utilities;
- The existing road network in an around Renfrew, Clydebank and Yoker;
- Contaminated ground and historic mine workings;
- Glasgow Airport, flight-paths and safeguarding zones;
- The extent of tidal and fluvial flooding both in terms of lateral extent and predicted flood levels; and
- The Yoker Burn Culvert and locations of existing water course and drainage outfalls to the River Clyde.

The location of the evolved project means that there is a requirement to liaise with three competent planning authorities (Renfrewshire Council, West Dunbartonshire Council and Glasgow City Council) for the terrestrial consent and also Marine Scotland for the marine licence and marine considerations.

4 PUBLIC INVOLVEMENT

4.1 Overview

The applicant is committed to encouraging public interest and participation in the development of the proposals. In May 2016, a programme of public engagement began in accordance with the National Standards for Community Engagement, 2005 and updated in 2015/16. The seven Standards, outlined in **Figure 4.1**, are good-practice principles designed to support and inform the process of community engagement, and improve what happens as a result.



Figure 4.1: National Standards for Community Engagement

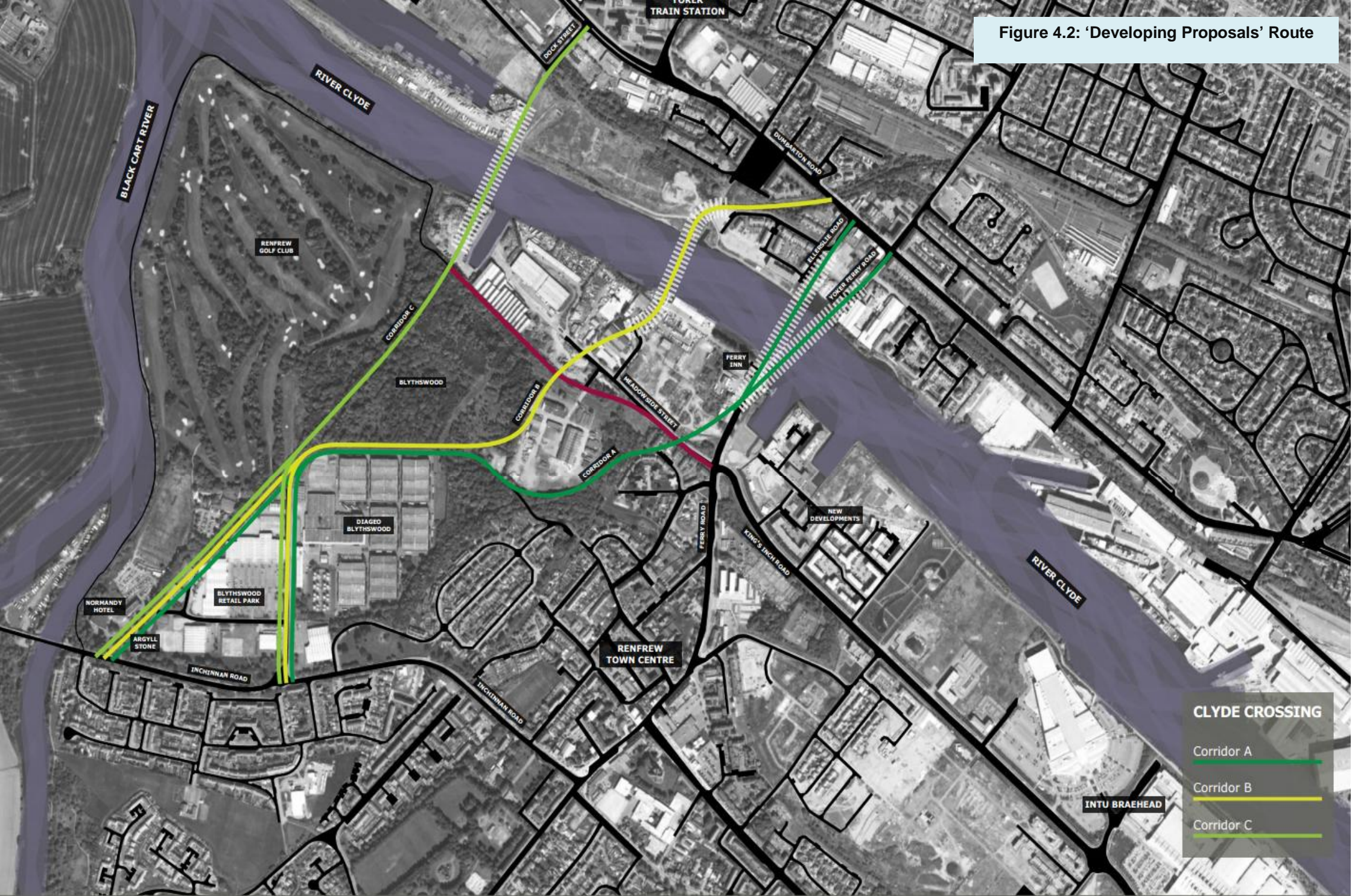
The programme was delivered in three phases, corresponding with key project milestones, and allowed the public to comment on, and contribute to, the proposals. The timing and description of each phase are provided in **Table 4.1**.

Phase	Timeline	Description
Developing Proposals	May – July 2016	<i>Options Generation, Appraisal, Sifting and Selection</i> The best performing options for each of the proposed infrastructure components were presented and feedback taken on board by the Design Team in advance of the selection of preferred options.
Developed Proposals	July – December 2016	<i>Preferred Options</i> The preferred options for each of the proposed infrastructure components were presented and feedback taken on board by the Design Team in advance of the designs being further refined.
Finalising Proposals	April – June 2017	<i>Statutory Consultation</i> The submission of Proposal of Application Notices (PAN) for the proposals began a period of consultation during which detailed plans were presented and feedback taken on board before the submission of the Planning Application.

Table 4.1: Phases of Public Engagement

The plans exhibited at the first two phases are shown in **Figures 4.2 and 4.3**, respectively, and also serve to show the evolution of the design. Specifics of the design development are further described in **Chapter 5 – Design Evolution**.

Figure 4.2: 'Developing Proposals' Route



CLYDE CROSSING

- Corridor A
- Corridor B
- Corridor C

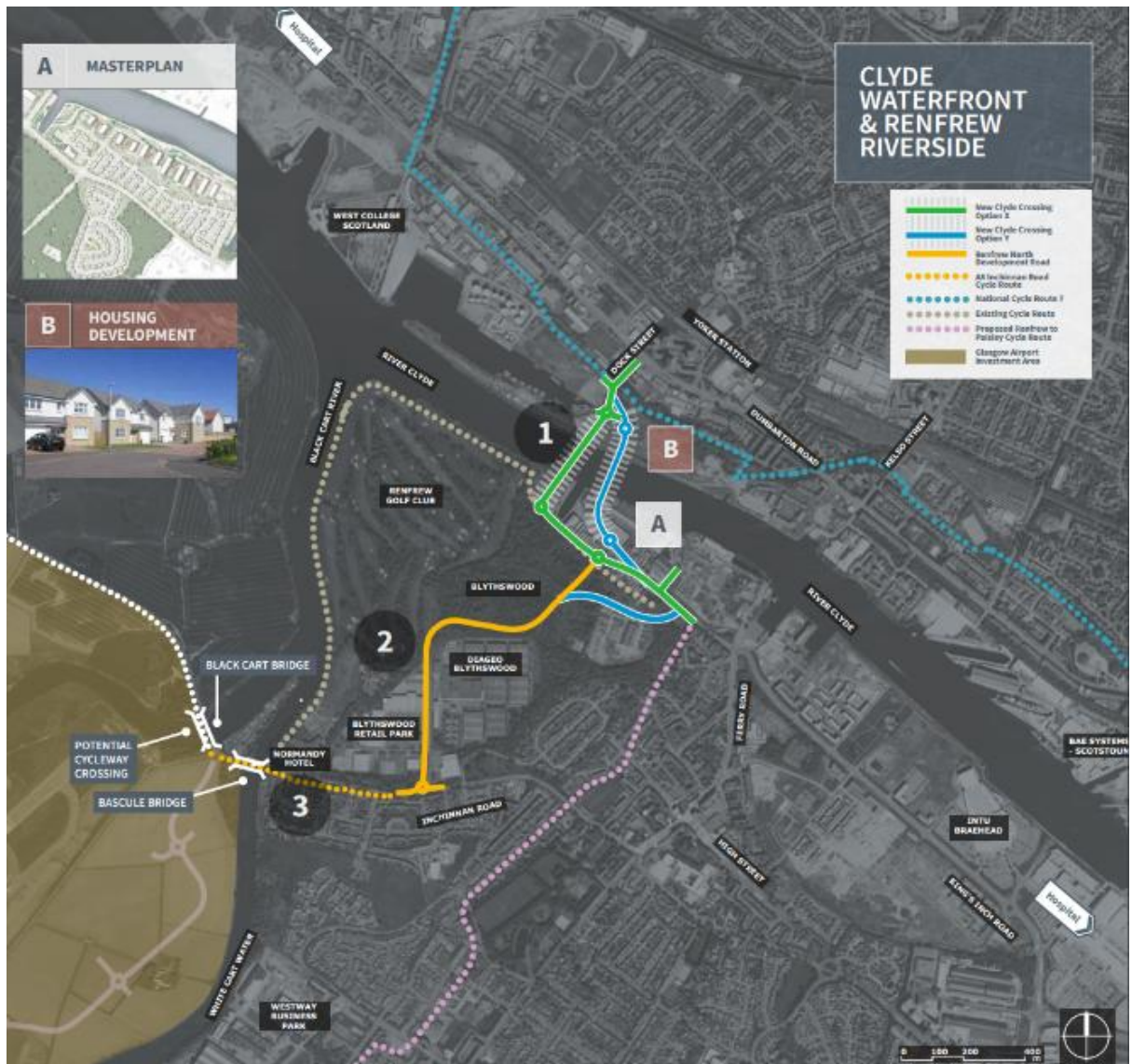


Figure 4.3: ‘Developed Proposals’ Route

Each phase saw various measures employed with the aim of involving and engaging the public. They included the following:

- Public Consultation Events;
- Feedback Surveys;
- Local Community Group Briefings; and
- Online Content.

4.2 PUBLIC CONSULTATION EVENTS

The proposals, alongside those of the GAIA project, were first formally presented to the public at a series of consultation events in May 2016. These events were held in communities both in and surrounding the project area, and enabled attendees to learn of the Glasgow City Region City Deal; the proposals in their area; and encouraged their comments.

The events were publicised via print media, social media and online, and via flyers distributed and displayed throughout local communities. As a result, over 1,500 people attended events across the three phases. Attendance figures, alongside the scheduling and locations of the events, are shown in **Table 4.2** below.

Phase	Date	Location	Attendance*
Developing Proposals	17/05/2016	Renfrew Town Hall, Renfrewshire	120
	18/05/2016	Paisley Town Hall, Renfrewshire	30
	19/05/2016	Intu Braehead, Renfrewshire	500**
	16/06/2016	St Margaret of Scotland Hospice, West Dunbartonshire	29
	21/06/2016	Yoker Community Campus, Glasgow	109
Developed Proposals	06/12/2016	Yoker Community Campus, Glasgow	88
	07/12/2016	Paisley Town Hall, Renfrewshire	40
	08/12/2016	Renfrew Town Hall, Renfrewshire	107
	09/12/2016	Clydebank Town Hall, West Dunbartonshire	35
Finalising Proposals	08/05/2017	Renfrew Town Hall, Renfrewshire	133
	09/05/2017	Paisley Town Hall, Renfrewshire	99
	10/05/2017	Clydebank Town Hall, West Dunbartonshire	75
	11/05/2017	Yoker Community Campus, Glasgow	148

Table 4.2: Public Consultation Events by Phase

* based on signatures received on sign-in sheets located at the entrance of each event

** 81 people signed in to this event but attendance is estimated due to the stand being located in the main concourse and the high volume of people that were passing by; stopping to review the information available; and talking to the project representatives

At each event, the proposals were presented on exhibition boards and summarised in booklets which were available to take away and for download on Renfrewshire Council’s website. Topics covered included project objectives; current position of the design development; timescale for completion; next steps; and project costs.

Representatives from the applicant, and design team, were available at each event to answer questions on the design and assessment process for the project. Local perspective

was gained as the public discussed the project with representatives, and captured formally by feedback surveys open for completion during each phase of engagement.

4.2.1 Feedback Surveys

During each phase of engagement, specific feedback surveys were issued for completion, both on paper and online, by the public. All three surveys followed the same format and asked respondents how supportive they were of the proposals in general, then asked questions surrounding each proposed infrastructure component. Respondents were also encouraged to leave further comments and feedback on the proposals.

Levels of support for the CWRR project from each survey are shown in **Table 4.3** below.

Phase	Timeline	Number of Respondents	Supportive Respondents
Developing Proposals	May 2016 – July 2016	280	94%*
Developed Proposals	July 2016 – December 2016	160	92%**
Finalising Proposals	April 2017 – June 2017	149	90%***

Table 4.3: Support Registered for the Proposals
*n=199 **n=152 ***n=135

4.3 Community Council Presentations

Community Councils whose boundaries are within or adjoining the site of the proposed development, in the Renfrewshire, Glasgow City and West Dunbartonshire Local Authority areas, were consulted directly by the applicant throughout the development of the proposals. The proposals were presented at the ‘Developing Proposals’, ‘Developed Proposals’ and ‘Finalising Proposals’ phases of engagement, during which Community Council representatives were informed of the evolving proposals, allowing input to the process and enabling wider publication of public events and encouraging social media dissemination. The presentations given to community groups are noted in **Table 4.4** below.

Community Council	Type of Meeting	Date
Renfrewshire	Councillor Drop In	01/04/2016
Paisley North	Community Council	12/04/2016
Gallowhill	Community Council	21/04/2016
Paisley North	LAC - Pre Agenda	25/04/2016
Renfrew & Gallowhill	LAC - Pre Agenda	25/04/2016
West Dunbartonshire	Councillor Drop In	27/04/2016
Renfrew	Community Council	03/05/2016
Inchinnan	Community Council	03/05/2016
Renfrew & Gallowhill	Local Area Committee	10/05/2016
Houston, Crosslee, Linwood, Riverside and Erskine	LAC - Pre Agenda	12/05/2016
Paisley North	Local Area Committee	12/05/2016

Community Council	Type of Meeting	Date
Houston, Crosslee, Linwood, Riverside and Erskine	Local Area Committee	25/05/2016
GCC - Garscadden Scotstounhill Area Partnership	Area Partnership Pre Meeting	01/06/2016
Glasgow City Council	GCC Officer Briefing	03/06/2016
Clydebank East Community Council	Community Council	06/06/2016
Glasgow City Council	DRS Mgt Meeting	07/06/2016
Renfrewshire	Business to Business	08/06/2016
Renfrewshire	B2B City Deal / 2021 / Invest	08/06/2016
Glasgow City Council	Councillor Briefing	13/06/2016
Glasgow City Council	Councillor Drop In	14/06/2016
Glasgow City Council	GCC Executive Committee	15/06/2016
GCC - Garscadden Scotstounhill Area Partnership	LAP (informal meeting)	15/06/2016
Renfrewshire	Eco Dev & Employability Conference	16/06/2016
Renfrewshire	CPP - Regenerating Our Comm.	20/06/2016
Glasgow City Council	Councillor Briefing	25/08/2016
Renfrewshire	Councillors elec briefing	w/c 28th November
Glasgow City Council	Councillors elec briefing	w/c 28th November
West Dunbartonshire	Councillors elec briefing	w/c 28th November
Yoker	Community Council	3rd April 2017
Clydebank East Community Council	Community Council	3rd April 2017
Inchinnan	Community Council	4th April 2017
Paisley North	Community Council	11th April 2017
Renfrew	Community Council	2nd May 2017

Table 4.4: Community Engagement Undertaken

4.4 Online Content

From the commencement of the City Deal projects in Renfrewshire, a dedicated website has been maintained with updated information on the development of the CWRR, GAIA and AAP projects. The proposals are featured on their main website (www.renfrewshire.gov.uk/citydeal), where a page is dedicated to CWRR. From here, feedback surveys could be completed; updates on the project, survey works and feedback from consultation can be viewed; and documents, such as the Environmental Impact Assessment Scoping Report, are available for download.

In addition to this, contact with the public was encouraged by email. Initially, the address citydeal@renfrewshire.gov.uk was publicised and, later, those seeking engagement were encouraged to sign up to a Renfrewshire City Deal mailing list. Once signed up, notifications were automatically sent as website updates occurred and public events were announced.

4.5 Resulting Actions

While feedback gained through the public consultation events; feedback surveys; responses to online content; and local community group meetings was largely positive, the public also voiced their concerns and noted any potential problems and constraints associated with the project. Each concern, potential problem and constraint was identified and, where possible, addressed prior to finalising the design of the infrastructure components and to the submission of the planning application and marine licence application.

Examples of actions completed as a result of public opinion received during the programme of public engagement are displayed in **Table 4.5** below.

Opinion	Action
A strong preference for the westernmost option for the location of the Clyde Crossing was expressed	The westernmost option, as shown in Figure 4.1, was taken forward as the preferred option for the location of the Clyde Crossing. Locating the Clyde Crossing, and access roads, at the westernmost option also increases the distance between the new infrastructure and existing and planned housing.
Concern about the impact of the new infrastructure on Blythswood was voiced	A previously considered road alignment option for the Renfrew North Development Road, as shown in Figure 4.1, was discounted due to its adverse impact on Blythswood. The proposed road alignment minimises the impact on trees in Blythswood.
Desire for safe walking and cycling routes	All proposed roads and bridges include walking and cycle routes remote from vehicular traffic where possible, and are designed to be safe for all users. The active travel network proposed at the 'Developing Proposals' and 'Developed Proposals' phases has also been extended to the north of the River Clyde, with a connection from the Clyde Crossing to Yoker Train Station.
Concern surrounding traffic congestion	A comprehensive Traffic Modelling assessment, covering the areas of Renfrew, Paisley, Yoker and Clydebank, has been carried out. This assessment enabled the location of the Clyde Crossing and access roads to be chosen to minimise traffic impact on both sides of the River Clyde.

Table 4.5: Actions Taken as a Result of Public Engagement

5 Design Evolution

5.1 Overview

This chapter sets out how the design of the proposed development has evolved through the project.

A discussion on how the design considered Glasgow City Region City Deal aims; project objectives; outputs of public engagement; technical challenges; and physical constraints is explained in relation to the following:

- Road Infrastructure;
- Footways/Cycleways;
- Structures;
- Flood and Drainage Provision;
- Landscape; and
- Sustainability.

5.2 Road Infrastructure

The roads infrastructure design has been developed through a staged design process which has considered the project constraints (**Section 3.5**) with a continued focus on satisfying the aims and specific project objectives described in **Sections 1.3** and **1.4**.

The process can be summarised as follows:

- Consideration of differing methods for providing connections between the communities on either side of the River Clyde, which resulted in a bridge being selected. Further detail on this stage is provided in **Section 5.4.1**.
- Corridor Generation: Focused on identifying potential bridge crossing locations and associated connections with the existing road network;
- Corridor Assessment: Options workshop undertaken which removed corridors which did not meet the project objectives;
- Route Generation: Focused on identifying potential routes within corridors; and
- Pre Route Assessment Sift: Following development of specific route options within the corridors, these routes were assessed against the information available of the key constraints at this stage of the project.



Figure 5.1: Corridor Options

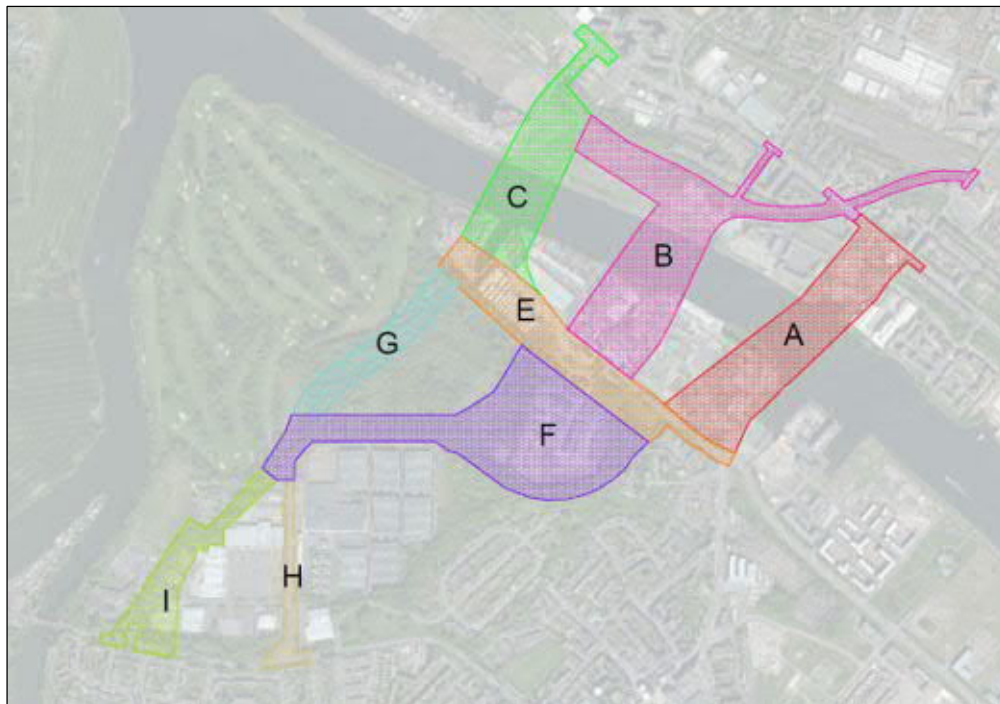


Figure 5.2: Outcome of Corridor Assessment

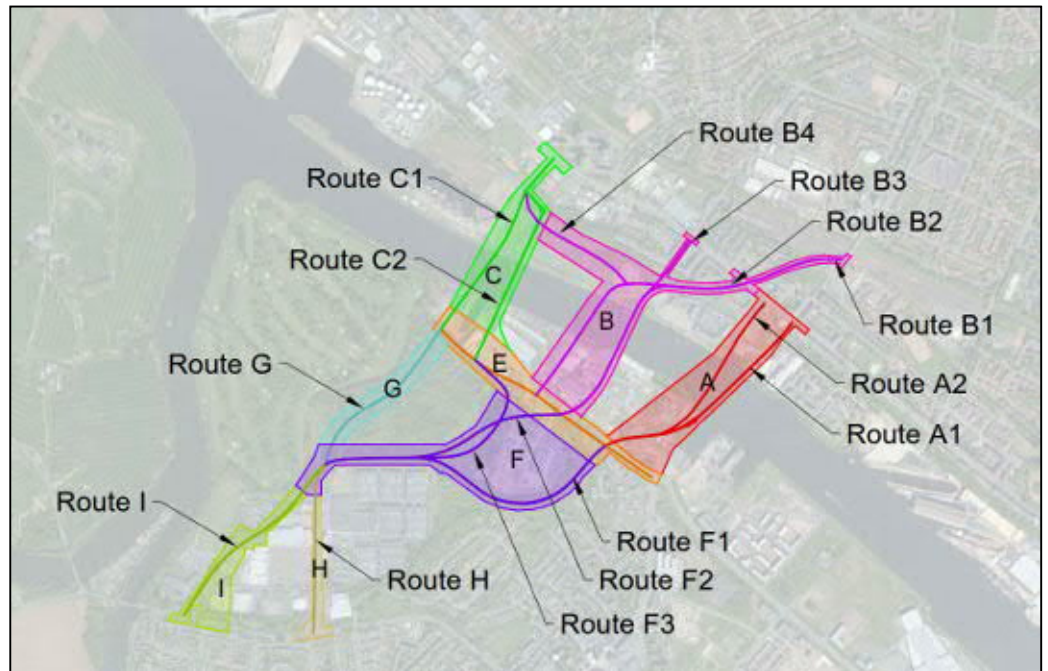


Figure 5.3: Generated Route Options

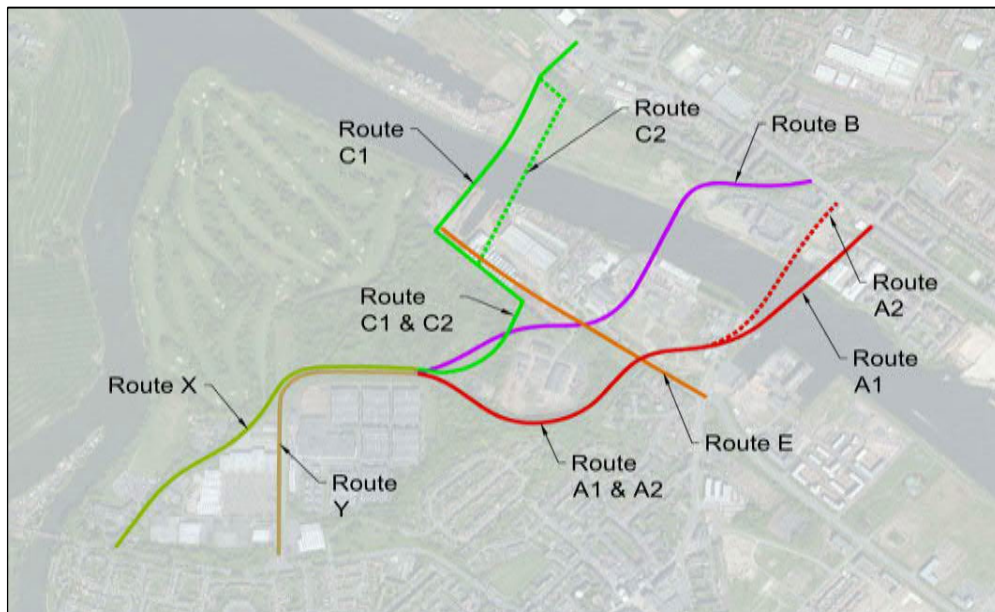


Figure 5.4: Route Options Taken Forward for Assessment

To aid the options generation sifting and development process a number of collaborative workshops were undertaken in parallel with technical evaluation, which included transport modelling, environmental assessments and masterplanning. The collaborative workshops included:

- Options Workshop;
- Objectives and Risk Workshop; and
- Non-Motorised User Workshop.

