Hull UK City of Culture 2017

Project Blade

Feasibility Study

Issue | 12 August 2016

Job number 249697

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Appendices

1 Introduction

Arup has been commissioned by Hull UK City of Culture 2017 Ltd ("Hull 2017") to undertake this study into the feasibility of realising the installation of Nayan Kulkarni's temporary public artwork 'Blade' – comprising the installation of a Siemens B75 wind turbine blade within Queen Victoria Square at the centre of the city of Kingston upon Hull.

This report describes the concept for the installation and identifies the key governance, technical, programme and economic issues associated with the realisation of the artwork. A high level risk assessment has also been undertaken to identify some of the key risks associated with this project.

The purpose of this report is to inform Hull 2017's, and other stakeholders, consideration of the viability of this proposal and their decision as to whether or not to commission the work as part of the 'Look Up' programme of temporary artworks.

This is a confidential report – all parties given access to this document are deemed to have signed Hull 2017's Non-Disclosure Agreement and are bound by its terms.

2 The Proposal

2.1 General

Throughout 2017, Hull will be celebrated as the UK's City of Culture. The first three months of 2017 are themed "Made in Hull". Artist Nayan Kulkarni was commissioned by Hull 2017 to develop his concept of 'interrupting' the newly revitalised Queen Victoria Square with the installation of a single, 75 metre long wind turbine blade – one of the first to be made in Hull.

Nayan Kulkarni proposed that "*the artwork should be finely poised on the cusp between a material fact and an image, an interruption in the square that is a material fact, a hand crafted object. It will be a beautiful and spectacular re-orientation of the city centre. And, simply a 'readymade' which will contribute to a revolving pattern of recycling and regeneration. A sculpture which takes its form from an object born out of ecological concern. A work which by its very presence is also a surprise – like a ship in a bottle raises questions and incites wonder.*"

As part of wider initiatives to develop the UK's offshore wind industry, Siemens have invested £310m in a new wind turbine blade manufacturing facility in Alexandra Dock, Hull. The facility is nearing completion and will shortly move into production. Siemens have appointed a significant part of their workforce and are implementing a programme in Hull and Denmark to train these new workers to make the turbine blades. The largest wind turbine blade Siemens produce is the B75 – this is 75.4m long and 4.6m diameter at the "root" end of the blade. This blade will be made in their Hull facility.

Programmed to mark the start of UK City of Culture 2017, and the significance of Siemens' commitment to Hull, it is proposed that a B75 turbine blade is installed within the city centre as part of the "Made in Hull" season.

This artwork was conceived by the artist Nayan Kulkarni and he has been commissioned by Hull 2017 to develop his proposal. The working title for the project is 'Blade'.

2.2 Parties Involved

The parties involved in the project to date are as follows:

- Hull 2017 – Project Sponsor, responsible for coordinating funding and overall delivery of the project.
- Siemens – Loan and transportation of the blade
- ALE (as subcontractor to Siemens) – specialist transport and installation.
- Arup – technical project definition, costing and risk management.
- Nayan Kulkarni – Artist

- Andrew Knight & Hazel Colquhoun (as consultants to Hull 2017) – 'Look Up' curators

2.3 Location Chosen for the Installation

It is proposed that the blade be installed within Queen Victoria Square. This location has been selected based on consideration of the following criteria:

Table 2.1: Selection criteria for locating the installation

Criteria	How applied
Visibility	To help promote Hull to a UK audience and to communicate the wider issues related to the blade, a highly visible location is preferred. Locations within the retail core of the city are therefore preferred. Images of the blade will be seen worldwide – the background to these images should show a positive image of the city and its heritage.
Impact on highways	It is preferred that the blade is located in a pedestrianized area so that impact to traffic (including buses and taxis etc.) is minimised. Where the blade overhangs a service route, an appropriate clearance envelope will be maintained.
Minimum impact on retail premises	The selected location should not block access to retail units. It should also have minimum impact on sightlines between retail units many shoppers like to "zig-zag" between retail units along a street.
Minimum impact on residential premises	On some of the streets, residential premises are located above shops and impact on these residential units should also be minimised.
Access for servicing vehicles	Some of the pedestrian areas are used for servicing retail units and civic buildings (e.g. City Hall) which do not have rear access. Large articulated lorries can access across the pedestrian areas from time to time.
Access for emergency vehicles	Emergency vehicle access is required to all areas. Safe routes for emergency vehicles must be provided around the installation.
Coordination with Public Realm construction works	Construction works to repave many of the pedestrianised streets are currently underway. The majority of these works are due to be complete on 23rd December 2016, however some areas including King Edward St North & Jameson St East (outside BHS), Beverleygate and areas north and south of the City Hall do not complete until 24th March 2017.
Available transport routes	The blade must be able to be transported to/from the proposed location without undue disruption.
Impact on buses on Carr Lane	The position of the blade at Queen Victoria Square will cause the tip of the blade to extend over Carr Lane. The blade will be orientated at a gradient and an appropriate clearance envelope will be maintained over the carriageway to allow vehicles (including buses) to pass under.

After considering a number of options, the preferred location for the blade in Queen Victoria Square has a number of significant benefits - this location does not obstruct the highway and minimises impact on retailers, residents and servicing. The square contains many of Hull's emblematic buildings (including the Ferens Art Gallery) and will be one of the focal points for the Hull 2017 celebrations.

It is recognised that a key risk (see also Section 10) for this location is a potential delay to the completion of the public realm construction works in Queen Victoria Square. For this reason, two potential options within the Square have been defined as follows:

- Option A (preferred) – located from the end of King Edward Street and passing between the Queen Victoria Statue and City Hall. This arrangement is shown on drawing 249697-SK-001 contained in Appendix A.
- Option B (alternative) – located from the end of King Edward Street and passing to the west of the Queen Victoria Statue – this option will only be used if the Public Realm works around City Hall are not completed by the end of the year. This arrangement is shown on drawing 249697-SK-002 contained in Appendix A.

2.4 Project Commencement

It is proposed that the Blade will be installed within Queen Victoria Square on the morning of 1st Jauary. This date will firmly mark the opening of the 2017 City of Culture celebrations. The blade will make a dramatic statement which should capture national and international media attention and make a very positive statement about Hull.

Whilst it is recognised that installation on the 1st January may bring some additional labour costs, it is noted that this day is a public holiday and there will be less traffic and pedestrian activity in the city centre which will help make the installation process more straightforward.

2.5 Confidentiality

It is intended that the public will initially encounter the realisation of this work as a surprise and a dramatic manifestation of what ‘Made in Hull’ means. All parties and stakeholders involved in the project will therefore be required to abide by the conditions of Hull 2017’s Non-Disclosure Agreement.

However it is noted that there is a risk that the licence and permit applications will need to give some description of the event and this will need to be carefully managed. In particular, a planning application will need to be consulted on publically which would result in disclosure of information – this process therefore must be carefully managed.

3 Ownership & Liabilities

3.1 Ownership & Loan Agreement

It is proposed that the blade will remain the property of Siemens. Hull 2017 will enter into a "Loan Agreement" with Siemens to use the blade in the "Blade" art installation.

A draft form of this Load Agreement has been drafted. This identifies the "Period of Loan" as follows

Table 3.1: Period of Loan

Loan Period	Description
Start of agreement	Date and time when blade in installed onto its supports within Queen Victoria Square
End of agreement	Date and time when blade is removed from the supports within Queen Victoria Square

Under the agreement, Siemens will be responsible for the operations to transport the blade to and from Queen Victoria Square and for the lifting operation. Siemens will subcontract these operations to their supplier ALE>

During the period of the loan, Hull 2017 shall be liable for the following:

- Damage caused to the blade – it is recommended that a condition survey is undertaken before handover and after return of the blade. The value of the blade is approximately £350,000.
- Damage caused to third party property
- Injuries to persons employed during the execution of the project
- Injuries to members of the public during the execution of the project.

3.2 Insurance

It is recommended that Hull take out an "All risks" insurance to cover for these risks, or specifically extends their current insurance to include Project Blade. The Insurance Company may wish to review and input into the risk management process for the project (see section 11).

Subcontractors and sub-consultants appointed by Hull 2017 should be required to carry Third Party [Public] Liability Insurance, and Employers Liability Insurance and Contractor's All Risks or Professional Indemnity insurance as appropriate in order for Hull 2017 to manage their liabilities.

As identified above, ALE are likely to be employed as a subcontractor to Siemens for the transport of the blade. ALE will be expected to carry insurances to cover their works. It is recommended that a collateral warranty is put in place between Hull 2017 and ALE to cover the transport operation.

4 Permissions and Licences

4.1 Summary of Licence Requirements

This project will require Hull 2017 to obtain a number of permissions and licenses as set out in the table below. This list should be reviewed with the relevant authorities.

Table 4.1: Likely Permission, Permit and License Requirements

Authority	Required Prior to Installation	Required Prior to Removal
Hull City Council Planning	• Planning consent	
Hull City Council Events	• Event license and/or similar to occupy Queen Victoria Square.	
Hull City Council Highways	• Abnormal Loads license; • Traffic management and Temporary Traffic Regulation Orders; • Suspension of parking bays, loading bays, etc. • Removal/reinstatement of safety barrier and street furniture. • Oversail license.	• Abnormal Loads license; • Traffic management and Temporary Traffic Regulation Orders; • Suspension of parking bays, loading bays, etc. • Removal/reinstatement of safety barrier and street furniture. • Oversail license.
Highways England	• Abnormal Loads license (HESO); • Traffic management and Temporary Traffic Regulation Orders; • Removal/reinstatement of safety barrier and street furniture.	• Abnormal Loads license (HESO); • Traffic management and Temporary Traffic Regulation Orders; • Removal/reinstatement of safety barrier and street furniture.
Police	• Police escort; • Removal of vehicles causing obstruction or illegally parked cars.	• Police escort; • Removal of vehicles causing obstruction or illegally parked cars.
Private landowners (if required)	• Oversail license.	• Oversail license.

4.2 Planning Consent

As the structure is >4m in height it could be classed as development. However if the Blade is to be positioned within Queen Victoria Square for up to 28 days, it will be deemed to be a temporary installation and planning consent will not be required.

Should Hull 2017 wish to retain the Blade in the square for >28 days, Hull 2017 should submit a planning application to obtain formal consent.

It is noted that a planning application would make the installation public and part of the artwork is the element of "surprise" created by its installation. It is recommended that discussions are held with the Head of Planning and Chair of the Planning Committee to agree an acceptable approach.

4.3 Event Licence

Hull 2017 will require an Events licence from Hull City Council to site the Blade on the Public Highway and to run the "event".

4.4 Transport Licences

The dimensions of the blade and the potential axle loads will require the transport of the blade to comply with 'abnormal load' regulations. This will require the relevant authorities to be notified including Highways England, Hull City Council (as local highway authority) and Police.

It should be noted that the application process for obtaining an Abnormal Loads license, traffic management, temporary suspension of on-street parking and securing Police escort is likely to take around 12 weeks.

5 Transport (including Removal)

5.1 Access Route Options

Abnormal Load Engineering Limited ("ALE") have been instructed by Siemens to consider the route options available for transporting the B75 blade by road between Alexandra Docks/Siemens factory yard to Queen Victoria Square.

The following have been considered in the high level route review:

- The overall dimensions of the B75 Turbine Blade are taken from Siemens drawing D3179302 rev. 003 as 75.422m (length), 6.378m (width) and approx. 4.6m (height).
- The transport weight of the B75 Turbine Blade is approx. 30 tonnes.

A number of route options have been considered by the project team and a high level review has been undertaken by ALE to identify the most feasible route from the options discussed.

5.2 Preferred Route

A high level review of routing options found "Route D" to be the most feasible to transport the blade from King George Docks to Queen Victoria Square in Hull city centre.

Route D is shown in Appendix B. The route comprises of Hedon Road, A63 Garrison Road, Myton Bridge, Market Place, Lowgate, Alfred Gelder Street, Queens Dock Avenue, Bond Street and Saville Street.

A further detailed study has been recently completed to "track" the path of the Blade and identify every item of street furniture that will be affected during transportation. A copy of this study is also included in Appendix B. The preferred route identifies potential conflicts with a building canopy and a tree, however subsequent surveys on site and refinement of the tracking have provided confidence that these obstruction can be bypassed with careful control of the SPMTs.

The preferred route will also need agreement from Highways England (Authority for the A63) and Hull City Council (as the Authority for the local highway network) to obtain the transport permits, arrange traffic management and street furniture alterations.

5.3 Transportation

The current proposal is to transfer the blade using self-propelled modular trailers (SPMT). SPMTs allow tight manoeuvres (smaller turning circles) to be achieved and travel at approximately 3mph which allows time to identify potential obstacles during turning movements.

An SPMT will be positioned at two location of the blade – at the root end and at a strengthened section of the blade towards the tip end. Bespoke fixtures have been specially designed to aid transporting of the blade – this comprises of a casing for the root end of the blade and a clamp towards the tip end of the blade. The blade has been designed to be transported in this manner.

Illustration of blade support positions during transport

Considering the end position of the blade at Queen Victoria Square, the blade will be transported "root" first until the Lowgate/Alfred Gelder Street junction at which point the blade will travel in reverse ("tip" first) along Alfred Gelder Street and Saville Street.

The Blade will therefore enter Queen Victoria Square "tip first" and be delivered to a position adjacent to the supports. There will be a relatively straightforward operation to then crane the Blade from the SPMTs onto the supports.

5.4 Affected Street Apparatus

All affected street furniture will be visited at least 4 weeks prior to the installation date and a schedule of advanced highway works (pre-installation activities) prepared. This will include identifying 'cast in concrete' columns/poles that can be re-installed into NAL type sockets ("socketed") for easier removal and replacement.

It is proposed that a Contractor is appointed to undertake the "pre-installation activities" and that these works are undertaken at least two weeks prior to the installation date. This is reflected in the project programme.

On the day of the installation, street apparatus will be temporarily removed immediately before the blade passes and reinstalled immediately after the blade passing. This operation will be prioritised for traffic and regulatory information (including signs and traffic signals).

Ideally, the same labour gangs should be used for the pre-installation activities and for the removal/re-installation of street apparatus on the day the blade is transported.

6 Installation

6.1 Supports

A visit has been made to Siemens' production facility in Alborg and further technical information has been made available by Siemens to identify how the blade is to be supported.

The current proposal is to pre-fabricate steelwork structures to hold the blade at its "root" end and also part-way along the length of the blade. These structures can be fabricated off site and then brought so site and bolted together on the date of the installation.

It is proposed that the supports simply sit on the surface of the public realm. The supports will have sufficient mass to resist the wind loads applied to them. These loads will be spread over the surface of the public realm so that the loading is less than a HGV wheel-load (the criteria that has been used for the design of the pavement).

It is intended that the standard fixings used by Siemens to hold down the blade will be used to connect the blade to the supports. In addition a strap will be placed over the tip end of the blade to provide an additional level of security should the clamp start to loosen.

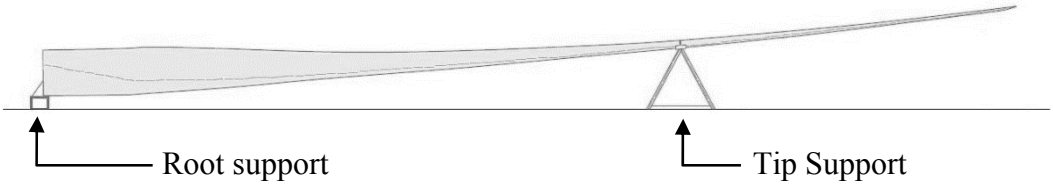


Illustration of Proposed Installation at Queen Victoria Square

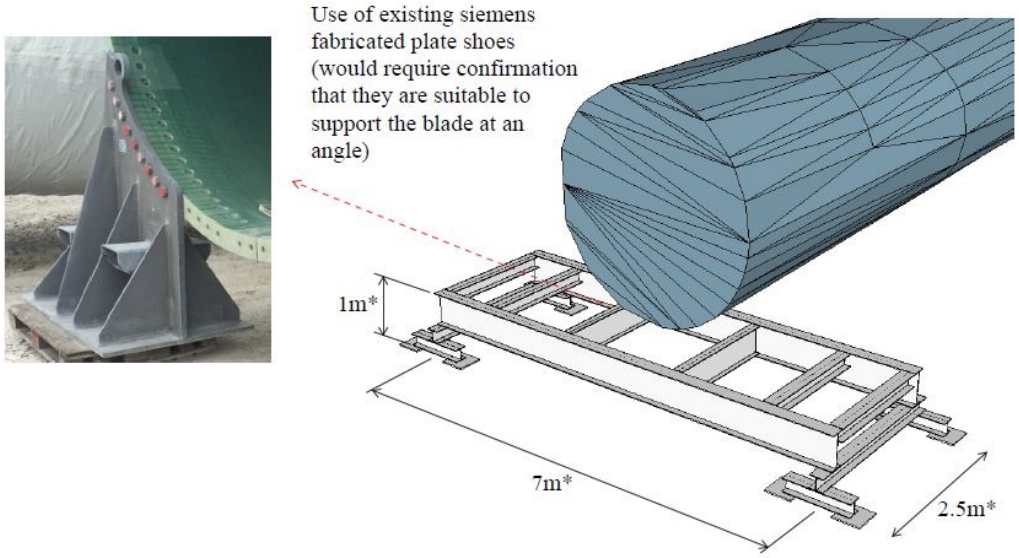


Illustration of Root Support

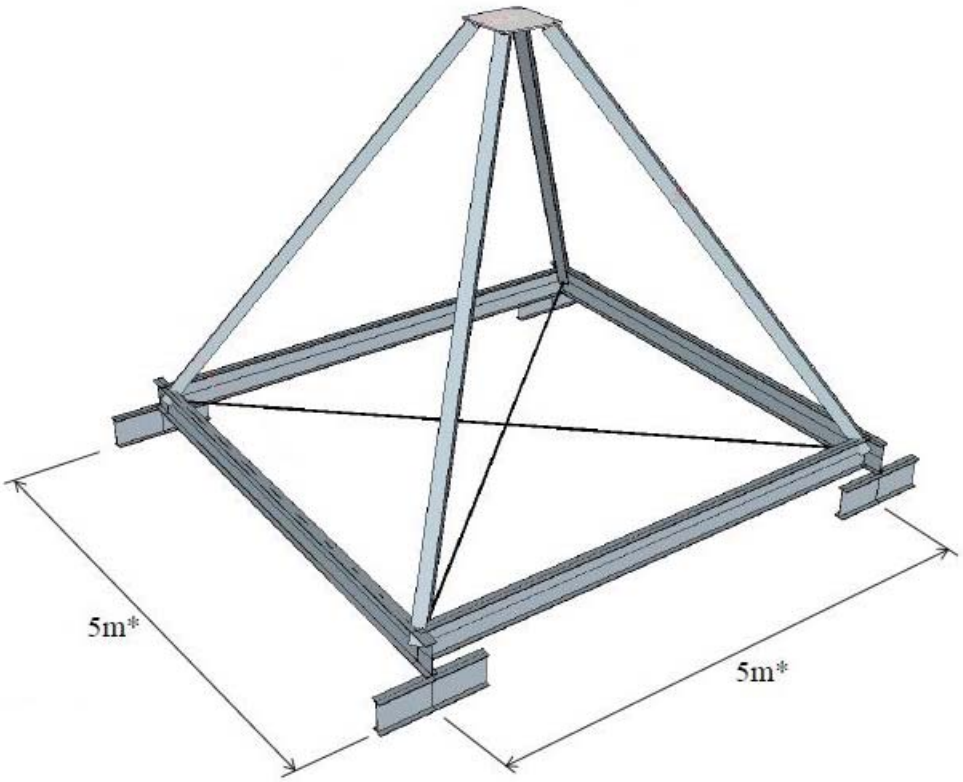


Illustration of Tip Support (Blade Clamp Omitted)

6.2 Mock Up

It is proposed that the supports are delivered to Siemens' yard in Alexandra Dock to enable a "mock up" of the installation to be undertaken. This "mock up" process will involve locating the supports in position, craning the blade into position and bolting it down. The blade can then be removed and supported to ground level.

