

4.0 Site Analysis

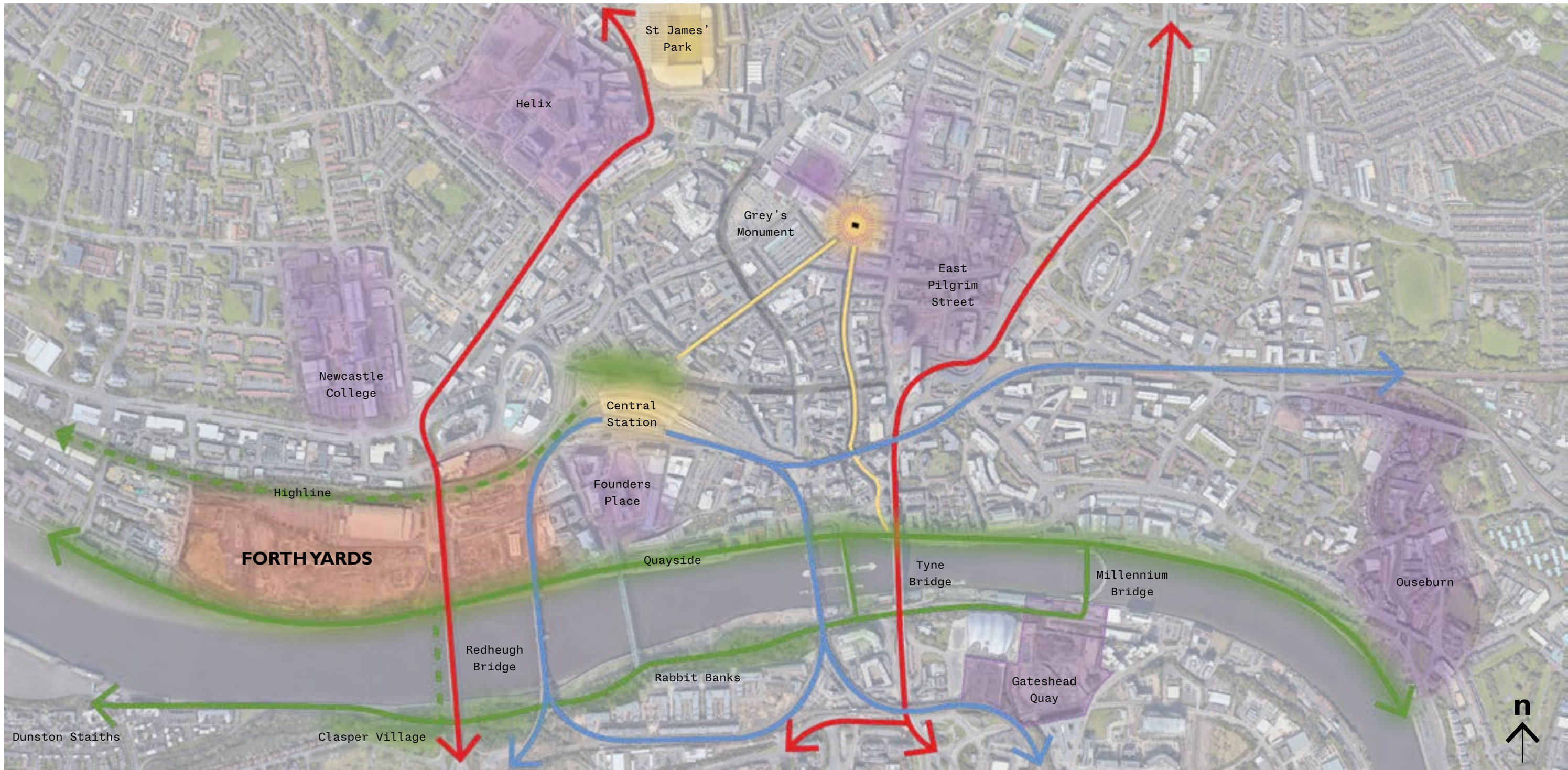
4.1 The Site and the City	30	4.10 Noise, Vibration and air Quality	48
4.2 Site Characteristics	32	4.11 Wider Heritage Context	52
4.3 Archaeology and Below Ground Heritage	34	4.12 Tyne Gorge and Townscape	54
4.4 Ground Conditions	36	4.13 Existing Views	56
4.5 Coal Mining Legacy	38	4.14 Open Space	60
4.6 Utilities	40	4.15 Ecology	62
4.7 Historic Structures	42	4.16 Biodiversity Net Gain	64
4.8 Barriers to Movement Across the Area	44	4.17 Flood Risk and Water Quality	66
4.9 Existing Transport Links	46	4.18 Local Character	68



Above: An aerial view of the site from the south.

4.1 The Site and the City

Forth Yards is located at the western edge of the city centre, immediately west of Central Station and the Quayside.



- | | | | |
|---|--|---|---|
|  Site |  City Landmarks |  Mainline Rail Connections |  Pedestrian/ Cycle Connections |
|  Key Development Areas |  Key Road Connections |  Primary Pedestrian Routes from Grey's Monument to Station and River |  New Connection Opportunities |

4.2 Site Characteristics

The Forth Yards site has four chief physical characteristics which make it ideal for redevelopment:

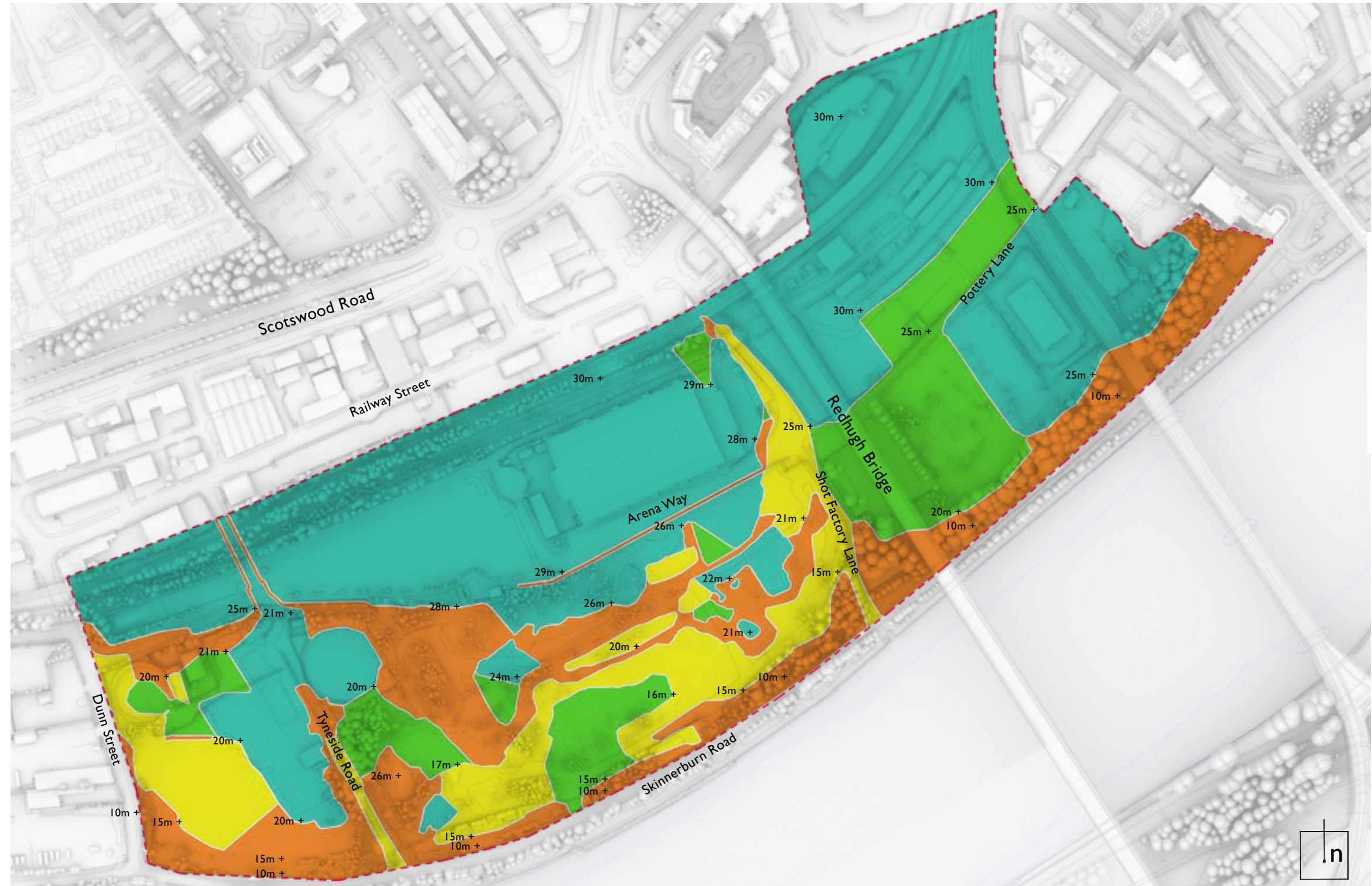
- a spectacular south to south-west orientation
- a topographical cascade towards the river
- over 1km of river frontage
- historic rail and river heritage features

The tiered topography of the area represents a challenge to create accessible routes between sites, but also an exciting opportunity to create a new layered contemporary river frontage to this part of the city centre.