These were used primarily to ensure that the option generation and development aligned with the project objectives. Additionally, specific elements were also discussed and deliberated in order to aid the development of options.

The routes shown in **Figure 5.4** were assessed using a seven point scale against the topics of engineering, environment and traffic and economics. Scores returned were averaged to obtain an overall score for each of the three topics considered.

This assessment concluded that routes C1/C2 and Y were preferred as they minimised environmental impact and provided connections to the existing road network with lower levels of queuing than other routes assessed. Therefore these routes were taken forward and developed into the final CWRR development proposal.

5.2.1 Horizontal Alignment

- The horizontal alignment of the proposed route has been developed to accommodate the design constraints listed in **Section 3.5** noting the need to most effectively manage the new traffic flows and air quality changes while minimising adverse impacts on adjacent residencies and businesses; reducing land take; minimising overall costs; and avoiding any existing physical constraints.
- The proposed route must effectively connect into the existing transportation network and as such existing prominent junction locations are proposed to be utilised to satisfy this requirement. These junction locations are namely:
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- **North Connection:**

- Dock Street at the existing junction with the access road to the Nu-Star compound and Rothesay Dock and continuing onto join Glasgow Road at a proposed signalised junction



- **East Connection:**

Meadowside Street west of the existing stowed bridge structure and thereon connecting to the existing Ferry Road/ Kings Inch Road/ signalised junction

-
- **South connection:**
- Argyll Avenue and thereon connecting to A8 Inchinnan Road at the existing roundabout



Development of the horizontal alignment was undertaken in parallel to a series of consultation meetings and events with key third-party stakeholders and public consultation events. This allowed the relevant outcomes of these to influence and refine the overall design. As a result of feedback received from members of the public, the proposed route alignment has been developed to restrict the environmental impact on Blythswood by minimising tree loss through the utilisation of existing clearings in the woodland. Consultation responses, in addition to traffic modelling outcomes also led to selection of the proposed bridge location as this minimised the potential adverse impact on existing residential properties and businesses, while proving an effective link to key public transport hubs. Furthermore stakeholder feedback formed a key influencing factor in the decision to provide a proposal which limited the impact on existing public utilities provision within the project extents.

5.2.2 Vertical Alignment

As with the proposed horizontal alignment, the vertical alignment development has considered how best to mitigate impact on the previously stated design constraints and seamlessly connect into existing levels at the chosen junction locations with the existing transportation network.

The primary design influence on the levels of the proposed roads was the need to for them to remain operational during flood events; therefore the design has been developed to provide a minimum freeboard of 300mm above the 1 in 200 year plus climate change flood level. This requirement, together with constraints imposed by existing utilities (primarily electric cables and drainage systems) has influenced the vertical alignments. The vertical alignment of the bridge structure is discussed in **Section 5.4.1**, where differing constraints apply.

5.3 Footways / Cycleways

5.3.1 General Provision

Through the proposed development there is an opportunity to influence sustainable transport and to encourage modal shift by improving active travel infrastructure. At an early

stage in the design process, an assessment of the proposed road cross section was undertaken which considered provision for non-motorised users (NMUs).

The following options were considered:

- shared footway/cycleway; and
- segregated footway/cycleway.

A series of consultation meetings and workshops with key NMU groups, together with public consultations, helped to inform the evolved designs. A shared footway/cycleway was considered best suited to areas of lower NMU volumes as it would require less width to effectively accommodate the expected numbers of both pedestrian and cyclists without conflict. This was expected to result in a solution with lower construction costs, minimising maintenance requirements while reducing sign/line clutter.

A segregated footway/cycleway was considered more appropriate for areas of high volumes of both cyclists and pedestrians, therefore to ensure effective segregation, an increased width would be required in order to accommodate this arrangement. This option was noted to have associated land take, construction costs and long term maintenance issues that offset the improved cycling experience that a segregated cycleway could provide.

As the anticipated volumes of both pedestrians and cyclists is likely to be relatively low within the study area, it was agreed that the effective solution would be a shared footway/cycleway would be provided adjacent to the proposed road carriageway along all routes.

There are a number of applicable design standards when considering NMU provision design, namely: Cycling by Design; DMRB TA 90/05 - The Geometric Design of Pedestrian, Cycle and Equestrian Routes; and Sustrans Design Manual Handbook for Cycle-Friendly Design.

These standards suggest a width of 3.0 metres for a shared cycleway based on combined pedestrian and cyclist flows of up to 300 per hour, and separation of the cycleway/footway from a trafficked carriageway of 0.5 metres.

This standard of provision was discussed with Sustrans. It was agreed that the associated footway/cycleways would allow a clear usable width of 3.0m with an additional 0.5m separation to the edge of carriageway and variable separation to features in the verge as stipulated in guidance documents and advice supplied by Sustrans and the Transport Scotland document, Cycling by Design.

5.3.2 Inchinnan Road Cycle Link

As described in **Section 5.3.1** above, all routes developed incorporate provision for NMUs. The upgrade of a further section, however, between the Inchinnan Bascule Bridge and the

CWRR route tie-in on A8 Inchinnan Road was considered important to provide a continuous NMU link between the CWRR and GAIA projects.

Three options were considered to provide the NMU link along A8 Inchinnan Road and are summarised as follows (See **Figure 5.5**):

- A shared footway/cycleway located on the north side of Inchinnan Road through widening of existing footway;
- A shared footway/cycleway located on the south side of Inchinnan Road through widening of existing footway; and
- A remote shared footpath/cyclepath between the northern end of Argyll Avenue and the junction of Inchinnan Road/Normandy Hotel Access Road.

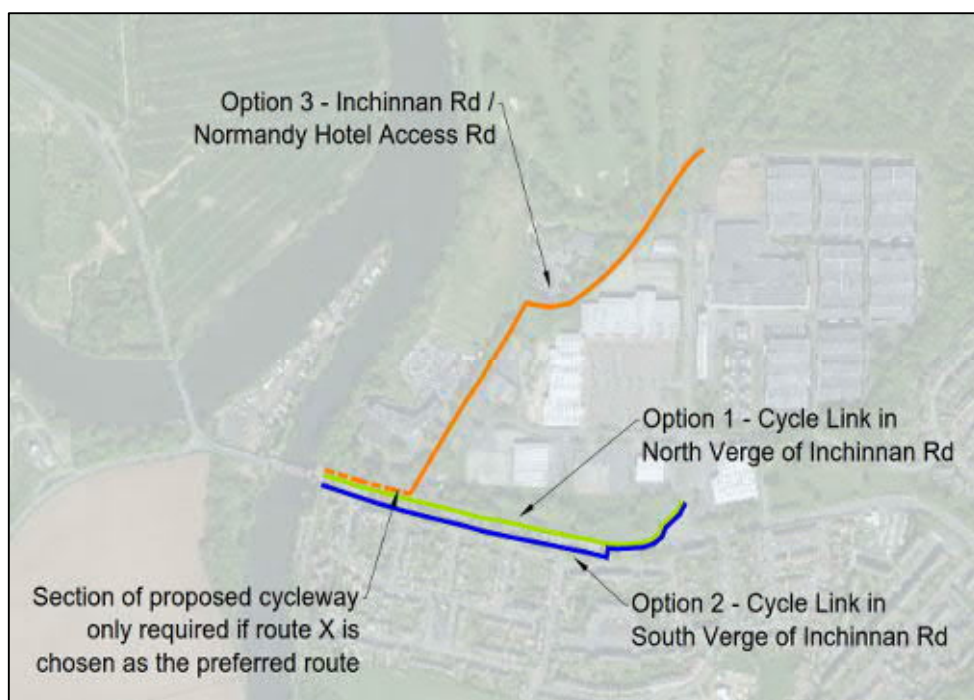


Figure 5.5: Inchinnan Road Cycle Link Options

The options shown in **Figure 5.5** above were assessed using a seven point scale against the topics of engineering, environment and traffic and economics. Scores returned were averaged to obtain an overall score for each of the three topics considered.

This assessment concluded that option 1 was preferred as it minimised disruption to traffic, avoided constraints such as existing utilities and bus stops and provided a safe connection westwards towards the GAIA development. Therefore this option was taken forward and developed into the final CWRR development proposal.

5.3.3 Yoker Train Station Cycle Link

Following feedback received at the public consultation events, it was agreed with West Dunbartonshire and Glasgow City Councils, to extend the scope of the proposed development to incorporate a cycle link from the northern extents of the scheme to the nearby Yoker Rail Station.

An additional active travel connection that provides a safe link from the northern extents of the CWRR project to the local rail network was considered to be a valuable addition to the proposed development. The link would extend NMU connections delivered by the CWRR and GAIA developments to provide a more holistic network and options for onward connections to Glasgow City Centre to the East and Loch Lomond and the Trossachs National Park to the west.

Discussions with West Dunbartonshire Council identified that development is planned on the land parcel at the North West corner of Glasgow Road/ Mill Street junction. Due to the status of the design proposals for this development, any cycle route through this site would be temporary in nature and indeed unusable during the future periods of demolition and construction.

It was therefore agreed with West Dunbartonshire Council, Glasgow City Council and Sustrans that it would be acceptable to use the existing footways of Glasgow Road and Mill Road to achieve a 3.0 metres shared cycleway through the introduction of road markings and signage. When the new development at Glasgow Road/ Mill Street progresses, opportunity to include a more direct cycle route between Dock St and Yoker Rail Station will be investigated by West Dunbartonshire Council.

This solution was considered to provide the safe link to Yoker Rail Station required while minimising construction costs, interference with utilities and disruption to Glasgow Road, adjacent land owners and existing businesses.

5.4 Structures

The Clyde Crossing Bridge and other structures are designed to the Eurocodes and the DMRB as implemented by Transport Scotland Interim Amendment 39. In addition the requirements of AASHTO Guide - Specification and Commentary for Vessel Collision Design of Highway Bridges and AASHTO Movable Highway Bridge Design Specifications have also been considered.

5.4.1 The Clyde Crossing

The Clyde Crossing Bridge is considered to be the centrepiece to the CWRR project. It provides the link between the communities to the north and south of the River Clyde which ultimately allows the project to deliver the project objectives that have been set.

In parallel with the corridor generation stage of the project (outlined in **Section 5.2**) a desktop study and an initial site walkover, identified four potential crossing points of the River Clyde, which may accommodate an opening bridge solution. These crossing points underwent an interrogation of the available bathymetric and topographical surveys to allow a basic understanding of the length of structure that would be required to span from the north bank to south bank of the river at each location.

The information gathered was used to agree preliminary structural forms that could cross the river while meeting the required navigational constraints of the River Clyde.

The following outline options were considered:

- Vertical Lift Bridge;
- Swing Bridge;
- Twin Swing Bridge;
- Twin Leaf Bascule Bridge;
- Twin Leaf Balance Beam Bascule Bridge;
- Single Leaf Bascule Bridge;
- Tunnel; and
- High Level Bridge (similar to Erskine Bridge).

These options were assessed against the project objectives discussed previously and high level engineering considerations including buildability, maintenance and cost. Three of these options – single leaf bascule, tunnel and high level bridge – were discounted due to these factors. The remaining options were taken forward for further assessment and are shown in **Figure 5.6** to **Figure 5.9**.

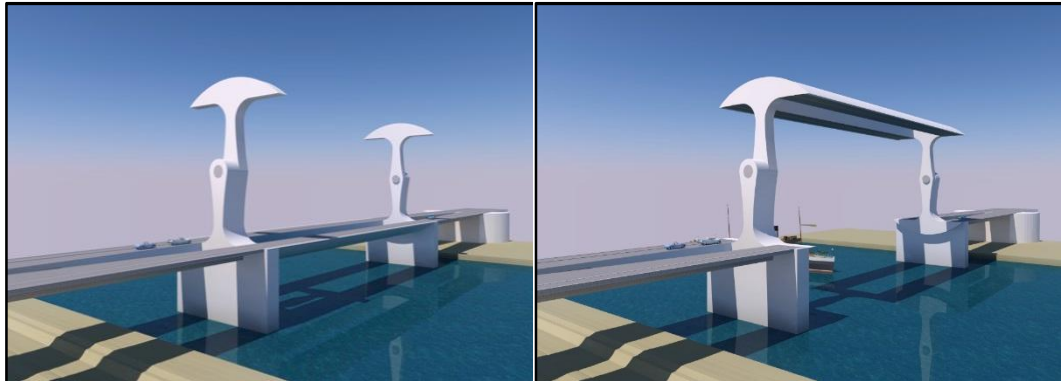


Figure 5.6: Vertical Lift Bridge

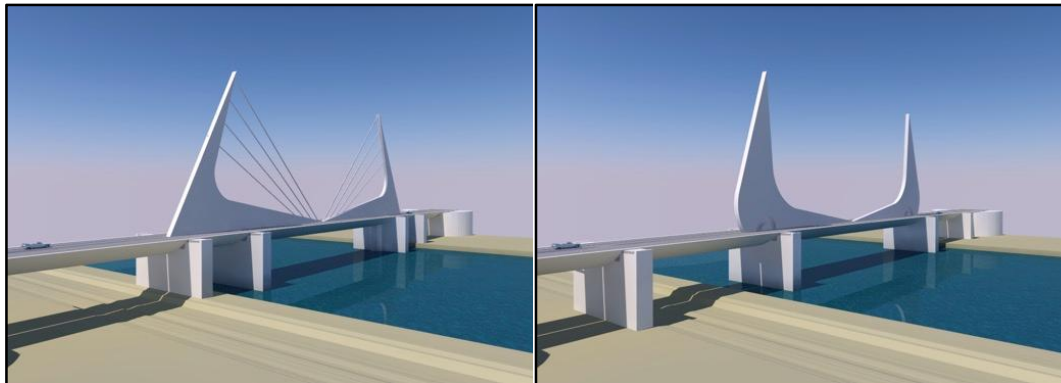


Figure 5.7: Twin Leaf Swing Bridge

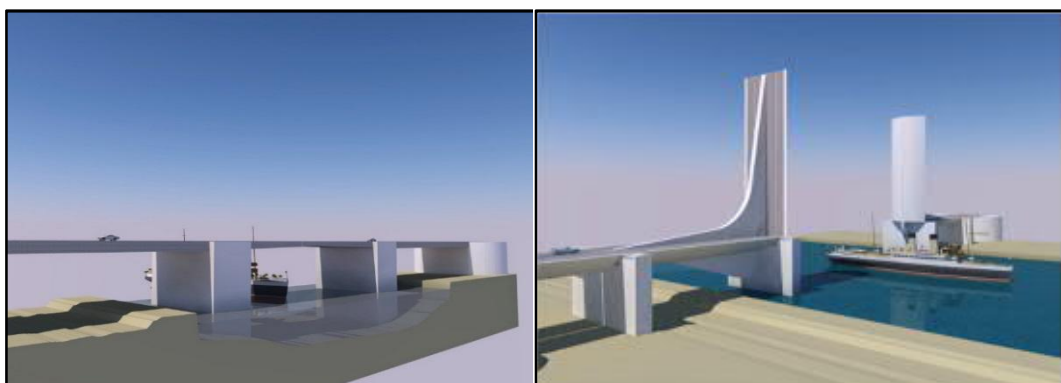


Figure 5.8: Twin Leaf Bascule Bridge

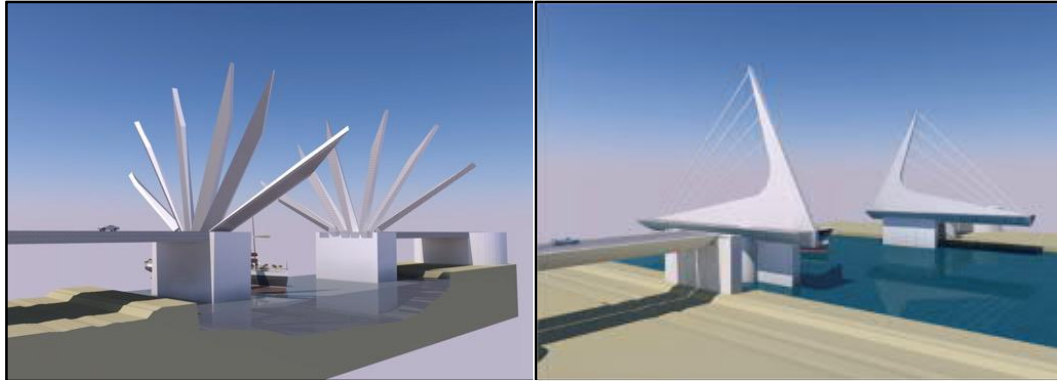


Figure 5.9: Twin Leaf Balanced Beam Bascule Bridge

Consultation with key stakeholders including the Port Authority and Glasgow Airport agreed certain requirements that must be met to ensure that shipping on the River Clyde and Airport operations remained unaffected by the works. These included, but were not limited to:

- A clear navigation channel (90m wide and 47m high) maintained through the bridge whilst open to river traffic;
- Commercial activity on the River Clyde to take priority over road traffic; and
- No infringement to airport safeguarding zones (both landing and take-off).

The combination of the 47m high navigation envelope and the level and extent, of the airport safeguarding zone restricted the structural options available. The vertical lift bridge and both forms of Bascule Bridge cannot achieve the 47m high navigation clearance without the structures permanently or temporarily infringing the airport safeguarding zones. Therefore the swing bridge solution was taken forward for development into the final CWRR proposal.

With the type of structure defined a decision on its form had to be made. One of the key objectives of the project and indeed City Deal's is to stimulate development and to enhance land use and land value. It was felt by the project team that by creating a 'statement' structure the Clyde Crossing itself could act as the catalyst for future development and set the standard for the quality of that future development.

- With this in mind the aesthetic advisor and design team have worked together to create a visually striking structure which has considered structural efficiency, buildability and future maintenance considerations to ensure a sensible balance between aesthetics, initial capital investment and whole life costs

Horizontal Alignment

The existing road network was considered early in the design process when determining where the best points at which the Clyde Crossing could be connected to roads north and south of the river. This was primarily driven by traffic modelling of junctions to ensure traffic queuing on existing routes, particularly Glasgow/Dumbarton Road was not significantly effected.

The horizontal alignment of the bridge and associated approach roads has been fixed to a certain extent by physical constraints such as Rothesay and Lobnitz Dock.

In addition, refinement of the proposed bridge location has been influenced by the outcomes of consultation with the land owners in respect of land acquisition and impact on existing businesses.

The result is an alignment which minimises impact on residential areas, adjacent businesses, reduces land take and minimises costs.

Vertical Alignment

The River Clyde is navigable all the way upstream to Glasgow Weir in the centre of Glasgow. Therefore the vertical alignment of the bridge has been balanced against:

- the need to maximise the air draught to minimise the number of vessels that the bridge needs to open for; and
- keeping the extent of approach roads and embankments to a minimal to keep costs and visual and physical impact on land/businesses to a minimum.

Data was provided by the Port Authority on the vessels that used the River Clyde during 2015. Information was also gathered on leisure cruise craft from publically available timetables. Svitzer Marine supplemented this data with information on some of the typical tugs that operate in the River Clyde.

The majority of the vessels included in the Port Authority data were large ocean going freight ships with a significant air draft. Therefore it was considered that any exercise to try and determine a vertical alignment at which would allow a proportion (e.g. 50%) of vessels without having to open the bridge would likely result in a high bridge soffit level. This would in turn require significant approach embankments impacting land based constraints.

Accordingly it was proposed, in consultation with the Port Authority, to set the vertical alignment at such a level that it did not impose any greater obstruction to craft than already present on the River Clyde.

The next restrictions are (in order, going upstream), the Millennium Bridge, Bells Bridge and the Clyde Arc, which have soffit levels as shown in **Table 5.1** below,

Location	Soffit Level (mACD)	Soffit Level (mAOD)
Millennium Bridge	8.36	5.86
Bells Bridge	8.63	6.13
Clyde Arc	10.01	7.51

Table 5.1: Soffit level of existing bridges

Both the Millennium Bridge and Bells Bridge are opening bridges, therefore the first fixed bridge upstream of the proposed Clyde Crossing, is the Clyde Arc with a soffit level of 10.01mACD (7.51mAOD). The vertical alignment has therefore been set to ensure that the available air draft for the passage of leisure craft under the Clyde Arc is achieved at the Clyde Crossing

Bridge Aesthetics

The inspiration behind the bridge aesthetic design has come from the historic industrial use of the Clyde and the abundance of cranes and tall structures that were present during its ship building past.



Figure 5.10: Historic Industrial Use of the River Clyde

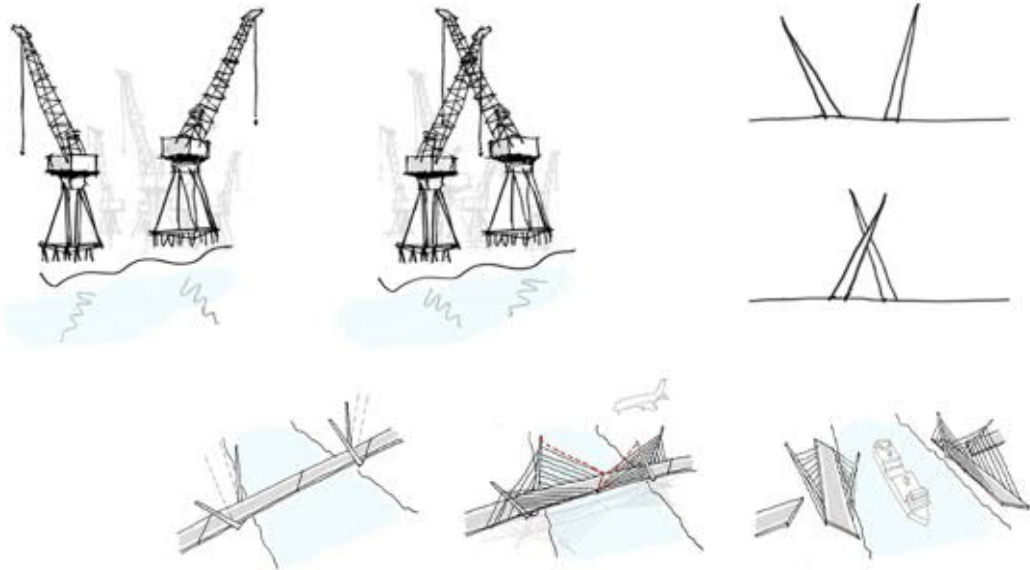


Figure 5.11: Aesthetic Sketches

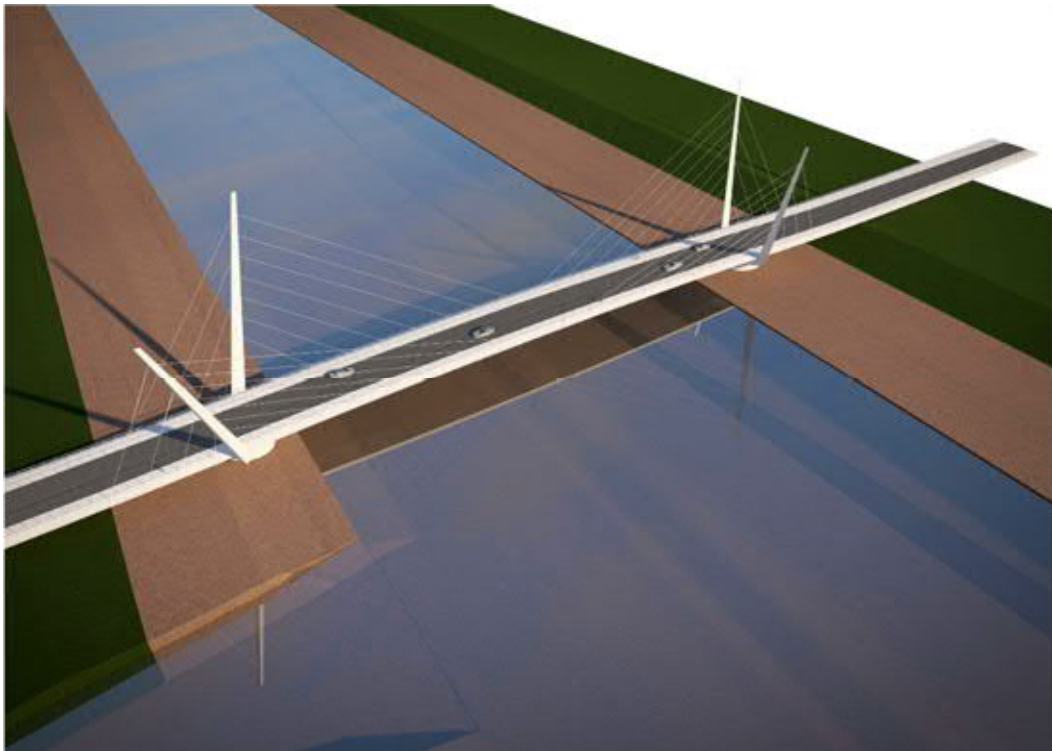


Figure 5.12: Twin Leaf Swing Bridge Options (bridge open to road traffic)

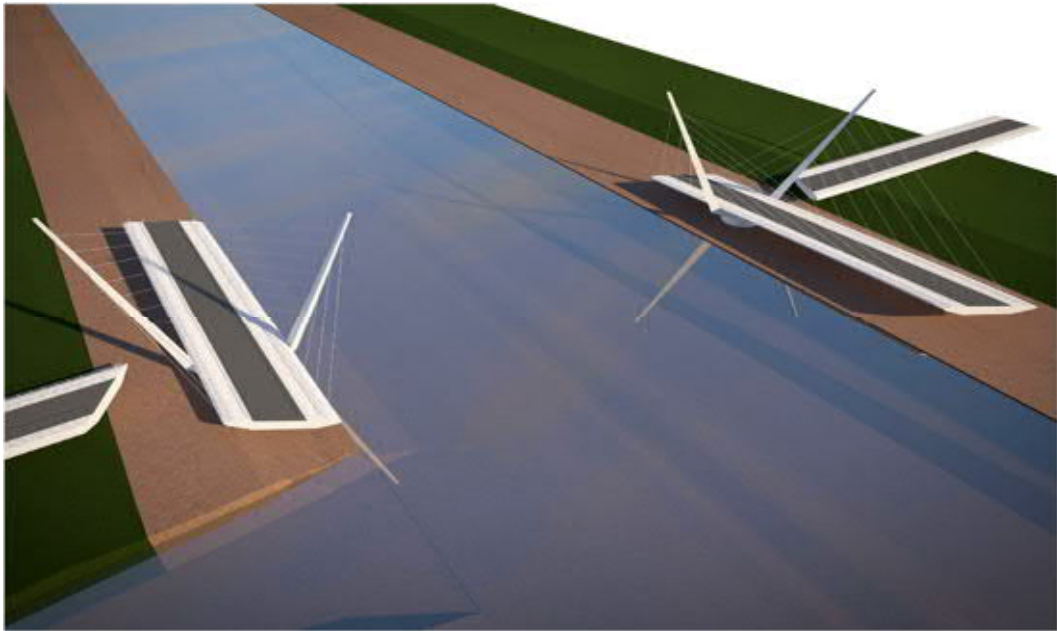


Figure 5.13: Twin Leaf Swing Bridge Options (bridge closed to road traffic)

The bridge aesthetics have been progressed, as shown in **Figure 5.11** to **Figure 5.13** with a view to creating a visually iconic crossing and a high quality piece of public infrastructure whilst mitigating the constraints mentioned above. The aspiration is that this opening bridge will become a new landmark for the areas of Renfrew, Clydebank and Yoker, creating a new destination area which will attract businesses and communities alike.