This mock up process will provide a valuable opportunity to check that the blade is supported correctly and to make any modifications to the supports if these are required. It will also give the installation teams a chance to practice the operation and get a better idea of time requirements etc.

6.3 Headroom Clearances

Arup's drawing 249697-SK-001 shows the plan position of the blade in Queen Victoria Square and highlights the areas below the blade that have less than 2.3m clearance from ground level (for pedestrians and cyclists) and also areas with less than 5.5m clearance (for vehicles).

Benches will be positioned below the blade where a 2.3m headroom clearance cannot be achieved. The position of the benches should be such that it prevents people from bumping into the blade and directs blind/partially sighted people around.

7 Operation

Safety and security during the operational phase of the project will be of paramount importance. The operational phase of the project is considered to be the duration of the blade in Queen Victoria Square.

7.1 Security Presence

The propensity for human interaction with the blade and the accessibility of the blade to the public has raised a number of risk items (see Risk Register/Section 10). This includes people climbing onto the blade, graffiti and vandalism.

It is anticipated that initially a 24 hour, 7 days a week security presence will be required. Security personnel on site will interface with Hull City Council wardens and emergency services (as required).

Queen Victoria Square is monitored by Hull City Council via CCTV cameras and this operation will also help to detect problems.

Security requirements should be reviewed on a weekly basis by Hull 2017, Hull City Council, Security personnel and representatives from the emergency services. Safety and security risks, i.e. vandalism, may reduce over time and there may be scope to reduce security presence on site whilst still being supported by wardens and CCTV coverage.

7.2 Secure Design

To help prevent vandalism and personal injury (through attempts to climb onto the blade), the following will be considered as part of the detailed design and implemented during the operational phase:

- Restricted access to blade supports – a “clam shell” arrangement around the blade support is being considered to prevent members of the public climbing onto the structure.
- Benches will be positioned below the blade where a 2.3m headroom clearance cannot be achieved.
- Anti-climb paint will be applied to supports (where appropriate).
- Display of information boards (with relevant contact telephone numbers), signs informing the public of surveillance and orders not to climb will be positioned around the blade.

7.3 Maintenance

A maintenance regime for cleaning, repairing and repainting the blade and supports will be established for the entire duration of the operational phase. The maintenance strategy will be developed during detailed design stage.

8 Programme

8.1 Overall Programme

A programme for the project is included in Appendix C. This identifies the overall duration of the scheme including design, approval and procurement activities.

The activities relating to design of the supports, procurement and fabrication of the supports, and mock up sit on the critical path. A delay to these activities potentially impacts on the opportunity to undertake a mock up and identify potential problems prior to installation at Queen Victoria Square.

In order to achieve the programme, a decision to proceed should be made by 26th August 2016 followed immediately by signing of agreements/contracts and commissioning of the detailed design for the supports.

The programme allows a day for a mock installation in Siemens' factory yard at the beginning of December 2016 followed by a lessons learnt meeting. This allows two weeks for any adjustments to be made to the supporting structures prior to installation in Queen Victoria Square.

The programme also allows 8 working days for pre-installation activities in December 2016. Pre-installation activities includes transferring anchored/'cast in concrete' street apparatus into NAL type sockets or bolted arrangements to help expedite removal/reinstallation of street apparatus during the transport of the blade.

8.2 Detailed Installation Programme

A detailed programme will need to be developed for the day of installation (and also removal) so that all activities are coordinated efficiently and safely. For the purposes of this feasibility study, the following timeline is proposed.

Table 8.1: Initial detailed programme for installation

Date / Time	Activity
Friday 30th December 2016	
11.00	Meeting with key project members to review following: • Completion of preparation works • Detailed Installation programme • Risk Register
13.00	• Team building meeting with all persons involved. Remind them of roles & responsibilities
Sunday 1st January 2017	
6.00	• Meet at Siemens Yard. • Health and Safety Induction
6.30	• Load steel supports onto lorries – transport to site • Cranes into position in Queen Victoria Square • Gangs start to remove street-furniture
7.30	• Blade leaves Siemens Yard under police escort • Steel supports lifted into position and bolted together
8.30 (approx.)	• Blade leaves A63 (Highways England property) • Gangs start to replace street furniture
10.00	• Blade arrives in Queen Victoria Square
11.00	• Blade lifted into position
12.00	• Blade securing in position • Safety checks
13.00	• Cranes demobilised & removed from site • Clean Up
14.00	• Hand-over

9 Cost Estimate

9.1 Approach

This is a unique project and therefore reference rates and costs are not available. A "bottom up" approach has therefore been used to establish the cost estimate for this Feasibility Study.

It is recommended that this cost estimate is revisited as the project progresses and more accurate costing information becomes available as the design of the supports is developed and discussions with streetworks contractors and others advance.

The cost estimate is split into six sub-headings as follows:

- **Transportation** – estimated costs to remove and reinstall street furniture in order to transport the blade between Queen Alexandra Docks to Hull city centre. The proposed transport route has been walked and an initial assessment made of the requirements to remove and relocate street furniture. To reduce risk an "enabling" contract is envisaged to place street furniture into sockets to facilitate removal and reinstallation on the day of the move. Costs have been estimated on the basis of providing 4 gangs of labour plus support plant to undertake the installation operation. Additional sums have been allowed for security, Police attendance and temporary traffic management.
- **Installation** – costs for manufacture of the supporting structure including provisional sum allowances for security and pedestrian control and adjustment to lighting apparatus.
- **Maintenance** – allowances for cleaning, repainting, security and reactive maintenance.
- **Removal** – The removal costs are very similar to the initial transportation costs as the operation to remove and replace street furniture to transport the blade between Hull city centre and Queen Alexandra Docks is very similar.
- **Management and Consultancy** – A provision sum is included to allow for project and commercial management, structure design, Health and Safety, and Planning. The sum excludes for local authority fees (including planning fees).

It is noted that the capital cost of the blade is excluded from the cost estimate. ALE's technical input and transportation costs, storage and trial erection, and craneage (via subcontractor) form part of the Siemens offer and has also been also excluded from this estimate.

The cost estimate is contained in Appendix D along with the scope and assumptions applied.

9.2 Summary of Cost Estimate

A summary of the cost estimate, broken down by the sub-headings referred to in Section 9.1, is provided in Table 9.1. Please note that the values shown are exclusive of VAT.

Table 9.1: Summary of Cost Estimate

Description	Estimated Cost
Street Furniture Removal & Replacement	£183,600
Support Structures & Barriers	£76,200
Installation & Removal	£59,300
Maintenance (4 weeks)	£23,320
Management and Consultancy	£70,000.00
Contingency	£25,000
Total	**£447,420**

10 Risk Register

10.1 Approach

A Risk Register has been prepared to identify the key risks, impact, risk rating, mitigation measure(s) and current risk owner and a copy of the Risk Register is contained in Appendix E. The project team has input to the Risk Register at a workshop held on 23rd June 2016.

The Risk Register will require reviewing by the project team/board throughout the subsequent stages of the project. As part of the review, the project board will be responsible for setting/reviewing contingency allowances against the risk items and ensure that an appropriate overall contingency amount is allowed for.

The following project stages are suggested for a review of the Risk Register:

- Prior to submission of Planning application/permit.
- Award of Planning Consent
- Completion of detailed design.
- Tender document review (prior to commencing tender process).
- Construction contract signing.
- Following trial assembly (at Siemens site).
- Prior to transport/installation of blade in Hull city centre.
- Following installation.
- Prior to removal of blade from Hull city centre.

The number of project stakeholders is expected to increase as the project progresses and therefore it is imperative to undertake further reviews to capture the potential risks as seen by all stakeholders.

Currently, the risks identified have been allocated to a current member of the project team. It may be that some of these risks can be re-allocated to another party (i.e. to a Contractor) but this can only be considered once the risks are well defined and the other party is in the best position to manage the potential consequences of the risk occurring.

Formal risk management procedures should be implemented during the next stage of the project and continued through to the end of the project. A Risk Manager should be identified who will apply the following procedures to mitigate/control the risks:

- Risk Management Workshops
- Costing of the Risk Register
- Reviews with Risk Owners

10.2 Summary of Risk Register

In the following table, key project risks (red and orange category risks scoring over 9 – see Appendix E) have been identified together with the proposed strategy to manage the risks. A more detailed risk register is included in Appendix E.

Table 10.1: Summary of Key Project Risks

Risk	Mitigation Action	Risk Allocation (Owner)
Delay to Queen Victoria Square Public Realm Works	Engage with Public Realm works Contractor and monitor programme to ensure completion of works. Propose "Plan B" location for the Blade with reduced risk of conflict.	Hull 2017
High winds during installation & removal	In Method Statement identify safe wind speeds for transport and lifting operations. Monitor weather forecasts. Check wind speeds on day. Be prepared to delay transport movements if too windy	ALE
Public interfere with blade during installation/removal	Recruit wardens (or similar) to help manage public. Use fencing / barriers to clearly cordon on working area & remove public. Do not advertise installation/removal process. Installation / removal to occur during quiet periods (e.g. early Sunday morning)	Hull 2017
Damage caused to Public Realm	Ensure that loading on surface is less that design loading (i.e. spread loads from cranes, supports etc.). Place protection materials (geotextiles, timbers etc.) between foundation pads & new surface. Undertake photographic survey before and after installation, Repair damage following removal of blade and supports.	Hull 2017
People collide with blade (eg blind person, cyclist)	Install physical barrier (e.g. a bench) to prevent people walking under lowest part of blade (i.e. where headroom is <2.3m	Hull 2017
People try to climb onto the Blade	Install "No climbing" sign. Provide physical security presence as deterrent. Use CCTV cameras to monitor activity around blade. Install anti-climb paint on supports. Use "clam shell" concept to close up supports and create physical barrier during "closed periods" (e.g. night-time)	Hull 2017
Straps securing blade become loose	Implement checking regime to check that blade is held firmly - e.g. taughtness of straps and tension in bolts. Tighten if necessary	Hull 2017
Deliberate attempt to set the Blade on fire	Provide security presence to deter vandals & use CCTV to monitor. Engage with Fire Service to assess risk. Consider use of specialist intumescent paints in areas accessible by people.	Hull 2017
New Year's Eve	Address issue with workforce in team briefing before installation. Use breathalyser to check for alcohol. Ensure sufficient resources are employed to cover for risk that an employee may not turn up and to help manage public	Hull 2017
Budget exceeded	Develop a cost plan and update it at regular intervals. Include a contingency allowance to cover uncertainty in pricing	Hull 2017

Risk	Mitigation Action	Risk Allocation (Owner)
Political objectors	Set out an Engagement Plan to inform political leaders of project and gather support. Implement in good time so that there are few surprises	Hull 2017
Planning consent is not granted	Engage with planners at early stage to understand and address potential issues. Engage with Chair of Planning Committee.	Hull 2017
Planning consent delayed	Engage with all statutory consultees as part of the pre-application process. Undertake pre-application consultation to solicit views and, in application, demonstrate how these views have been taken into account.	Hull 2017
Temporary Planning Consent limits installation to 28 days	Engage with Planners. Submit full planning application if longer period required.	Hull 2017
Enforcement Action possible if Blade installed without planning	Engage with Planners to agree strategy. Engage with Chair of Committee & gain political support. Submit planning application if 28 day period will be exceeded.	Hull 2017
Surprise element	Engage with planners to see if temporary planning route would be acceptable. Carefully control information (particularly visual information) about the sculpture and who it's sent to.	Hull 2017

11 Next Steps

11.1 Actions

Subject to a decision to proceed, the following actions will need to be undertaken within the first month (August):

- Hull 2017 to confirm whether to proceed with the project
- Sign Loan and sponsorship agreement(s) – Hull 2017 & Siemens.
- Arrange insurances and warranties.
- Hull 2017 to appoint Consultants (PM, Structural Engineer, CDM).
- Progress detailed design of supports.
- Prepare to commence procurement process for supports.
- Siemens to appoint specialist transporters (ALE).
- Discussions with the Events team.
- Informal meeting with Planner(s).
- Establish Communications Plan.

11.2 Roles and Responsibilities

The following table (Table 11.1) sets out the anticipated project team needed to deliver the project.

Table 11.1: Anticipated Project Team Roles

Role	Potential Scope	Organisation
Project Sponsor	Responsible for the overall delivery and funding of the project. Ensuring that the work is governed effectively and delivers the objectives that meet identified needs.	Hull 2017 & Siemens
Client Project team	Appoint the project delivery team, arrange insurances/indemnity, prepare the Communication Plan, key stakeholder engagement.	Hull 2017
Blade supplier	Temporary loan of a blade (and storage supports) for the art installation.	Siemens
Transport (including craneage)	Specialist transporter and logistics planning. Obtain all relevant licenses/permits for transport of blade.	ALE
Artist		Nayan Kulkarni
‘Look Up’ Curators		Andrew Knight & Hazel Colquhoun

Role	Potential Scope	Organisation
Public Relations	Input into the Communication Plan. Pre and post-installation public and stakeholder engagement in accordance with the Communication Plan.	To be arranged
Video Maker		To be arranged
Project Manager	Manage and monitor the project against programme, cost and risk management.	To be arranged
Cost Control	Prepare a project Cost Plan and monitor costs against plan.	To be arranged
Structural Engineer	Detailed design of blade supports.	To be arranged
Planning Agent	Planning advice. Pre-application discussions with Planning Authority. Preparation and submission of planning application, and post-application discussions in order to secure Planning consent.	To be arranged
Principal Designer (CDM)	Plan, manage, monitor and coordinate Health and Safety in the pre-construction phase. Liaison with the Principal Contractor, keeping them informed of any risks that need to be controlled during the construction phase.	To be arranged
Security (during operation)	Work jointly with the Client Project Team to prepare a Surveillance and Security Plan. Security presence at Queen Victoria Square for the entire duration of the operation phase.	To be arranged
Maintenance (during operation)	Input into a maintenance plan. Cleaning, repairing and repainting of the blade and supports.	To be arranged
Highway works team (Street Furniture Contractor)	Street apparatus alterations – including pre-installation activities and works required during blade alterations.	To be arranged
Crowd Control	Crowd control on route during delivery/removal of the blade and at Queen Victoria Square during installation.	To be arranged
Police Escort	Police escort during delivery and removal of the blade.	Humberside Police
Supports Fabricator	Fabrication and supply of supporting structures.	To be arranged

Appendix A

Preferred and Alternative Installation Arrangements

A1

Existing tree

Bench with power connection

Street sign with power connection

15m high feature lighting column

Bench

Building frontage

Street lighting column

Traffic signs and columns

Building frontage

15m high feature lighting column, CCTV column and litter bin

15m high feature lighting column

Traffic signal apparatus.

Building frontage

Building frontage

15m high feature lighting column

Traffic signs and columns

Monument

Building frontage

Building frontage

New tree locations

Building frontage

Preferred Orientation

SANTANDER

POTENTIAL CAFE

CAFE NERO

BARCLAYS BANK

VIRGIN MONEY

HULL CITY HALL

HULL MARITIME MUSEUM

QUEEN'S DOCK AVENUE

FERENS ART GALLERY

PRINCES QUAY SHOPPING CENTRE

H. SAMUEL

STAND

WORKS

North

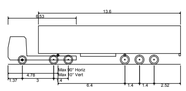
Notes:

1. Preliminary layout subject to detailed design including full CDM compliance, progress of Public Realm works and Local Authority approval.
2. Two-way bus services to continue to operate along Carr Lane. Bus gates to be implemented at locations indicated.
3. Area shown to have less than 5.5m height clearance under the blade is measured from 58.07m from the edge of the blade at "root" end. See Nayan Kulkarni drawing ZYR-LOC-B (dated 28/06/2016).