Key

- Gradients 1:40 and above
- Gradients 1:40 to 1:21
- Gradients 1:21 to 1:12
- Gradients 1:12 and below



4.3 Archaeology and Below Ground Heritage

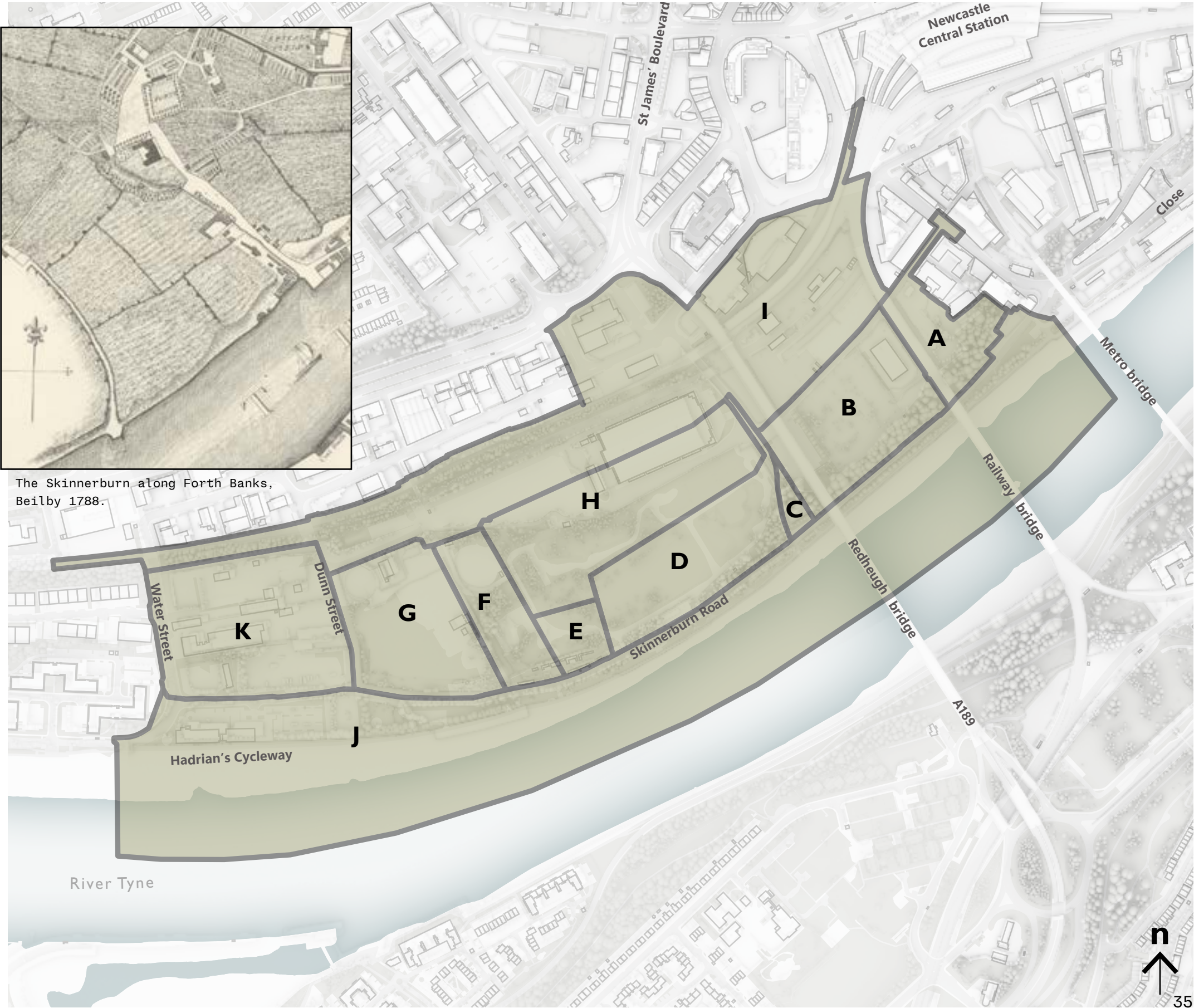
Archaeological remains around Forth Yards range from the prehistoric to the industrial periods. While an Early Bronze Age logboat (c. 2500 – 1500 BC) was dredged from the Tyne near the mouth of Skinner Burn in 1869 and medieval pottery was found during groundworks at Pottery Lane and the former Mitford school (F), Forth Yards is characterised by industrial development as a result of the commercial and industrial expansion of Newcastle upon Tyne from the late 18th century.

Historic mapping dating to the early 18th century shows the area around the Skinner Burn as largely agricultural but the foundation of the early Elswick Lead works in 1778 marked an influx of industrial development. As a result, the area which would become Forth Yards was a key part of the Newcastle to Carlisle Railway in the early 19th century and the original Newcastle terminus for the line was located here before it was demolished to make the connection to the Central Station with the High Level Bridge across the Tyne in the mid-19th century.

There are eleven key archaeological zones within Forth Yards:

- A: Former Cattle Lairage and Glass Works (east of the King Edward VII railway bridge)
- B: Former Stables, Engineering and Glass Works (Pottery Lane)
- C: Former Redheugh Bridge Road
- D: Former Elswick Lead Works
- E: Former Mitford School
- F: Former Mitford Street and Tyneside Terrace
- G: Former Water and Gas Works (Newcastle Heliport)
- H: Former Forth Yards Sidings and Victoria Running Ground
- I: Former Forth Yards and Forth Banks Goods Station
- J: Former Elswick Wharf along Skinnerburn Road
- K: Former Elswick Leather Works

Significant archaeological remains are largely 19th century and 20th century industrial buildings, however, there are exceptions (such as Zones E and F). In addition, due to historic clearance, the quality of archaeological survival varies. For example, the remains of some buildings have been incorporated into later structures such as retaining walls along Skinnerburn Road.



4.4 Ground Conditions

The Forth Yards industrial past has left a legacy of ground contamination that will require remediation to make each site suitable for occupation to a level that demonstrate no linkages to contaminants that would impact upon the health of future occupants.

Several sites in the Forth Yards area have had site investigations to understand the impact of their industrial history upon ground conditions and how they can be remediated.

Arena Site

The Arena site was historically used as railway lines connected to Forth Goods Station Yard. Remediation was undertaken to a level suitable for use as a Arena in the 1990s.

Quayside West

Quayside West was used for over 200 years as a lead works. As a result significantly elevated levels of lead, arsenic and asbestos and concentrations of polycyclic aromatic hydrocarbons (PAHs), total petroleum hydrocarbons (TPH) and BTEX are found across the site. A site wide remediation strategy which includes the removal/ bioremediation of PAHs and sealing remaining contaminated materials beneath a clean capping layer and membrane with topsoil above and gas protective measures will be necessary.

Pottery Lane East

Pottery Lane East was last used as a cement batching plant. It is recorded as having elevated concentrations of TPH, BTEX and PAH and sulphates. Ground bearing floor slabs or additional loadings should not be developed at the top of the site southern escapement edge. Made ground materials would only likely be suitable for reuse below areas of hardstanding or beneath clean material and membrane with gas protection measures.

Heliport

The Heliport site was historically used as the city’s town gas works. The site was partially remediated in the 1990s to a level suitable for use as a heliport. It contains significantly elevated concentrations of arsenic, lead, cyanide and asbestos and PAH and inorganic (copper and selenium and zinc) and organic contamination BTEX compounds and significantly elevated concentrations of methane, carbon dioxide and volatile organic compounds (VOCs). A site wide remediation strategy which includes the removal/ bioremediation of PAHs and sealing remaining contaminated materials beneath a clean capping layer and membrane with top soil above and gas protective measures will be necessary.