Opening Frequency and Duration

The Port Authority provided a database of ship movements on the River Clyde. This provided the date and time of all vessels moving upstream through the area of the Clyde Crossing during 2015. The data did not include the regular passage of the paddle steamer SS Waverley, which sails up and down the Clyde during the summer. The timetable for 2016 was downloaded from the SS Waverley website and these movements added to the data provided by the Port Authority.

In addition, a 3 month video vessel survey was undertaken to validate the data provided by the Port Authority and to capture the frequency of leisure craft movements that are not formally recorded by any authority.

A review of all of this data suggests that the Clyde Crossing will open on average 4 times per day for commercial vessels. The majority of leisure craft, passing the selected location, can pass under the bridge without the need to open the bridge with the exception of high mast yachts. The video survey suggests the frequency of yachts passing the Clyde Crossing location is rare and openings for this type of vessel would have minimal impact on the daily average of bridge openings.

An operational strategy, in consultation with the Port Authority and recognising the feedback from other stakeholders and from public consultation, is being developed. This strategy has considered the cycle of opening/closing the bridge and the consequential effect on road traffic. This exercise enabled traffic modelling to consider the implications of the bridge not being available for road users at peak periods and to examine the consequential effects. The modelling undertaken demonstrates that the proposed traffic management plan enables the road network to accommodate the differing traffic flows.

The traffic management plan which has been developed includes a communications system, using variable message signage, to ensure sufficient warning is given and alternative routes are relayed to all pedestrian, non-motorised and road traffic prior to opening of the bridge. Due to the operational processes used for river vessels, the notice period for the need to open the bridge is greater than the travel time within the local road network. Thus road users will have sufficient information to enable informed decisions on travel times and routes. The operational process for the bridge will form part of a Section 75 Road (Scotland) Act 1984 application.

Continued dialogue with the Port Authority has allowed an understanding of the length of the bridge opening time to be understood. Simulations of vessel movements have also been completed by the Port Authority in association with serving Pilots to understand the impact that the Clyde Crossing will have on vessel operations.

This consultation confirmed that vessels greater than 60m in length are unable to turn within the navigable channel width of the Clyde. Therefore, if a vessel travelling to a position upstream of the new crossing, greater than 60m, has committed to the navigational channel at Greenock and the new Clyde Crossing is unable to open (for whatever reason) there would be no safe place for them to moor up.

Without the provision of an alternative mooring location, the Port Authority confirmed that they would request the Clyde Crossing to open as vessels pass Greenock which would result in each opening of the bridge lasting up to 3 hours. The impact on road traffic, traffic economics and the effectiveness of the crossing to achieve its outcomes under this scenario could be significant.

Therefore to allow larger ships to continue to safely navigate up and down the Clyde once the bridge is in place, an alternative layby berth has been developed, in consultation with the harbour authority. More detail on the development of that structure is described in **Section 5.4.2**.

With an alternative layby berth in place, the simulations have confirmed that the bridge would need to be opened once vessels pass the Erskine Bridge which is an approximate 30 minute sail to the Clyde Crossing. When this transit time is coupled with the opening and closing sequence of the bridge the average estimated opening time of the bridge is expected to be in the region of 40 minutes.

5.4.2 Layby Berth

To agree a suitable location for the layby berth, further simulations have been carried out by the Port Authority and serving Pilots. The location of the proposed layby berth is provided below.

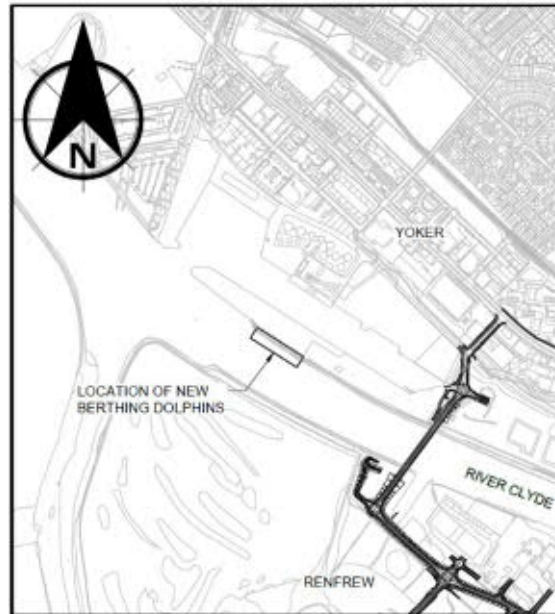


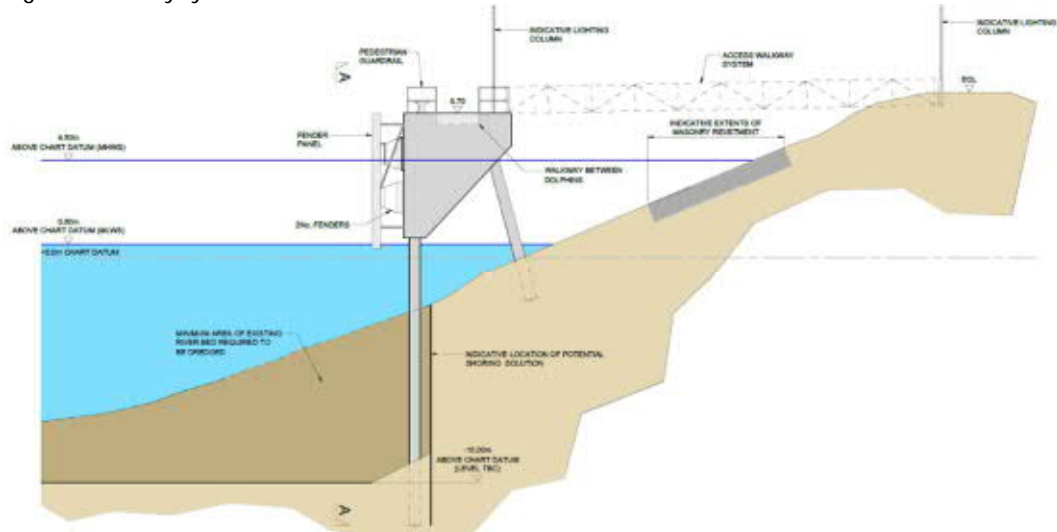
Figure 5.14: Proposed Revetment Berthing Structure Location

The structural options considered for the layby berth below were compared based on factors including, but not limited to: cost, environmental impact and existing river bank conditions. The structural forms considered were as follows:

- Creation of a new quay wall through the installation of permanent sheet piling adjacent to the existing quay wall and revetment which would be subsequently backfilled;
- Construction of discrete reinforced concrete dolphins supported on steel piles and connected to each other and the river bank by steel walkways.

Upon carrying out this comparison, along with further investigation into the existing river bank conditions, it has been concluded that progression of the concrete dolphin option would be the most financially and practically beneficial option.

Figure 5.15: Layby Berth Structure



5.4.3 Control Buildings

To accommodate the plant required to power, control and operate the Clyde Crossing, two new buildings will need to be constructed, one on the north and one on the south of the River Clyde.

On the south bank of the river, immediately west of the approach road to the bridge a new two storey building will be required. The ground floor will house the plant and the 1st floor will accommodate the control room for the bridge with associated bridge controls and communications. The building will consist of a steel or concrete frame clad with timber panelling and a glass façade. The panelling and façade will be strengthened as require.

The external finishes of both buildings will be agreed in detail with the relevant local planning authorities but indicative designs are provided in the **Figure 5.16** below. The buildings have been designed to reflect aspects of the bridge design to ensure consistency in approach.



Figure 5.16: Control Room Development

5.4.4 Yoker Burn Culvert Realignment

The new Clyde Crossing northern approach roads are located directly over the existing Yoker Burn culvert and as such a section of the culvert needs to be re-aligned. The Yoker Burn is culverted for some 250m northwards from its outfall at the River Clyde, with the existing culvert consisting of a masonry arch section at the outfall and a box culvert section at the inlet.

It is proposed to re-align approximately 160m of the existing culvert eastwards with a new reinforced concrete box culvert. The new section of culvert will tie in to the existing arch culvert section approximately 90m south of the existing inlet and 40m south of the box/arch transition.

A flood risk assessment (the extent of which was agreed with Glasgow City Council officers) has been completed to ensure the suitability of the completed design.

5.5 Flood and Drainage Provision

The proposed route within the Blythswood area intrudes within the tidal (1 in 200 year) floodplain, with the raised road also forming a potential barrier to land drainage from south to north in this area. Provision of a flood relief culvert is included in the design proposal to ensure that flood and drainage pathways are not impeded by the proposed road at this location.

The drainage system for the proposed development will comprise pre-earthworks ditches and carriageway drainage. Discharge from all development surfaces will be via sustainable drainage systems (SuDS), comprising pre-treatment and end-of-line treatment (compliant with SEPA and Renfrewshire Council requirements) before discharge to nearby main watercourses (the White Cart and River Clyde). Due to the low level of outfalls relative to tidal water levels, enhanced attenuation storage will be provided to protect the drainage system from flooding during extreme tidal conditions. Cross-drainage connections (for the pre-earthworks ditches) will also be provided where needed to maintain existing drainage pathways for the surrounding landscape.

5.6 Landscape

The landscape design is considered to be of significant importance to aid in the creation of a sense of place; to accommodate the works in an existing environment; and to set an appropriate quality for following development. The landscape design has the potential to create vistas of the bridge through the use of existing high points in the topography and the careful screening of views using planting.

- Through the development of the landscape design the following has been considered:
- The integration of the road alignment with the existing landscape particularly through the Blythwood woodland and other areas of existing mature trees;
- Emphasis of the new road alignment through the creation of new tree avenues, hedge planting and contrasting hard surface material choices; and
- Creation of an approach to the new bridge crossing and creation of a sense of place on the north and south sides of the river.

The influences on the landscape design include the existing ecology and woodland, the industrial heritage of the site and the anticipated use by pedestrians, cyclists and motorists.

5.6.1 **Inchinnan Road Cycle Link**

Along Inchinnan Road the cycle path route and design has been undertaken to retain the existing trees, as shown in **Figure 5.17**. Selective pruning to raise the crown of the trees will ensure a clear route for cyclists, while a minimal dig technical solution is proposed for the construction. New tree planting is also proposed to enhance this tree lined route.



Figure 5.17: Existing Trees Retained Through Inchinnan Road Cycle Link

5.6.2 **Argyll Avenue**



Argyll Avenue is currently tree lined with grass verges however, the trees are of poor stock and do not appear to be well maintained.

The upgraded and extended Argyll Avenue will form the connection from the Clyde Crossing to the north and Renfrew/Paisley to the south. A key consideration of the design was to develop a solution that created a gateway between the north and south extents of the development.

The proposal achieves this through new tree and hedge planting to replace any trees lost during the works and to improve on the quality, extent and design of the landscape setting. The species incorporated will be formal street trees such as Field Maple 'Streetwise' at 4.5m to 6m tall to create an immediate impact along the route.

Figure 5.18: Proposed Large Tree Avenue

5.6.3 Blythswood



The proposed new landscape design will provide screening to those using the woodland for recreation. Improvements are proposed within the wider Blythswood woodland to improve this habitat and green space, this will include removal of dead trees and thinning where appropriate to improve the health of the woodland as a whole.

Through Blythswood new young woodland planting will replace trees lost to road construction and tie into the existing woodland. Wildflower planting is proposed on the embankments to create an open and natural environment up to the woodland margin. Native hedge planting will also be used to define the edge of the woodland.

Figure 5.19: Existing Blythswood Woodland



Figure 5.20: Example of Wildflower Meadow at Road Edge

5.6.4 Meadowside Street and Clyde Crossing

On the approach to the Clyde Crossing, avenue tree planting is proposed where space allows to create a strong link to the new bridge. Vistas will be created in the planting to give views of the bridge and enhance the sense of arrival to the bridge.



Design of the bridge setting has been influenced by the industrial heritage of the site.

The angled lines of the slipways has been an influence on the Clyde Crossing and Control Building design and is also followed through into the landscape design of the bridge landing points. Landform, paving and tree planting lines will reference these angled lines.

Figure 5.21: Historic shipyard and slipways

Where possible material salvaged from the demolition of the Simons & Lobnitz Shipyard Building will be reused within the final landscape design. It is hoped that bricks from the demolished buildings can be incorporated into the paving design and salvaged rails from the slipways introduced as a feature in the landscape. This will help preserve the history of the ship building and industrial past of this section of the Clyde.



Figure 5.22: Example of Angled Landscape Design



Figure 5.23: Former Simons & Lobnitz Shipyard Building



Figure 5.24: Example of Rails Used Within Modern Landscape Scheme

These features will provide an important reference to the industrial heritage of the site and create an appropriate landscape setting for the new bridge.

5.7 Sustainability

A sustainable approach to new development is one which attempts to reduce or minimise its negative impact on both the local and (where possible) the global environment. The following sustainability principles defines ways in which new development this negative impact.

There are many ways in which a development can improve its sustainability at each of the different scales of the development design process and the current guidance indicates that the earlier that sustainability is considered, the greater the savings can be.

The Sustainable Development Goals (SDGs), established by the UN in 2015, provide a global vision of sustainability and it is recognised that to achieve the SDG's it is imperative to unlock opportunities presented by the infrastructure sector. The following elements have been incorporated into the proposed development to try and reduce and minimise impacts upon the receiving environment and to 'future-proof' the infrastructure.

5.7.1 SUDS, Drainage and Flood Prevention (SDG6)

The proposed development has been designed with the 1:200 year flood event with regards to levels. All drainage has been designed to be SUDs compliant and provide new drainage where required. The proposed development will not increase flood risk within the local area or the wider region. By providing drainage for the new infrastructure, the proposed development will not utilise precious capacity within the existing wastewater system.

5.7.2 Providing Pedestrian & Cycle Routes (SDG 11)

Pedestrian and cycle routes have been incorporated within each section of the proposed road infrastructure. The development also includes two separate cycleways (Yoker Station Cycle Link and Inchinnan Road Cycle Link), which are being provided to link with existing public transport and other new cycleways associated with the GAIA project.

The provision of a fine network of routes across the local area is intended to encourage people to walk or cycle as an alternative to car use.

5.7.3 Landscape Space and High Quality Design (SDG 11)

Landscape space has been integrated into the proposed development layout and designed to maximise the potential contribution within the land available. The planting schedule has been carefully selected to meet the Glasgow Airport standards regarding berry bearing species while ensuring that a high quality landscape is provided.

This type of planting and design aims to improve the aesthetic of the area, integrate the infrastructure sympathetically, potentially create additional habitat and also provide an area that will attract further sustainable economic growth.

5.7.4 Compensatory Planting and Woodland Tidy (SDG 15)

There will be the partial removal of Blythswood and this is to be compensated for by planting the same area lost in agreement with the woodland trust.

The existing woodland is in a state of decline and our proposals allow tidy up of the woodland within land ownership of others. This would include removal of invasive plant species, felling of standing dead trees that present a risk to health and safety, thinning of shrubs in the understory and the creation of woodland glades. This will improve the health and longevity of the existing woodland.

6 Proposed Development

6.1 Proposed Details

CWRR Project Details

The CWRR project involves a new opening bridge across the River Clyde linking Renfrew, Yoker & Clydebank that maintains existing navigation rights and a new Renfrew North Development Road from the new bridge to Meadowside Street / King's Inch Road and Inchinnan Road and improved facilities for public transport, cyclists and pedestrians. A summary of the key project outputs are as follows:

1 OPENING BRIDGE OVER RIVER CLYDE

A new opening bridge linking Dock Street to Meadowside Street at Lobnitz Dock, including:

- 184m long twin leaf cable stayed swing bridge with a 7.3m road accommodating 2 lanes of traffic
- 3m wide shared cycleway¹ on west side only (2m footway on east)
- Layby berthing facility for ships at Rothesay Dock.
- Plant & control rooms will be constructed on both sides of the river
- Minimum clearance height of 5.5m from bridge to water level

2 RENFREW NORTH DEVELOPMENT ROAD

New 30mph road will be constructed to link Meadowside Street to the A8 at Argyll Avenue:

- 750m of new 7.3m wide road accommodating 2 lanes of traffic from a new junction with Meadowside Street to the existing Argyll Avenue
- 400m of upgrading of the existing Argyll Avenue
- 3m wide shared cycleway¹ on both sides of the new and upgraded road

3 CYCLE LANE CONNECTIONS

In addition to the active travel routes incorporated into the new roads and bridges described above, new / improved active travel routes connecting to these will also be constructed, including:

- 2a Conversion of 100m of existing northern footway of the A8 Inchinnan Road to provide a 3m wide shared cycleway¹ connection between Argyll Avenue and the new off road cycle link
- 3a 420m of new 2.5m wide cycle only off-road link parallel to A8 Inchinnan road, between Argyll Avenue and the Bascule Bridge

Further improved connections to existing cycleways & core paths will also be provided:

- 3a Conversion of 400m of existing footway on Glasgow Road and Mill Road to provide a shared cycleway¹ connection from Dock Street to Yoker Railway Station
- Links to existing cycle routes (NCR7, core paths) and planned routes (Paisley / Renfrew)
- New toucan crossings on Glasgow Road and A8 Inchinnan Road

BRIDGE APPROACH ROADS

New 30mph approach roads will be constructed to provide access to the bridge from existing roads:

- 3b 120m of upgrading & widening to 14m of Dock Street to accommodate 4 lanes of traffic from its junction with Glasgow Road to a new signalised junction
- 3c 70m of new 11m wide road accommodating 3 lanes of traffic from the new signalised junction to the proposed Dock Street Roundabout
- 3d 190m of new 7.3m wide road accommodating 2 lanes of traffic between Dock Street Roundabout and Meadowside Street West Roundabout
- 3e 750m of new and upgraded 7.3m wide road (Meadowside Street) accommodating 2 lanes of traffic linking the bridge to Ferry Road / King's Inch Road. This includes a number of minor access roads maintaining connections to existing land and businesses

JUNCTIONS

There will also be new & improved junctions:

- Upgrading of the existing Glasgow Road / Dock Street Junction
- New signalised junction on Dock Street
- A new roundabout on the north approach to the bridge providing a turn back facility and link to existing and future developments
- A new roundabout on the south approach to the bridge providing a turn back facility
- A new roundabout connecting Meadowside Street with the new Renfrew North Development Road
- Upgrading of the existing Meadowside Street / Ferry Road / Kings Inch Road Junction
- Upgrading of the existing Argyll Avenue / A8 Inchinnan Road Junction

LANDSCAPING

Landscaping new roads and cycleways, including:

- New woodland planting to replace trees removed as a result of the scheme
- Trees planted to provide continuity along proposed and existing road corridors
- Landscape design to reinforce the aesthetics of the Clyde Crossing
- Soft landscaping used to reduce the visual impact of the new roads
- New hedges to create habitats for wildlife

DRAINAGE

Drainage for new road and cycleways will use the principles of Sustainable Urban Drainage Systems and include:

- Pollution Control
- Tidal Attenuation
- Realigned Yoker Burn Culvert
- Flood relief measures

¹ By 'shared cycleway' we mean a shared use path for use by pedestrians and cyclists.

3a Corresponds to map reference overleaf

Figure 6.1: Summary of the Proposed Development

Figure 6.2: Schematic of Proposed Development

6.2 Scale

The proposed roads and footways are considered to be of a scale appropriate to the surroundings, fitting with and being in proportion to the scale of the existing road network.

The proposed road cross-section and NMU provision is based on the predicted user flows following traffic modelling of the local road network. As such the roads are designed in accordance with the geometrical parameters stated in the Design Manual for Roads and Bridges (DMRB) TD9/93 guidance document for a design speed of 50kph. The carriageway width is generally a standard 7.3m, as stated in DMRB TD27/05, comprising of single lanes in each direction with corner widening and additional turning lanes on approach to junctions where necessary.

The associated footway/cycleways allow a clear usable width of 3.0m with an additional 0.5m separation to the edge of carriageway and variable separation to features in the verge as stipulated in guidance documents and advice supplied by Sustrans during consultations and the Transport Scotland document, Cycling by Design.

Due to the requirement for new construction to be above the 1 in 200 year flood level, it is necessary to site the majority of the proposed route on raised embankment. As a result the roads proposals will be higher than existing roads in the local area which primarily are situated at ground level.

The height and scale of the bridge has been dictated mostly by the technical constraints and the height required to allow the safe passage of river traffic but the scale of the proposed bridge with regards to its setting and surroundings has been a major consideration during the aesthetics development of the bridge design. The design sets out to create a high quality piece of public infrastructure, providing a new landmark for the area of Renfrew, Clydebank and Yoker. The bridge also has the potential to create a new destination which is hoped will attract businesses and communities alike.

6.3 Maintenance

6.3.1 Roads Infrastructure

Detail of the responsibility for maintenance of the infrastructure has been discussed between representatives of the three member authorities. The maintenance of the roads and associated footways/cycleways within each council boundary will generally be the responsibility of the relevant local authority. Key lines of demarcation for responsibility have been agreed where this is not the case (i.e. Bridge and approach roads). To the north of the River Clyde, the adopted roads shall be operated and maintained by West Dunbartonshire Council with the road network south of the River overseen by Renfrewshire Council; private means of access will be the responsibility of the relevant land owners unless these are adopted by the relevant local authority.

In the design of the scheme, future maintenance requirements have been considered and discussed with the solution proposed seeking to minimise ongoing maintenance concerns wherever possible.

6.3.2 Clyde Crossing

Maintenance of the proposed bridge has been a key consideration throughout the design process.

The bridge solution itself has in part, developed as a result of future maintenance considerations. The swing bridge design allows major maintenance operations to be undertaken when the bridge is closed to road traffic, thus minimising the impact on commercial activities on the river, which has no alternative route to destination.

Recognition that there will need to be access to the bridge for maintenance and inspection has been included in the overall design and a dedicated access track has been provided to the bridge supports either side of the River Clyde.

In the immediate vicinity of the bridge supports a flat hardstanding area is proposed beneath the plan footprint of bridge when it rests in its open position to allow safe access and maintenance from beneath. The level of this hardstanding has been developed to allow for the removal of bearings and all other components which need to be replaced during the design life of the bridge.

Consideration of CDM regulations has been at the forefront of the development of solutions, particularly when considering access to the M&E components of the bridge with suitable access points being designed to bearings, masts and the bridge deck itself.

Maintenance of the bridge, abutments and the access road south of the southernmost roundabout on Dock Street will be by Renfrewshire Council.

6.4 Masterplanning

The proposals have been developed in connection with a masterplan, prepared by 5plus Architects. The masterplan, which links to that of the GAIA project, provides a framework for future development and in line with Planning Advice Note (PAN) 83 it aims to:

- Provide the appropriate physical environments to support strong communities;
- Support a rich and pleasurable quality of life for inhabitants and visitors;
- Connect people and places by providing ease of movement within, and through, developments; and
- Create places of distinction and enduring quality.