Background drawing:
- Area 12 - Queen Victoria Square General Arrangement Plan (drawing no.: RFM-12-DR-LA-0001 Rev. C3)
- NK-QUESTION-060716-1
- Area 12 Phasing Works (doc. ref.: Hull CCPR-PHAS-06)

Key:
- Apparatus potentially affected by blade installation
- Safe working zone (5m offset from edge of blade)
- Area with less than 2.3m height clearance under the blade
- Area with less than 5.5m height clearance under the blade

Vehicle Profile:



Max Legal Length (UK) Articulated Vehicle (16.5m)

Overall Length	16.500M
Overall Width	2.550M
Overall Body Height	3.681M
Min Body Ground Clearance	0.411M
Max Track Width	2.500M
Lock-to-lock time	6.00s
Curb to Curb Turning Radius	6.530M

Ambulance

Overall Length	5.461M
Overall Width	2.020M
Overall Body Height	2.498M
Min Body Ground Clearance	0.225M
Track Width	1.860M
Lock-to-lock time	4.00s
Curb to Curb Turning Radius	6.500M

ISSUED FOR DISCUSSION PURPOSES

Issue	Date	By	Chkd	Appd
A	22/07/16	JH	RB	RB
First issue				

Client

Hull UK City of Culture 2017

Job Title

Hull Zephyr

Drawing Title

Preferred Arrangement
Queen Victoria Square

ARUP

Admiral House Rose Wharf
78 East Street Leeds LS9 8EE
Tel +44 (0)113 242 8498 Fax +44 (0)113 242 8573
www.arup.com

Scale at A1: 1:250

Plot ID: 48ADBCEE-76F3-4307-A482-96B8C966E314

Drawing Status: **For information**

Job No	Drawing No	Issue
249697	249697-SK-001	A

A1

New tree locations
Building frontage
15m high feature lighting column
Building frontage
Traffic signs and columns
15m high feature lighting column
Monument
Building frontage
Building frontage
15m high feature lighting column
Traffic signal apparatus.
Existing tree
Bench with power connection
Street sign with power connection
15m high feature lighting column
Bench
Building frontage
Street lighting column
Traffic signs and columns
Building frontage
15m high feature lighting column, CCTV column and litter bin
Alternative Orientation
SANTANDER
POTENTIAL CAFE
BARCLAYS BANK
VIRGIN MONEY
CAFE NERO
HULL MARITIME MUSEUM
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QUEEN'S DOCK AVENUE
FERENS ART GALLERY
PRINCES QUAY SHOPPING CENTRE
H. SAMUEL
STAND
WORKS
WORKS

North

Notes:

1. Preliminary layout subject to detailed design including full CDM compliance, progress of Public Realm works and Local Authority approval.
2. Two-way bus services to continue to operate along Carr Lane. Bus gates to be implemented at locations indicated.
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Key:

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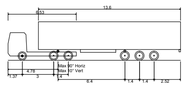
Vehicle Profile:



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Overall Body Height	3.681M
Min Body Ground Clearance	0.411M
Max Track Width	2.500M
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Ambulance

Overall Length	5.461M
Overall Width	2.020M
Overall Body Height	2.498M
Min Body Ground Clearance	0.225M
Track Width	1.860M
Lock-to-lock time	4.00s
Curb to Curb Turning Radius	6.500M

ISSUED FOR DISCUSSION PURPOSES

Issue	Date	By	Chkd	Appd
A	22/07/16	JH	RB	RB
First issue				

Client

Hull UK City of Culture 2017

Job Title

Hull Zephyr

Drawing Title

Alternative Arrangement
Queen Victoria Square

ARUP

Admiral House Rose Wharf
78 East Street Leeds LS9 8EE
Tel +44 (0)113 242 8498 Fax +44 (0)113 242 8573
www.arup.com

Scale at A1: 1:250

Plot ID: 332A5802-7A30-459D-AA34-98AC3DF4F804

Drawing Status: **For information**

Job No	Drawing No	Issue
249697	249697-SK-002	A

Appendix B

Transport Route

ROUTE SURVEY REPORT

for the

Road Transportation of B75 Turbine Blade

from

ABP Alexandra Dock, Hull

to

Hull City Centre

prepared for

SIEMENS

Project Number	AA0971-04
Project	B75 Route Survey Report
Client	Siemens
Document Number	ALE-RS-AA0971-04-001-0
Date	04/08/16
Prepared by	Ben Edwards

1. SCOPE

This Route Survey Report is concerned with the transport of 1 No. B75 turbine blade from Alexandra Dock, Hull to Queen Victoria Place, Hull City Centre.

The blade transport dimensions are taken from Siemens Dwg. No. D1019598:

B75 Blade: 75590 x 4345 x 5348 mm (L x W x H) @ 26.1t

2. TRANSPORT ARRANGEMENT

The Blade is to be transported on a SPMT 3 point bolster trailer. For details see the Transport Arrangement Dwg. No. DRW-AA0971-04-001.

3. ROUTE OVERVIEW

The route from Alexandra Dock is illustrated in Dwg. No. DRW-AA0971-04-002, sheet 1.

On exiting the dock from either the Eastern or Western gates, the route follows the A63 West.

After crossing Myton Bridge, the transport will cross the central reservation to turn North on Market Place.

Continuing on Market Place North, becoming Lowgate Road, the transport will turn West onto Alfred Gelder Street. To make the turn, the transport will need to reverse direction.

The transport follows Alfred Gelder Street West, becoming Queens Dock Avenue, until joining Bond street. The Transport will cross the junction with George street before reversing down Savile Street into Queen Victoria Place.

4. SWEPT PATH ANALYSIS

The Swept Path Analysis of the route is shown in Dwg. No. DRW-AA0971-04-002 and DRW-AA0971-04-003.

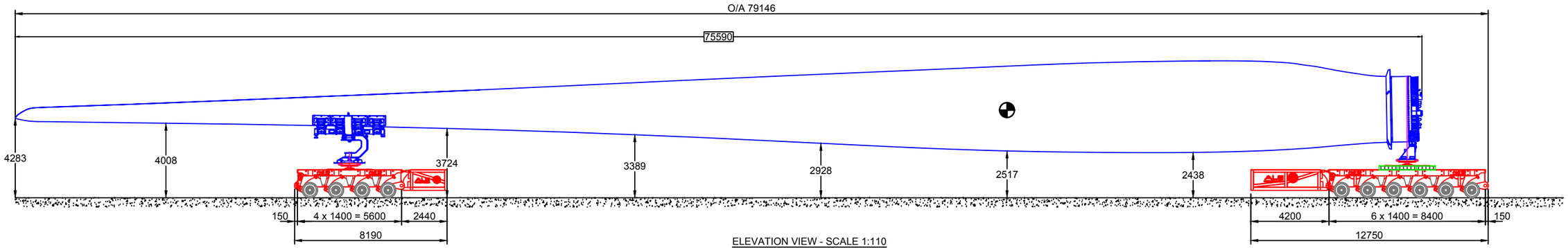
The plan view drawings of the turns were surveyed on 05-07/07/16 using a total station with prism reflector. During the survey, street furniture and possible obstructions were noted.

The Swept Path Analysis shows the path of the trailer (hatched in red) and the oversail of the blade (hatched in blue). For most of the route, the trailer remains on the road, however, there are occasions where the trailer must cross a curb.

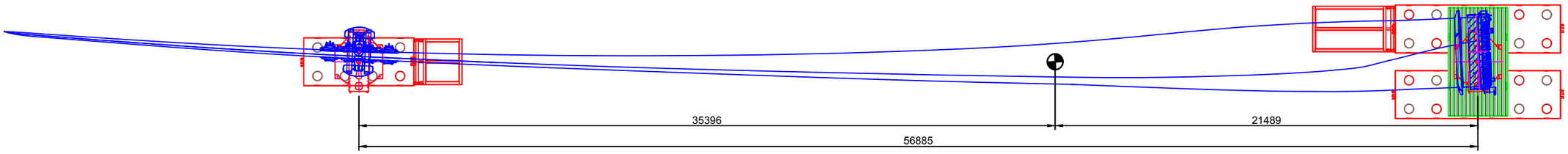
The street furniture that is required to be removed is indicated on the drawings. The objects in red must be removed. The objects in black are not essential to be removed, but they are close to the swept path to be noted and may need to be removed.

5. PROJECT DRAWINGS

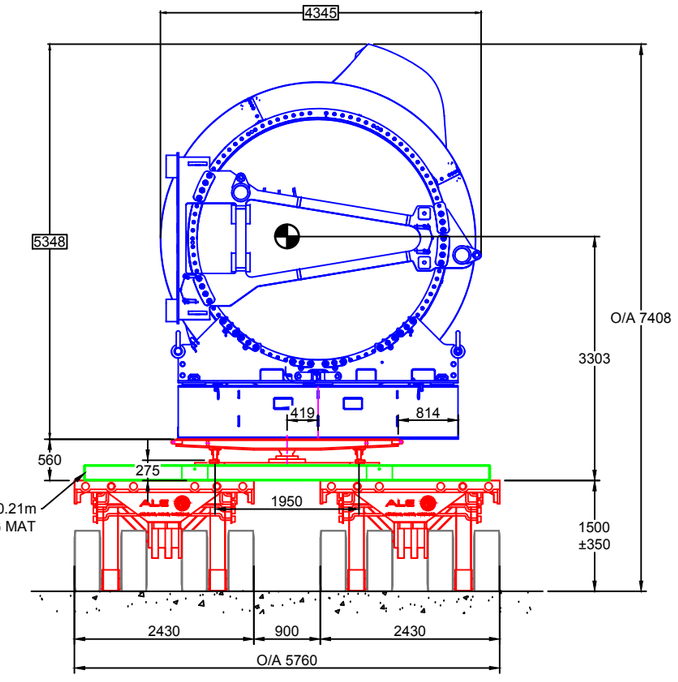
Drawing Number	Sheets	Description
DRW-AA0971-04-001	1 of 1	Transport Arrangement – B75 Blade
DRW-AA0971-04-002	1 to 10	Swept Path Analysis – Dock to City Centre
DRW-AA0971-04-003	1 of 1	Swept Path Analysis – Final Positioning



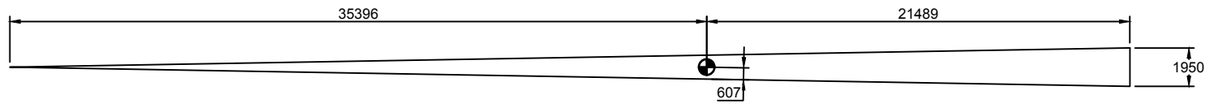
ELEVATION VIEW - SCALE 1:110



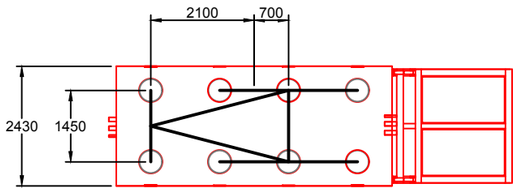
PLAN VIEW - SCALE 1:110



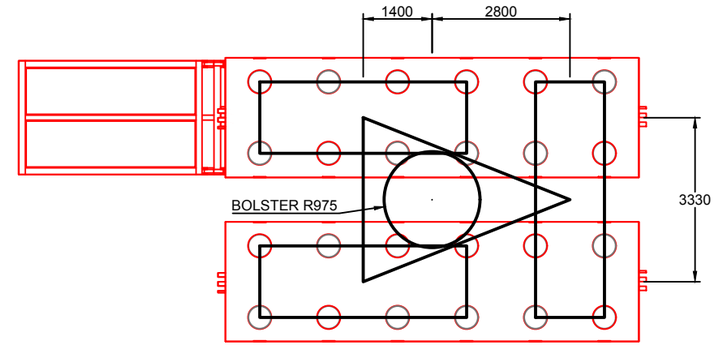
END ELEVATION VIEW - SCALE 1:40



STABILITY TRIANGLE



FRONT TRAILER HYDRAULIC GROUPS



REAR TRAILER HYDRAULIC GROUPS

DRAWING NOTES:

-ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE STATED.

-ALL WEIGHTS ARE IN t (METRIC TONNES) UNLESS OTHERWISE STATED.

-ALL DETAILS ARE PROVISIONAL AND ARE SUBJECT TO CONFIRMATION.

TECHNICAL NOTES:

- TRAILER GEOMETRIC OPERATION LIMIT = ± 202 mm
- BOLSTER GEOMETRIC OPERATION LIMIT = ± 288 mm
- TRAILER HYDRAULIC OPERATION LIMIT = ± 350 mm
- LASHING DETAILS TBC.
- BLADE TRANPORT DIMENSIONS AND WEIGHTS FROM RECEIVED Dwg. No. D1019598
- B75 BLADE TRANSPORT DIMENSIONS: 75590 x 4345 x 5348 mm (L x W x H) @ 26.1t
- BLADE SUPPORTS OFFSET ON BOLSTER DUE TO CoG OFFSET. CoG POSITIONED CENTRALLY ON TRAILERS.

TRAILER SPECIFICATION		TRAILER SPECIFICATION	
FRONT TRAILER SCHEURLE SPMT 1x2x4		REAR TRAILER SCHEURLE SPMT 1x4x6	
all weights in t (metric tonnes)	Total	all weights in t (metric tonnes)	Total
NUMBER OF AXLE LINES	4	NUMBER OF AXLE LINES	6
NUMBER OF FILES	2	NUMBER OF FILES	4
LOAD DETAILS		LOAD DETAILS	
PAY LOAD	9.86	PAY LOAD	16.24
TRANSPORTER WEIGHT	16.00	TRANSPORTER WEIGHT	48.00
ENGINE WEIGHT	4.00	ENGINE WEIGHT	7.00
AUXILIARY STEEL WEIGHT	4.96	AUXILIARY STEEL WEIGHT	11.41
TOTAL LOAD	34.82	TOTAL LOAD	82.65
LOAD PER AXLE LINE / TRAILER	8.7	LOAD PER AXLE LINE / TRAILER	6.9
LOAD PER FILE	4.4	LOAD PER FILE	3.4
LOAD PER WHEEL	2.2	LOAD PER WHEEL	1.7
GROUND BEARING PRESSURE t/m²	2.56	GROUND BEARING PRESSURE t/m²	2.02

Rev.	Date	Drawn	Check	Description
0	28.07.16	BE	NJ	FIRST ISSUE

QF19 (Issue 5)

Abnormal Load Engineering Ltd.
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Tel: +44 (0) 1889 272 500
Fax: +44 (0) 1889 271 750
Web: www.ale-heavylift.com

Client: SIEMENS

Project Title: B75 ROUTE SURVEY REPORT

Drawing Title: TRANSPORT ARRANGEMENT FOR B75 BLADE
BOLSTER ARRANGEMENT ON SPMT

Date	Drawn	Checked	Scale (A1)	Sheet
28.07.16	BE	NJ	AS SHOWN	1 of 1

Project No.: AA0971-04
Drawing No.: DRW-AA0971-04-001
Rev.: 0

File Location: Z:\Public\Job Files\AA0000 -\AA0971 - Siemens Hull - B75 Blades and Moulds\AA0971-04 - Siemens B75 Route Survey Report\Engineering\Drawings\DRW-AA0971-04-001-0 - TA - Bl

DRAWING NOTES:

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TECHNICAL NOTES:

- ROUTE FROM ALEXANDRA DOCK TO HULL CITY CENTRE.
- ROUTE A - DOCK EXIT VIA EASTERN GATE ONTO NORTHERN GATEWAY ROUNDABOUT.
- ROUTE B - DOCK EXIT VIA WESTERN GATE ONTO EARLE'S ROAD. JOINS ROUTE A ON A63.
- B75 BLADE TRANSPORT DIMENSIONS: 75590 x 4345 x 5348 mm (L x W x H) @ 26.1t
- FOR TRANSPORT ARRANGEMENT, SEE Dwg. No. DRW-AA0971-04-001

Rev.	Date	Drawn	Check	Description
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Web: www.ale-heavylift.com