Forth Goods Yard

Localised contamination has been identified relating to the historic use of the site as a railway station and is classified as ‘Low’ to ‘Moderate’ risk. Initial hazardous ground gas monitoring data indicates that the Site would be classified as Very Low Risk.

Nixon site

The Nixon site was used for various industrial uses such as tannery and engineering works.

Quayside Frontage

Sites south of Skinnerburn Road include historic industrial uses, The presence of PAHs on these site will require a site remediation strategy to include the removal/ bioremediation of PAHs and sealing remaining contaminated materials beneath a clean capping layer and membrane with top soil above and gas protective measures will be necessary.



The Leadworks taken from south of the River, October 1965



A birds eye view of the area from Tyneside Terrace eastward, 1929

4.5 Coal Mining Legacy

Parts of the Forth Yards area fall within an area of historic coal mining activity and so are identified as Development High Risk Areas by the Mining Remediation Authority. The depth of seams varies across the area. A number of the worked seams are likely to be less than ten times the height of the possible working. As such, the working could present a risk of mineral instability to proposed development and requires further investigation.

A number of mine entry points have been identified across the area, including on the Quayside West, Heliport and north east of the Pottery Lane East site. There is also a geological fault passing through the western edges of Quayside West, Heliport and north eastern corner of the Nixon's sites. Seam depths either side of the fault could vary by as much as 10 metres. The Brass Thill is reported 23 metre below ground level potentially indicating a fault displacement of depths ranging from 13 to 33 metres. The presence of the fault presents a risk of potential differential movement either side of the fault due to the recorded working in the Brass Thill coal seam. As such, any structures proposed to be spanning the fault location are designed with a suitable span and cantilever in accordance with Coal Authority guidance.

The presence of recorded shallow flooded mine workings (less than 23 m depth), together with a mine shafts across the Heliport and Quayside West sites present a high risk for mine gas emissions. As such a detailed mine gas risk assessments will be required for developments on these sites.

All applications in the High Risk Areas will need to undertake a The Coal Mining Risk Assessment in accordance with the principles of current guidance including the Coal Authority's guidance document "Risk Based Approach to Development Management - Resources for Developers Version 4" (2017) (Ref. 1) and CIRIA "C758 Abandoned Mine Workings Manual" (2019) (Ref. 2).

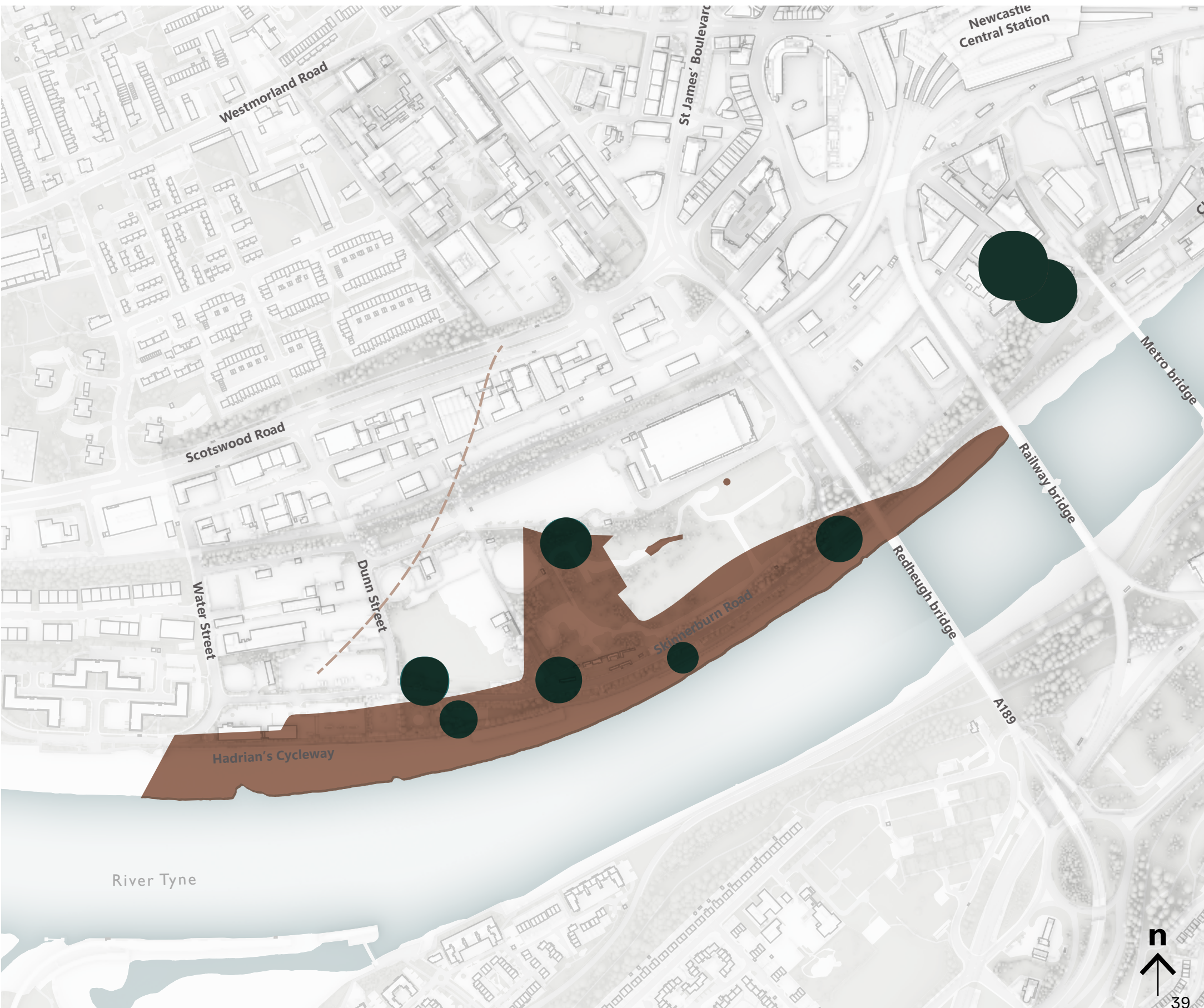
KEY

Mine Entry

Potential zone of influence

Development high risk area

Fault line



4.6 Utilities

Electricity and gas supply

Electricity to serve the area is supplied from two Northern Power Grid Distribution substations: Close Substation and Benwell Substation. There may be a need for a new primary 33kV/11kV or 33kV/6.6kV substation to increase capacity to serve the future development for power supply, network resilience or future expansion needs. Further work on electricity supply needs will be progressed as part of the Masterplan.

The Elswick Gas Governor Station is situated to the west and east of Tyneside Road. This gas infrastructure will require reconfiguration to accommodate a proposed link road across the adjacent Quayside West site and proposed district energy centre to serve the area.

Telecommunication

Telecommunication routing for Virgin Media, BT Openreach, and City Fibre traverses parts of the area. Additional capacity can be secured within existing and extended ducting within roads and buildings to provide gigabit connections. The potential need for a sitewide intranet or data network through which building management systems, smart functionality, heating requirements, and electrical consumption and production could be coordinated, will also need to be planned.

KEY



Electricity Substation



Water pumping station



Gas Station



Overflop



Surface water



4.7 Historic Structures

The Forth Yards area contains several historic structures which help interpret the industrial and rail heritage of the area.

The Grade II listed King Edward Rail Bridge is the only designated heritage asset in the Masterplan area. It was built between 1902 and 1906 and comprises sandstone piers and red sandstone approach viaduct with steel girder bridge deck and arches.