A copy of the CWRR Masterplan and the supplementary CWRR Masterplan has also been submitted in support of the planning application.

6.5 Project Benefits

The project is anticipated to enable the delivery of a range of benefits for the local and wider communities¹. Direct project benefits, outlined in **Section 6.5.1**, are those achieved

¹ Renfrewshire Council, Outline Business Case v 1.0, December 2016

with the construction and operation of the proposed development. Indirect project benefits, as summarised in **Table 6.1**, are those envisaged to be delivered as a result of the improved connectivity between the communities, business and facilities throughout the area.

These benefits are fully described in the Outline Business Case prepared by Renfrewshire Council and approved in December 2016.

6.5.1 Direct Project Benefits

Development of the project design in consultation with stakeholders and the public has enabled the following additional benefits to be expected upon delivery:

- Up to a 50% reduction in journey times between the newly connected communities;
- Reduced through traffic flow in Renfrew town centre;
- Air Quality improvements in Renfrew Town Centre.
- Improved access to waterfront and green space Step change in cycleway provision within the local context;
- Cycle links to Yoker Railway Station, and a connection to National Cycle Route (NCR) 7;
- Modifications to Dock Street/ Glasgow Road junction that includes the provision for safe crossing for pedestrians and cyclists;
- Opportunities for future public transport services on both sides of the River Clyde, including enhanced reliability through Renfrew town centre;
- Potential for significant areas adjacent to the River Clyde to become accessible for leisure;
- Reduction in greenhouse gas emissions from vehicles by over 500 tonnes in 2020; and
- One of the first projects worldwide to follow the new standard (PAS 2080: Carbon Management in Infrastructure) to minimise greenhouse gas emissions, directly contributing to the achievement of the UN's Sustainable Development Goals

6.5.2 Indirect Project Benefits

One of the main aims of City Deals is that, through the delivery of new high quality roads and other key infrastructure, they will provide enhanced access to land which is currently under used or derelict in the local area, unlocking the potential for regeneration, economic growth and new development. The completed project, and the following regeneration and business growth, will create an attractive, vibrant and sustainable addition to existing communities on both sides of the River Clyde. A summary of these anticipated future benefits is provided below.

Development	<ul style="list-style-type: none"> • 83.38 hectares of vacant and derelict land brought back into use; • 21.51 hectares of land remediated; • 27,480 sqm of new business space (industrial/ storage/ distribution); • 10,000 sqm of enhanced retail space; • 2 hectares of new public realm; • 2,800 sqm of new office space; and • 1,690 new homes.
Employment	<ul style="list-style-type: none"> • 1,015 jobs created during the project's construction; and • 629 permanent additional jobs as a result of new business creation.
Investment	<ul style="list-style-type: none"> • £282m of private sector investment.

Table 6.1: Indirect project benefits

The project benefits displayed above were calculated using standard economic modelling processes as set out in the OBC Guidance issued to member authorities, as part of the Assurance Framework for Glasgow City Region City Deal. As the project elements have been developed and the CWRR Masterplan has been finalised, further assessment has been undertaken by PBA to further assess the potential socio-economic effects of the development. The results from this assessment are provided in Chapter 11 of Volume 2 of the Environmental Statement.

The projected benefits differ due to slightly different approaches. The Assurance Framework Guidance approach (the OBC) examines national Type I employment effects which gives estimates of direct and indirect (i.e. supply chain) construction jobs. The approach by PBA uses localised data rather than national averages and permits disaggregation of direct, indirect and induced construction jobs. In addition, the later study also used 2013 figures, which were slightly lower than the 2012 data which was available when the OBC outcomes were assessed.

The different in projected operational jobs is due to the application of different densities for industrial and distribution space.

7 ACCESS

7.1 Introduction

Access is important for any development but particularly so when proposing to construct new infrastructure. The proposed development has been carefully considered and designed to provide the most suitable route for vehicles and non-motorised users taking into account environment, engineering and cost constraints. During the detailed design phase, a review of relevant local and national policies and plans which set out the need for fostering social inclusion and providing access for all groups of people, particularly disabled people will be included. This review will ensure that all infrastructure is fully designed to meet those needs, particularly when designing pedestrian/multi-user crossings.

This chapter provides further information on the access considerations that have informed the project and its proposed layout and specimen design.

7.2 Accessibility

The proposals will be designed in line with the UK Government document, Inclusive Mobility, DfT 2005.

Shared footway and cycleway widths of 3 metres, described as the desirable minimum width for provision of this form by Cycling by Design (2010), are provided throughout the proposals. This provision also is suitable to accommodate the passage of two wheelchair users side by side. The shared footway and cycleways shall remain clear of obstructions where possible, with street furniture such as lighting columns and signage positioned in the verge or, where positioning in the footway is unavoidable, shall be suitably located to allow as much usable space as is feasibly possible.

Where on-street parking is provided as part of the proposal, designated disabled spaces are included. These spaces are designed to achieve the geometry specified in Inclusive Mobility and the number required in accordance with regional guidelines.

7.3 Public Transport Provision

The CWRR project, by connecting communities either side of the River Clyde, will provide a platform for additional travel choices for local residents to access wider employment, healthcare, retail, education and leisure opportunities.

As the project progresses and the infrastructure becomes operational, there will be new opportunities to improve the Glasgow City Region's cross-river public transport links through the provision of new or enhanced bus services and through opportunities for improved Demand Responsive Transport (DRT) and Community Transport links. There will also be opportunities to integrate with Fastlink BRT services south of the river.

A number of developments in the area of influence, including Queens Quay, Glasgow Airport Investment Area, Queen Elizabeth University Hospitals Campus and the Golden Jubilee Hospital - where the staffing levels are expected to double within the next 10 years - means demand for improved cross river transport connections, including public transport,

is likely to increase significantly further. The CWRR infrastructure will assist in meeting this demand.

In addition, West Dunbartonshire Council and Strathclyde Partnership for Transport (SPT) are working together to explore options for transport improvements within Clydebank town centre, including an enhanced bus/rail interchange facility. As the Clydebank & CWRR projects develop and delivery timescales become clearer, discussions will continue with potential service operators over new opportunities for operating commercial services which will take advantage of the new infrastructure and any increased travel demand that may arise.

Working closely with stakeholders, including Sustrans and the active travel teams in the relevant local authorities, active travel measures such as cycling and walking infrastructure have been included within the CWRR design process from the outset. This will help ensure there are good cross-river linkages with the existing national and local cycle networks, with existing transport interchanges such as nearby Yoker rail station and with the wider transport network, including access to bus stops either side of the river.

Building upon the discussions to date, work will continue with SPT, service operators and other partners to look at measures designed to meet cross-river travel demand between communities and facilities through the successful delivery of new and/or enhanced public transport and active travel opportunities. The reliability of the river crossing, in respect of bus operations and where the operational demands of shipping on the river require to be met will be considered as part of this ongoing work.

Work on the overall transport network and the public transport offering within the Glasgow City Region, is likely to be informed by the on-going work on the review of the National Transport Strategy, the review/refresh of the Regional Transport Strategy, the development of the Glasgow City Region Strategic Transport Plan, developments on integrated ticketing and the development of SPT's City Deal Bus Investment Programme project. SPT has also set out its ambitions for improving bus services in the West of Scotland, through its Ten Point Bus Action Plan and through proposals to develop a Strathclyde Bus Alliance (SBA). These are all factors that will be taken in to account as the overall public transport offer in the City Region, is developed.

The City Region Councils will continue to work with SPT and other partners to continue to develop opportunities for bus, other public transport and active travel opportunities to move towards a more sustainable transport network across the City Region, taking advantage of the new infrastructure delivered through City Deal, including CWRR and other Glasgow City Region initiatives.

7.4 Walking and Cycling

NMU groups were consulted at an early stage of the project as it was recognised their input would help achieve an important project objective of providing better quality, integrated walking and cycling routes to link key employment, healthcare and leisure locations. Providing a significant change to sustainable transport opportunities is a key objective of this City Deal development. To this end, a number of relevant NMU organisations were

consulted directly and subsequently invited to a workshop in April 2016, with the aim of discussing the project proposals. Attendees at the workshop included Sustrans; Strathclyde Partnership for Transport (SPT); Glasgow and Clyde Valley Green Network; Glasgow City Council; and Renfrewshire Council, all of whom were able to consider the emerging design proposals and provide their views, or highlight issues, on design for pedestrians and cyclists. Feedback from the workshop was used to input to the emerging design of cycleways and pedestrian facilities, further feedback from a number of NMU groups was received out with the workshop and developed into the design where appropriate.

To develop and improve the active travel arrangements within the project area, the proposals incorporate continuous walking and cycling provision connecting the existing facilities on Kings Inch Road, and the proposed provision to the west of the Inchinnan Bascule Bridge incorporated in the associated GAIA project. The proposed network, featuring both the Clyde Waterfront and Renfrew Riverside and Glasgow Airport Investment Area improvements, is shown in **Figure 7.1**.

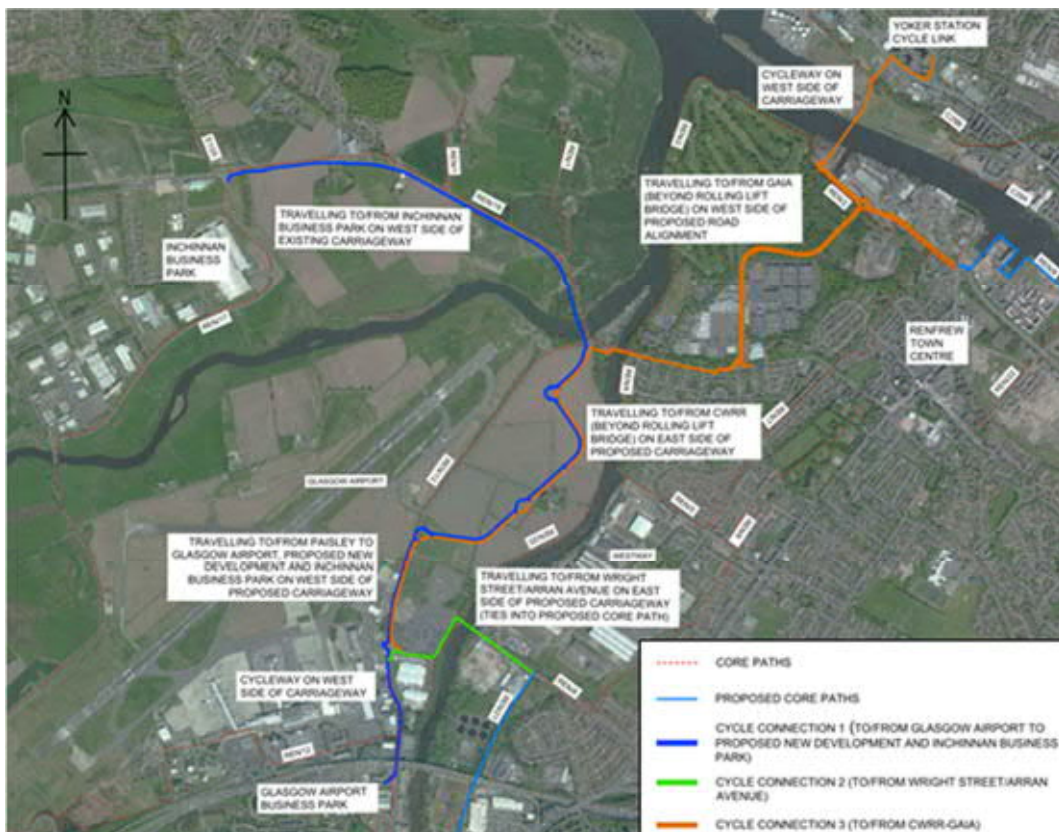


Figure 7.1: Renfrewshire City Deal Active Travel Strategy

In addition, the routes are provided on the verges of the new roads, providing an element of segregation from the traffic, with no requirement, other than carriageway crossings, for NMUs to share carriageway space with vehicular road users.

In response to public feedback, a link to Yoker Station from Dock Street is proposed – this will allow commuters to easily access the rail network into Glasgow north of the River Clyde. To ensure NMU connectivity throughout the local area, the proposals maintain the current links to the NCR 7 which runs through Yoker and several existing recreational routes in Renfrew.

The provision will take the form of a shared footway and cycleway adjacent to both sides of the carriageway on the proposed routes. On the Clyde Crossing, a shared cycleway is proposed on the west side with the east side catering for pedestrians. This arrangement continues on Dock Street, where the presence of existing businesses on the east side, and their close interaction with the footway, makes it unsuitable for cyclists. An additional section of shared footway and cycleway is proposed adjacent to Dumbarton Road and Mill Road continuing onto Yoker Station – this will utilise the existing footway which will be suitably re-determined for shared use. To link the CWRR and GAIA schemes, a cycle path is proposed along Inchinnan Road between Argyll Avenue Roundabout and the Inchinnan Bascule Bridge. This will be remote from the existing footpath situated in the green space adjacent to the Kirklandneuk residential area and Inchinnan Road, for use by cyclists only travelling in either direction.

A variety of carriageway crossing formats are proposed depending on the location of the crossing and nature of the road in the vicinity. Existing signalised carriageway crossings, either single phase or two-phase with central island, will be converted to single phase Toucan crossings in adherence to Sustrans guidance providing a safer user environment and continuity of flow across the crossing; this is applicable to the signalised junctions at Glasgow Road, Dock Street and Kings Inch Road and the existing signalised crossing of Inchinnan Road. Roundabouts shall feature dual use zebra crossings on the major arms where vehicular traffic and NMU flows are considerable to address safety concerns and improve continuity of travel for NMUs. Arms of roundabouts which are lightly trafficked by vehicles shall retain a drop kerb crossing arrangement where the NMU gives way to vehicular road traffic. At the crossing of minor accesses, coloured surface treatment, road markings and signage is proposed to assign priority to the NMU. These crossings are to be implemented over a raised table arrangement, following the outcome of consultation with Sustrans, due to the predicted high flows of HGV traffic and approach gradient of many of the minor roads.

7.5 Stopping Up of Existing Roads and Footways

To facilitate the proposed alignment a number of existing roads and footpaths are required to be stopped up in accordance with section 207 of the Town and Country Planning (Scotland) Act 1997. These roads and associated footpaths are namely Meadowside Street, the access to Stagehire compound, and the access to Rothesay Dock.

7.6 Private Means of Access

In general, new/ proposed private accesses have been positioned close to those they replace, unless safety issues such as stopping sight distance or the gradient on the approach to the major road dictate otherwise.

The access to Rothesay Dock from Dock Street is relocated to an arm of the Dock Street Roundabout and designed such as to accommodate the indicated vehicle movements required. Existing private accesses on Meadowside Street are suitably raised in level to tie-in with the proposals.

New accesses to existing businesses and development areas are located at roundabout junctions to improve the safety of users and ensure continuity and free flow of traffic.

7.7 Restriction of Parking

Following consultation with representatives of the three member authorities and feedback from stakeholder and public engagement events, the design recognises the need to restrict parking on the approach roads to the bridge during periods when the bridge is closed to road traffic. Parking restrictions are therefore required on the proposed approach roads to allow the carriageways to be free of obstruction and effectively cater for predicted traffic flows. Traffic regulation Orders will therefore be compiled in accordance with the project programme to enable their implementation in time for the completion of construction.

8 CONCLUSIONS

Overall, the proposed development represents a scheme that that is appropriate to the setting of the site, with the intention to provide a proposal with a sympathetic scale, form and massing. It achieves project objectives while taking account of the local environment, the key environmental constraints and it will provide infrastructure that will open up existing areas of derelict/underused land.

It will also provide a connection between communities and much improved active travel options.



Renfrewshire Council

Renfrewshire City Deal Masterplan

The Proposals - Clyde Waterfront and Renfrew
Riverside (CWRR)

5plus architects



30th May 2017 (FINAL DRAFT)



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Executive Summary

Executive Summary

This document sets out the masterplan proposals for two key areas within Renfrewshire - Glasgow Airport Investment Area (GAIA) and Clyde Waterside and Renfrew Riverside (CWRR). The masterplan design followed extensive stakeholder engagement, in-depth technical studies and a thorough analysis of the opportunities and constraints to create a development framework and an illustrative masterplan. This work has been undertaken jointly with lead consultant Sweco and reference should also be made to their works too, contained in separate documents.

Our designs have been developed to support the routes for new major infrastructure of roads, bridges, cycle paths and links for non-motorised users. One of the key agendas of the City Deal is to create high quality green travel routes that promote active travel, link up existing routes and promote sustainable modes of transportation.

Understanding the potential market drivers and building in future flexibility were important aspects in ascertaining plot sizes and locations which have underpinned the infrastructure plans. The potential future expansion of Glasgow Airport has also been a key driver for the GAIA masterplan.

The Clyde Waterfront and Renfrew Riverside project, Airport Investment Area project, together with the other City Deal initiatives will create opportunities for transformational change, resulting in:

- + improved business conditions
- + employment opportunities
- + a boost to the incomes of young people, those in longer term unemployment and those tackling barriers to gaining employment
- + major regeneration including extensive opportunities for new housing

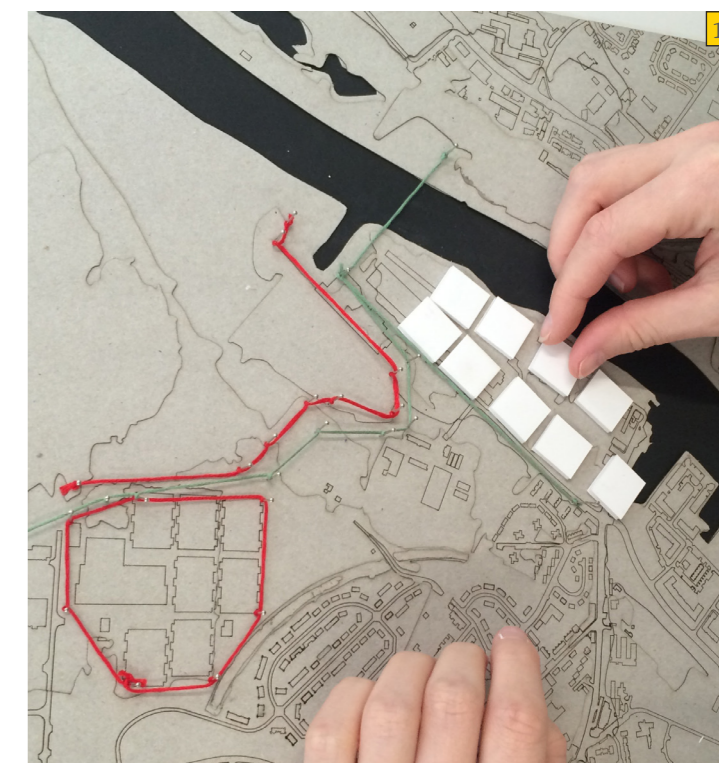
Clyde Waterfront Renfrew Riverside

The site for CWRR benefits from a long area of waterside frontage to one of the most famous rivers in the world. It is currently split into a number of sites occupied by industrial buildings, mostly scrap yards. It is likely to be heavily contaminated and there is no public access along the riverside past some of the sites. There is clear potential to enhance this area adjacent to Blythswood and Renfrew Golf Club in the same way as the residential buildings have off King's Inch Road and Braehead further east. Residential developments are planned or under construction to the north of the river off Dumbarton Road opposite the CWRR site.

Major investment is planned into the infrastructure in this area. New roads will help relieve traffic through Renfrew and on Inchinnan Road by creating an alternative route through Blythswood. It is expected that the new links and connections will better connect, disperse and control the traffic. The new Clyde River bridge is a high quality piece of public infrastructure. This opening bridge will become a new landmark for the area of Renfrew and Yoker. The bridge will also create a new destination area which will attract businesses and communities alike.

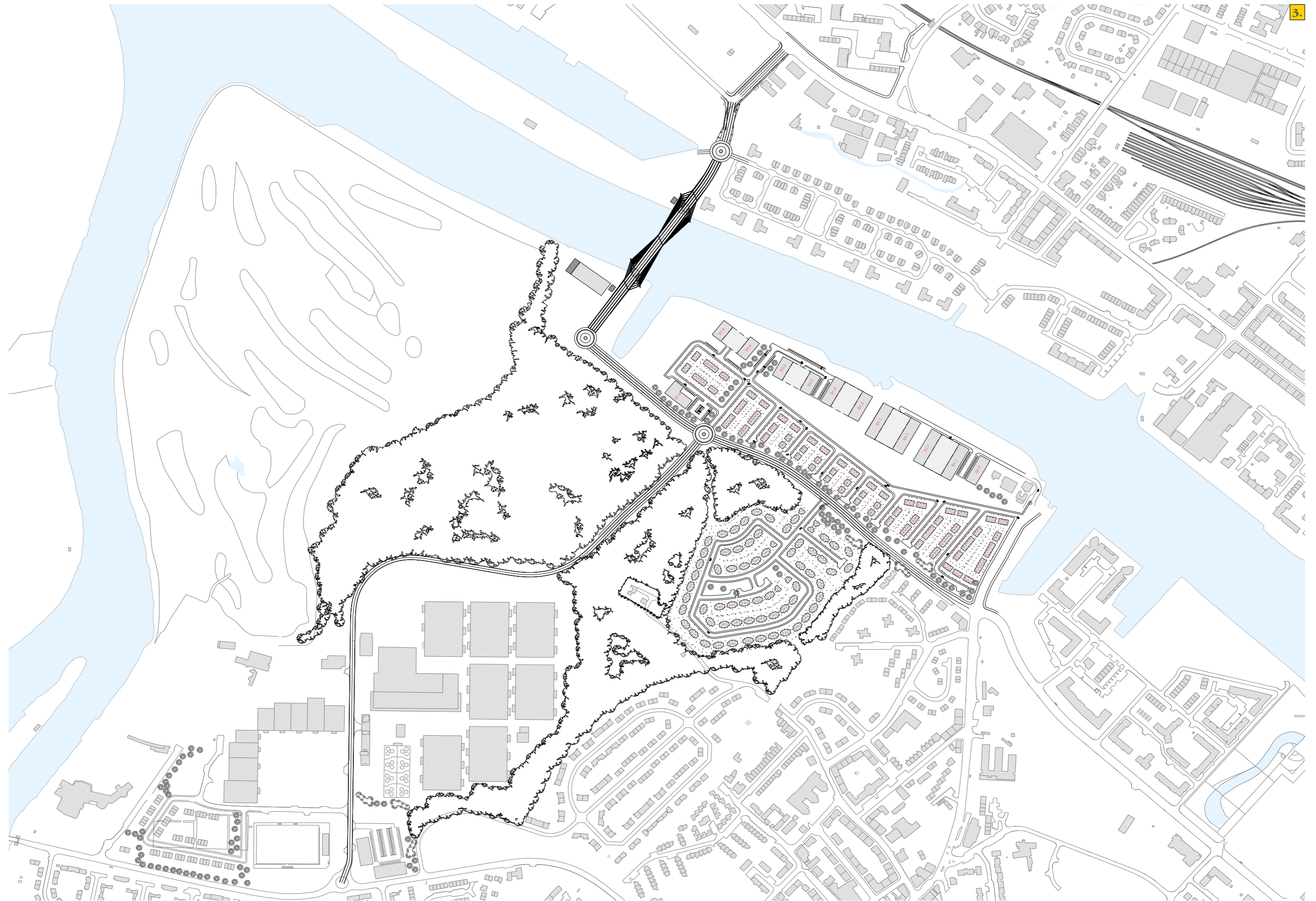
The bridge, which will accommodate vehicles, pedestrians and cyclists, will create an important new connection between the communities and businesses on both sides of the river. This will increase the potential for business growth, with businesses gaining access to increased numbers of customers and suppliers, and giving local people new travel options to employment, education, healthcare and leisure locations throughout Renfrewshire, Clydebank, West Glasgow and the wider City Region.

Roads and other key infrastructure will provide enhanced access to land which is currently under used or derelict in the local area, unlocking the potential for regeneration and new development to follow. The completed project and the following regeneration and business growth will create an attractive, vibrant and sustainable addition to existing communities on both sides of the River Clyde.