Client: SIEMENS

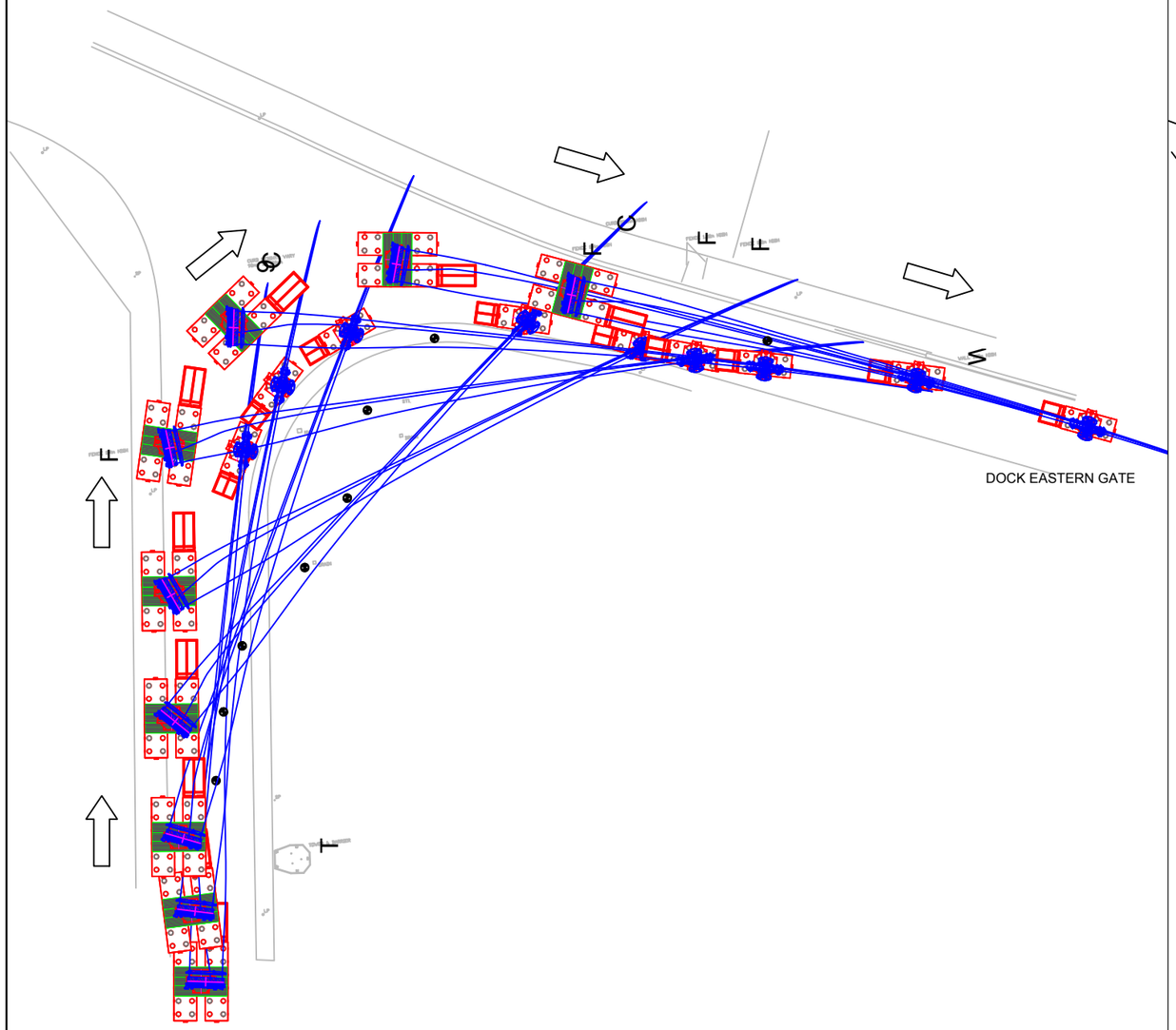
Project Title: B75 ROUTE SURVEY REPORT

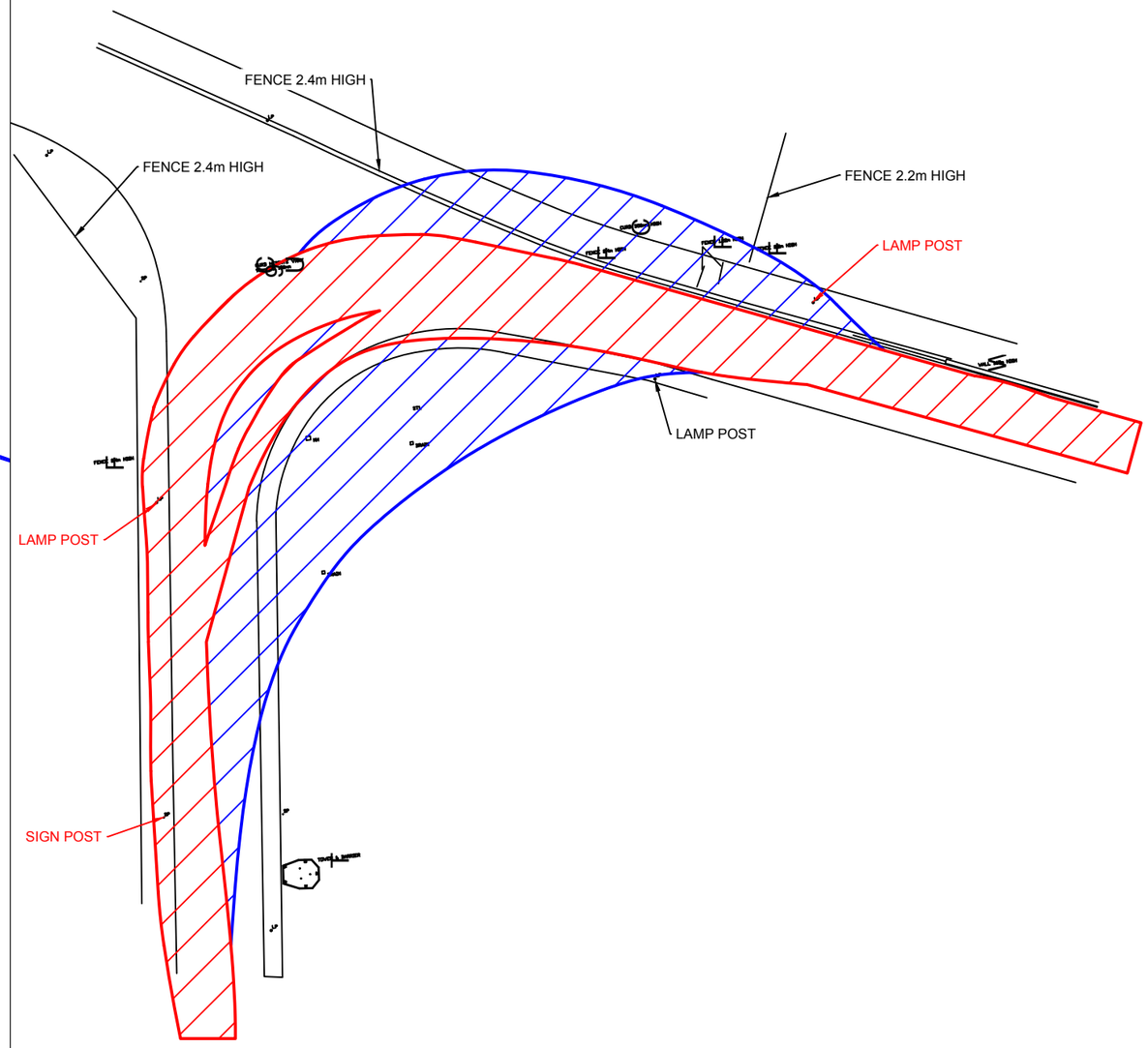
Drawing Title: SWEPT PATH ANALYSIS - HULL CITY CENTRE
ROUTE OVERVIEW

Date	Drawn	Checked	Scale (A1)	Sheet
29/07/16	BE		NTS	1 of 10

Project No.	Drawing No.	Rev.
AA0971-04	DRW-AA0971-04-002	0

File Location: Z:\Public\Job Files\AA0000 -\AA0971 - Siemens Hull - B75 Blades and Moulds\AA0971-04 - Siemens B75 Route Survey Report\Engineering\Drawings\DRW-AA0971-04-002-0 - SP - HumberCentre.dwg





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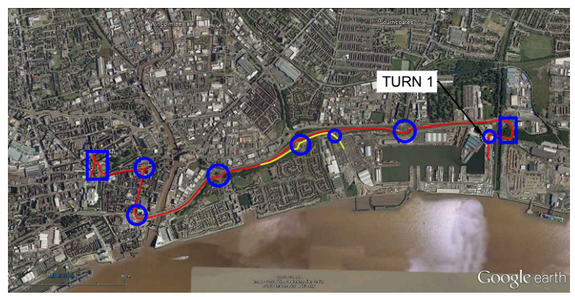
TECHNICAL NOTES:

- TRAILER PATH
- BLADE OVERSAIL

- B75 BLADE TRANSPORT DIMENSIONS: 75590 x 4345 x 5348 mm (L x W x H) @ 26.1t
- FOR TRANSPORT ARRANGEMENT, SEE Dwg. No. DRW-AA0971-04-001
- STREET FURNITURE INDICATED IN RED MUST BE REMOVED.
- OTHER STREET FURNITURE IDENTIFIED MAY BE REQUIRED TO BE REMOVED.



Rev.	Date	Drawn	Check	Description
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Abnormal Load Engineering Ltd.
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Client: SIEMENS

Project Title: B75 ROUTE SURVEY REPORT

Drawing Title: SWEPT PATH ANALYSIS - HULL CITY CENTRE TURN 1

Date	Drawn	Checked	Scale (A1)	Sheet
29/07/16	BE		NTS	2 of 10

Project No.	Drawing No.	Rev.
AA0971-04	DRW-AA0971-04-002	0

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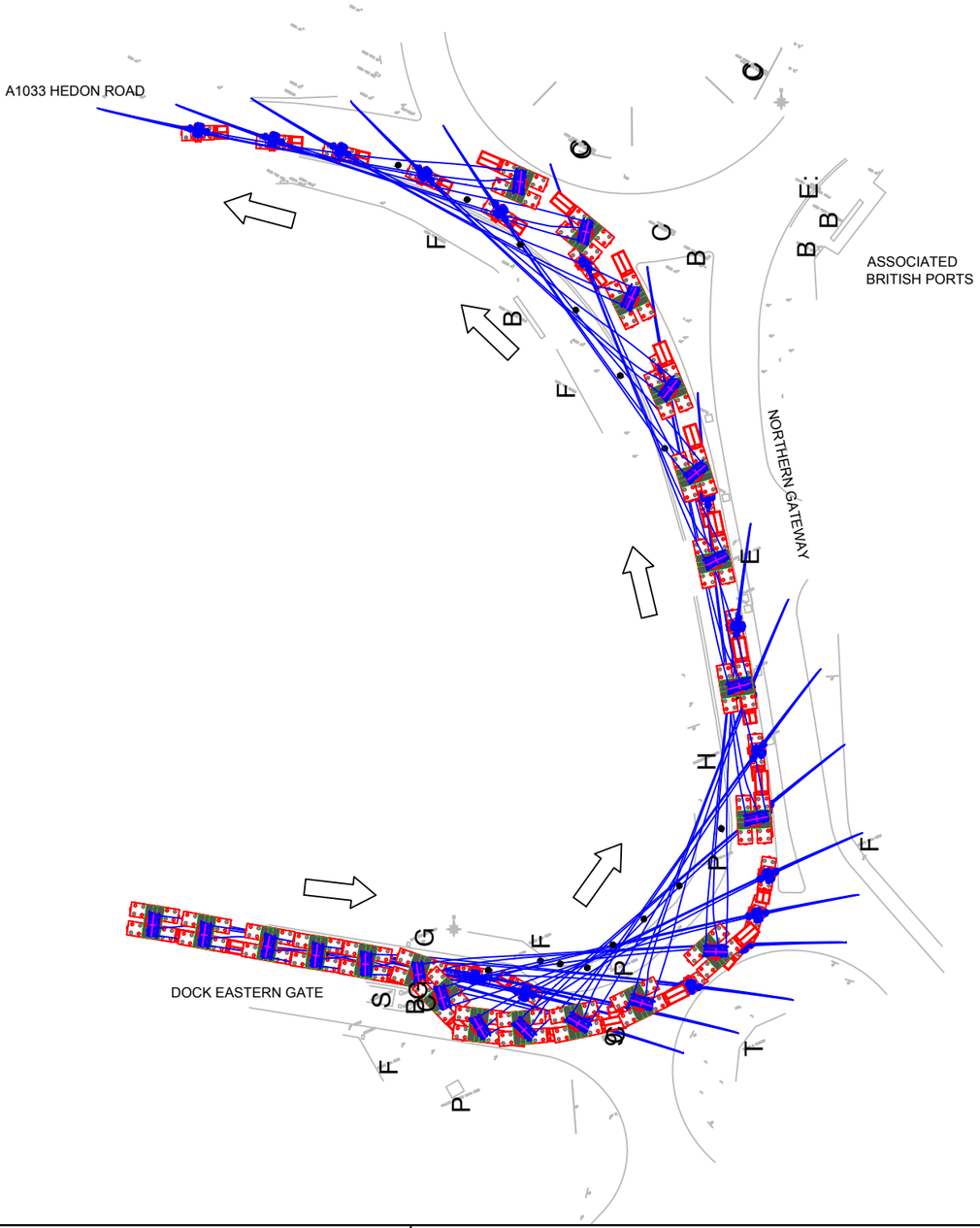

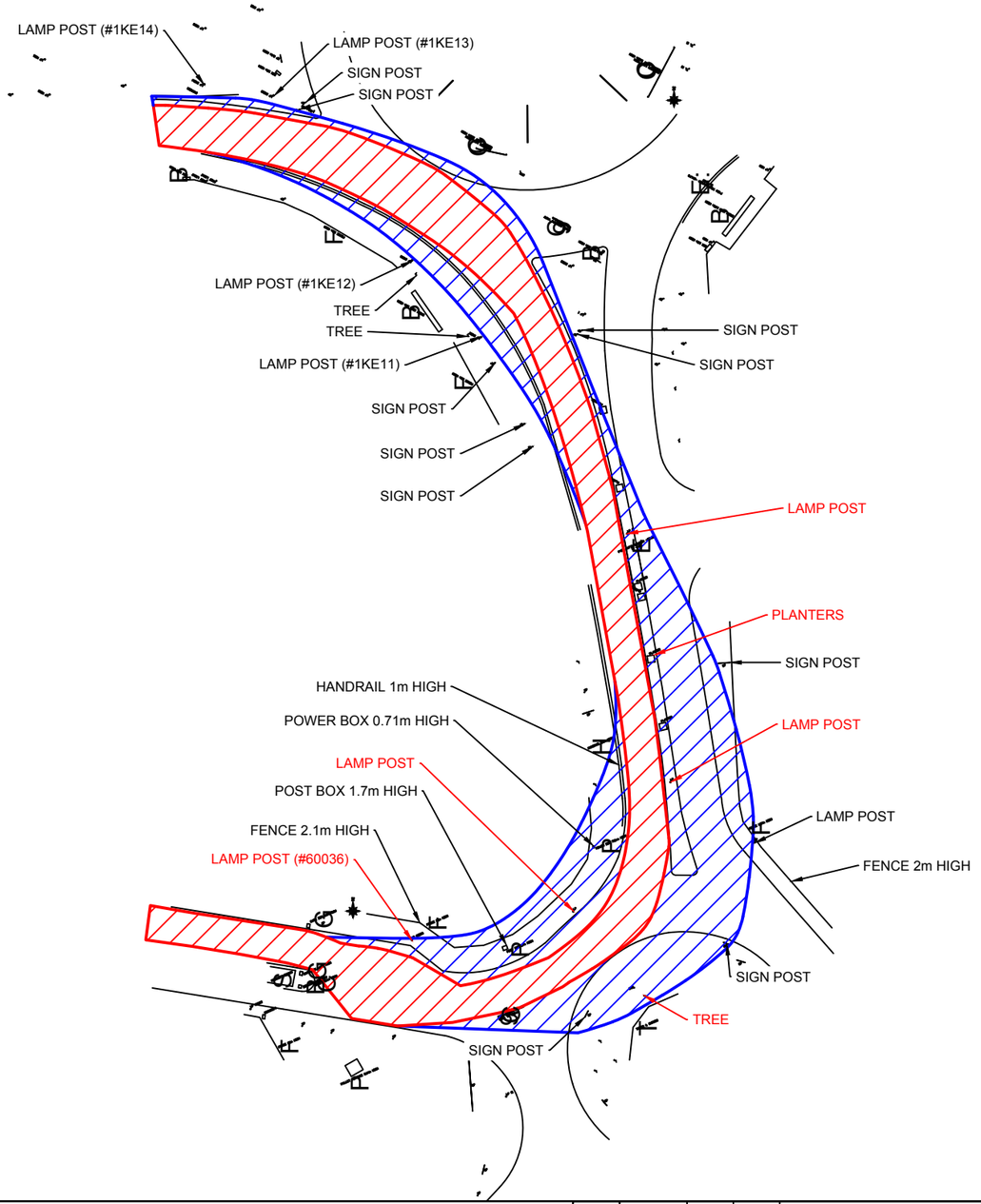

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- BLADE OVERSAIL

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Rev.	Date	Drawn	Check	Description	QF19 (Issue 5)
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Web: www.ale-heavylift.com

Client: SIEMENS

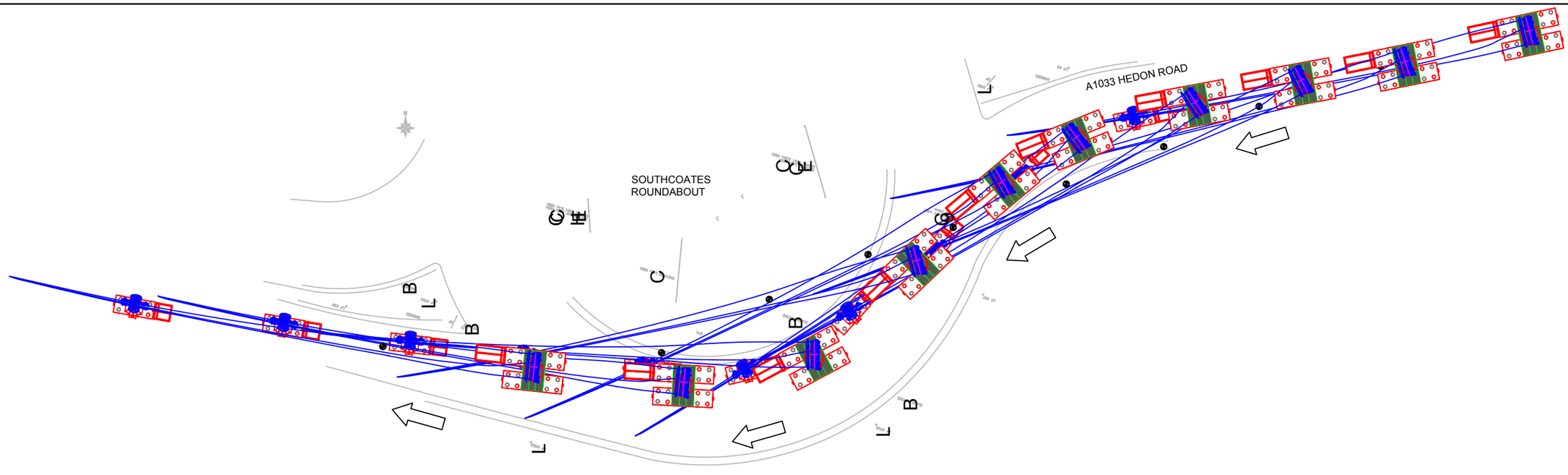
Project Title: B75 ROUTE SURVEY REPORT

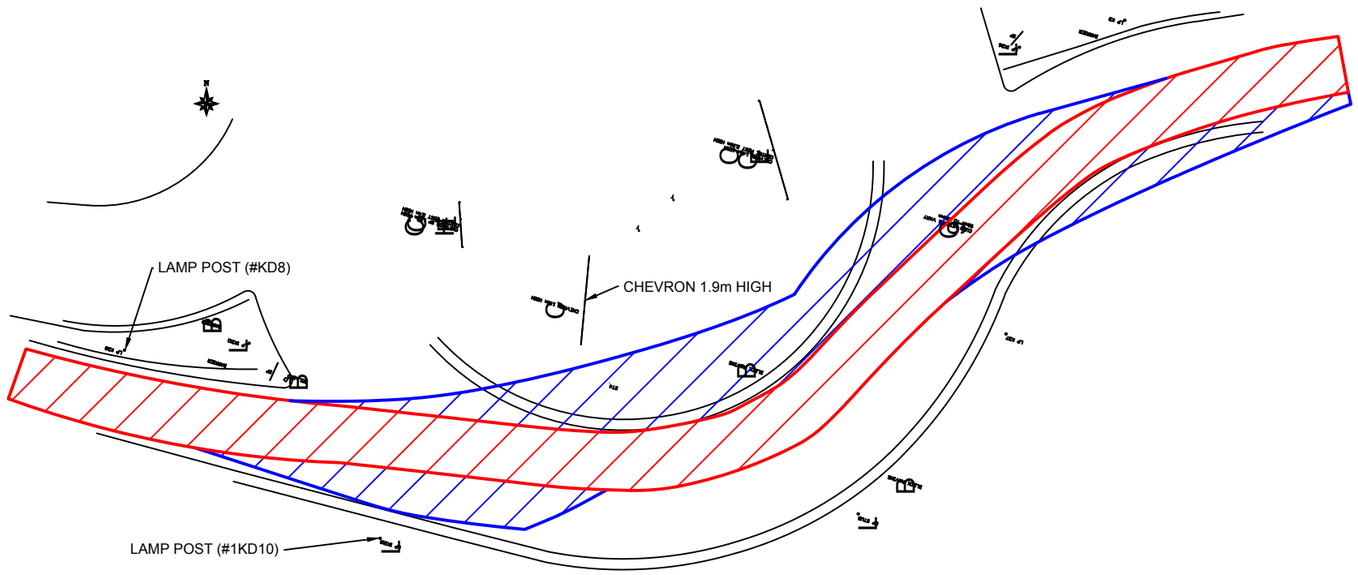
Drawing Title: SWEPT PATH ANALYSIS - HULL CITY CENTRE
TURN 2

Date	Drawn	Checked	Scale (A1)	Sheet
29/07/16	BE		NTS	3 of 10

Project No.	Drawing No.	Rev.
AA0971-04	DRW-AA0971-04-002	0

File Location: Z:\Public\Job Files\AA0000 -\AA0971 - Siemens Hull - B75 Blades and Moulds\AA0971-04 - Siemens B75 Route Survey Report\Engineering\Drawings\DRW-AA0971-04-002-0 - SP - Hull City Centre.dwg





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- BLADE OVERSAIL

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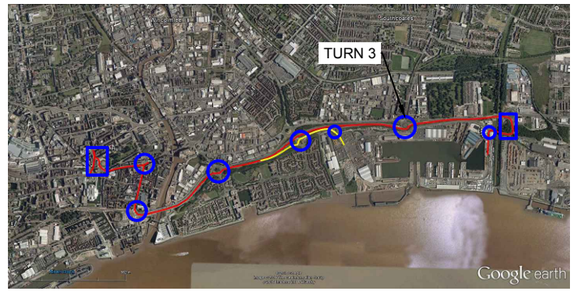

Rev.	Date	Drawn	Check	Description
0	29/07/16	BE		FIRST ISSUE

QF19 (Issue 5)