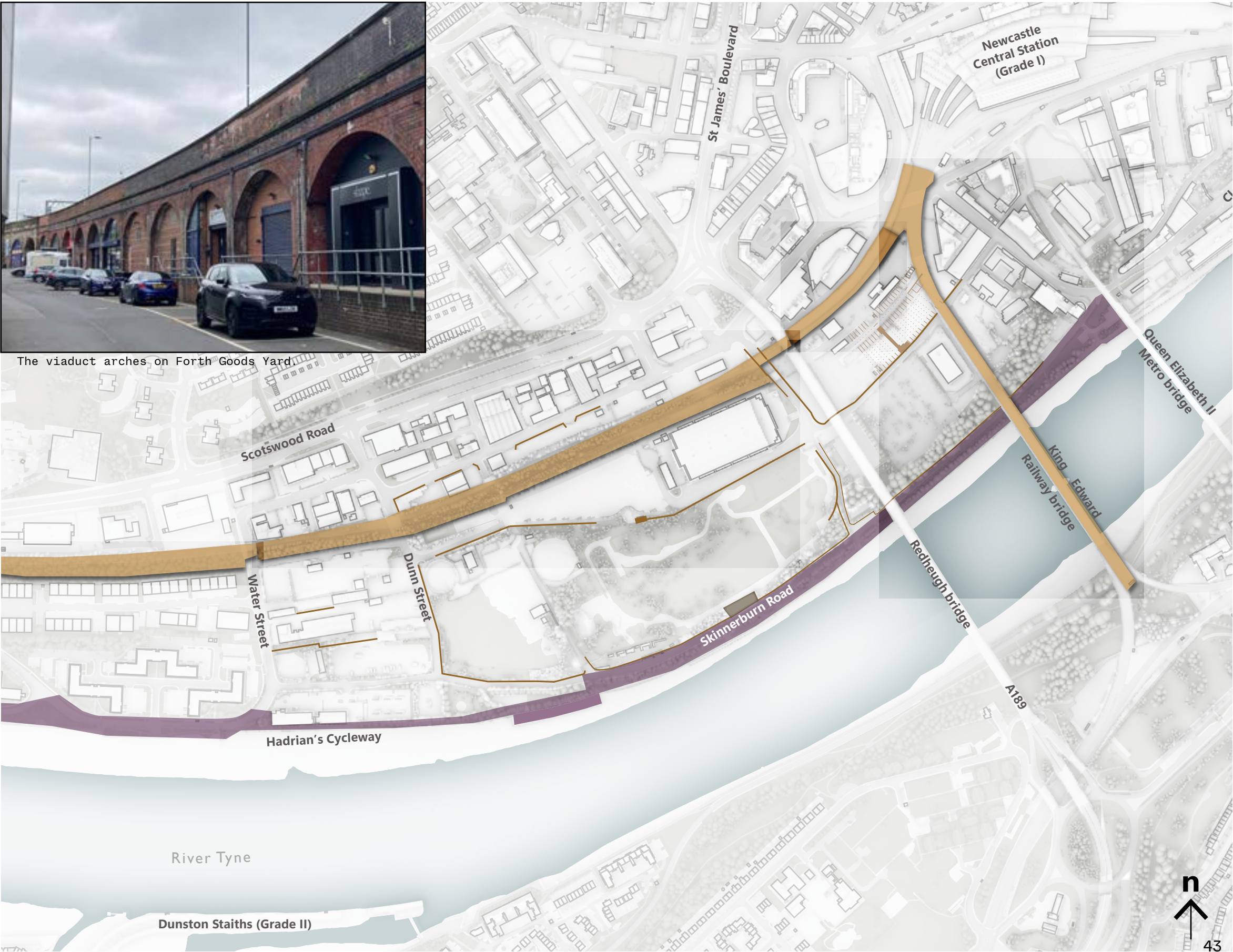
There are several non-designated heritage assets in the masterplan area:

- The Forth Goods viaduct is a brick and stone structure with arches under and historically carried the Newcastle-Carlisle rail line along the north bank of the Tyne;
- The vaulted undercroft of Forth Goods Yard;
- Tyne Waterfront, including the Victorian Elswick Warf timber platform in the River Tyne.

Other historic features also contribute to the character of the area, notably: Forth Goods Yard frontage to Pottery Lane and Redheugh Bridge Road; retaining and boundary walls and former signal house on the Arena site; Quayside West boundary walls to Skinnerburn Road and Shot Factory Lane and central load out building to Skinnerburn Road; Heliport boundary walls on Skinnerburn Road and Dunn Street; Nixons Site retaining walls and structure through the centre of the site; the remnants of historic structures west of 11/12 Skinnerburn Road; and the stone walls and other features relating to the former Newcastle-Carlisle rail line.



The viaduct arches on Forth Goods Yard.



4.8 Barriers to Movement Across the Area

Movement through the Forth Yards area is restricted by a series of physical barriers;

- the sloping gradients across the site and associated stone retains walls restrict north/south movement.
- Transport infrastructure, in the forms of Scotswood Road (A695), the former Newcastle-Carlisle rail line and the East Coast Main Rail Line, all act as physical and psychological barriers to pedestrian and cycle movement in and out of the area;
- The River Tyne prevents movement to the south. The nearest pedestrian bridge crossing is on the east side of Redheugh Bridge which is narrow and heavily impacted by road traffic noise and cross winds. It is not recommended for cycle use. The nearest alternative pedestrian/cycle crossing is the High Level Bridge.



4.9 Existing Transport Links

There is no current public transport directly serving the area. The nearest bus routes to the area are along Scotswood Road/Railway Street. Central Station provides access both to national rail network and Metro rail system.

The primary distributor roads serving the area comprise Scotswood Road (A695), Saint James' Boulevard/Redheugh Bridge (A189) and Forth Street/ Forth Banks (B1600). Future development in the area will be managed to minimise through vehicular movements and focusing traffic to use the Urban Core Distributor Road which is routed around the periphery of the area.

Car Parking

Within the Forth Yards area there is public car parking available at the Arena site (600 spaces), Safestore (119 spaces), Time Square (635 spaces) Stephenson Car Park (360 spaces) Grainger Car Park (401 spaces) and Tyne Riverside Park (30 spaces). Other public parking locations are available close to the edge of the area in both on -street parking and multi-storey car parks. The existing highway network is dominated by unregulated on-street parking and limited natural surveillance.