Images

1. Plot development model
2. Plot development model
3. Illustrative Masterplan Clyde Waterfront Renfrew Riverside



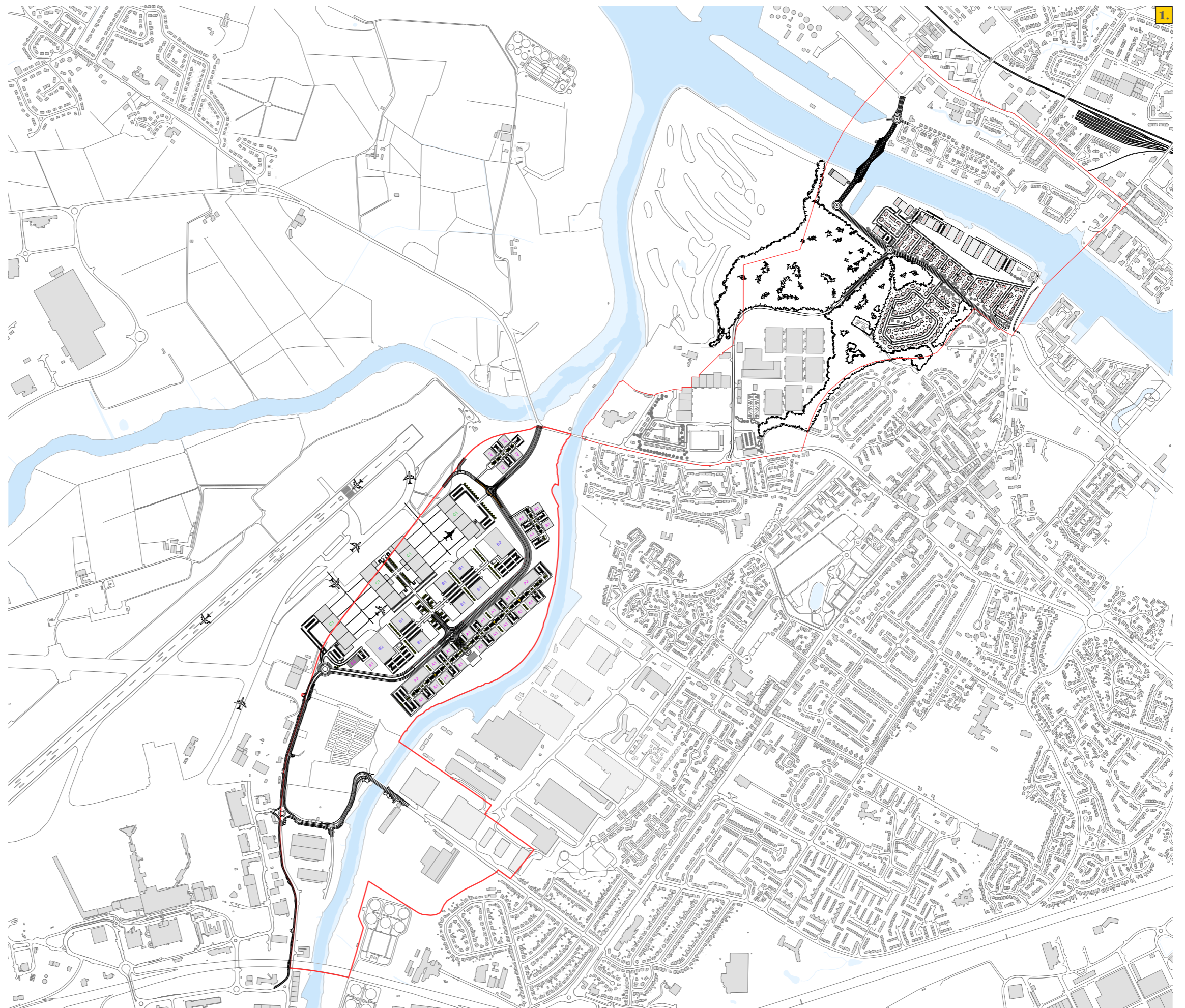
Introduction

This work has been undertaken jointly with lead consultant Sweco and is documented in The Context document which precedes and should be read in conjunction with this document.

These opportunities and constraints have informed the development of the masterplan and subsequently led to a robust and flexible framework. The framework has been developed into an illustrative masterplan which is included, along with a series of visuals, for illustrative purposes.

Based on the drawings and reports contained in this document, Corderoy have reviewed existing utility capacity and prepared outline costs for utility supplies for the illustrative masterplan which should be referred to separately.

This document represents the work undertaken up to May 2017, and as well as justifying positions of major new infrastructure projects, will be a platform from which development may be taken forward into the delivery stage in the future.



Images

1. Illustrative Masterplan combined sites
2. CGI - View looking east along river Clyde







2.

Images

1. Landscape Illustrative Masterplan Clyde Waterfront Renfrew Riverside
2. Rendered still from 3D flythrough of Clyde Waterfront Renfrew Riverside
3. Panoramic picture looking north over river Clyde



3.

1.0 Developing a Framework Clyde Waterfront and Renfrew Riverside (CWRR)

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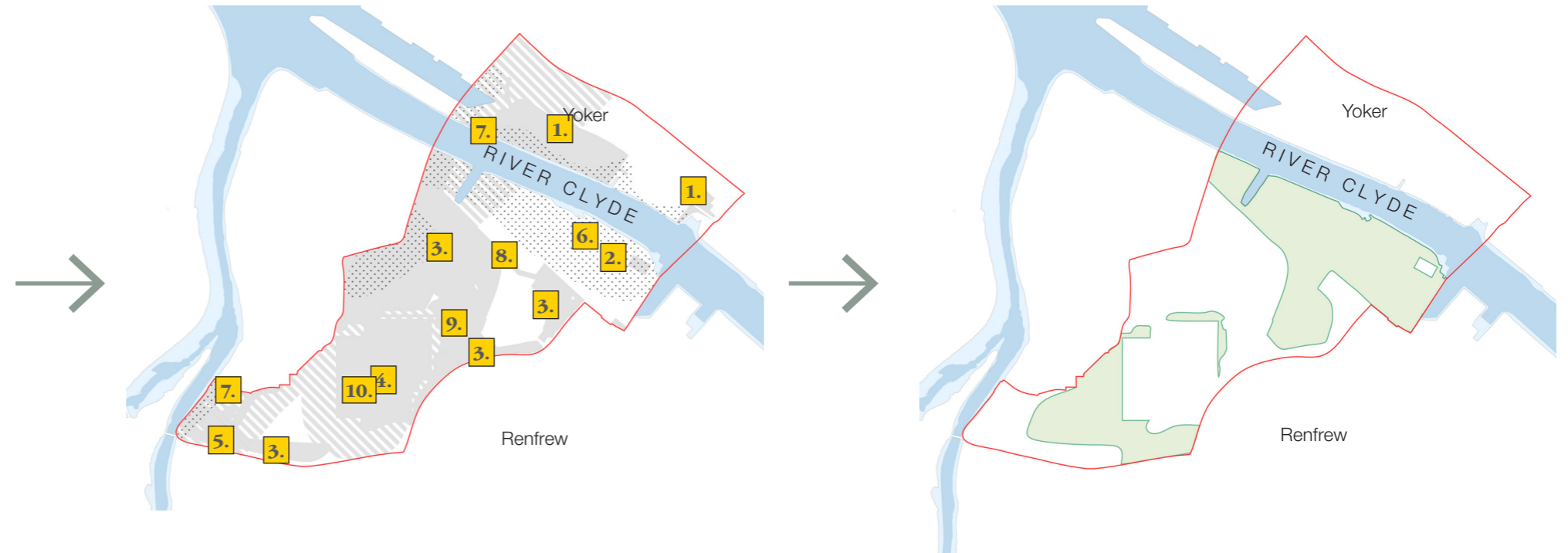
1.1 Key Attributes

Following on from the site analysis and identification of the key opportunities and constraints from the Context document, we can determine the key considerations that affect the development of the framework.



Key Constraints & Opportunities

Summary of the key constraints and opportunities to be read in conjunction with the Context document. These constraints and opportunities combined generate a series of development considerations which have been evaluated in the adjacent diagram. From this the development site has derived.



Consideration Areas

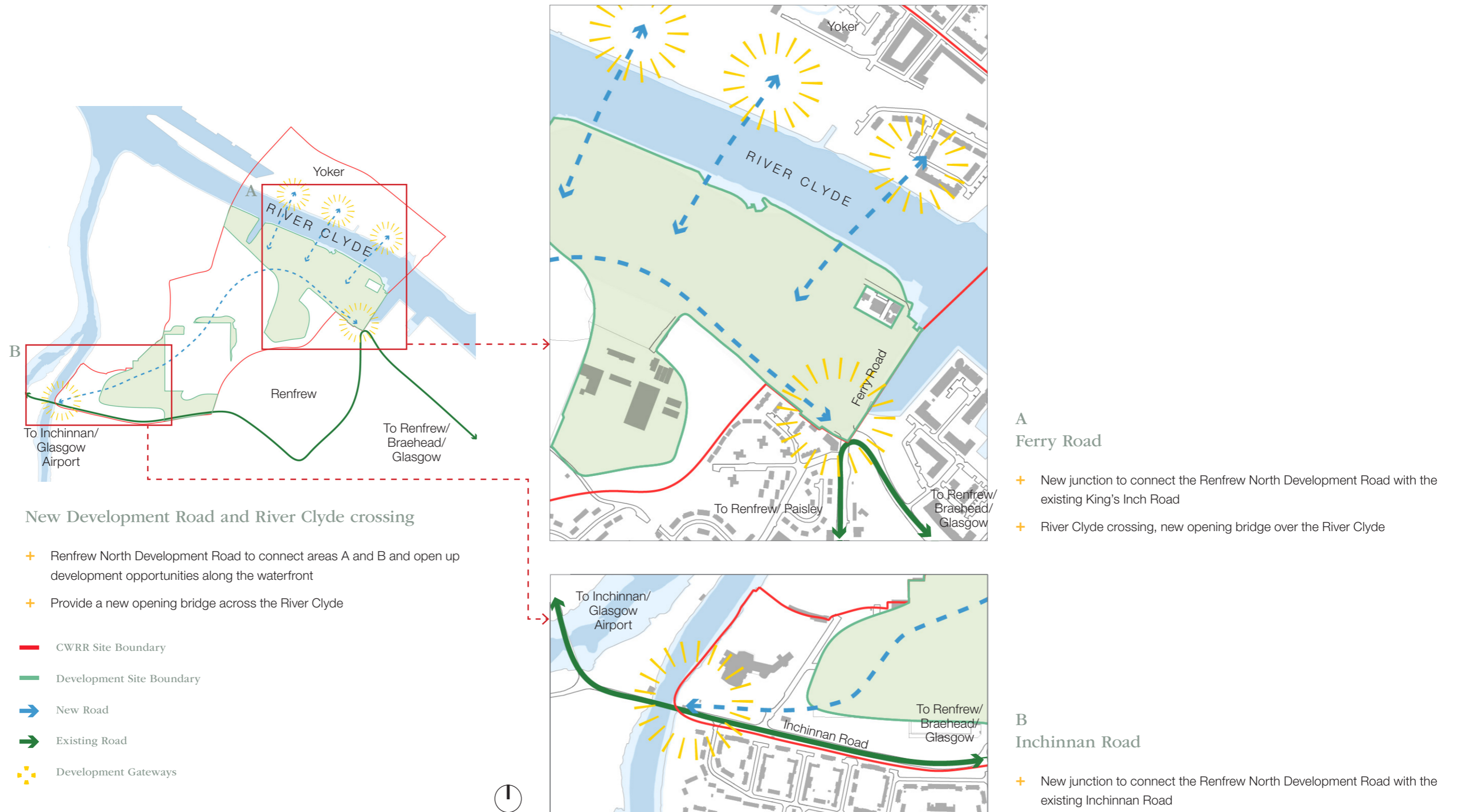
- | | |
|--------------------------------------|--|
| 1. Neighbouring Masterplan Proposals | 6. Floodplain |
| 2. Listed Buildings | 7. Noise contour provided by Glasgow Airport |
| 3. Existing Woodland | 8. Sludge Main |
| 4. Diageo Whiskey Bond | 9. High Voltage Cable Underground |
| 5. The Normandy Hotel | 10. Major Hazard Site |

The Development Site

From review of the consideration areas, a development site boundary is identified. This is an area reduced in size from the overall CWRR site boundary, which takes into consideration the existing buildings and amenities to be retained.

- Development Site
- CWRR Site Boundary

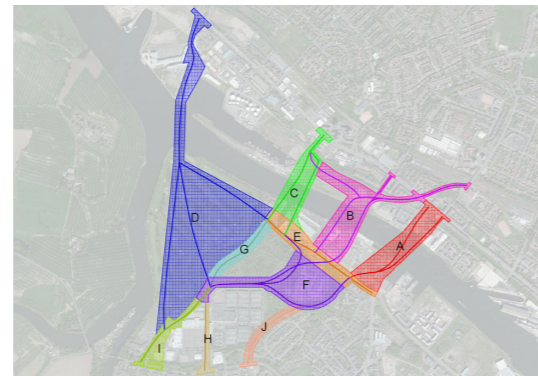
1.2 Corridor Options - Overview



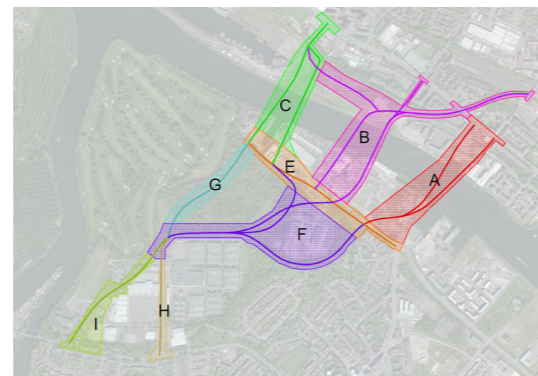
1.3 Corridor Options - Analysis

An analysis of the Renfrew North Development Road alignment and River Clyde bridge options are presented across these pages. The team (Renfrewshire Council, 5Plus architects and Sweco) considered three corridor options (shown adjacent) with each corridor crossing the river at a different point. Within each corridor were a number of different routes through the site. The team evaluated each route and scored against a set of agreed criteria, details of which can be read in Sweco's report.

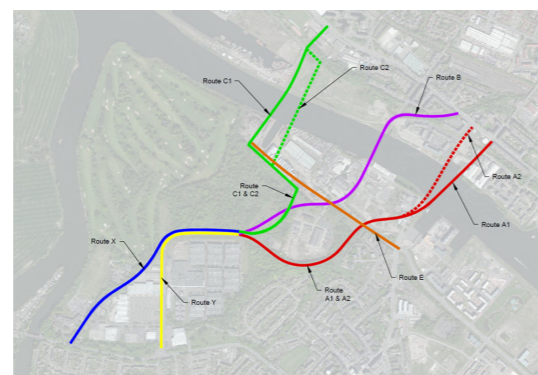
These pages summarise the main points to come from this analysis and provides justification for the preferred corridor, Corridor C, to be taken forward.



Initial Corridor Options



Corridor Assessment



Emerging Route Options



Corridor Option A

- 1.** The location of the bridge draws focus away from the potential development area and Blythswood.
- 2.** The location of the bridge crosses the River Clyde at the widest span of the three options, which will have cost implications and a higher carbon footprint.
- 3.** The location of the bridge optimises the opportunity for development along the waterfront.
- 4.** This location could encourage traffic to route through Renfrew Town Centre.
- 5.** These routes pass through protected woodland and close to residential areas so should be avoided.
- 6.** This route was discounted by SWECO largely due to the proximity to residential areas.

■ Disadvantage
■ Advantage



Corridor Option B

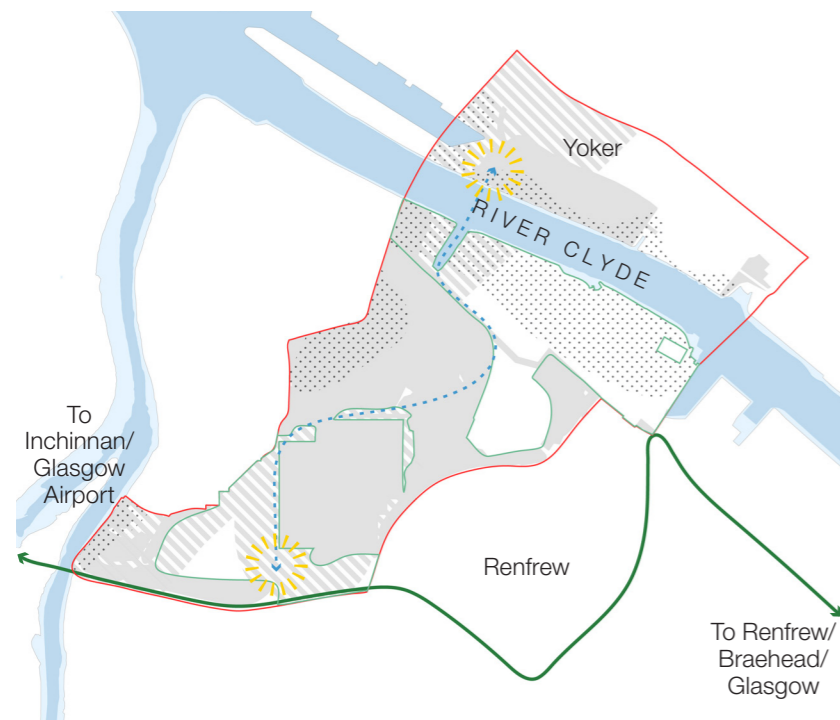
- 1.** The location of the bridge divides the development area into two. A road through this location and the inclined landing area for the bridge will disconnect the two areas and disconnect the development creating a disjointed development.
- 2.** The bridge crosses the river at a narrower point in comparison with Corridor Option A.
- 3.** This route has minimal impact on Blythswood whilst maximising the available development area.



Corridor Option C [Preferred Option]

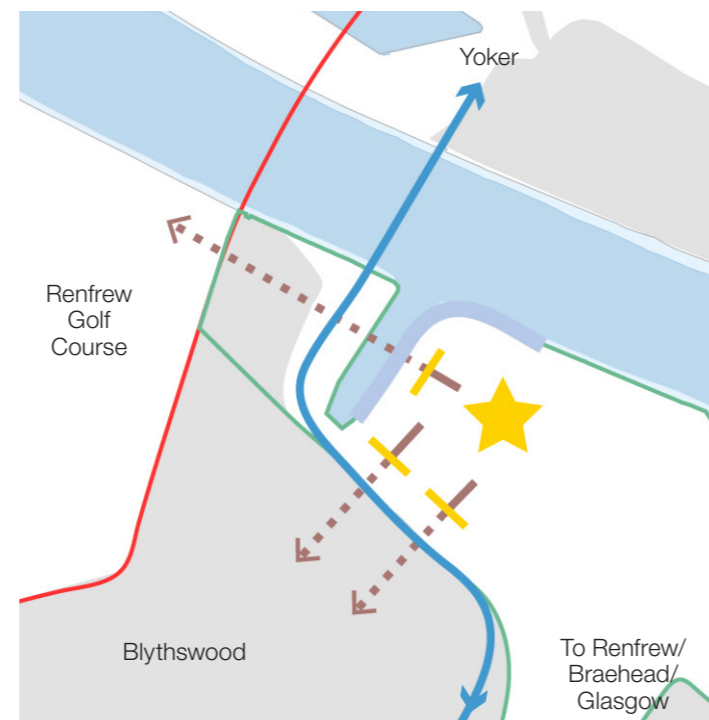
- 1.** The bridge crosses the river at a narrower point in comparison with Corridor Option A.
- 2.** The location of the bridge optimises the opportunity for development along the waterfront. The positioning of a destination opening bridge at the westernmost end of the development area has the potential to draw interest through the site.
- 3.** This route has minimal impact on Blythswood whilst maximising the available development area.

1.4 Road Alignment Options - Analysis



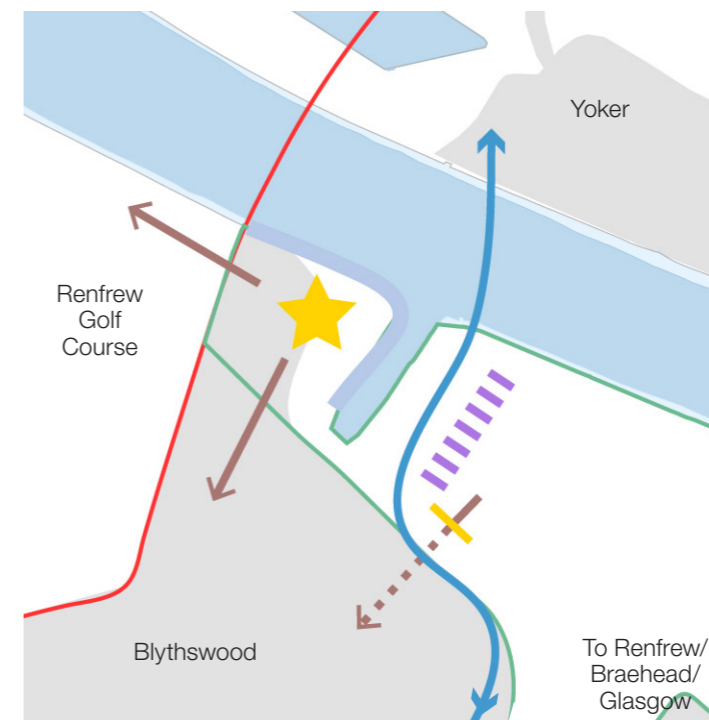
Road Alignment - Corridor C

- + Optimises opportunity and flexibility for development
- + Maximises the visibility and usage of the waterfront to encourage development and regeneration
- + Minimises adverse impact on Blythswood green space and other existing features
- + The crossing location is positioned as a focal point at the end of the site
- + Considers the impact of the crossing on existing residents



Option 1

- + There is the opportunity to create a 'destination' on the waterfront.
- + The road alignment restricts access to Blythswood and the walking route around Renfrew Golf Course, approaching from the destination location and potential development plot.
- + Road alignment does not need a buffer between road and development site as the river inlet acts as one.

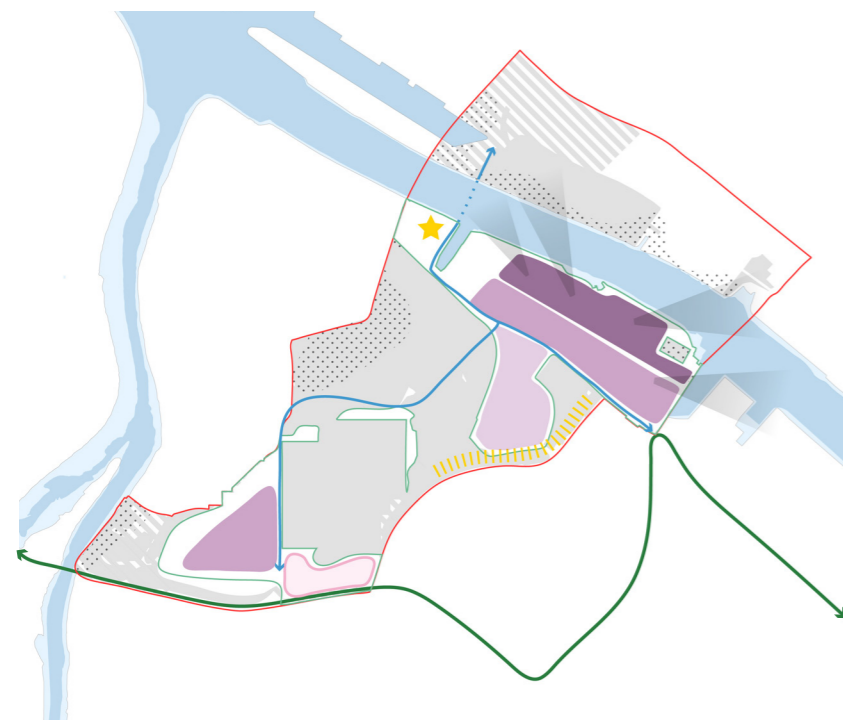


Option 2

- + There is the opportunity to create a 'destination' with the potential for leisure uses having direct links with Blythswood, waterside and the walkway around Renfrew Golf Course
- + The road alignment restricts access to Blythswood approaching from the development plot.
- + Restriction to the north of the River Clyde as the landing point is within the boundary for the CCG Wheatley North Ferry masterplan proposals
- + A buffer would be required between the road and the development site

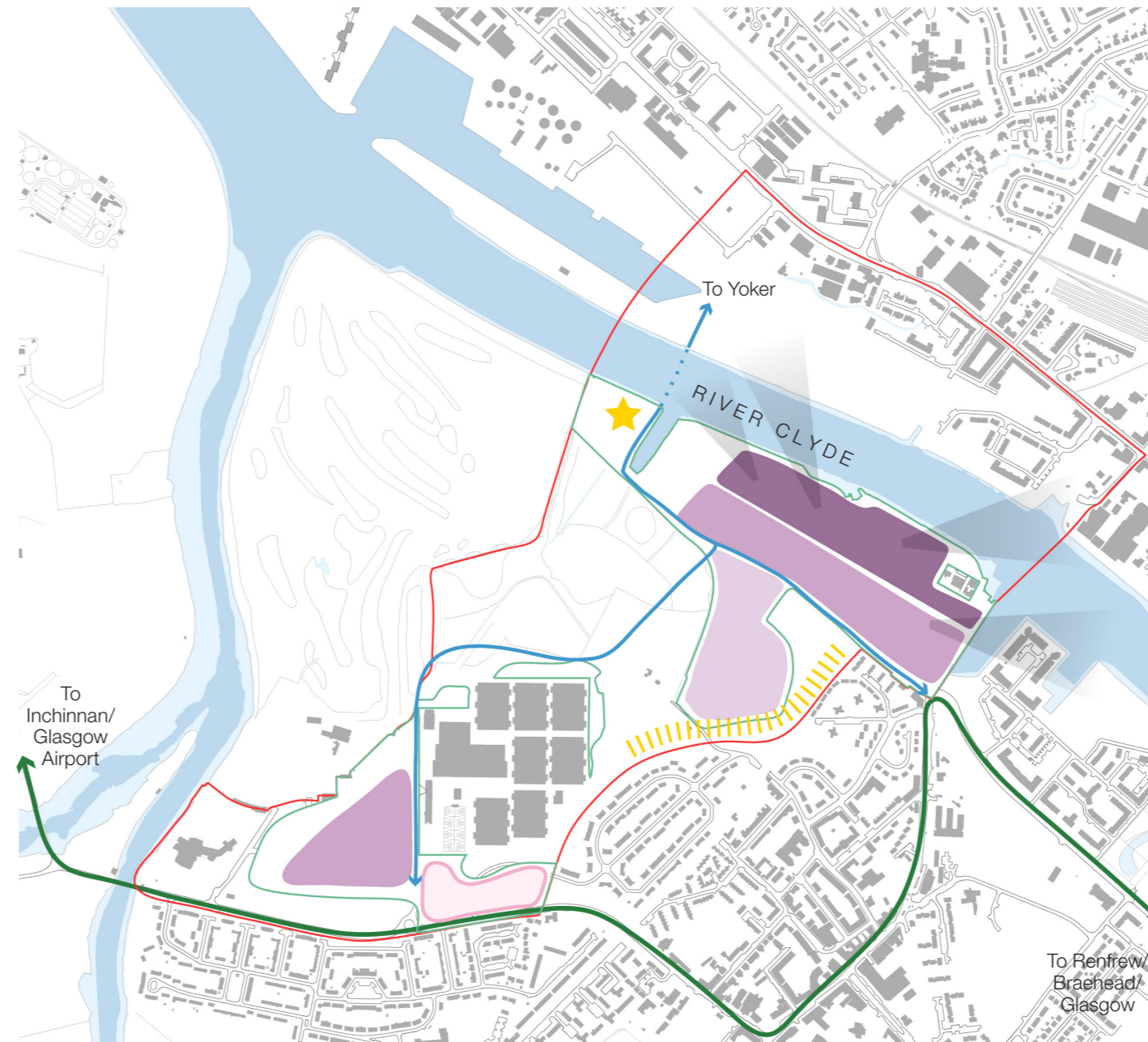
- CWRR Site Boundary
- Development Site Boundary
- Consideration Areas
- ★ Hub Destination
- ↳ Access to Waterfront
- ↳ Pedestrian Route
- ⊥ Block to Pedestrian Route
- ▨ Buffer required
- ↳ New Road
- ↳ Existing Road
- ⊕ Development Gateways

1.5 Define Development Plots



Interface with Consideration Areas


This diagram illustrates how the proposed development plots interface with the identified constraints. The plots are arranged so as to avoid the consideration areas where possible.