Abnormal Load Engineering Ltd.
New Road, Hixon, Staffordshire, ST18 0PE, U.K.
Tel: +44 (0) 1889 272 500
Fax: +44 (0) 1889 271 750
Web: www.ale-heavylift.com

Client: SIEMENS

Project Title: B75 ROUTE SURVEY REPORT

Drawing Title: SWEPT PATH ANALYSIS - HULL CITY CENTRE
TURN 3

Date	Drawn	Checked	Scale (A1)	Sheet
29/07/16	BE		NTS	4 of 10

Project No.	Drawing No.	Rev.
AA0971-04	DRW-AA0971-04-002	0

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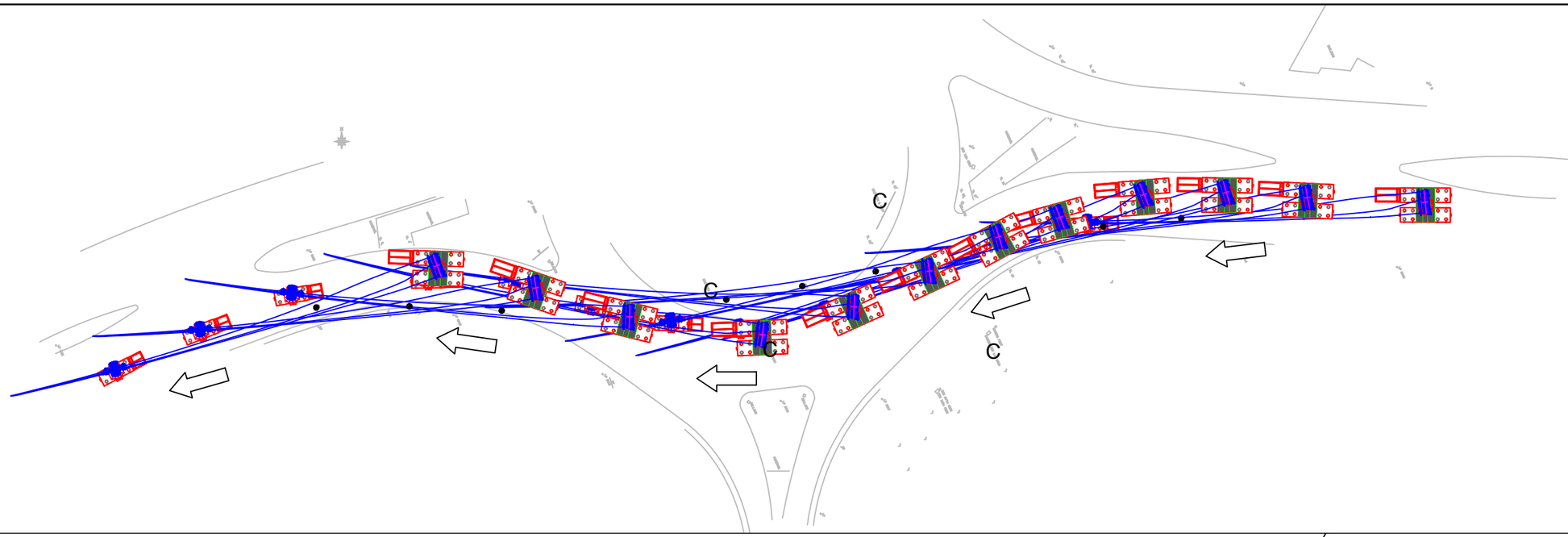

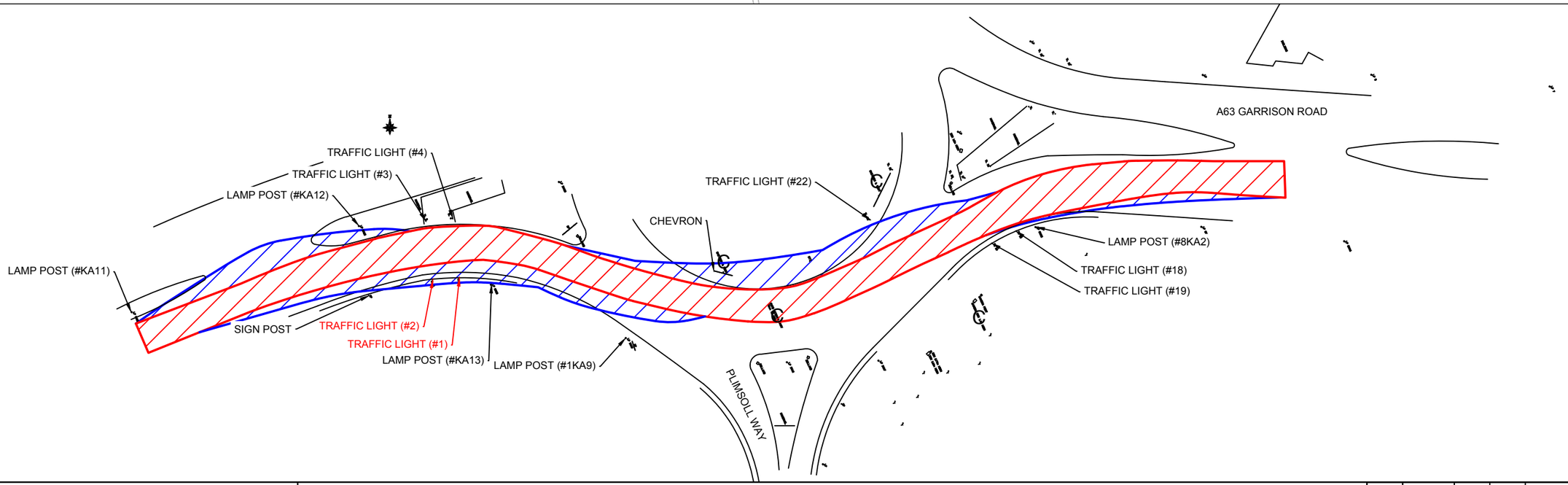

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TECHNICAL NOTES:

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Rev.	Date	Drawn	Check	Description	QF19 (Issue 5)
0	29/07/16	BE		FIRST ISSUE	

ALE
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New Road, Hixon, Staffordshire, ST18 0PE, U.K.
Tel: +44 (0) 1889 272 500
Fax: +44 (0) 1889 271 750
Web: www.ale-heavylift.com

Client: SIEMENS

Project Title: B75 ROUTE SURVEY REPORT

Drawing Title: SWEPT PATH ANALYSIS - HULL CITY CENTRE TURN 4

Date	Drawn	Checked	Scale (A1)	Sheet
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Project No.	Drawing No.	Rev.
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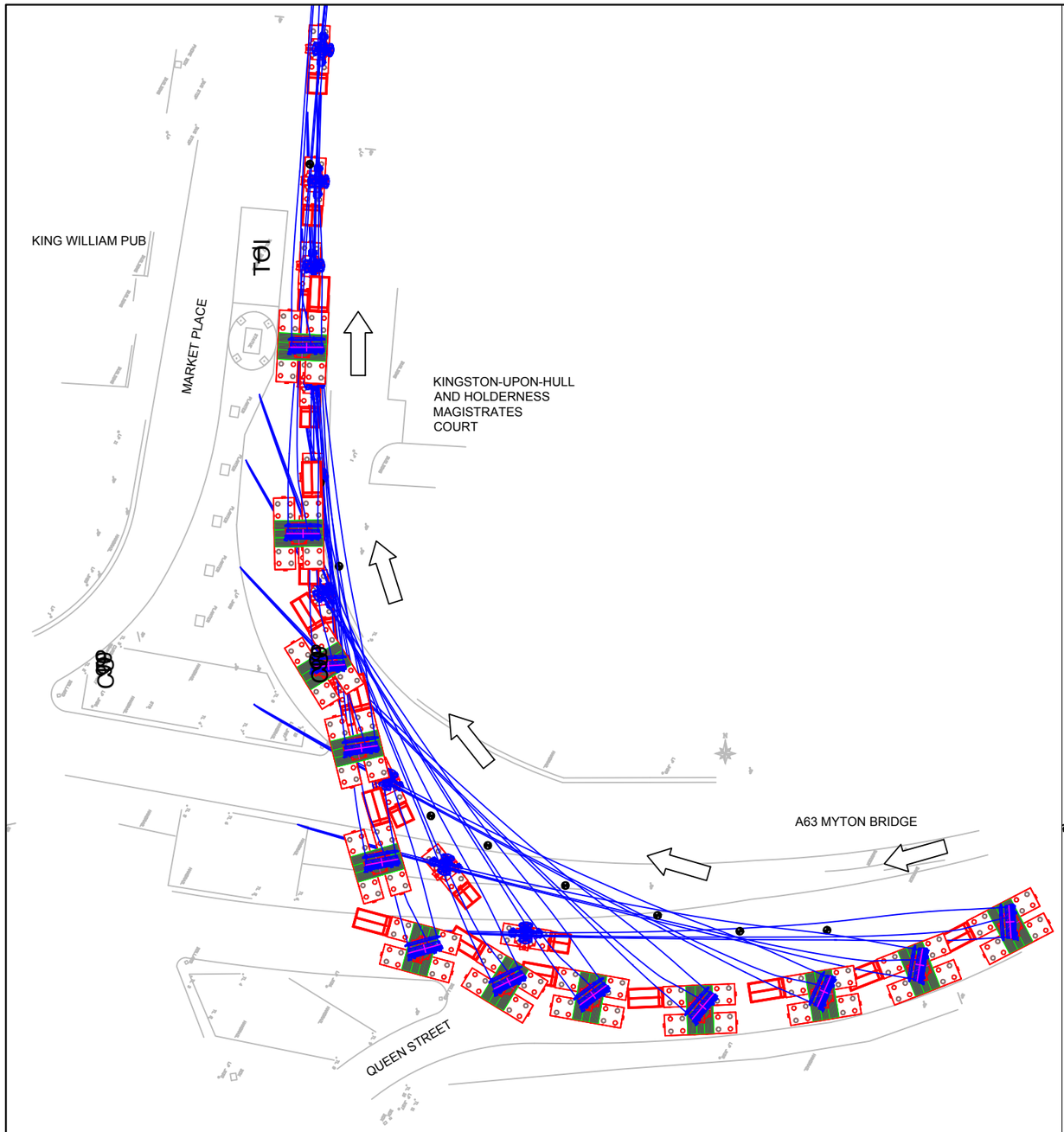

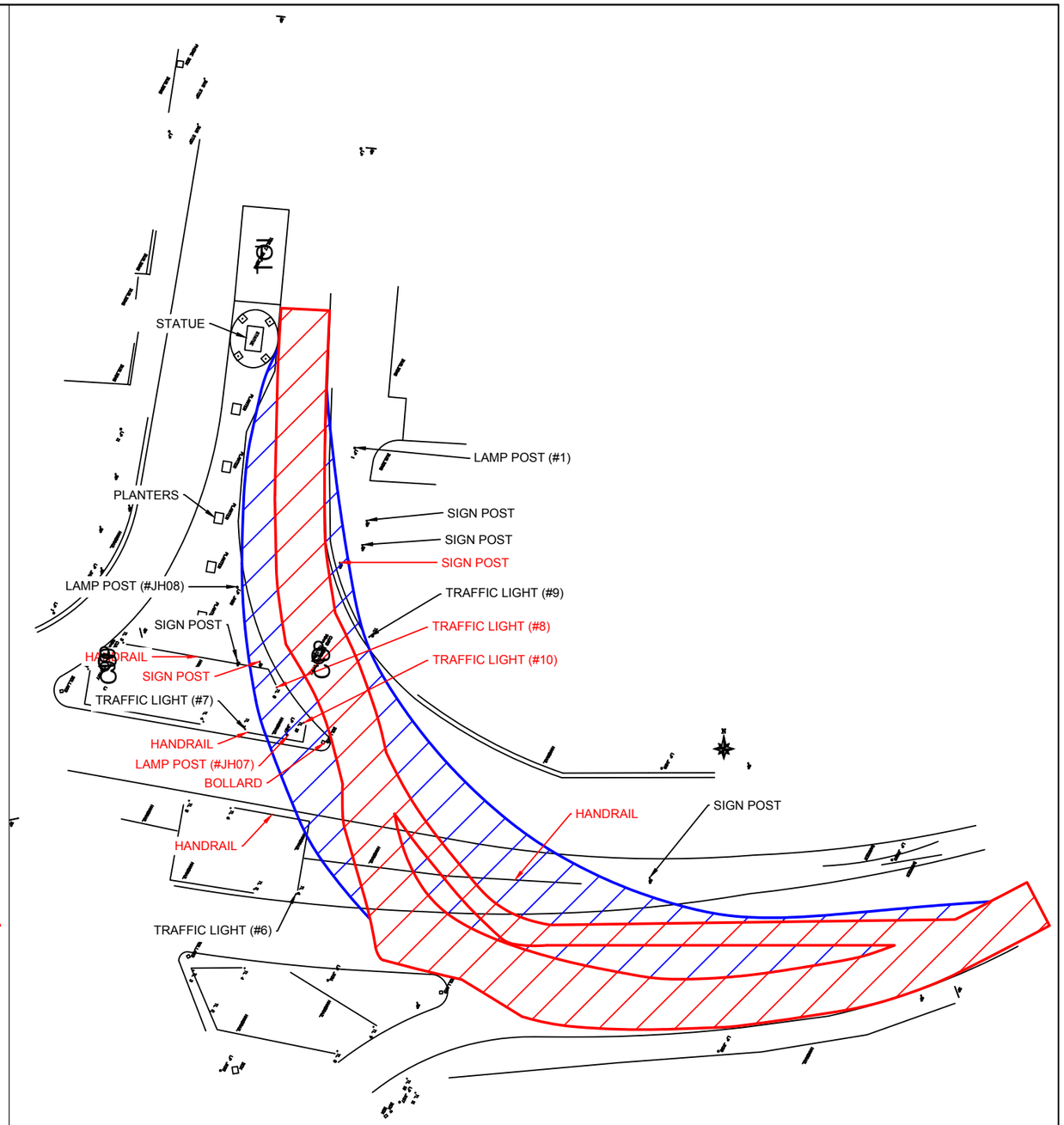

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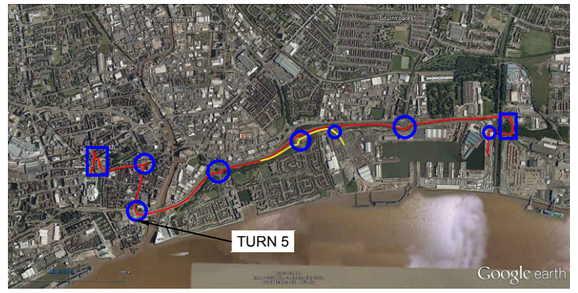

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Drawing Title: SWEPT PATH ANALYSIS - HULL CITY CENTRE
TURN 5

Date	Drawn	Checked	Scale (A1)	Sheet
29/07/16	BE		NTS	6 of 10

Project No.	Drawing No.	Rev.
AA0971-04	DRW-AA0971-04-002	0

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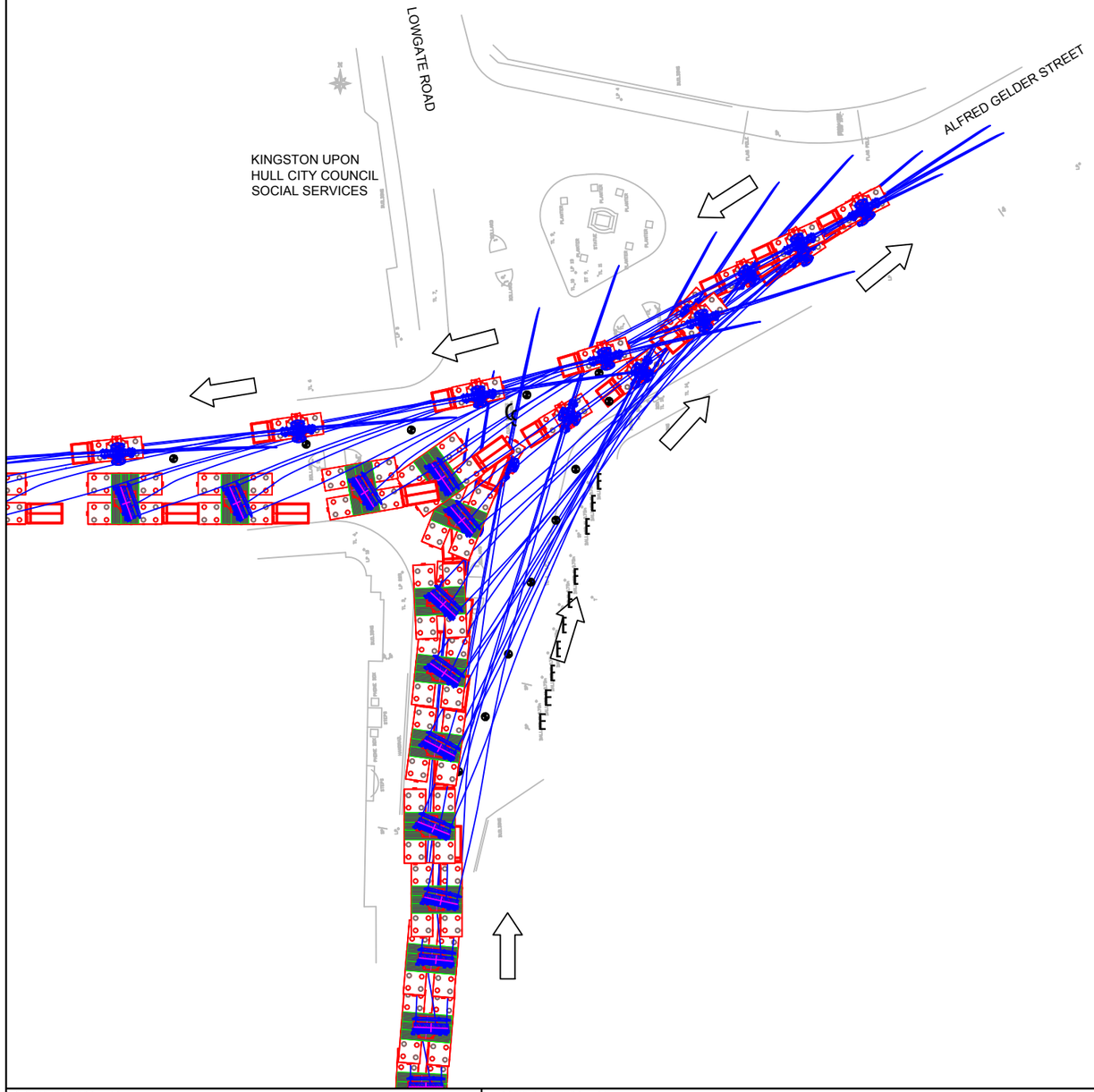