KEY

Footpaths
- National Trails/Coastal Path

Cycle Routes
- National Cycle Network

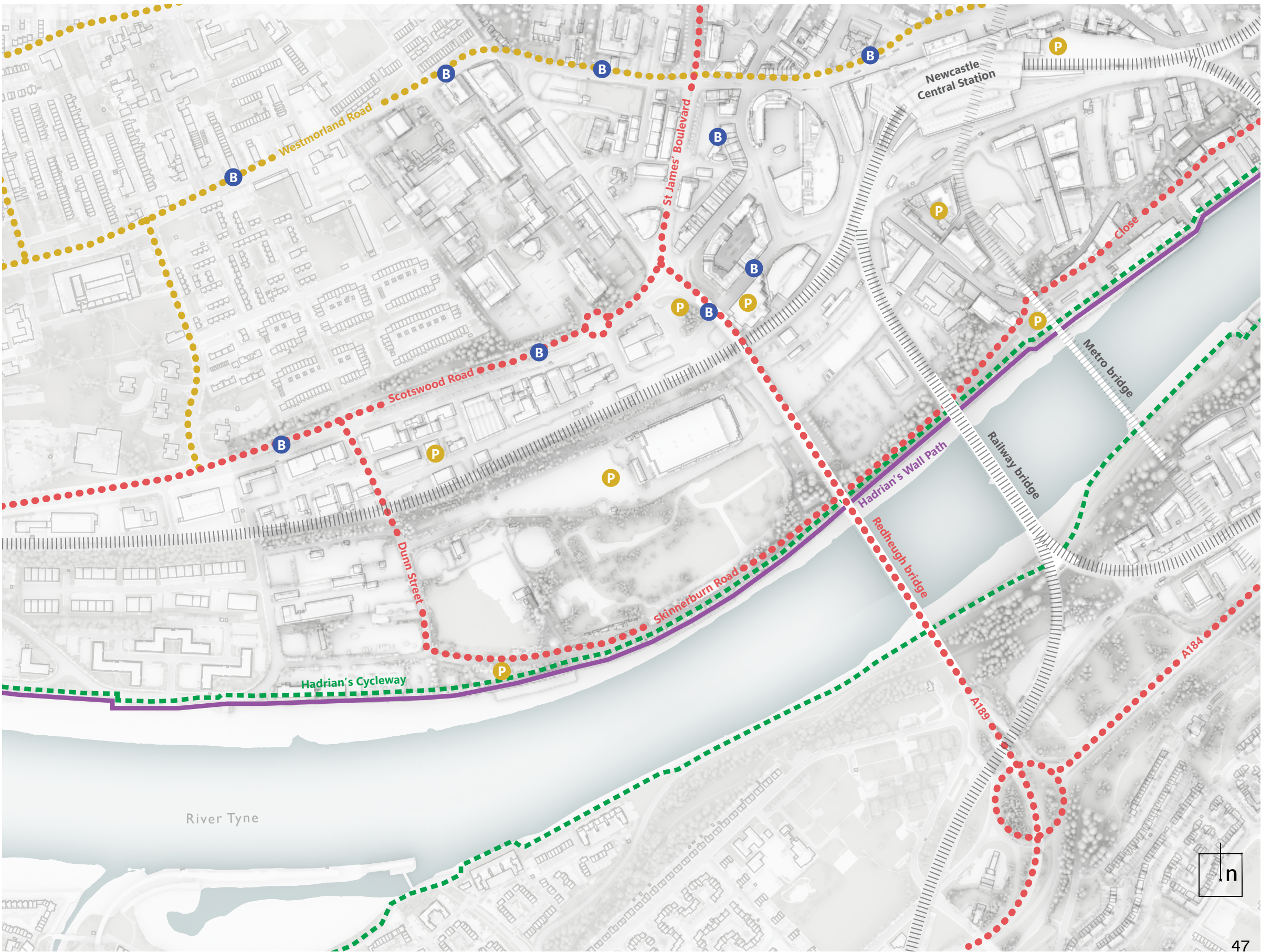
Urban Core Distributor Road

Secondary Distributor Road / Public Transport Distributor Road

Railway / Metro

Car Parks

Bus Stops



4.10 Noise, Vibration and air Quality

A significant part of the Forth Yards area experiences raised noise levels from a variety of sources, including road traffic, rail traffic, entertainment, aircraft and gas infrastructure. Future developments will need to mitigate these impacts. It is therefore important that good acoustic design principles are followed to create an integrated design solution where the optimum acoustic outcome is achieved without compromising the living conditions and the quality of life of future residents and other sustainable design objectives.

Noise and vibration from rail traffic using the East Coast Main Line and Queen Elizabeth Metro bridge will need to be assessed and mitigated for developments in the eastern part of the area.

The close proximity of sites to the A189 will require an assessment to be undertaken to address the potential impact upon local air quality from road traffic upon any future occupants of a development, focusing on concentrations of particulate matter (PM10 and PM2.5) and nitrogen dioxide. The impacts of development arising from site construction and upon the City Centre Air Quality Management Area (AQMA) will also require mitigation.



- KEY
- Air Quality Management Area
 - Poor air quality
 - Noise and vibrations from transpo
 - Risk of nighttime noise
 - Heliport
 - Indicative flight path



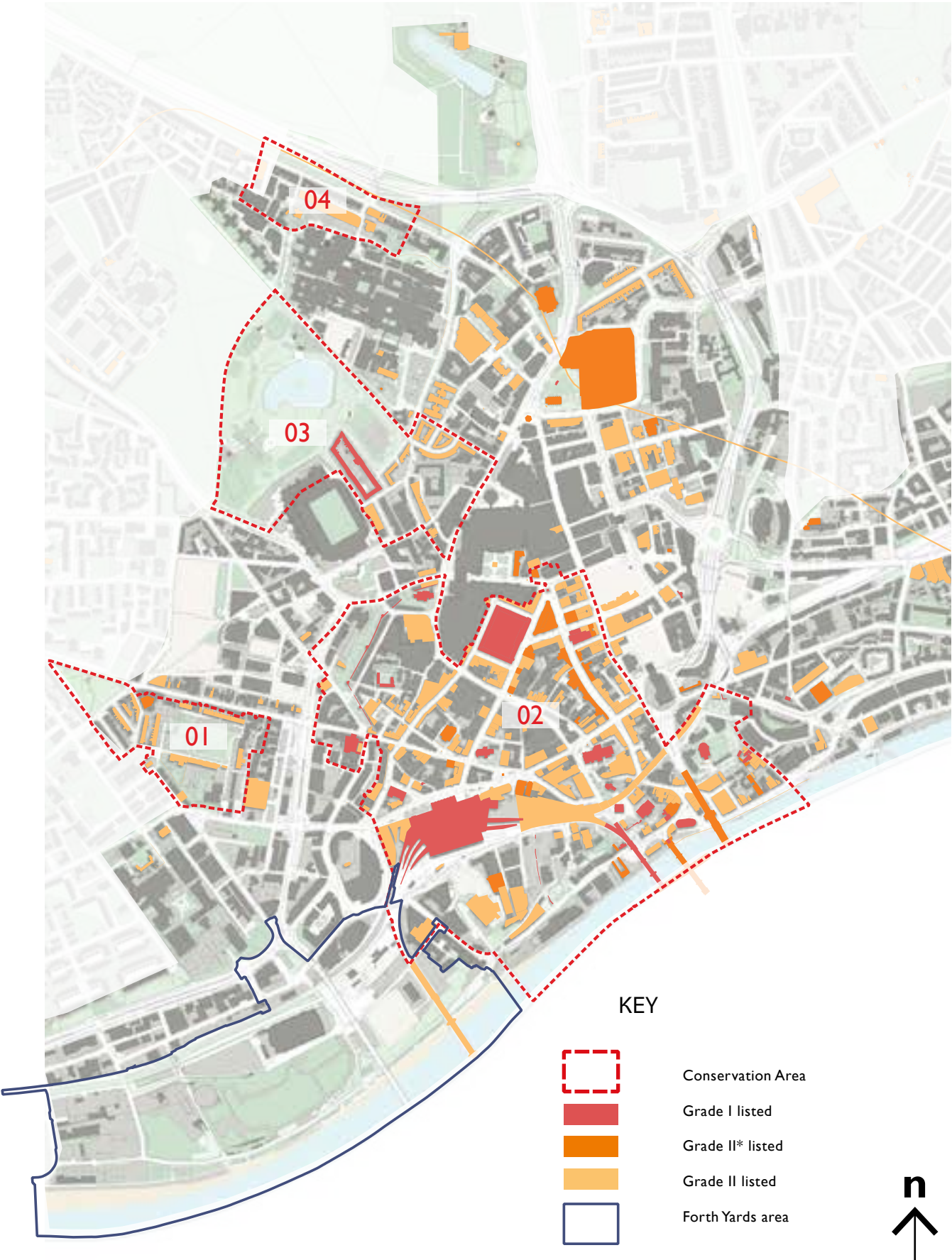
An aerial view of the Arena and Quayside West, looking East.

4.11 Wider Heritage Context

Forth Yards area forms part of the wider historic city centre and Tyne Gorge river edge. There are a number designated heritage assets outside of the Masterplan boundary whose setting and significance could be affected by future development in the masterplan area. These include:

- The Central Conservation Area (02) incorporating the medieval heart of the city.
- Summerhill Conservation Area (01) developed in the 18th century as a suburb to the city centre.
- Newcastle Central Station is Grade I listed.
- The RC Cathedral of Saint Mary (Grade I) on Clayton Street West has a landmark spire visible when approaching the city from the south.
- The seven bridges spanning the River Tyne: the High Level Bridge (Grade I), Tyne Bridge (Grade II*), Swing Bridge (Grade II*), King Edward Bridge (Grade II), Gateshead Millennium Bridge, Queen Elizabeth II Metro Bridge and new Redheugh Bridge.
- Dunston Staiths is Grade II listed and a Scheduled Monument. It is situated on the southern side of the Tyne opposite Forth Yards.
- Former Saint Cuthbert's Church (Grade II) in Bensham, Gateshead.
- Saint Stephen's Church Spire (Grade II) is a distinct skyline feature of Elswick.

Images:
A- Newcastle Central Station.
B- RC Cathedral of Saint Mary.
C- The bridges viewed from the eastern edge of the site: King Edward, Queen Elizabeth II, High Level, Swing Bridge and Tyne Bridge.
D- Dunston Staiths.
E- Former Saint Cuthebert's Church, Gateshead.