Following on from analysis and identification of the consideration areas and restrictions on development, the proposed development areas are placed as appropriate within the remaining development site.

Along the waterfront, high density residential development is proposed to take advantage of the good views along the river and the prime waterfront setting. Medium density and low density family dwellings are located south of this. Development is sympathetic to the 'sensitive boundary' of existing residential areas, with low density family dwellings placed adjacent to this.

To the south of the site, two potential development areas are identified. The westernmost site is proposed for residential use and the site situated on Inchinnan Road is identified for a small local centre serving the adjacent existing and proposed residential communities and comprising Class 1 Shops and Class 3 Food and Drink uses.

-  Hub Destination
-  High Density Residential Development Plot
-  Medium Density Residential Development Plot
-  Low Density Residential Development Plot
-  Local Amenity Centre Development Plot
-  Sensitive boundary by existing housing
-  Views
-  CWRR Site Boundary
-  Development Site Boundary
-  New Road
-  Existing Road



1.6 Housing Typology

The brief identified that the Clyde Waterfront Renfrew Riverside site would be made available for development comprising varying residential typologies, from high density apartment blocks to medium and low density family dwellings. This section analyses the flexibility of possible 'generic' plot sizes and configurations within the development plots.

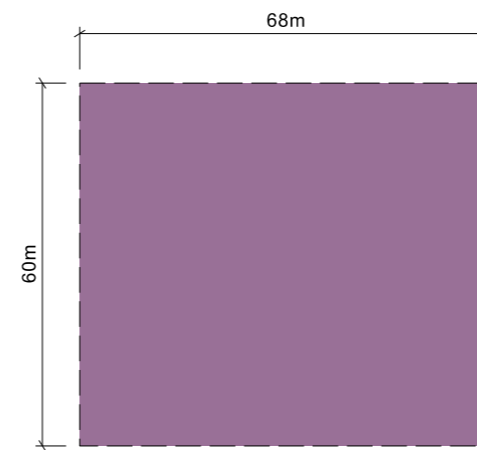
By opening up the opportunity for larger plots, this allows maximum flexibility for how those plots are developed.

The series of diagrams opposite gives some options on how the module can be broken down into larger or smaller buildings depending upon the requirements.

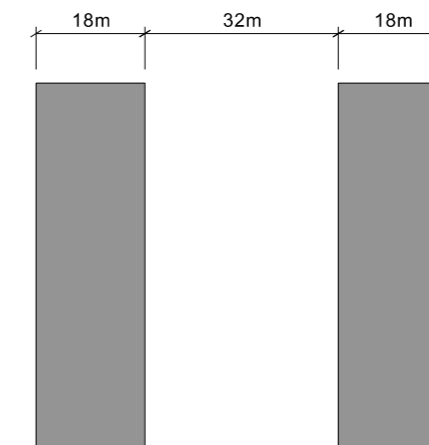
High Density Residential Development Plots

We have assumed typical high density residential plots, based on previous residential schemes designed by 5plus Architects.

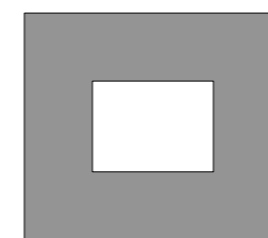
A typical plot can be broken down into smaller blocks comprising a mix of one to three bed apartments containing kitchen, living area, bathrooms and bedrooms. All apartment arrangements are approximate per floor depending on density of apartments and configuration of each flat type.



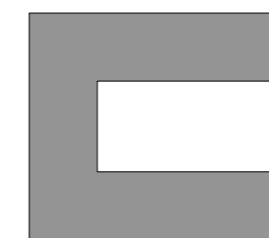
Footprint of High Density Residential Development Plot



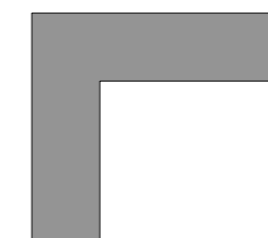
Example Buildings Within Plot



Courtyard
Most dense typology
approx. 45 apartments
Other Example Layouts



Horse shoe
Approx 42 apartments



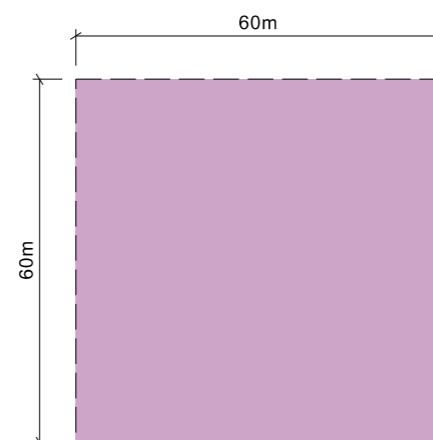
L Shape
Approx 25 apartments



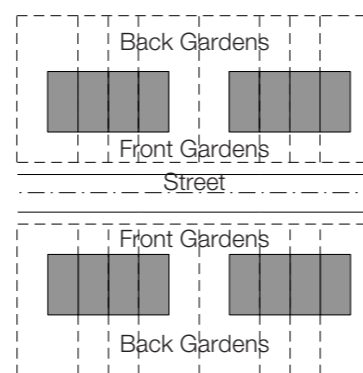
Rectangular
Approx. 14 apartments per block

- High Density Residential Development Plots
- Medium Density Residential Development Plot
- Low Density Residential Development Plot
- Building Footprint
- Garden Boundary

Medium Density Residential Development Plot

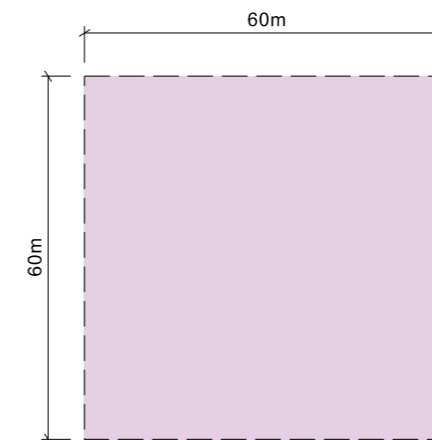


Footprint of Medium Density Residential Development Plot

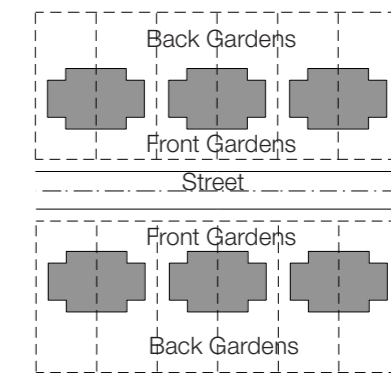


Example Buildings Within Plot

Low Density Residential Development Plot



Footprint of Low Density Residential Development Plot

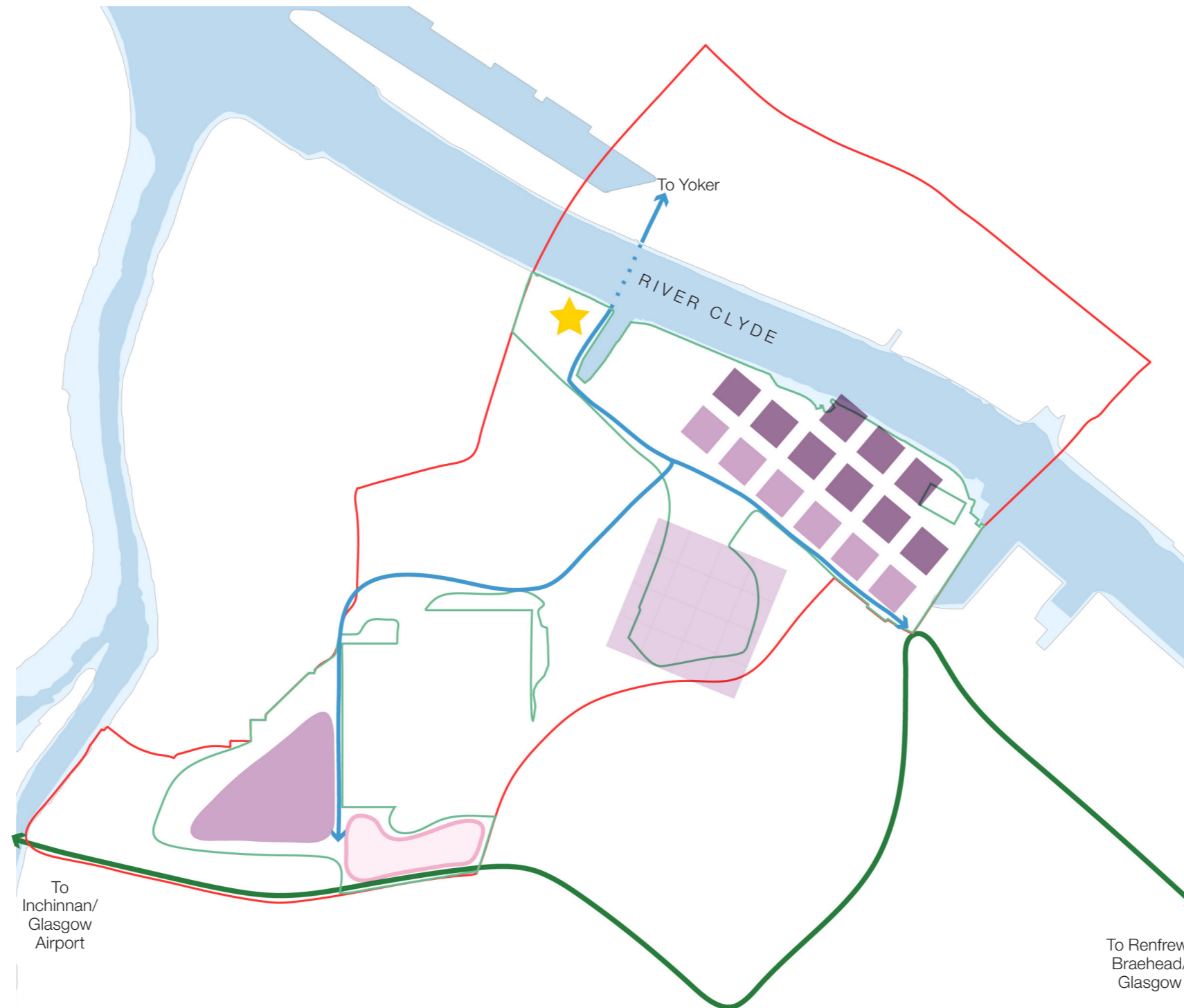
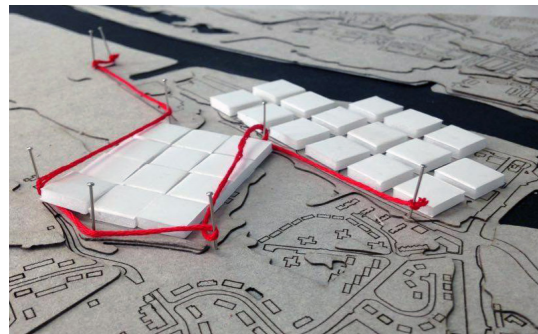
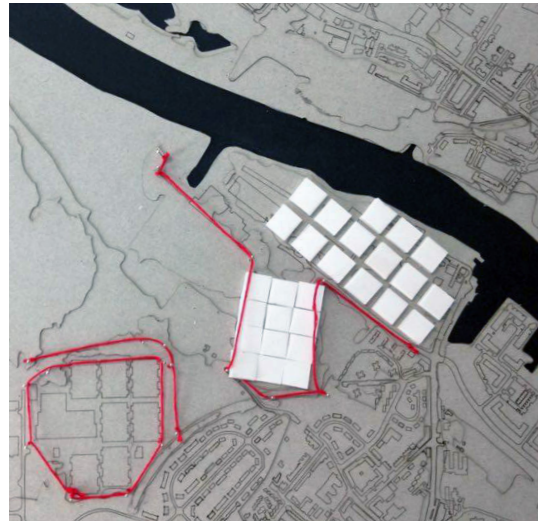


Example Buildings Within Plot

1.7 Plot Testing

Using the assumed housing typologies identified on the previous page, development plots are overlaid on the site.

Each residential development site is arranged to demonstrate a maximum plot capacity in relation to the developable site boundary. This gives maximum flexibility due to the various configurations the different residential floor plates allow.



-  Hub Destination
-  High Density Residential Development Plot
-  Medium Density Residential Development Plot
-  Low Density Residential Development Plot
-  Local Amenity Centre Development Plot
-  CWRR Site Boundary
-  Development Site Boundary
-  New Road
-  Existing Road

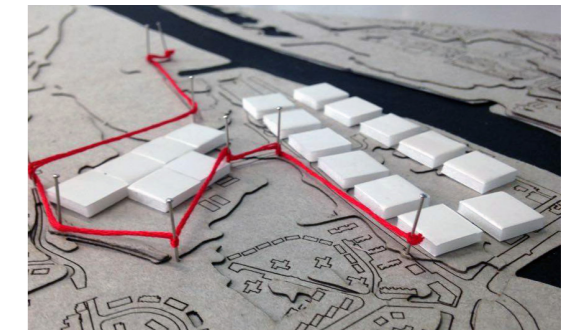


1.8 Relate to Context

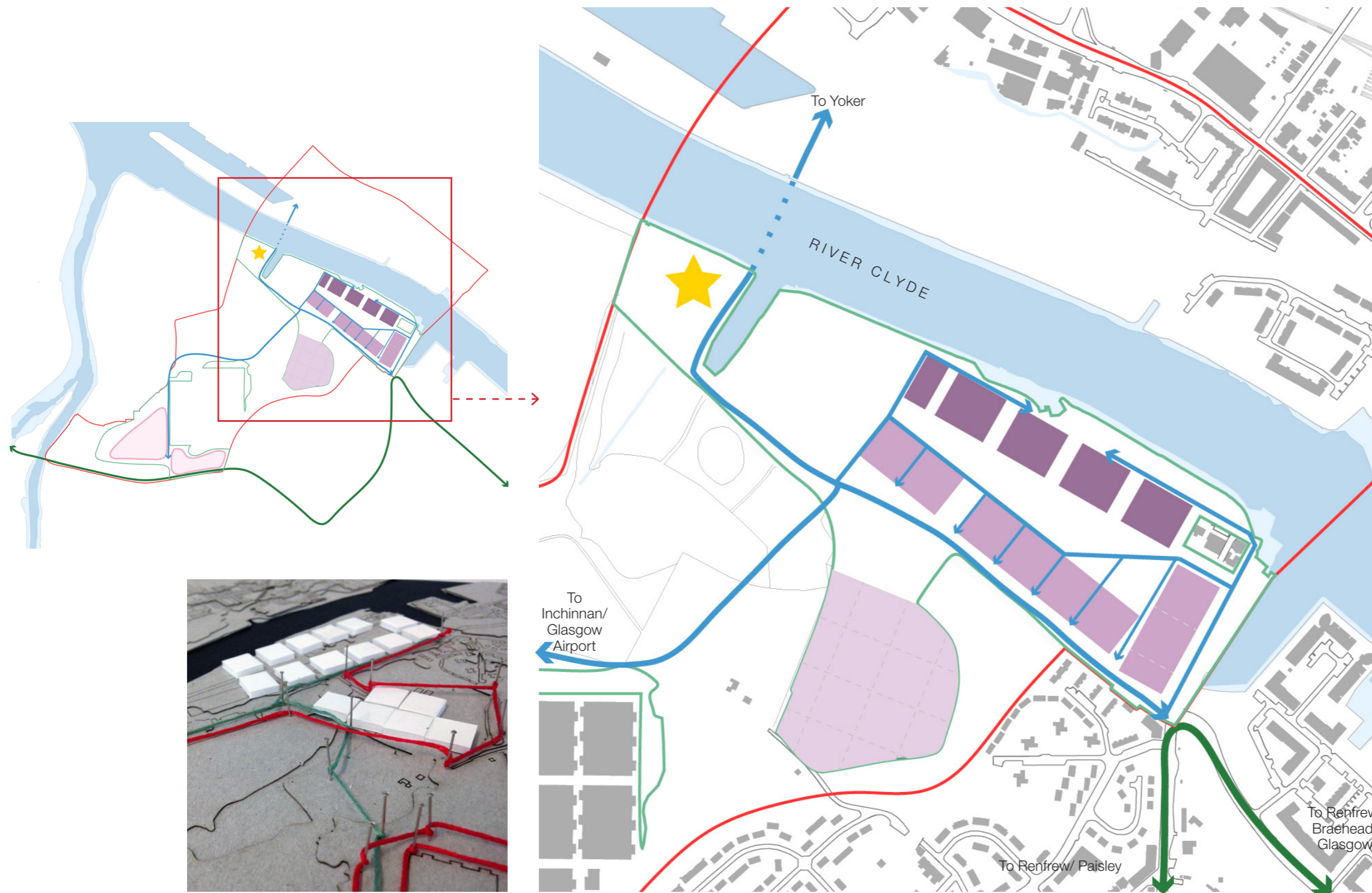
The arrangement of the plots is rationalised to respond to the geometry of the site and allow an appropriate ratio of open space required for infrastructure, public realm, landscaping and a waterside destination.

The layout is adjusted to suit the development area boundary with residential plots positioned in response to the natural shape of the river for riverfront access whilst being sensitive to the existing listed buildings to the east of the site.

-  Hub Destination
-  High Density Residential Development Plot
-  Medium Density Residential Development Plot
-  Low Density Residential Development Plot
-  Local Amenity Centre Development Plot
-  CWRR Site Boundary
-  Development Site Boundary
-  New Road
-  Existing Road
-  Listed Buildings



1.9 Infrastructure



Additional secondary infrastructure is added to serve the high and medium density residential plots north of the Renfrew North Development Road.

Access is maintained to the listed buildings to the east of the site, via Ferry Road and retained section of Clyde Street.

- ★ Hub Destination
- High Density Residential Development Plot
- Medium Density Residential Development Plot
- Low Density Residential Development Plot
- New Roads
- CWRR Site Boundary
- Development Site Boundary
- Existing Roads
- Listed Buildings

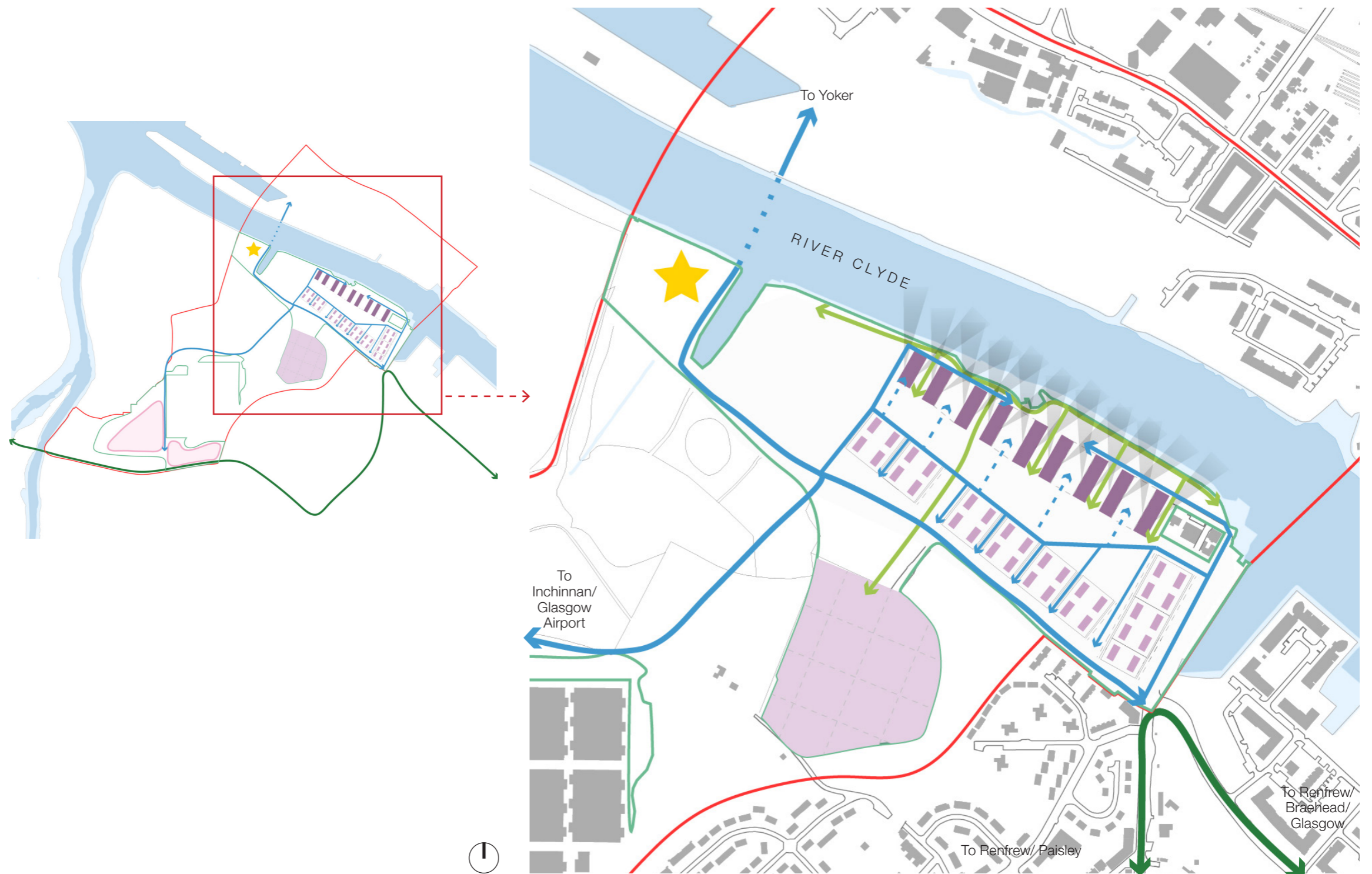


1.10 Create Hierarchy and Grain

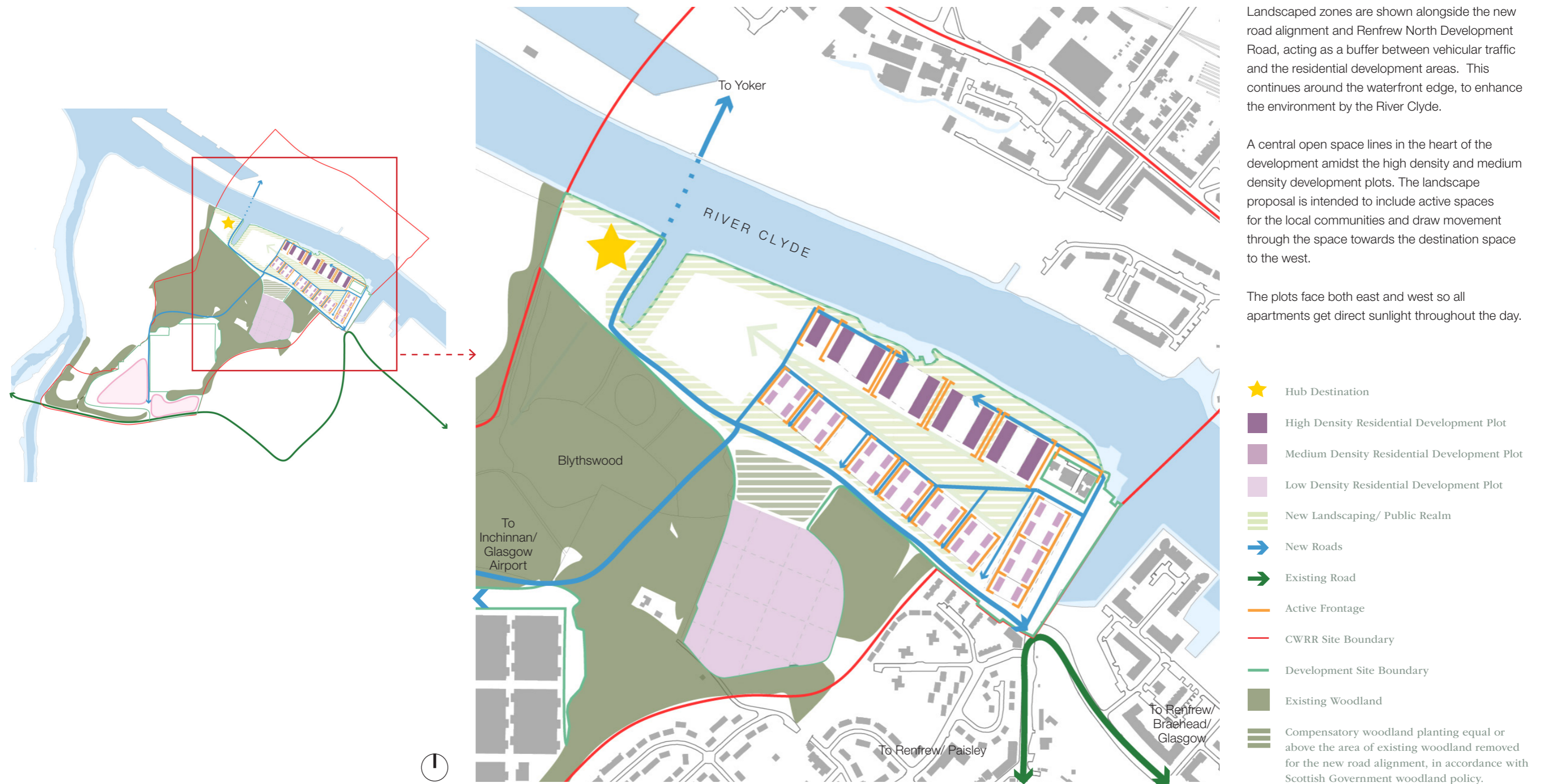
The adjacent plan indicates a suggestion as to how the illustrative masterplan may be developed.