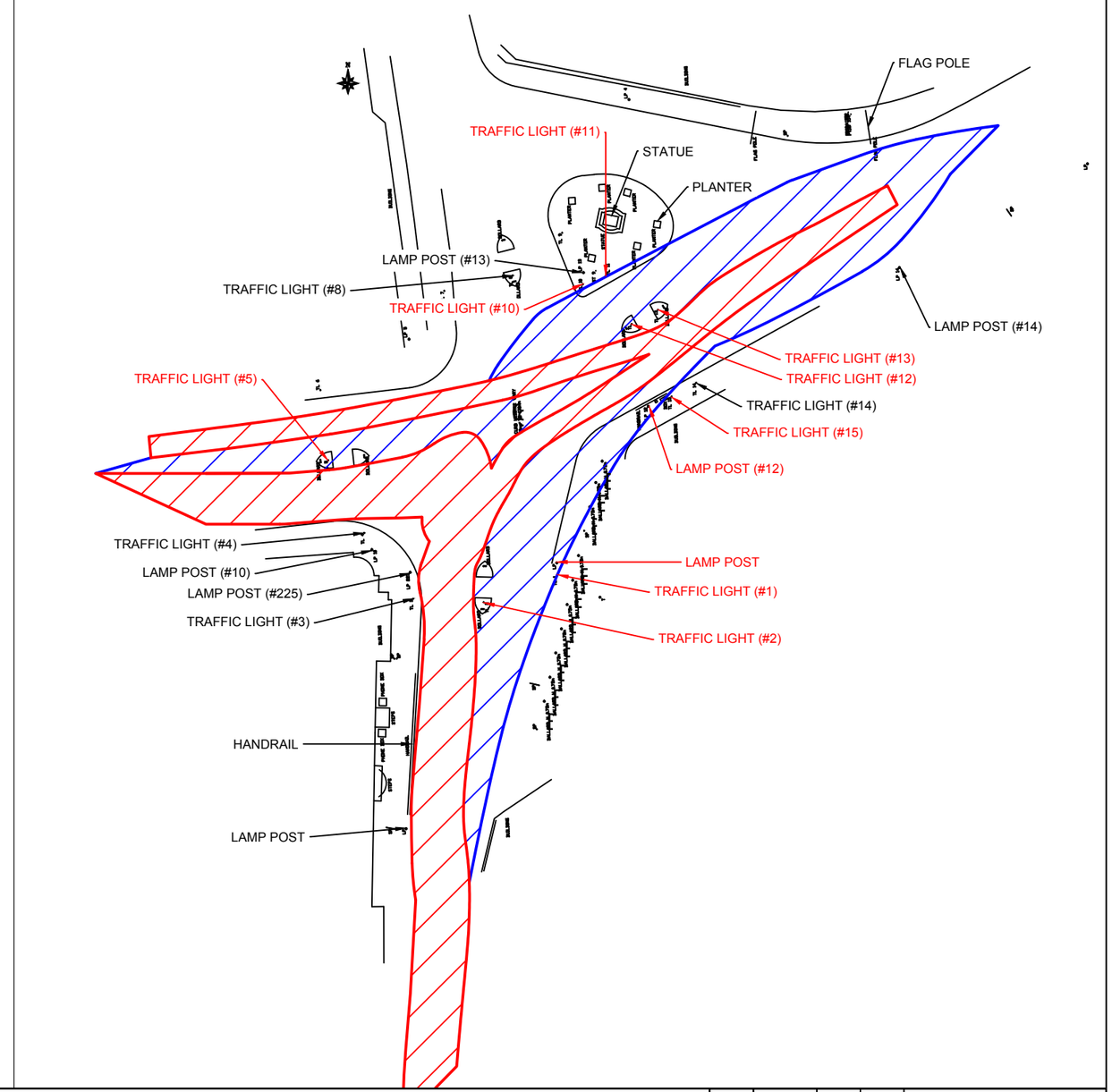

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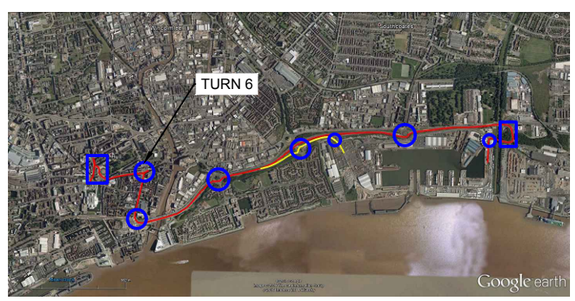

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Drawing Title: SWEPT PATH ANALYSIS - HULL CITY CENTRE TURN 6

Date	Drawn	Checked	Scale (A1)	Sheet
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Project No.	Drawing No.	Rev.
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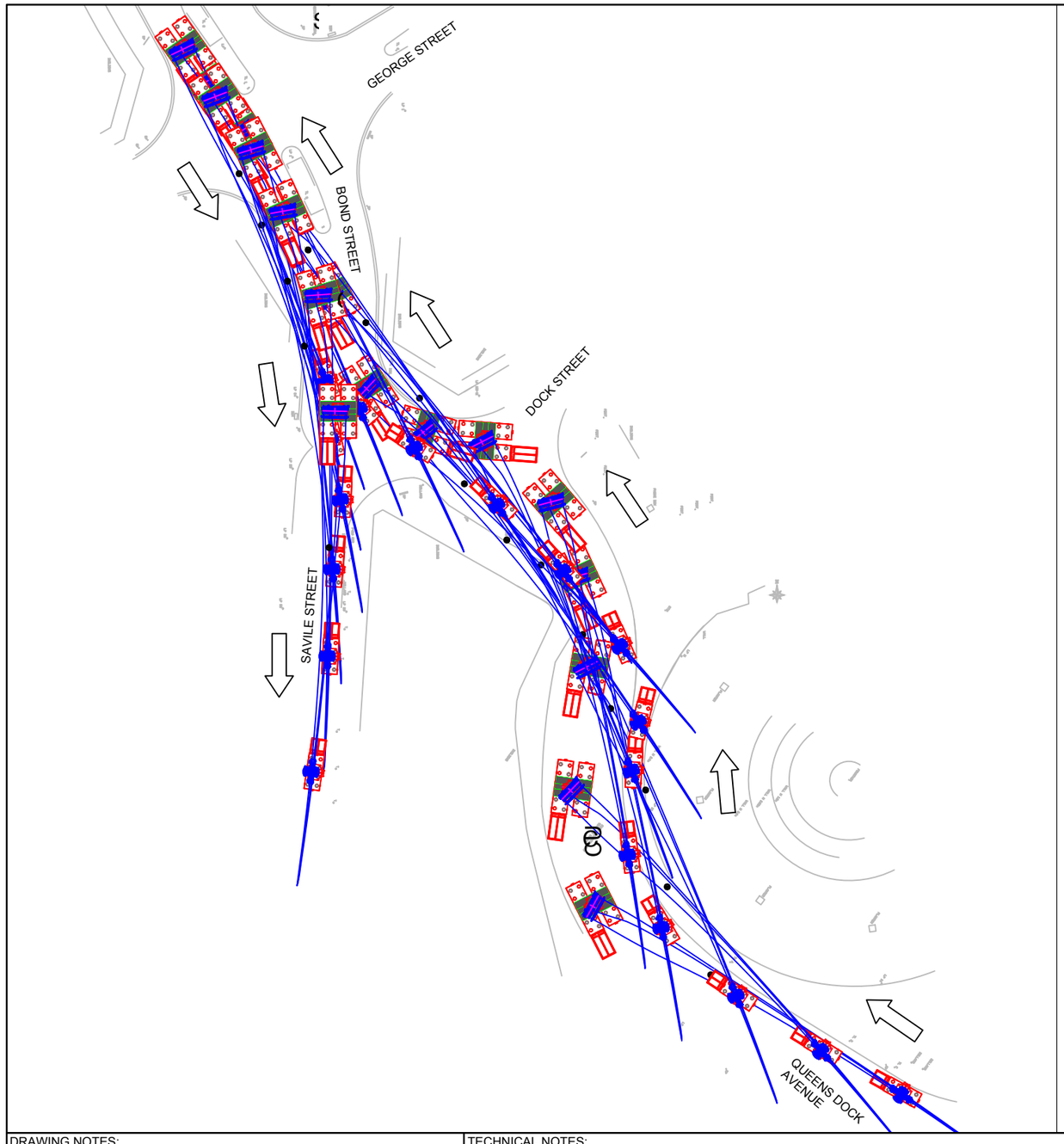

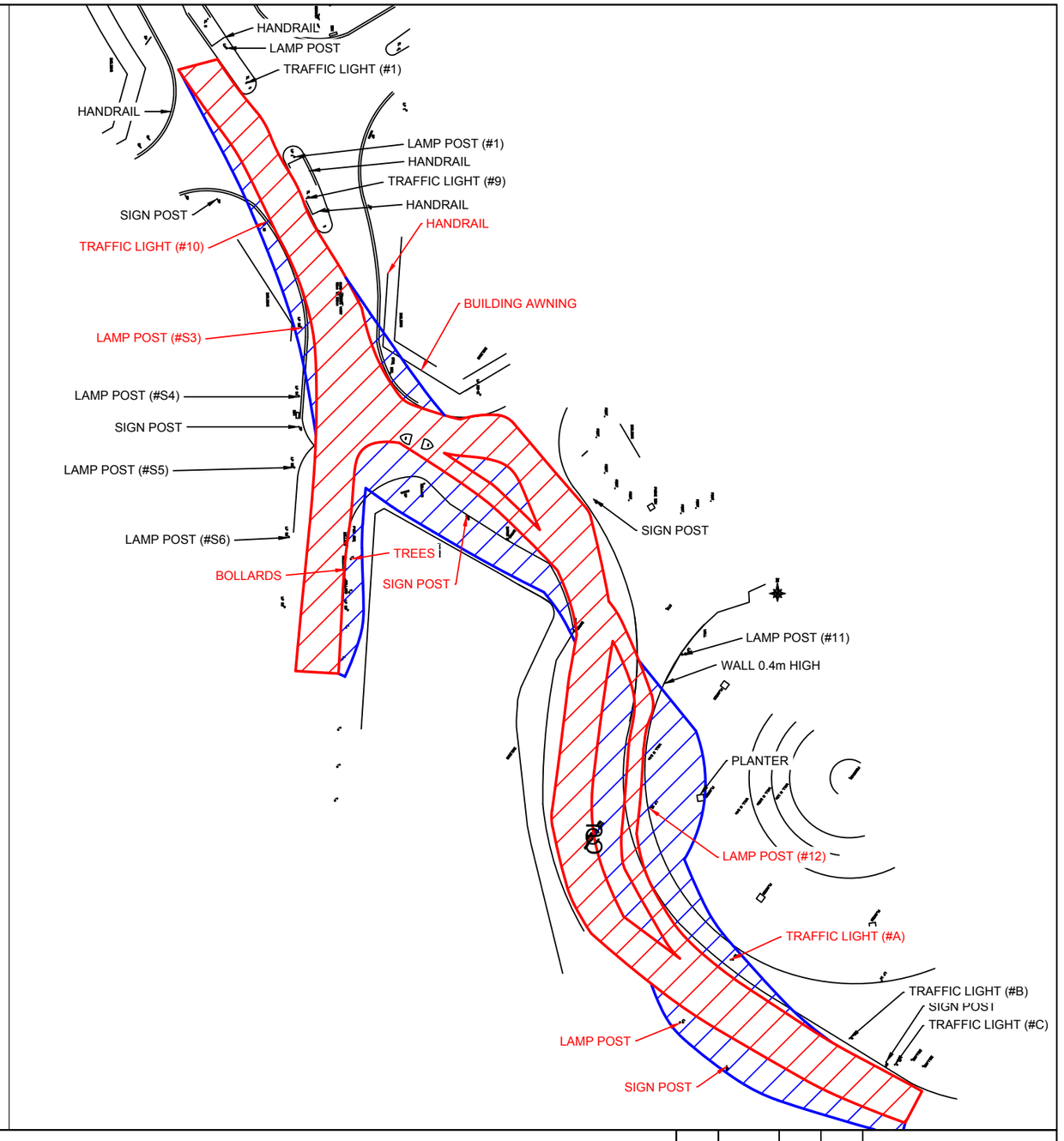

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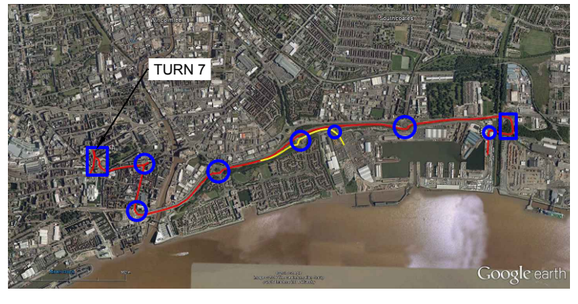

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Drawing Title: SWEPT PATH ANALYSIS - HULL CITY CENTRE TURN 7

Date	Drawn	Checked	Scale (A1)	Sheet
29/07/16	BE		NTS	8 of 10

Project No.	Drawing No.	Rev.
AA0971-04	DRW-AA0971-04-002	0

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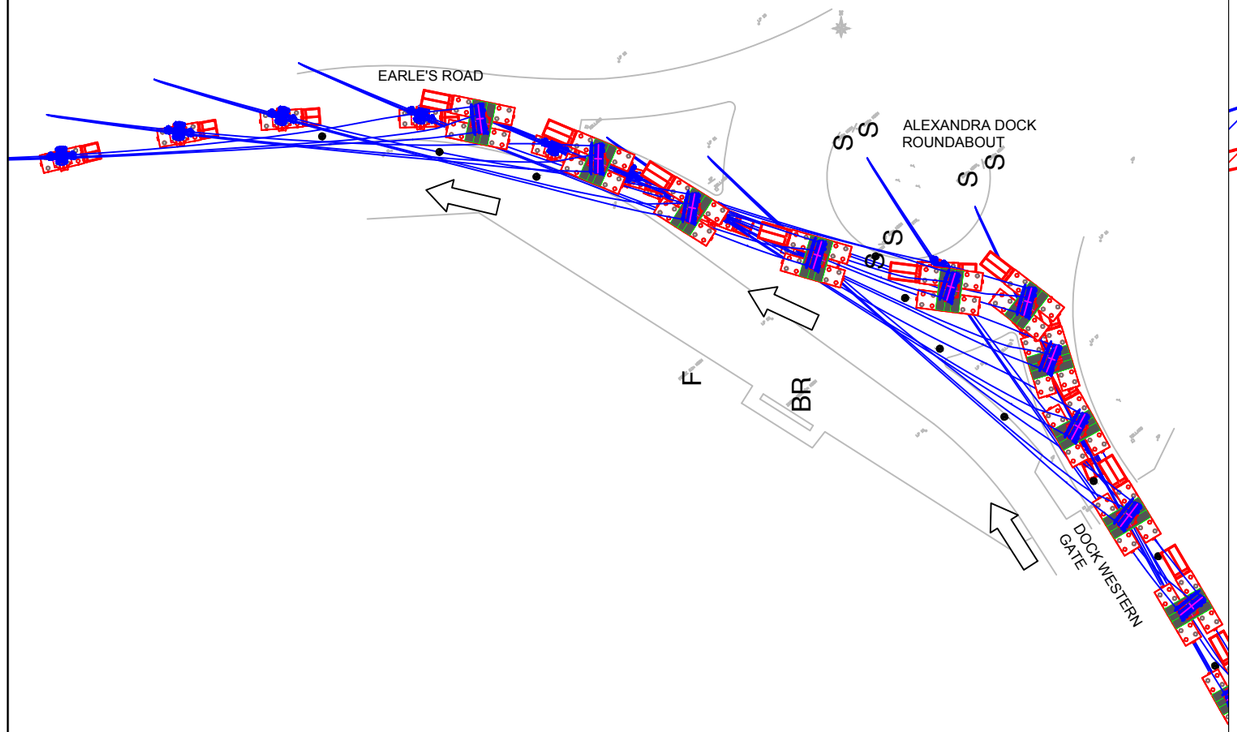