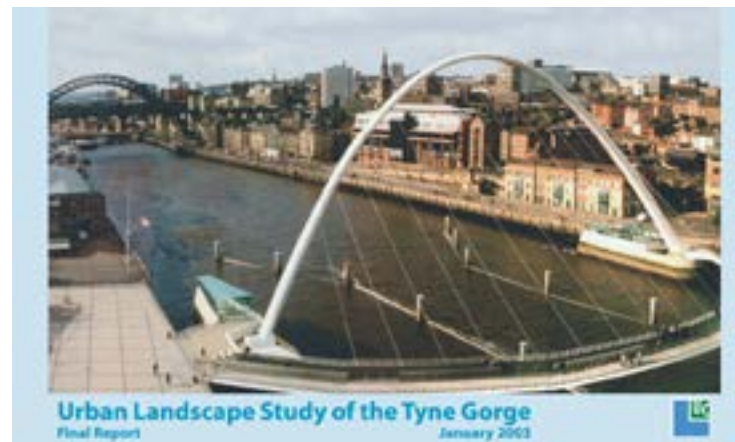
4.12 Tyne Gorge and Townscape

Future development across the Forth Yards area will need to respond positively to its prominent setting within the Tyne Gorge. For this reason, the impact of a development will need to be considered from numerous key viewpoints including those identified in the Urban Landscape Study of the Tyne Gorge. Good design principles will need to be followed to ensure developments respect this aspect of the site context, including:

1. Reintroduce an urban grain that is human in scale and can help to attract people back into the area, so increasing density in an area that is close to the city centre.
2. Ensure the layout of any new development maintains a close relationship with topography and visual linkages with the River.
3. Consider the strategic views from the Old Redheugh Bridgehead, Windmill Hill's Town Park, St Michael's Church Byker, Northumbrian Water information board underneath the Redheugh Bridge, Tyne and Wear footpath on south bank of the Tyne and Pipewellgate Car Park.



The terminating vista down Grainger Street towards Central Station.



The Tyne Gorge Study (2003)



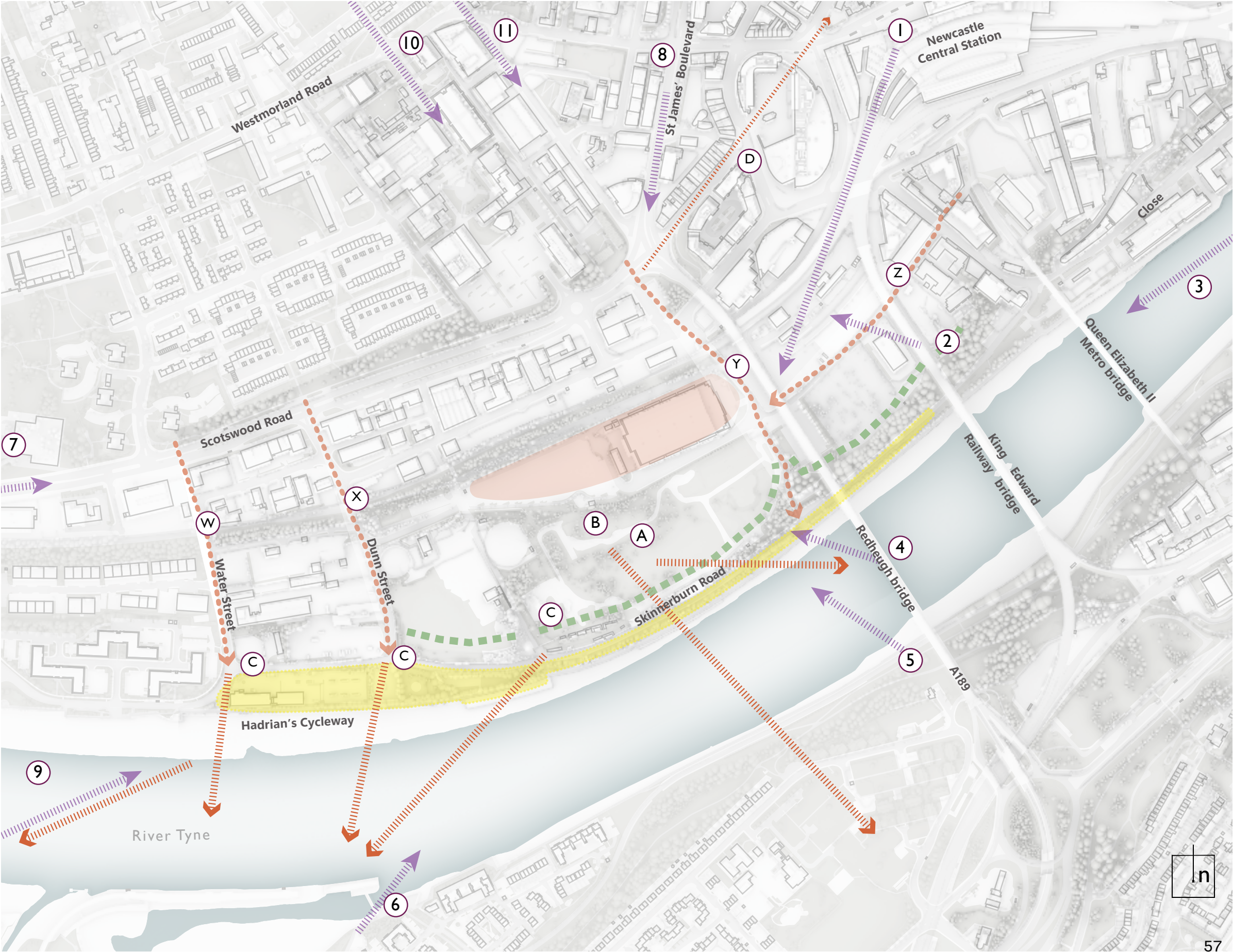
An aerial view taken from the South East towards the site.

4.13 Existing Views

The openness and raised levels of the area give an opportunity for development to create unfolding and vista point views from Forth Yards to the south along and across the River Tyne gorge towards features such as the Dunston Staiths and bridge crossings. Views of developments on Forth Yards will be particularly noticeable from major movement corridors across the River Tyne, from Gateshead Riverside Park and sensitive viewing corridors across the city centre.

KEY

- Area of expected panoramic views
- Views along River Tyne across Tyne Gorge
- Views towards iconic landmarks
- Filtered or open views along Escarpment Edge
- Unfolding views
- Views into Forth Yards
- 1 View from Grainger Street
- 2 Views from King Edward VII Bridge (Grade II)
- 3 Views from East Quayside
- 4 Views from Redheugh Bridge
- 5 Views from old Redheugh Bridgehead
- 6 Views from Dunston Staiths (Grade II)
- 7 Views from Scotswood Road
- 8 Views from St James Boulevard
- 9 Views from and to the Tyne Valley
- 10 Views from Rye Hill
- 11 Views from George Street
- A Views towards the iconic bridges
- B Views to the former St Cuthbert's Church (Grade II)
- C Views to Dunston Staiths (Grade II)
- D View to St Mary's Catholic Cathedral (Grade I)
- W Water Street unfolding view
- X Dunn Street unfolding view
- Y Redheugh Bridge/ Shot factory Lane unfolding view
- Z Pottery Lane unfolding view





Panoramic view from Quayside West to the Redheugh Bridge .



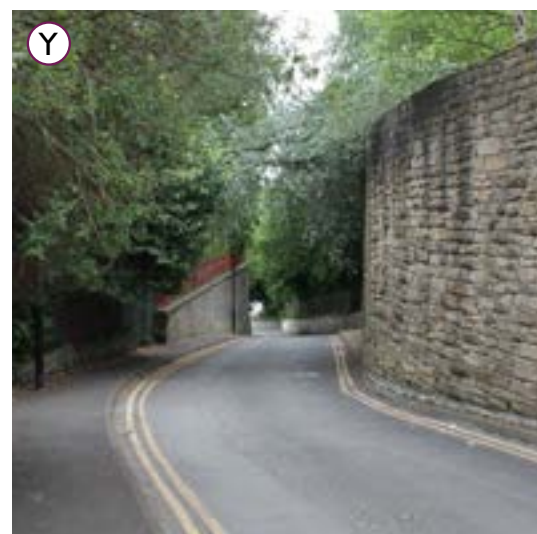
Looking from the Arena car park to former St Cuthbert's Spire (grade II listed building)



Looking from the Arena car park (above Tyneside Road) to Dunston Staiths.



Broad prospect view down Water Street.



Unfolding view down Shot Factory Lane.



Looking across the Redheugh Bridge from the pedestrian walkway.



Looking across the river towards to the site from Redheugh Bridgehead.



Looking across the river towards Forth Yards from Dunston Staiths (Scheduled Monument and Grade II listed structure).