Along the waterfront, the high density apartment blocks take advantage of the views up the river, with every apartment having sight of the water. Spacing between each block allows for alternating access points; for car parking and pedestrian routes through to the waterfront.

- ★ Hub Destination
- High Density Residential Development Plot
- Medium Density Residential Development Plot
- Low Density Residential Development Plot
- New Roads / Active Travel Improvements
- Public / Pedestrian Route
- - -> Parking Access
- ▲ Waterfront Views
- CWRR Site Boundary
- Development Site Boundary
- Existing Road



1.11 Open Space and Active Frontages



2.0 The Framework Clyde Waterfront and Renfrew Riverside (CWRR)

<u>2.1 Defining the Parameters of Development</u>	<u>26</u>
<u>2.2 Placemaking Framework: Principles</u>	<u>28</u>

2.1 Defining the Parameters of Development

The adjacent diagram sets out the parameters of development. The key elements are as follows;

Development plots:

Potential development plots are highlighted in blue to show the flexibility of the masterplan. Each plot has been tested in terms of flexibility, servicing, car parking and placemaking. These plot studies can be found earlier in this report.

Highways and Infrastructure:

The highway network has been developed iteratively in conjunction with the plot, servicing and car parking strategy, centred around the positioning of the Clyde. The proposed infrastructure includes dedicated routes for Non Motorised Users (NMU). The proposed infrastructure will link the Glasgow Airport Investment Area, new and proposed cycle routes and Yoker.

Green space:

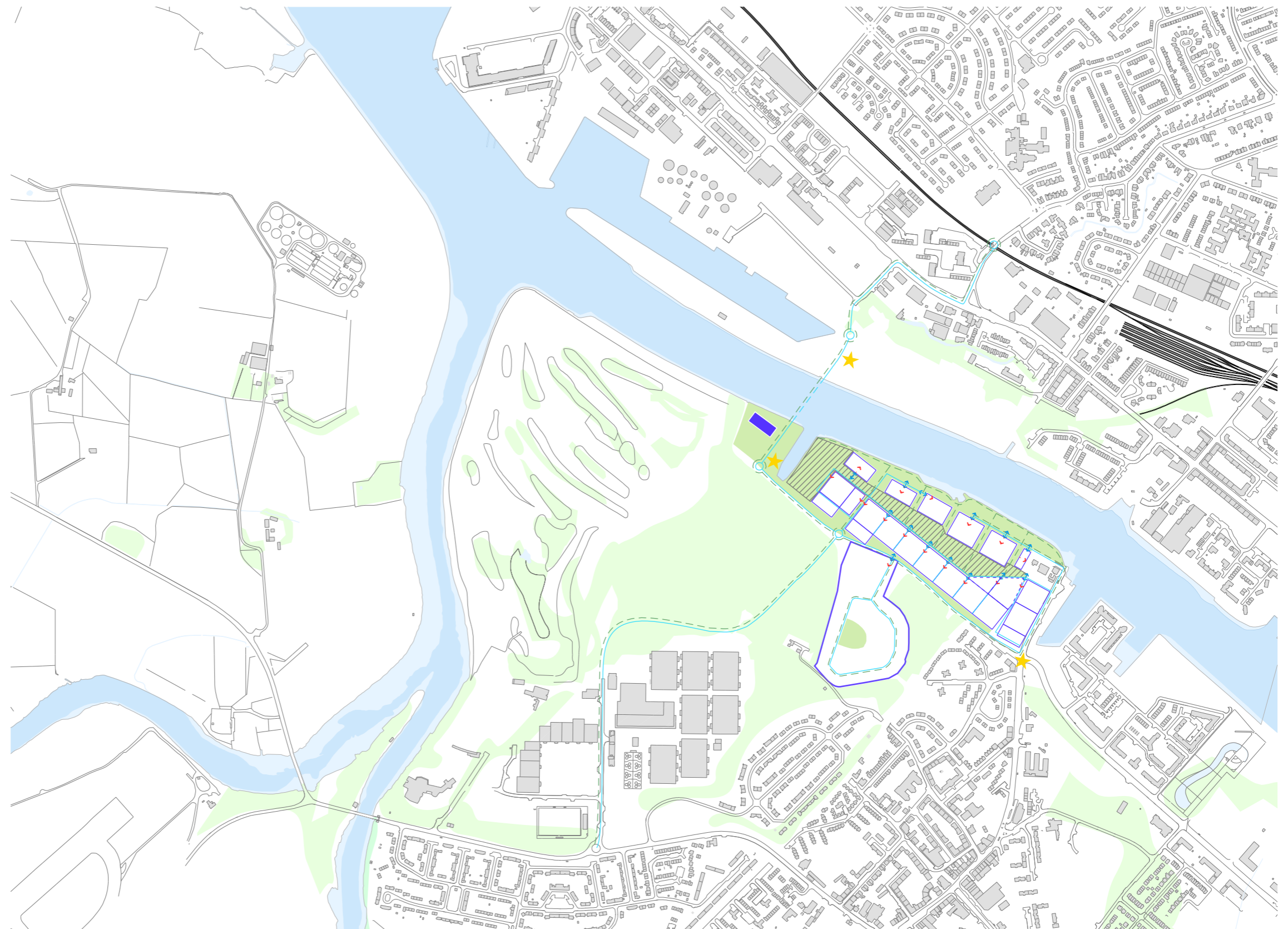
Open space is indicated in the diagram in three defined areas; the waterfront, the central green and the destination space

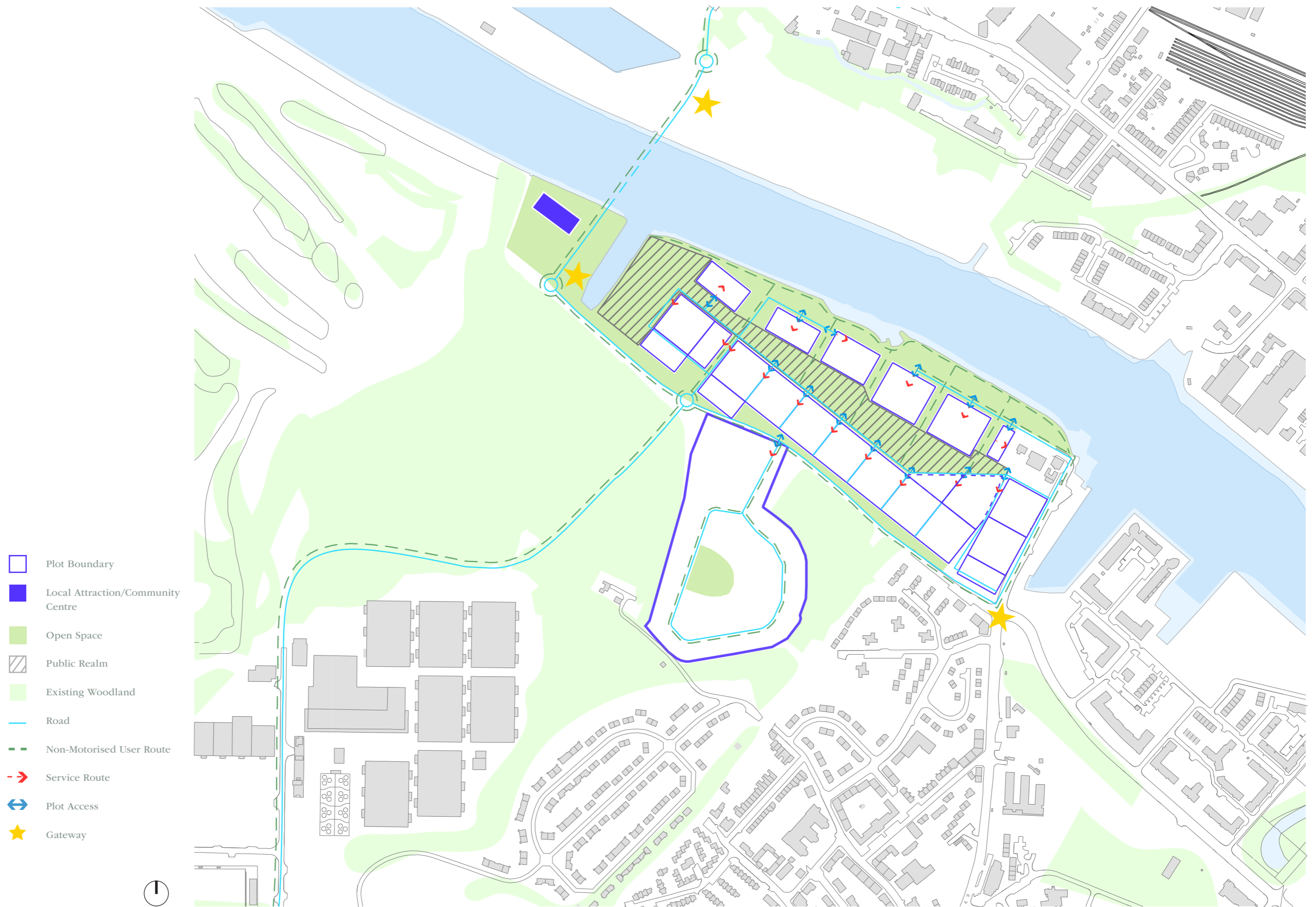
Car Parking:

Car parking is not defined in the diagram, therefore maintaining maximum flexibility within the plots.

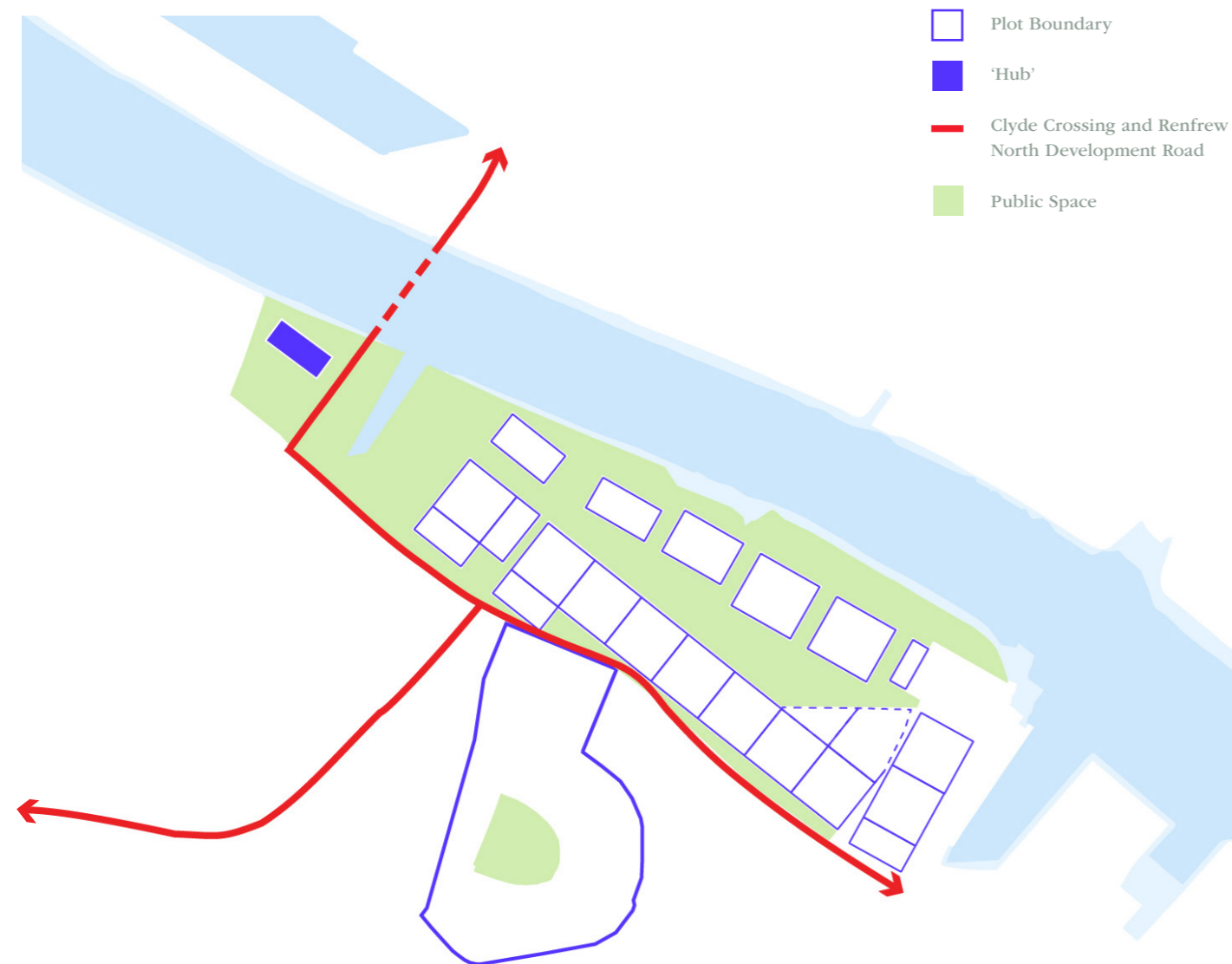
Active Travel:

Walking, cycling, bus, rail and car travel will all have key links to other City Deal infrastructure and also link up with existing infrastructure and National Cycle Routes. There are links from the residential hubs to employment, retail, leisure and health centres.





2.2 Placemaking Framework: Principles



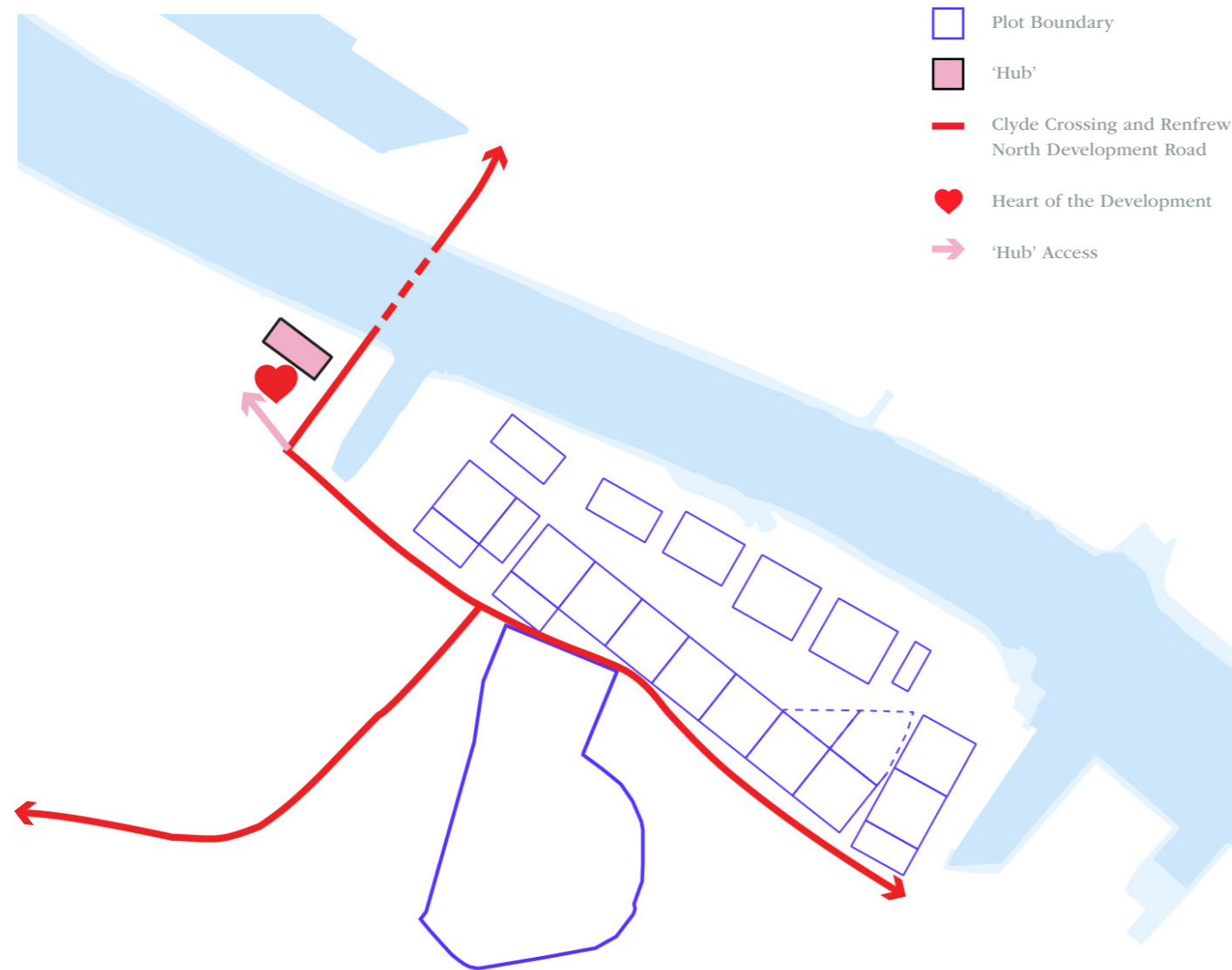
Principle 1 - Public Realm & Open Space

There are three predominant areas of public realm; the Waterfront, the Green and the Destination. The 'Waterfront' runs along the south bank of the River Clyde providing a pleasant river side walking and cycling route. The 'Green' threads its way through the centre of the residential development lined with apartment buildings to the north and housing to the south. This could potentially accommodate a range of spaces including children's play areas, local growing opportunities and small recreation areas serving the new residential community. The 'Destination' is a single larger space fronting onto the river and forms a social hub allowing for larger community events to take place. There are larger recreation grounds and space that could be used for pop-up markets as well as further local growing opportunities. The backdrop to this space is the new opening bridge across the river.



Principle 2 - Connectivity

There is an opportunity to enhance connectivity between the communities north and south of the River Clyde. The nearest crossing is the Clyde Tunnel 4 miles to the east. An opening bridge is proposed to the west of the site which will connect residential communities Yoker and Renfrew and promote social and economic development. The major benefits are connecting communities with businesses, retail centres, health centres, etc..



Principle 3 - The 'Hub'

It is proposed that at the southern landing point of the opening bridge a 'Hub' building should be erected. It is envisaged that this may become a local attraction providing the ideal viewing gallery for the opening bridge. The building will also become a community centre where local groups can meet and use the space and facilities. The site's energy centre could be part of the hub and could display on-site energy creation and usage in order to promote sustainable energy.



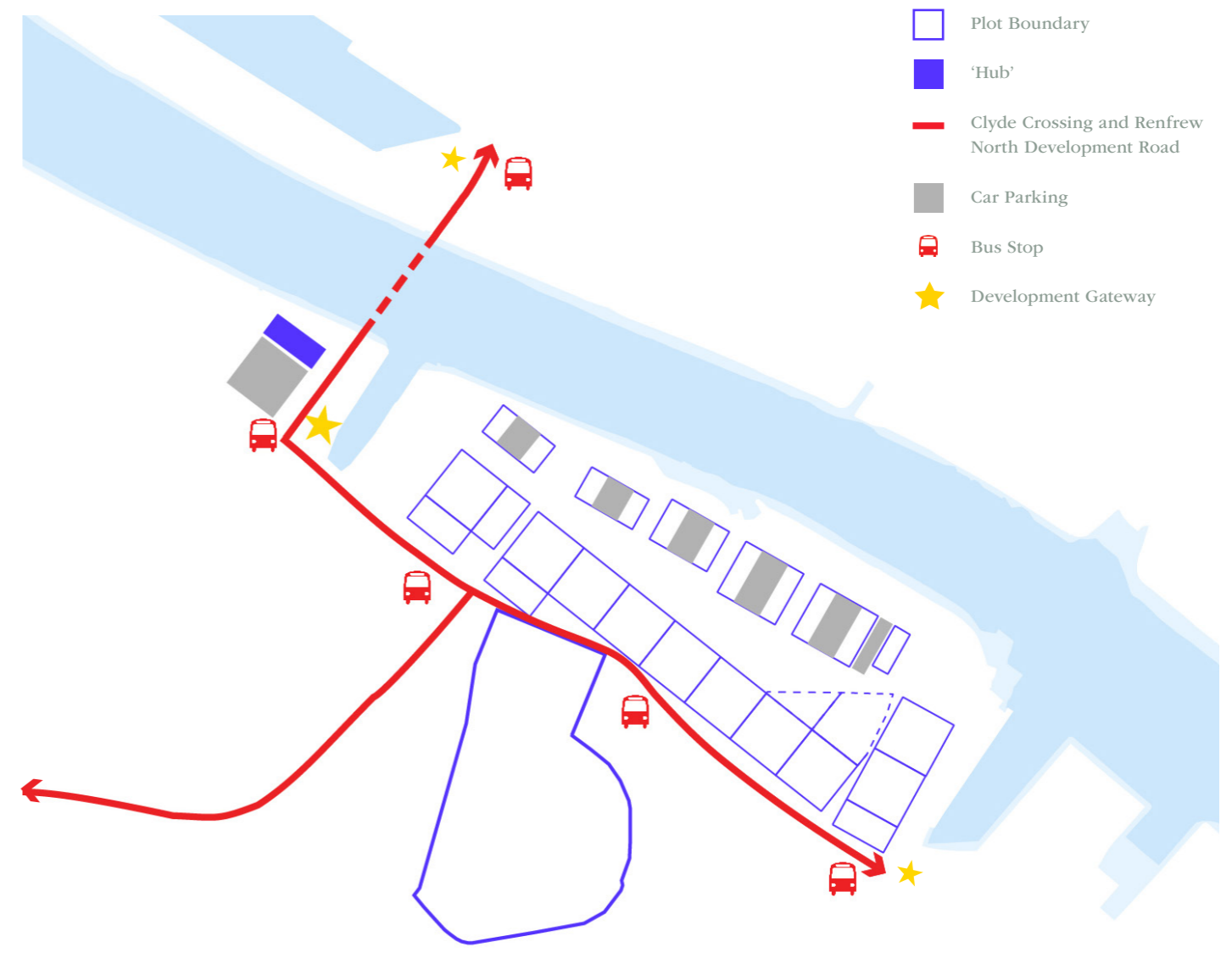
Principle 4 - Plot Flexibility

The framework generates a typical development parcel that can accommodate varying scales of residential development and supporting amenity in a flexible manner.



Principle 5 - Phasing

The development parcels are arranged such that a sense of place can be created during each phase of development, meaning that the masterplan can respond to changes in future market demand.



Principle 6 - Arrival, Active Travel, Public Transport & Car Parking

There are three main gateways to the development. The landmark Clyde crossing is the gateway when approaching the site from the north. There are two further approaches to the site from the south along Argyll Avenue and the east along Meadowside Street from King's Inch Road. Car parking to the apartment buildings along the river is accommodated within the ground floor of the buildings in a secure private enclosure. The houses each have their own car parking within their demise and the low density housing also have private garages. Public transport will be promoted through the site, introducing new bus stops to ensure the site is well connected and accessible.



Principle 7 - River Frontage

Apartment buildings along this frontage ought to be arranged with a north-south orientation to afford river views and morning/evening sun to all apartments. Waterfront walking and cycling routes active the water's edge and link up with routes further along the Clyde and allow connection with the newly formed routes through GAIA and beyond into Paisley town centre.