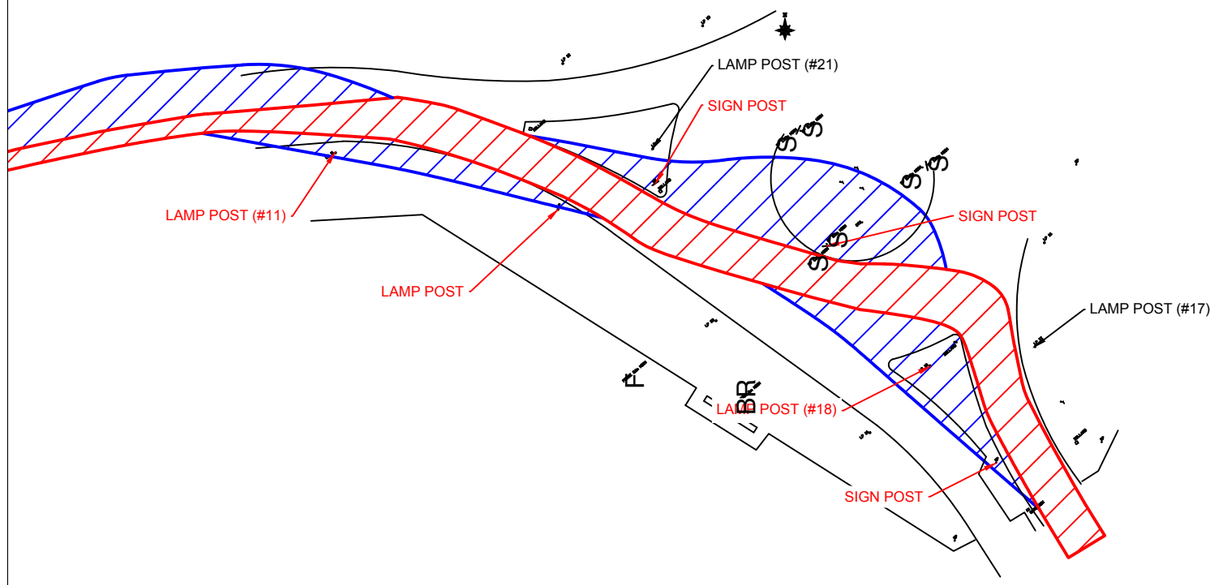

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Client: SIEMENS

Project Title: B75 ROUTE SURVEY REPORT

Drawing Title: SWEPT PATH ANALYSIS - HULL CITY CENTRE
ROUTE B - TURN 1

Date	Drawn	Checked	Scale (A1)	Sheet
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Project No.	Drawing No.	Rev.
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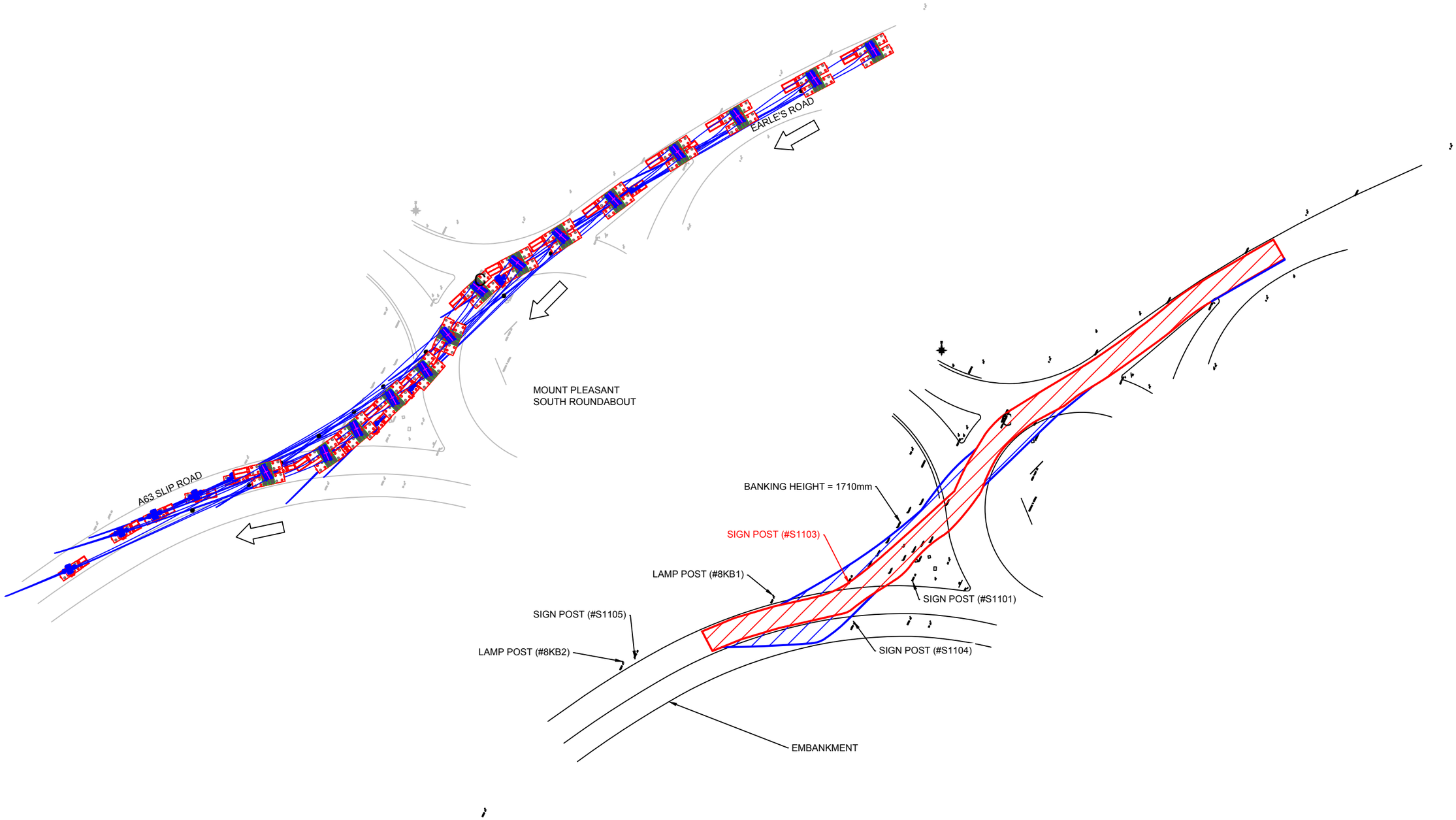

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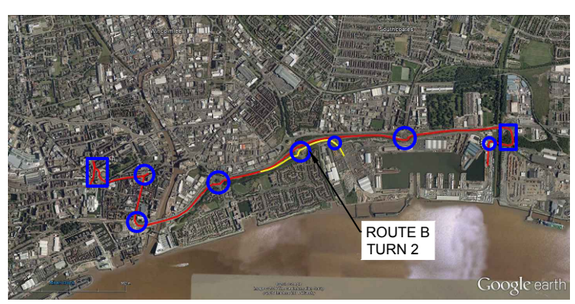

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Client: SIEMENS

Project Title: B75 ROUTE SURVEY REPORT

Drawing Title: SWEPT PATH ANALYSIS - HULL CITY CENTRE
ROUTE B - TURN 2

Date	Drawn	Checked	Scale (A1)	Sheet
29/07/16	BE		NTS	10 of 10

Project No.	Drawing No.	Rev.
AA0971-04	DRW-AA0971-04-002	0

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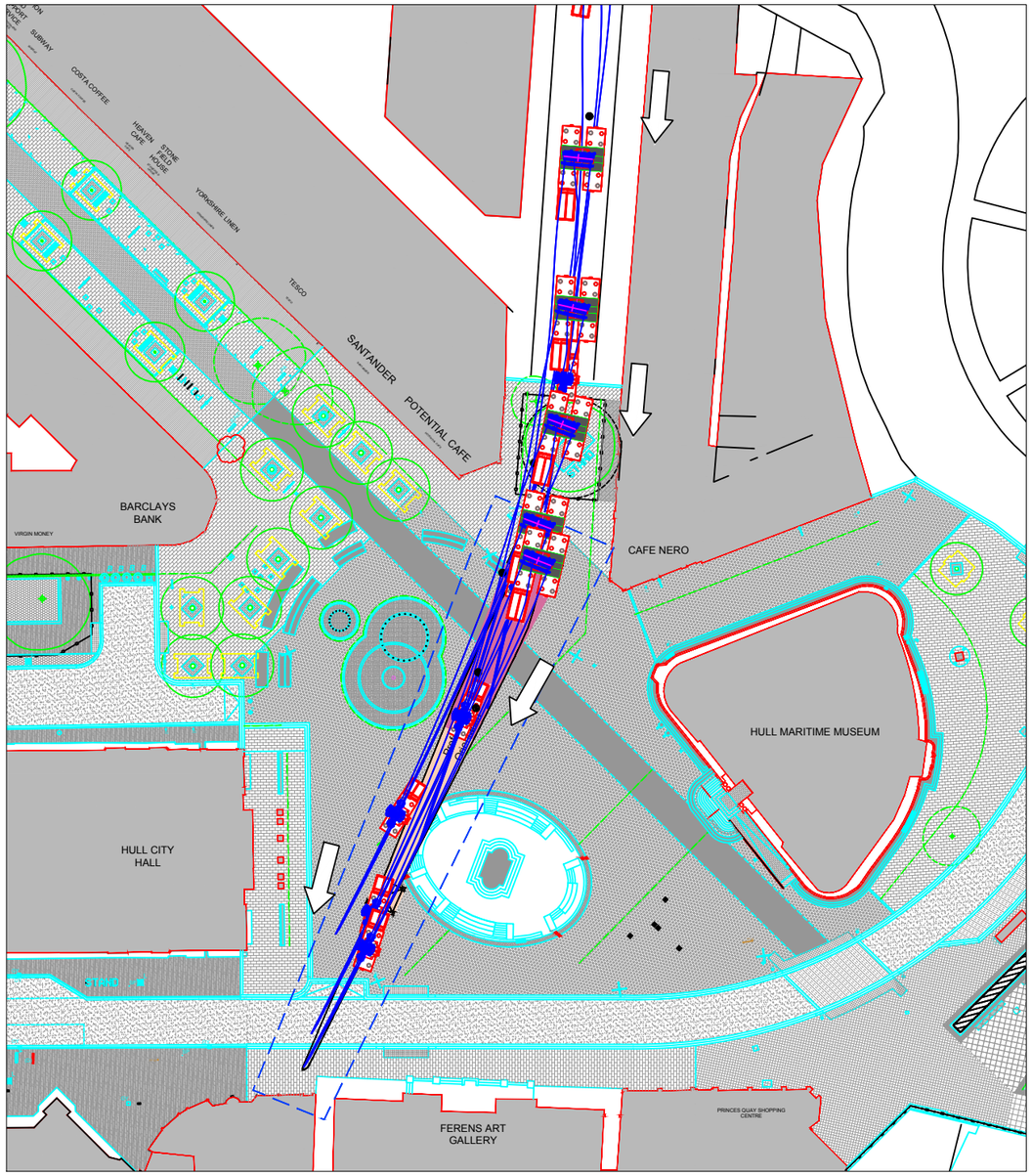

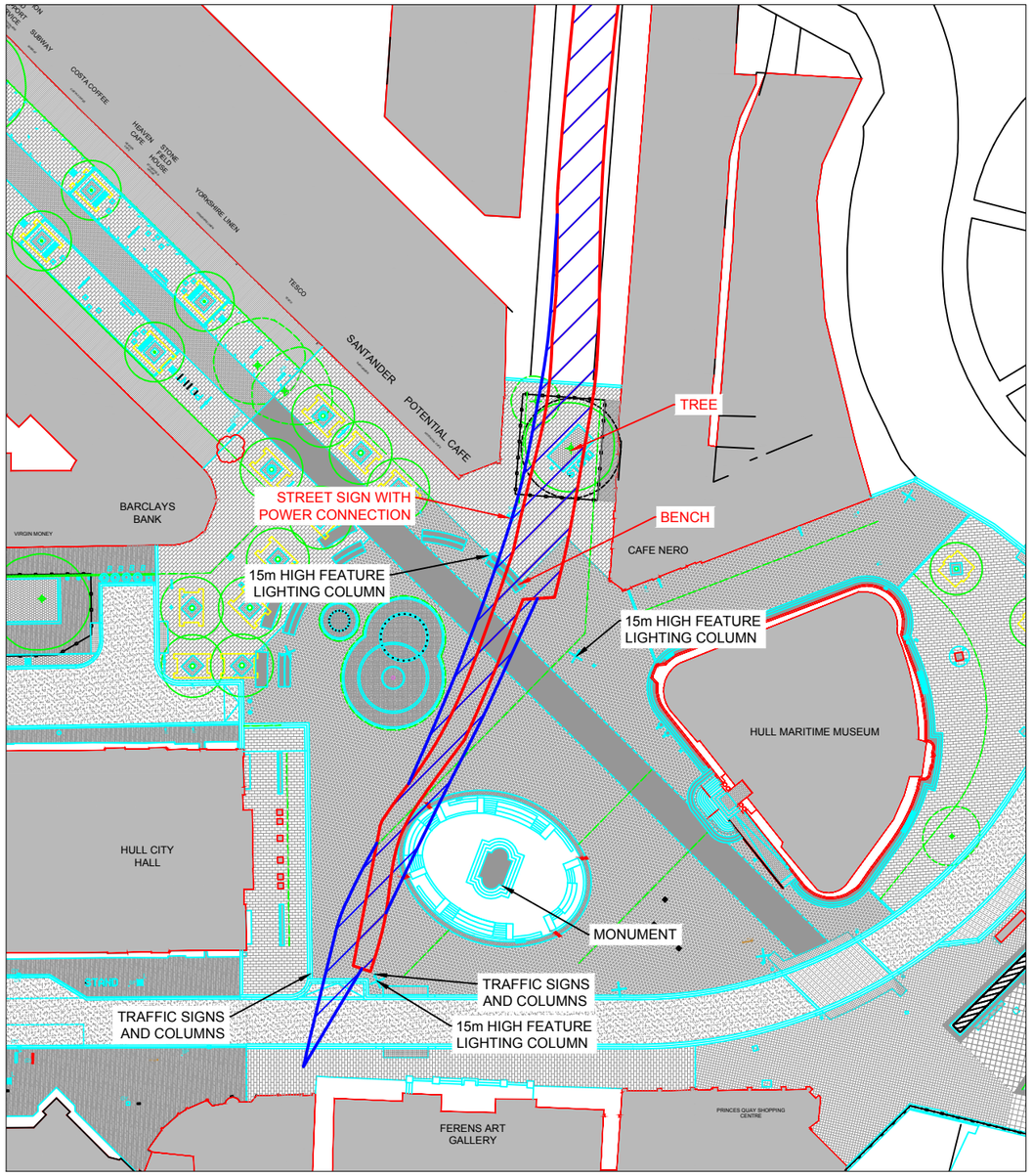

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- BLADE FINAL POSITION FROM RECEIVED Dwg. No. 249697-SK-001-A

Rev.	Date	Drawn	Check	Description
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Project Title: B75 ROUTE SURVEY REPORT