4.14 Open Space

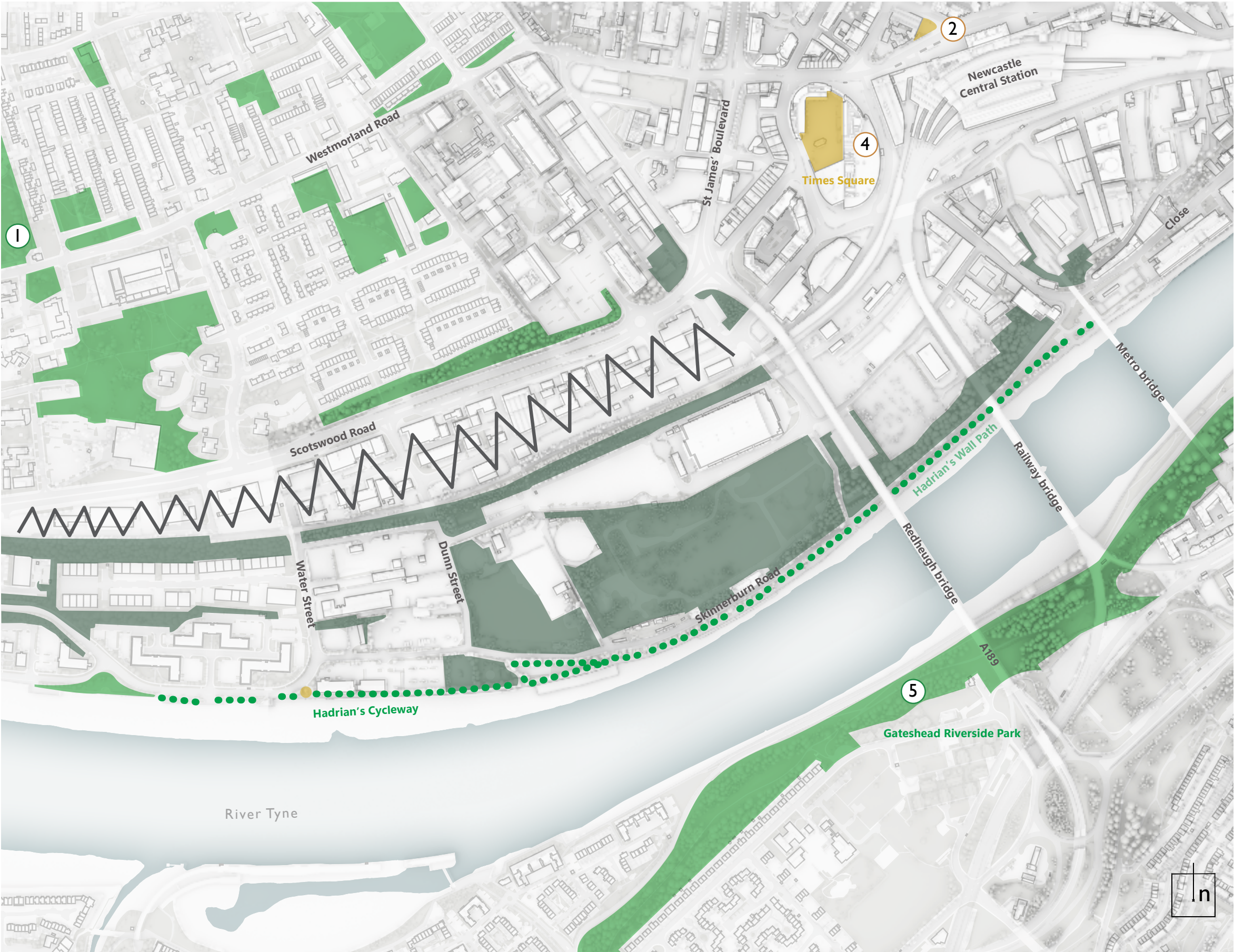
The only areas of public open space in the Forth Yards area are currently alongside the River Tyne and in the space under Redheugh Bridge. The nearest accessible Neighbourhood Park is Elswick Park (1) situated over a kilometre to the north. This Park contains children's playgrounds, sports courts, community swimming pool and gym. Multiple barriers make this area seem far away, including the industrial area, railway viaduct and Scotswood Road.

To the east of the area is the city centre which contains several urban spaces, including Cardinal Hume's Garden (2) and Time Square (4). Gateshead Riverside Park (5) is situated on the southern banks of the River Tyne, opposite Forth Yards, but is not readily accessible due to the poor pedestrian/cycle connectivity across the river.

The Forth Yards area has the potential to create a new open space network which will link the city centre to the River Tyne and Newcastle Business Park. This will be delivered through creating green spaces in areas such as the former Newcastle-Carlisle rail line and across each development site.

KEY

-  Accessible Green Spaces
-  Inaccessible Green Spaces / Colonised Brown Field
-  Square / Urban Open Spaces
-  Riverside Treeline
-  Barrier to North-south Green Corridor



4.15 Ecology

The Forth Yards area falls within the River Tyne Wildlife Enhancement Corridor and forms part of the Strategic Green Infrastructure Network and Urban Green Infrastructure Improvement Area . Wildlife Corridors allows movement of species between islands of habitat, including the adjacent River Tyne Local Wildlife Site which is particularly important for its tidal mud flats, providing valuable habitat for wading birds.

Ecology surveys undertaken since 2017 at the sites have identified a range of priority habitats and species within the Forth Yards area. Key features of the redevelopment area include the presence of the priority habitats ‘Open Mosaic Habitat’ on previously developed land and ‘Lowland meadow’. Priority butterfly species including Dingy Skipper and Grayling are also present across the area.

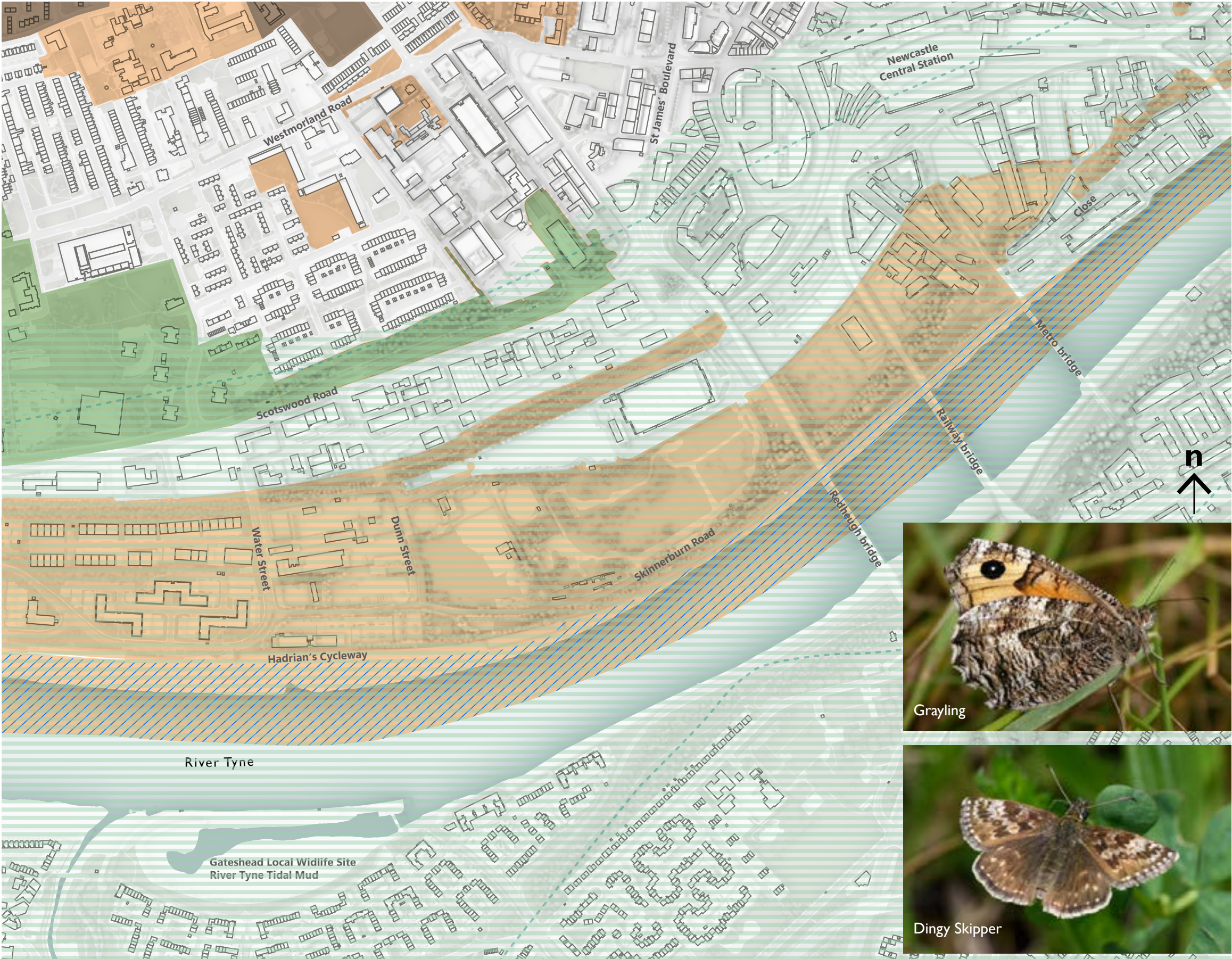
Invasive species are present throughout the area.