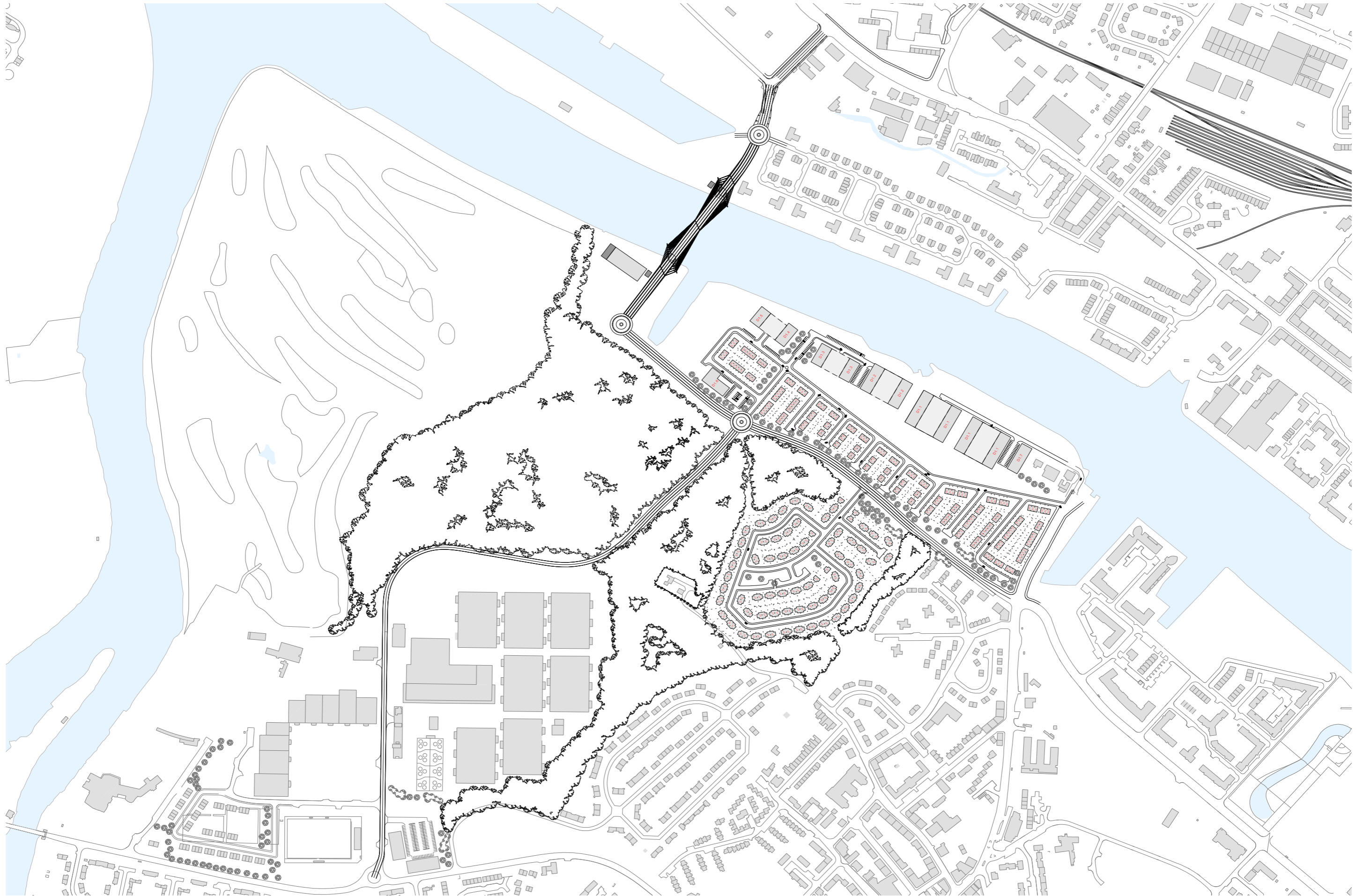
Principle 8 - Residential Communities

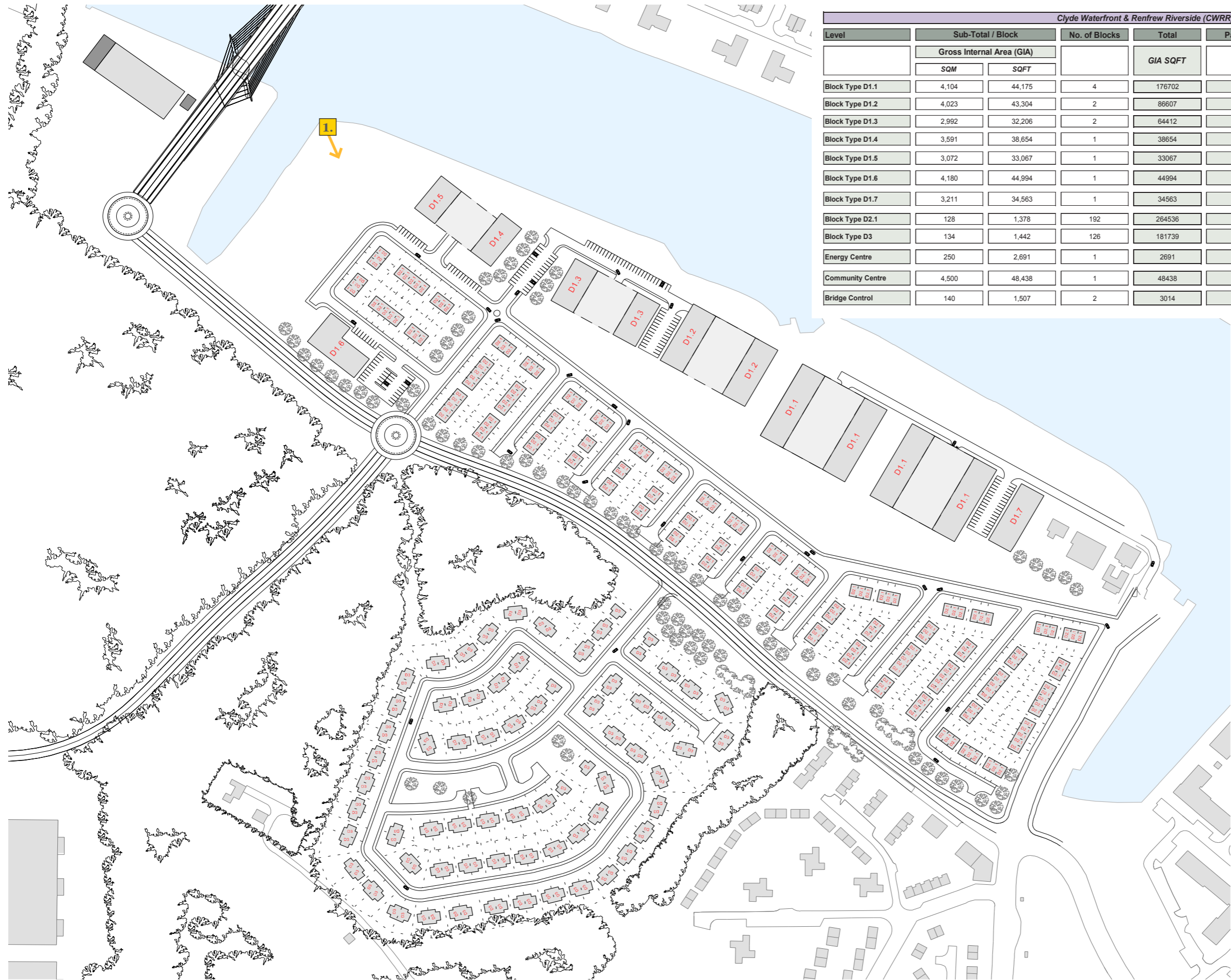
The creation of a new residential community and Clyde crossing will allow existing communities in Yoker, Renfrew and Paisley to become more connected. The development will be at the heart of these existing communities and provide supporting amenities to benefit the whole area. The dwelling types have been arranged such that the higher density apartment types are located to the north of the site along the River Clyde and build upon the adjacent existing King's Wharf development at Ferry Village. The scale of development gradually decreases in density towards the south of the site where low density housing is located adjacent to existing Renfrew residential communities.

3.0 The Illustrative Masterplan Clyde Waterfront and Renfrew Riverside (CWRR)

3.1 Illustrative Masterplan	34
3.2 Landscape Plan	36

3.1 Illustrative Masterplan





Clyde Waterfront & Renfrew Riverside (CWRR)									
Level	Sub-Total / Block		No. of Blocks	Total	Parking	Phase 1	Phase 2	Phase 3	Phase 4
	SQM	SQFT							
Block Type D1.1	4,104	44,175	4	176702	252		176,702		
Block Type D1.2	4,023	43,304	2	86607	118		86,607		
Block Type D1.3	2,992	32,206	2	64412	118			64,412	
Block Type D1.4	3,591	38,654	1	38654	44			38,654	
Block Type D1.5	3,072	33,067	1	33067	32			33,067	
Block Type D1.6	4,180	44,994	1	44994	71			44,994	
Block Type D1.7	3,211	34,563	1	34563	71	34,563			
Block Type D2.1	128	1,378	192	264536	384	93,690	84,045	86,801	
Block Type D3	134	1,442	126	181739	252	181,739			
Energy Centre	250	2,691	1	2691	NA	2,691			
Community Centre	4,500	48,438	1	48438	NA	48,438			
Bridge Control	140	1,507	2	3014	NA	3,014			

Block Type D1

Block Type D2.1

Block Type D3

CGI View (see page 83)

- + 318 Dwelling Houses
- + 446 Apartments
- + 1 Local Attraction/Community Centre
- + 1 Energy Centre
- + 2 Bridge Control Centres

3.2 Landscape Plan





1. View along Clyde Waterfront




4.0 Appendix

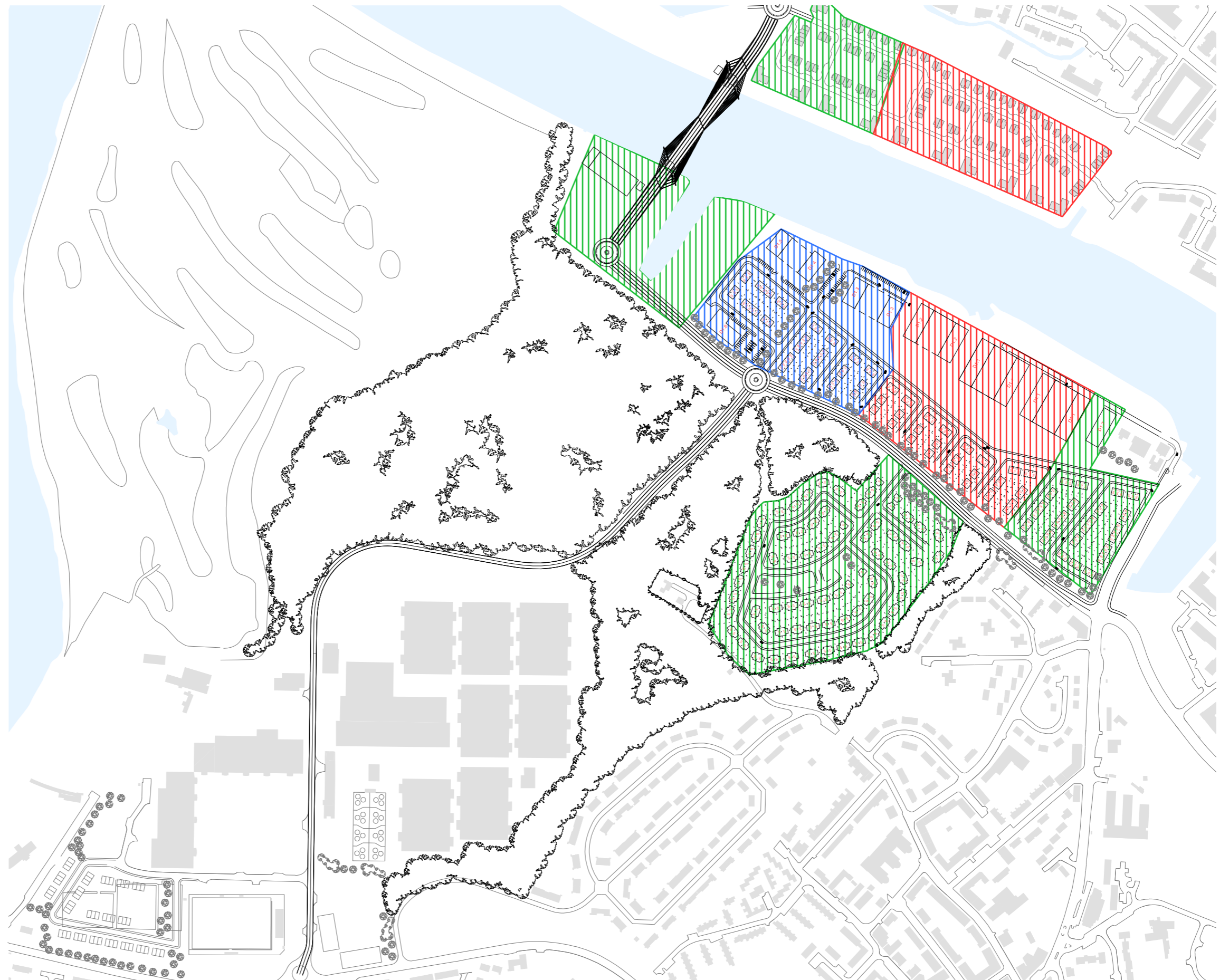
<u>4.1 Development Phasing</u>	<u>40</u>
<u>4.2 CWRR Strategic Business Case</u>	<u>44</u>

4.1 Development Phasing

The drawings over the next couple of pages demonstrate an example of how the development may be brought forward incrementally whilst ensuring the initial built elements can come forward with a strong sense of place and identity. This also looks at how existing uses can be retained alongside proposed new infrastructure and development.

- + 318 Dwelling Houses
- + 446 Apartments
- + 1 Local Attraction/Community Centre
- + 1 Energy Centre
- + 2 Bridge Control Centres

-  Phase 1 (2020 - 2025)
-  Phase 2 (2025 - 2030)
-  Phase 3 (2030 - 2035)





Existing Plan (2016)



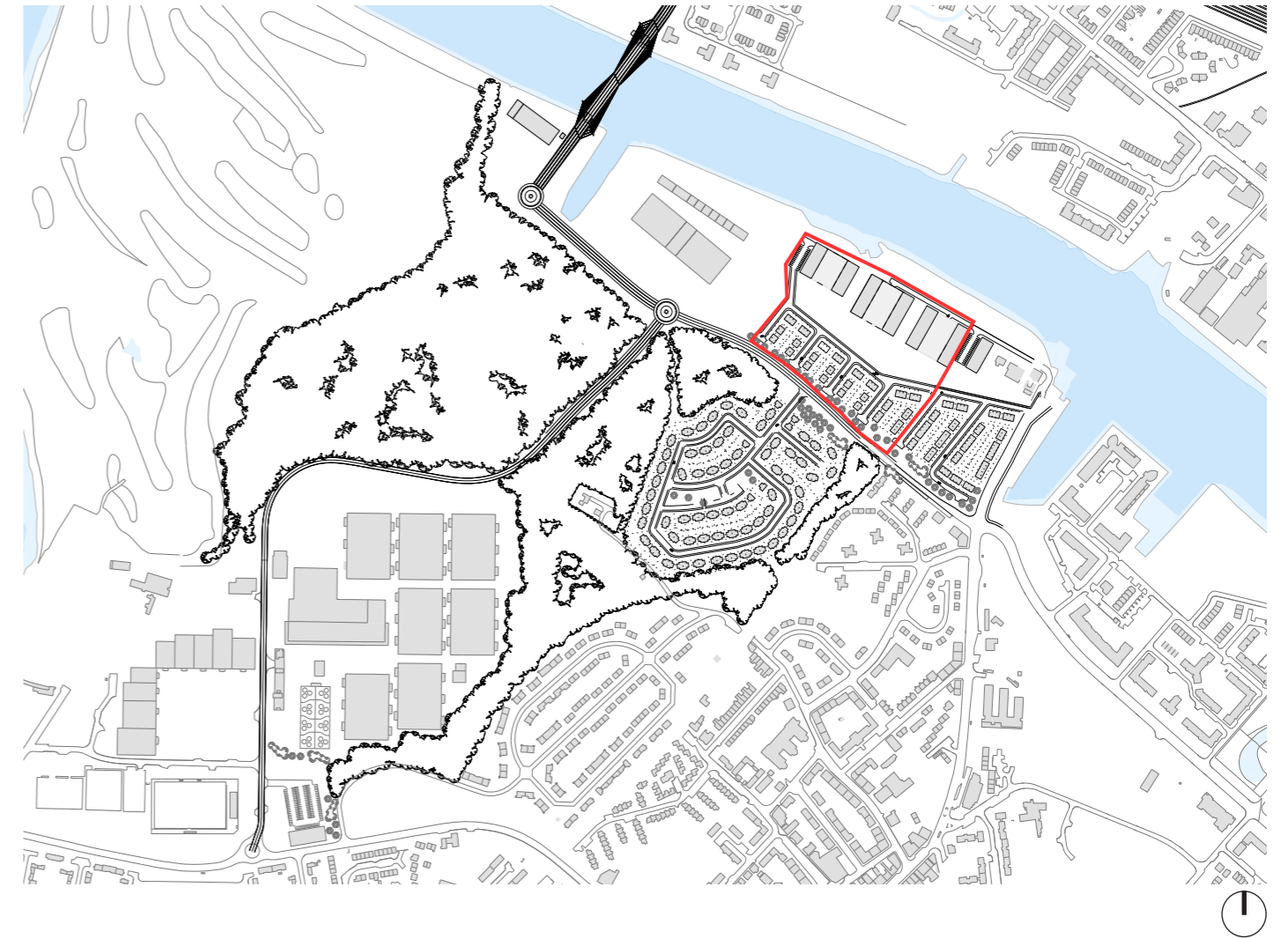
Infrastructure Addition (2018 - 2020)

As well as the new opening bridge across the Clyde, the new Renfrew Northern Development Road links the junction of King's Inch Road and Ferry Road with the A8 Inchinnan Road in the vicinity of Argyll Avenue.



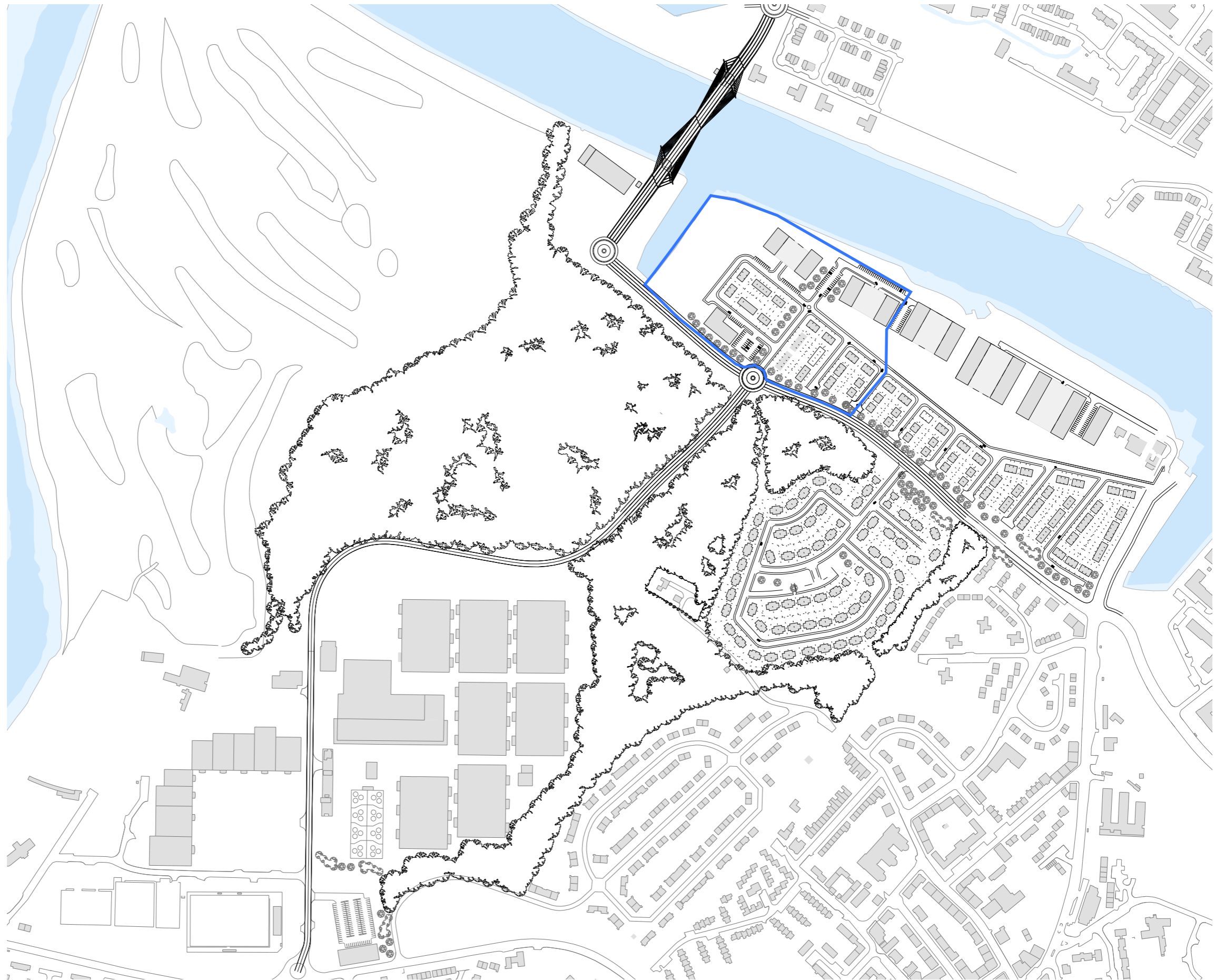
Phase 1 (2020 - 2025) —

- + 190 dwelling houses
- + 33 Apartments
- + 1 Local Attraction/Community Centre
- + 1 Energy Centre
- + 2 Bridge Control Centres



Phase 2 (2025 - 2030) —

- + 61 dwelling houses
- + 205 Apartments



Phase 3 (2030 - 2035) —

- + 60 dwelling houses
- + 208 Apartments



4.2 CWRR Strategic Business Case

APPENDIX B1: ECONOMIC, PHYSICAL AND SOCIAL BENEFITS AT OUTPUT LEVEL

Infrastructure benefits

- Vacant and derelict land brought back into use (hectares) **98.89 ha**
- Land remediated (hectares) **21.51 ha**
- Business space (Industrial/Storage/Distribution) new (sqm) **25,480 sqm**
- Business space (Industrial/Storage/Distribution) enhanced (sqm) **157,337 sqm**
- Retail space new (sqm) **88,393 sqm**
- Retail space enhanced (sqm) **195,290 sqm**
- Public realm new (sqm) **2 ha**
- Public realm enhanced (sqm) **0**
- Office space new **15,513 sqm (new); 18,490 sqm (enhanced);**

Utility benefits

- Electricity cables new (m) **N/A**
- Electricity cables upgraded (m) **N/A**
- New/enhanced sewage network **N/A**
- Water mains **N/A**

Communications benefits

- Number of households benefiting from new broadband **N/A**
- Number of households benefiting from upgraded broadband **N/A**
- Number of businesses benefiting from new broadband **N/A**
- Number of businesses benefiting from upgraded broadband **N/A**

Transport [This project will provide significant transport benefits which will be quantified in future iterations of this business case. This will be informed with the aid of the outputs from the traffic modelling consultant.]

- Journey time
- Journey time reliability
- Traffic flows
- Speed
- PT Patronage
- Walking / Cycling
- Mode share
- Accidents
- Frequency
- Catchment area served
- Access to employment
- Population changes

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Employment benefits [An estimate of the total jobs that will be created is provided. Further details of specific employment benefits will be estimated with the development of the detailed benefits strategy and will be provided in future iterations of the business case]

- Total jobs created **4,003 FTE**
- Sector created
- Occupational
- Number of New Entrant Trainee places created (this should be subset of total jobs created)
- Number of Apprenticeships created (this should be subset of total jobs created)
- Total jobs safeguarded (this related to existing jobs which have been safeguarded and does not include Total jobs created)

Training and skills benefits [This project will provide significant training and skills benefits, details will be estimated with the development of the detailed benefits strategy, informed by the outcome of the masterplanning study and will be provided in future iterations of the business case]

- Number of qualifications gained
- Number of project participants assisted into employment
- Number of project participants assisted into training
- Number of project participants assisted into further education
- Number of project participants assisted into volunteering

Environmental benefits [This project will provide significant environmental benefits, details will be estimated with the development of the detailed benefits strategy, informed by the work of external specialist consultants and will be provided in future iterations of the business case]

- Greenspace created (hectares)
- Greenspace enhanced (hectares)
- Land decontaminated (hectares)
- Wildflower area created (hectares)
- Area of land protected from floods (hectares)
- Households protected from floods
- Sustainable Urban Drainage System created (sqm)
- Noise prevention
- Waste - Construction materials recycled (tonnage)
- Waste - Construction material diverted from landfill
- Energy generation per year through solar panels (kilowatts)
- Energy metrics

Housing benefits

- Number of dwellings created **3664 units**

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- Number of affordable homes **406 units**
- Number of social housing units

Community benefits

- Volunteers engaged **N/A**

Business benefits [This project will provide significant business benefits. Details will be estimated with the development of the detailed benefits strategy, informed by the work of external specialist consultants and will be provided in future iterations of the business case]

- Profit generated (£)
- Business turnover (£)

Financial benefits [This project will provide significant financial benefits. Details will be estimated with the development of the detailed benefits strategy, informed by the work of external specialist consultants and will be provided in future iterations of the business case]

- Leverage - Private sector income secured/levered

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5plus architects