Nearby priority habitats include mudflats and deciduous woodlands.

Nearby ecological destinations include the Tyne River tidal mudflats (and local wildlife site) Dunston Staiths tidal mud and Rivers Team saltmarsh.

KEY

- Wildlife Enhancement Corridor
- Wildlife Enhancement Corridor
- Wildlife Enhancement Corridor
- River Tyne Tidal Extent Local Wildlife Site
- Green Infrastructure Opportunity Area (DM27)
- Strategic Green Infrastructure Network (DM27)



4.16 Biodiversity Net Gain

Each individual development site will need to plan for delivering a net gain in biodiversity of a minimum of 10%. Biodiversity gains should primarily be created on-site, and only where this cannot be achieved should a mixture of on-site and offsite be proposed, either on developers own landholdings outside of the site, or through the purchase of off-site biodiversity units. The range of habitats found in the Forth Yards area requires early agreement on the baseline biodiversity value of the site and the optimal way to achieve a net gain to maximise the opportunity to retain and enhance the ecological value of the area.

KEY

- Mixed scrub
- Other broadleaved woodland
- Lowland Meadows
- Other neutral grassland
- Modified grasslands
- Ruderal/ Ephemeral
- Bramble scrub
- Gorse scrub
- Open mosaic habitats on previously developed land
- Artificial unvegetated unsealed surface
- Developed land, sealed surface
- Buildings
- Tall Forbs
- Spoil heap
- Introduced scrub



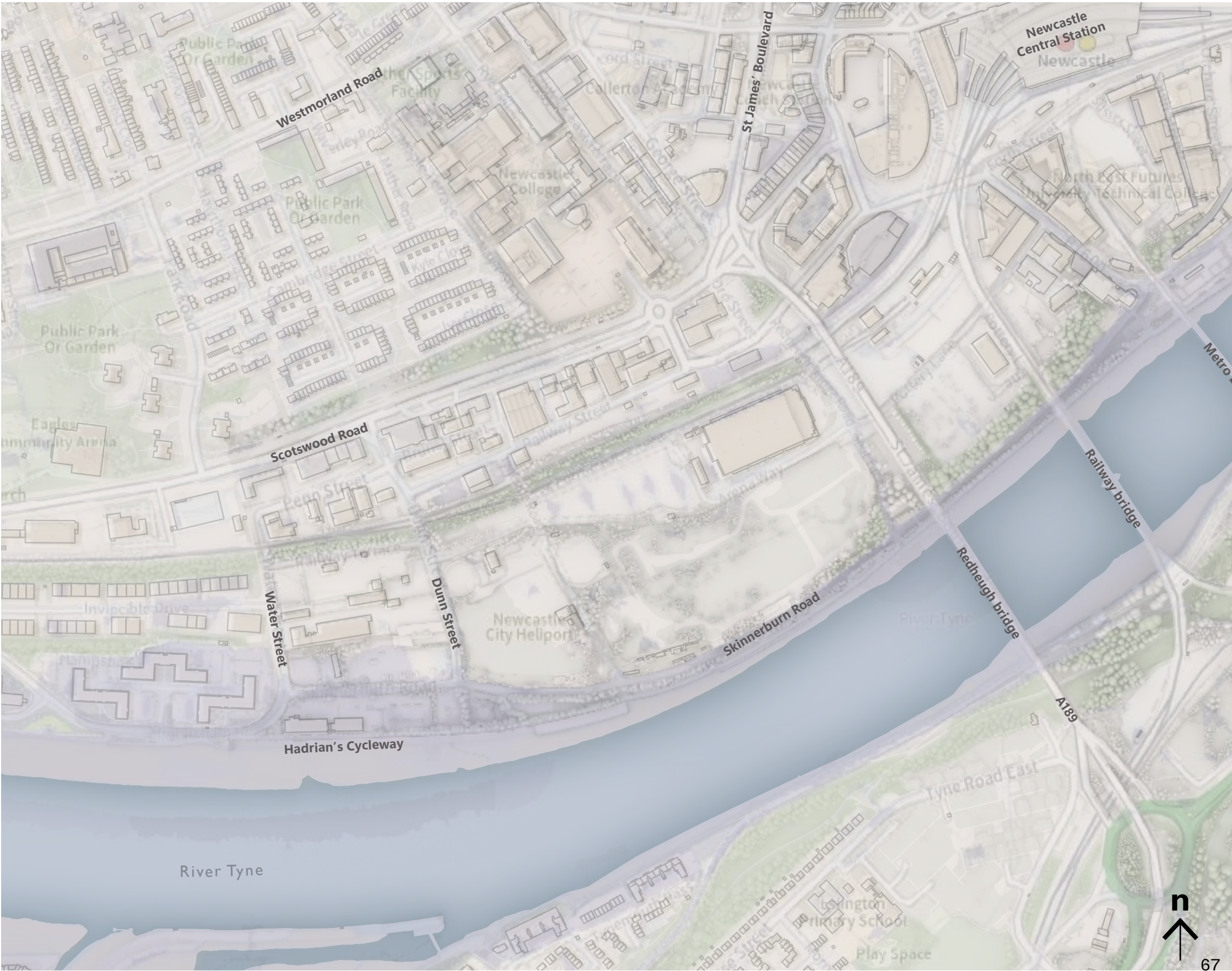
4.17 Flood Risk and Water Quality

Parts of the Forth Yards area are at risk from flooding from surface water and fluvial/tidal sources. A flood risk assessment looking at the impact of climate change from all sources will be required. Development in these areas will need to avoid future occupants being put at risk from flooding, including arrangements for access/ egress. The sites most susceptible to flooding are along Skinnerburn Road.

All development in the area will need to include sustainable drainage systems (SuDS) to mimic natural drainage, by managing surface runoff at or close to the surface and as close to its source as practicable. This approach shall control the flow of runoff, manage the quality of surface water and provide a range of additional benefits to include source control and green conveyance features such as green roofs, permeable surfaces and swales. Rain water harvesting from all buildings will also be required across the Forth Yards area. All surface water drainage options will need to reference and adhere to National Standards for Sustainable Drainage Systems, the Water Framework Directive and Northumbria River Basin Management Plan. The existing combined sewer at CSO outfall at Shot Factory Lane shall be reclassified as a surface water only sewer. A site wide drainage masterplan will need to be created, ensuring all parts of the development can drain via gravity and all outfalls to the Tyne will not be detrimental from a flood risk and ecological perspective.

Foul water flows from the Forth Yards area will be diverted to a pumping station located close to the southern end of Tyneside Road and within the Quayside West development site. The new surface and foul water networks will need to be developed in agreement with Northumbrian Water and the Environment Agency.

Rivers and Sea Yearly chance of flooding between 2036 and 2069 and Surface Water Yearly chance of flooding between 2040 and 2060



4.18 Local Character

Gorge
Slopes



Sandstone Walls and changes of level that converge at the end of Pottery Lane after passing under Redheugh Bridge.



Steep routes with unfolding views framed by walls and trees..

Tyne
River



Quayside walkway with Redheugh Bridge and iconic bridges built in different historic periods.



Hadrian's Wall Path curved leisure route with views of Gateshead hills.

Contained
and directed



Framed views and shady gateways through legacy Railway infrastructure.



Cascading site levels forming views across the Tyne Gorge.

Filtered
and open



Filtered views of the River Tyne, bridges and landscape beyond.



Industrial legacy structures incorporated into the edges and broad prospect views.