Drawing Title: SWEPT PATH ANALYSIS
BLADE FINAL POSITIONING

Date	Drawn	Checked	Scale (A1)	Sheet
29/07/16	BE		NTS	1 of 1

Project No.	Drawing No.	Rev.
AA0971-04	DRW-AA0971-04-003	0

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Appendix C

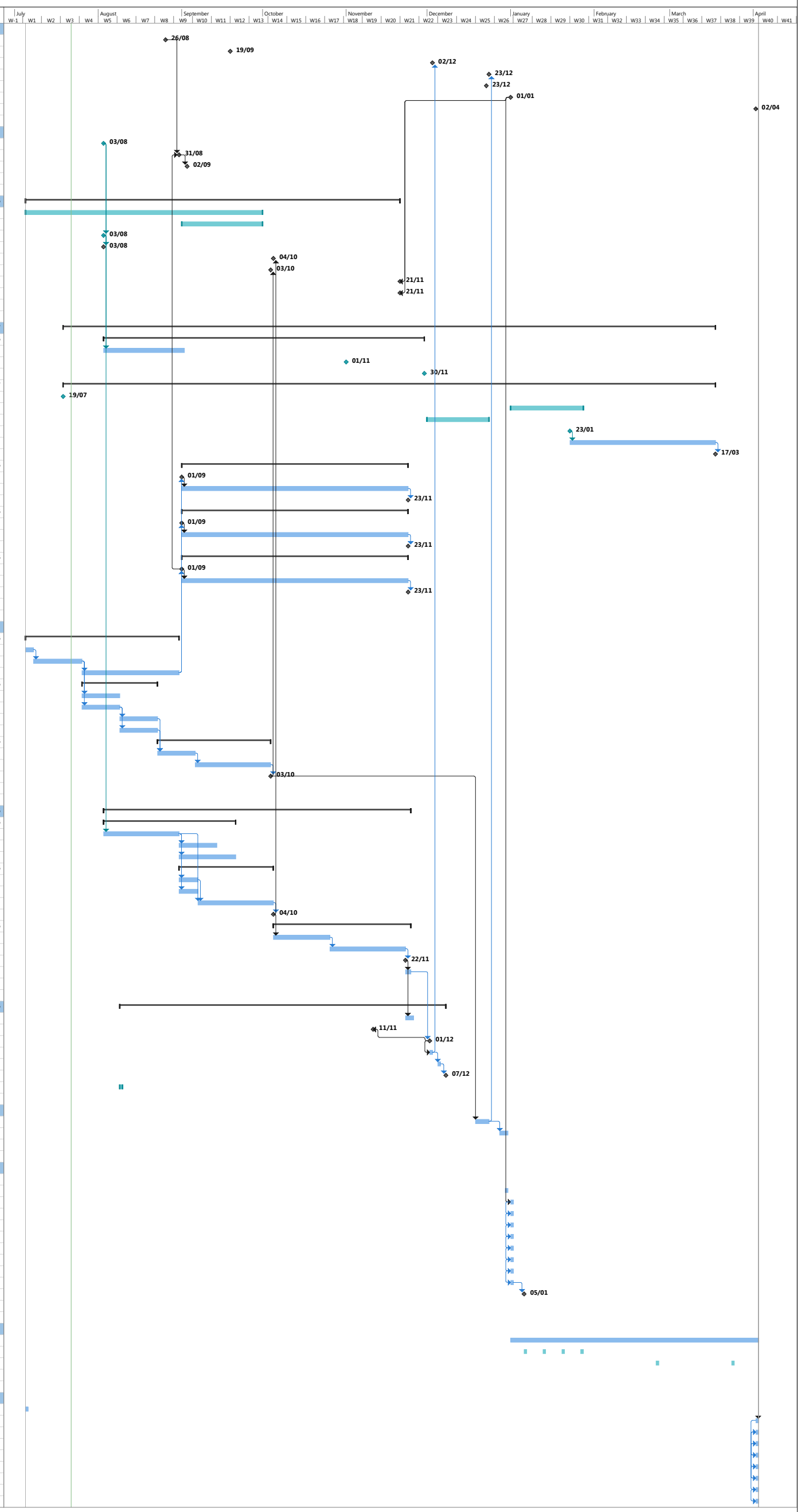
Programme

Project Zephyr

Programme

ARUP

ID	Task Name	Duration	Start	Finish
1	**KEY DATES**			
2	Go/No Go decision by Project Board	0 days	26/08/2016	26/08/2016
3	Siemens confirm if Blade is a "Hull" blade	0 days	19/09/2016	19/09/2016
4	Pre-Installation - Mock Up	0 days	02/12/2016	02/12/2016
5	Pre-Installation - Socketing of Street Furniture	0 days	23/12/2016	23/12/2016
6	Completion of Queen Victoria Square Public Realm Works	0 days	23/12/2016	23/12/2016
7	Installation	0 days	01/01/2017	01/01/2017
8	Removal	0 days	02/04/2017	02/04/2017
9				
10	**GOVERNANCE**			
11	Presentation to Project Board	0 days	03/08/2016	03/08/2016
12	Presentation to Council Leader	0 days	31/08/2016	31/08/2016
13	Presentation to Chair of Planning	0 days	02/09/2016	02/09/2016
14				
15				
16	**AGREEMENTS & CONTRACTS**	**99 days?**	**05/07/2016**	**21/11/2016**
17	Sign Sponsorship Agreement - H2017 & Siemens	64 days	05/07/2016	30/09/2016
18	Sign Loan Agreement - H2017 & Siemens	22 days	01/09/2016	30/09/2016
19	H2017 to appoint consultants (PM, Struct Engineer, CDM)	0 days	03/08/2016	03/08/2016
20	Siemens to appoint ALE (transport - installation & removal)	0 days	03/08/2016	03/08/2016
21	H2017 to appoint Steelwork Fabricator	0 days	04/10/2016	04/10/2016
22	H2017 to appoint Street Furniture Contractor	0 days	03/10/2016	03/10/2016
23	H2017 to appoint Crowd Control (for installation/removal)	0 days	21/11/2016	21/11/2016
24	H2017 to appoint Security	0 days	21/11/2016	21/11/2016
25				
26				
27	**PERMISSIONS & LICENCES**	**175 days**	**19/07/2016**	**17/03/2017**
28	**HCC Events (Temporary Permission for Installation)**	**85 days**	**03/08/2016**	**30/11/2016**
29	Discussions with Events team	22 days	03/08/2016	01/09/2016
30	Licence Application submitted	0 days	01/11/2016	01/11/2016
31	Licence Awarded	0 days	30/11/2016	30/11/2016
32	**HCC Planning**	**175 days**	**19/07/2016**	**17/03/2017**
33	Informal meeting with Planners (Alex Codd)	0 days	19/07/2016	19/07/2016
34	28 day temporary works period	21 days	01/01/2017	27/01/2017
35	Planning Application Prepared	17 days	01/12/2016	23/12/2016
36	Planning Application Submitted	0 days	23/01/2017	23/01/2017
37	Determination Period	40 days	23/01/2017	17/03/2017
38	Planning Consent Granted	0 days	17/03/2017	17/03/2017
39	**Police - Abnormal Loads Permission & Police Escourt**	**60 days**	**01/09/2016**	**23/11/2016**
40	Application Form submitted	0 days	01/09/2016	01/09/2016
41	Consultation / Determination Period	60 days	01/09/2016	23/11/2016
42	Police Approval	0 days	23/11/2016	23/11/2016
43	**Highways England - Approval to move Street Furniture**	**60 days**	**01/09/2016**	**23/11/2016**
44	Application Form submitted	0 days	01/09/2016	01/09/2016
45	Consultation / Determination Period	60 days	01/09/2016	23/11/2016
46	Highways England Approval	0 days	23/11/2016	23/11/2016
47	**HCC Highways - Temporary Road Closure**	**60 days**	**01/09/2016**	**23/11/2016**
48	Application Forms submitted	0 days	01/09/2016	01/09/2016
49	Consultation / Determination Period	60 days	01/09/2016	23/11/2016
50	HCC Approval	0 days	23/11/2016	23/11/2016
51				
52				
53	**TRANSPORTATION**			
54	**Planning of Transport Operation**	**41 days**	**05/07/2016**	**30/08/2016**
55	Detailed Route Survey	3 days	05/07/2016	07/07/2016
56	CAD Tracking Drawings, Identification of Equipment to remove	12 days	08/07/2016	25/07/2016
57	Preparation of information for Licence Approvals	26 days	26/07/2016	30/08/2016
58	**Street Furniture Removal - Planning**	**20 days**	**26/07/2016**	**22/08/2016**
59	Identify Scope of pre-installation "Socketing" works	10 days	26/07/2016	08/08/2016
60	Identify Scope of "on the day" street furniture removal	10 days	26/07/2016	08/08/2016
61	Agree strategy for Street Furniture Removal with HE	10 days	09/08/2016	22/08/2016
62	Agree strategy for Street Furniture Removal with HCC	10 days	09/08/2016	22/08/2016
63	**Street Furniture Removal - Contractor**	**30 days?**	**23/08/2016**	**03/10/2016**
64	Identify potential contractor(s)	10 days	23/08/2016	05/09/2016
65	Tender / Negotiate Price	20 days	06/09/2016	03/10/2016
66	Appoint Street Furniture Contractor	0 days	03/10/2016	03/10/2016
67				
68				
69	**SUPPORTS - DESIGN & FABRICATION**	**82 days?**	**03/08/2016**	**24/11/2016**
70	**Design**	**35 days**	**03/08/2016**	**20/09/2016**
71	Design supports	20 days	03/08/2016	30/08/2016
72	Siemens reivew of design	10 days	31/08/2016	13/09/2016
73	Construction information for fabricator	15 days	31/08/2016	20/09/2016
74	**Fabricator Procurement**	**25 days**	**31/08/2016**	**04/10/2016**
75	Identify fabricator	5 days	31/08/2016	06/09/2016
76	Prepare Tender Information	5 days	31/08/2016	06/09/2016
77	Tender / Negotiate price	20 days	07/09/2016	04/10/2016
78	Appoint Fabriactor	0 days	04/10/2016	04/10/2016
79	**Fabrication of Supports**	**37 days?**	**05/10/2016**	**24/11/2016**
80	Mobilisation	15 days	05/10/2016	25/10/2016
81	Fabrication	20 days	26/10/2016	22/11/2016
82	Delivery to Siemens Yard	0 days	22/11/2016	22/11/2016
83	Check compatibility with Siemens feet/clamp	2 days	23/11/2016	24/11/2016
84				
85				
86	**PRE-INSTALLATION ACTIVITIES - MOCK UP (SIEMENS YARD)**	**87 days?**	**09/08/2016**	**07/12/2016**
87	Plan Mock Up	3 days	23/11/2016	25/11/2016
88	Craneage ordered for mock up	0 days	11/11/2016	11/11/2016
89	Cranes arrive on site	0 days	01/12/2016	01/12/2016
90	Mock Up - Erect	1 day	02/12/2016	02/12/2016
91	Mock Up - Dismantle	1 day	05/12/2016	05/12/2016
92	Lessons Learnt Meeting	0 days	07/12/2016	07/12/2016
93		2 days	09/08/2016	09/08/2016
94				
95	**PRE-INSTALLATION ACTIVITIES - SOCKETING STREET FURNITURE**			
96	Pre-installation Socketing Works - Phase 1	5 days	19/12/2016	23/12/2016
97	Pre-installation Socketing Works - Phase 2 (if required)	3 days	28/12/2016	30/12/2016
98				
99				
100	**INSTALLATION OF BLADE**			
101	Detailed Plan for Instllation			
102	Pre-meet & Installation Review	1 day	30/12/2016	30/12/2016
103	Mobilise cranes	1 day	01/01/2017	01/01/2017
104	Transport & Install Supports	1 day	01/01/2017	01/01/2017
105	Street-Furniture Removal	1 day	01/01/2017	01/01/2017
106	Transport of Blade to Queen Victoria Square	1 day	01/01/2017	01/01/2017
107	Installation of Blade in Queen Victoria Square	1 day	01/01/2017	01/01/2017
108	Street Furniture Replacement	1 day	01/01/2017	01/01/2017
109	Dembilise cranes	1 day	01/01/2017	01/01/2017
110	Clear site & tidy up	1 day	01/01/2017	01/01/2017
111	Lesssons Learnt Meeting	0 days	05/01/2017	05/01/2017
112				
113				
114	**OPERATION & MAINTENANCE ACTIVITIES**			
115	Security Presence	67 days	01/01/2017	02/04/2017
116	Initial Maintenance Checks (weekly)	16 days	06/01/2017	27/01/2017
121	Maintenance Checks (monthly)	21 days	24/02/2017	24/03/2017
124				
125				
126	**REMOVAL OF BLADE**			
127	Pre-meet & Removal Review	1 day	05/07/2016	05/07/2016
128	Mobilise cranes	1 day	02/04/2017	02/04/2017
129	Street-Furniture Removal	1 day	02/04/2017	02/04/2017
130	Remove Blade from Supports	1 day	02/04/2017	02/04/2017
131	Transport of Blade to Siemens Yard	1 day	02/04/2017	02/04/2017
132	Street Furniture Replacement	1 day	02/04/2017	02/04/2017
133	Dismantle & Remove Supports	1 day	02/04/2017	02/04/2017
134	Dembilise cranes	1 day	02/04/2017	02/04/2017
135	Clear site & tidy up	1 day	02/04/2017	02/04/2017



Project: 2016-07-05 Zephyr Pro

Task, Split, Milestone, Summary, Project Summary, Inactive Task, Inactive Milestone, Inactive Summary, Manual Task, Duration-only, Manual Summary Rollup, Manual Summary, Start-only, Finish-only, External Tasks, External Milestone, Deadline, Progress, Manual Progress

Appendix D

Cost Estimate

Hull City Council
Project Blade
Indicative Cost Estimate
10/08/2016

Item No.	Description	Quant	Unit	Rate	Value
	Street Furniture Removal & Replacement				
	Modifications to structures and street furniture along the route:				
	Advance works, placing furniture into sockets, temporary repositioning, vegetation clearance etc	1.00	sum	£79,800.00	£79,800.00
	Allowance for advance works where furniture may have to be relocated: 50% of cost allowed.	1.00	sum	£45,200.00	£45,200.00
	Installation: 3nr teams on night of transportation, labour, vehicles, equipment	1.00	sum	£30,600.00	£30,600.00
	Removal: 3nr Gangs on night of transportation, labour, vehicles, equipment	1.00	sum	£28,000.00	£28,000.00
	Support Structures & Barriers				
	Root support structure, ballast, cladding, folding lockable ramps	1.00	nr	£32,500.00	£32,500.00
	Tip support structure, ballast, cladding, folding lockable ramps	1.00	nr	£33,700.00	£33,700.00
	Passive warning / barrier for visually impaired, provisional allowance for planters / benches etc.	1.00	sum	£10,000.00	£10,000.00
	Installation & Removal				
	Trial erection gang (assumed within Siemens yard). Labour, plant, materials. Briefing and pratice for final installation.	1.00	sum	£7,500.00	£7,500.00
	Permanent erection gang (night time). Labour, plant, materials.	1.00	sum	£23,300.00	£23,300.00
	Provisional Sum for adjusting Nayan lighting	1.00	sum	£2,500.00	£2,500.00
	Installation : Security in Hull City Centre and along the route:				
	Police attendance & road closures, provisional	1.00	sum	£5,000.00	£5,000.00
	Private security and pedestrian control	1.00	sum	£5,000.00	£5,000.00
	Removal: Security in Hull city centre and along the route:				
	Police attendance & road closures	1.00	sum	£5,000.00	£5,000.00
	Private security and pedestrian control	1.00	sum	£5,000.00	£5,000.00
	Installation: Street cleaning	1.00	sum	£1,000.00	£1,000.00
	Removal: Street cleaning, repairs, disposal	1.00	sum	£5,000.00	£5,000.00
	Launch Event				
	Excluded	1.00	sum		£0.00
	Maintenance				
	Maintenance regime to be confirmed, assume weekly cleaing, repainting, enhanced security patrol, minor reactive maintenance.				
	Pressure wash cleaning - weekly	4	nr	£800.00	£3,200.00
	Extra over cost of 24hr security patrol	4	nr	£3,780.00	£15,120.00
	Provisional sum for reactive maintenance (weekly)	4	nr	£500.00	£2,000.00
	Management and Consultancy				
	Budget sum including: Project & commercial management Structural design Health & Safety Planning	1.00	sum	£70,000.00	£70,000.00
	Artist Fees	1.00	sum	£13,000.00	£13,000.00
	Contingency. Say £25,000	1.00	sum	£25,000.00	£25,000.00
					£447,420.00

Appendix E

Risk Register

Hull UK City of Culture 2017 - Project Zephyr
Risk Register

Project Title	Project Zephyr
Arup Project Ref Code	249697
Version No.	Revision 0
Author Name	Javed Hussain, Arup

Ref	Risk Name	Risk Description	Impacts	Risk Rating			Mitigation Measures	Risk Owner	Notes
				Probability	Impact	Total			
				1 - 5	1 - 5	12+ 9 - 11 1 - 8			
	Delay to Queen Victoria Square Public Realm Works	Public realm improvements to Queen Victoria Square not completed in time. Potential conflict with Blade supports. Poor PR image for Hull	Physical difficulties in installing blade. Negative PR	3	5	15	Engage with Public Realm works Contractor and monitor programme to ensure completion of works. Propose "Plan B" location for the Blade with reduced risk of conflict.	Hull 2017	See Arup drawing 249697-SK-001 for preferred and alternative blade installation locations.
	Public interfere with blade during installation/removal	Queen Victoria Square not closed off to the public in time to accept delivery of blade. Public get in the way of installation/removal. Crowds are attracted to see operation.	Potential Health & Safety Risks. Delays to installation process	4	3	12	Recruit wardens (or similar) to help manage public. Use fencing / barriers to clearly cordon on working area & remove public. Do not advertise installation/removal process. Installation / removal to occur during quiet periods (e.g. early Sunday morning)	Hull 2017	
	Damage to Public Realm	Damage is caused to public realm during installation / removal of blade and/or by supports. Damage apparent as cracked paviours, settlement etc.	Additional costs. PR impact - public realm has only recently been completed	4	3	12	Ensure that loading on surface is less that design loading (i.e. spread loads from cranes, supports etc.). Place protection materials (geotextiles, timbers etc.) between foundation pads & new surface. Undertake photographic survey before and after installation, Repair damage following removal of blade and supports.	Hull 2017	
	Budget exceeded	The costs for the project are in excess of Hull 2017's budget.	The project might have to be abandoned or additional funding made available	2	5	10	Develop a cost plan and update it at regular intervals. Include a contingency allowance to cover uncertainty in pricing	Hull 2017	
	Political objectors	Politicians object to the project. Politicians try to block scheme (e.g. refuse planning permission) and/or attack scheme in Media	Public Relations damage	2	5	10	Set out an Engagement Plan to inform political leaders of project and gather support. Implement in good time so that there are few surprises	Hull 2017	There is a desire to keep the project secret so that it creates a "surprise". The Engagement Plan should identify how much information can be communicated
	Planning consent is not granted	Planning consent is refused for the blade	Project cannot be realised	2	5	10	Engage with planners at early stage to understand and address potential issues. Engage with Chair of Planning Committee.	Hull 2017	An alternative option to install the blade under temporary powers (<28 days) is being considered
	Fire	Vandals could seek to set blade on fire. If set alight, resin would create a major chemical fire.	Major health & safety impact. Damage to blade. Damage to public realm	2	5	10	Provide security presence to deter vandals & use CCTV to monitor. Engage with Fire Service to assess risk. Consider use of specialist intumescent paints in areas accessible by people.	Hull 2017	
	People collision with blade	People will be encouraged to walk under blade. Potential for people to hit their heads when walking below blade	Health and Safety risk	5	2	10	Install physical barrier (e.g. a bench) to prevent people walking under lowest part of blade (i.e. where headroom is <2.2m	Hull 2017	Consider if we want to encourage people to touch blade or not.
	High winds during installation & removal	High winds during installation / removal blow blade and make cranage and transport unsafe	Damage to blade. Health & safety risks. Delay to installation / removal	3	3	9	In Method Statement identify safe wind speeds for transport and lifting operations. Monitor weather forecasts. Check wind speeds on day. Be prepared to delay transport movements if too windy	ALE	
	Planning consent delayed	More time required for planners to consult with statutory authorities & respond to comments. Planning application not determined within 8 weeks	Delay to implementing project	3	3	9	Engage with all statutory consultees as part of the pre-application process. Undertake pre-application consultation to solicit views and, in application, demonstrate how these views have been taken into account.	Hull 2017	
	Legal Enforcement Action	Blade installed under delegated powers (temporary installation <28 days). Legal objection raised that Hull 2017 always meant to install the blade for >28 days.	Potential legal action from Hull City Council to remove blade. Poor PR	3	3	9	Engage with Planners to agree strategy. Engage with Chair of Committee & gain political support. Submit planning application towards end of 28 day period	Hull 2017	A Temporary Consent route would avoid putting information into the public domain prior to installing the blade. Route may not be strictly in conformance with planning regulations
	Temporary Planning Consent	Planners do not accept temporary planning consent route (<28 days).	Only install blade for less than 28 days or run risk of legal action	3	3	9	Engage with Planners. Plan to submit full planning application. Be prepared to manage PR around potential enforcement action	Hull 2017	
	Surprise element	Planners require Hull 2017 to submit planning application. Media and others publicise images before blade is installed. People comment & some criticise.	Reduced Media Impact. Poor PR	3	3	9	Engage with planners to see if temporary planning route would be acceptable. Carefully control information (particularly visual information) about the sculpture and who its sent to.	Hull 2017	Hull 2017 wish for the installation of the blade to be a surprise.
	New Year's Eve	Ambition to install Blade during early hours of January 1st - some workers may have been drinking previous night. Some workers may not turn up on day. Some members of public likely to be drunk.	Health and Safety Impact	3	3	9	Address issue with workforce in team briefing before installation. Use breathalyser to check for alcohol. Ensure sufficient resources are employed to cover for risk that an employee may not turn up and to help manage public	Hull 2017	
	Climbing	People (e.g. University Climbing Club) attempt to climb onto blade and or climb up supports. People slip off and are injured	Health and Safety risk to general public. Damage to blade	3	3	9	Install "No climbing" sign. Provide physical security presence as deterrent. Use CCTV cameras to monitor activity around blade. Install anti-climb paint on supports. Use "clam shell" concept to close up supports and create physical barrier during "closed periods" (e.g. night-time)	Hull 2017	Blade is 4m diameter at root end - will be difficult to climb. Blade designed to support people during maintenance - Siemens verbally confirmed blade will be stong enough to support people loads
	Straps securing blade	Over time, straps securing blade to the supports may relax. Blade not held firmly and may start to move	Damage to blade. Health & safety risks	3	3	9	Implement checking regime to check that blade is held firmly - e.g.. taughtness of straps and tension in bolts. Tighten if necessary	Hull 2017	
	Objection from General Public	General public object to proposals - possible grounds include aesthetics, impact on retail, "waste of money" etc.	Objections to planning application	4	2	8	Carefully consider protocols for the release of information, including as part of the Planning application submission.	Hull 2017	
	Planning committee meeting delayed	Targeted committee meeting missed (for example there is already too much on the agenda). Decision date deferred	Delay to implementing project	2	4	8	Agree a target committee meeting with planners. Give members a pre-application presentation of the scheme to gather views. Work with planners to ensure all issues addressed	Hull 2017	
	Fit with supports	Blade does not fit in supports.	Potential damage to blade & instability of structure. Health & Safety Risks	2	4	8	Undertake "mock up" at Siemens Yard to check that supports and blade fit. Identify and correct any issues prior to main installation operation.	Hull 2017	

	Funding delayed	Funding for the project is not available - there is a delay in being able to pay bills	Potential delay to project	2	3	6	Consider alternative funding sources and impact on overall programme.	Hull 2017	
	Parked vehicles cause obstruction	Obstruction caused by vehicles parked on route.	Time	3	2	6	ALE to arrange for vehicle to drive up ahead and clear route. Police assistance may be required to remove vehicle.	ALE	
	Removal of street furniture	Affected street furniture is not removed in time and/or is more difficult to remove. Blade transport is delayed	Delay to installation process	3	2	6	Undertake enabling works to install all affected street furniture in sockets so they can be easily removed during transport. Have sufficient labour on site to address any difficulties encountered.	Hull 2017	
	Conflict with January Sales / Easter events	Increased shoppers expected during times when blade is installed / removed. People could start queuing from early hours	Health & Safety risks	3	2	6	Plan installation / removal process to avoid periods of high retail activity. Ensure sufficient wardens (or similar) present to manage public during installation & removal processes	Hull 2017	
	Delays in design & planning	Deadlines / targets are not met which leads to programme slippages	Potential delay to installation	3	2	6	Develop detailed programme and regularly monitor to identify whether works on track. Appoint Project Manager to monitor progress and proactively address issues.	Hull 2017	
	Graffiti	Blade is graffitied whilst on display. Siemens require blade to be returned in original condition	Visual appearance. Cost to remove graffiti	3	2	6	Allow budget to repaint blade from time to time. Provide on-site security presence to deter graffiti artists. Consider using anti-graffiti paint	Hull 2017	Allow costs for use of cherry picker and team to repaint blade if graffitied
	Vehicle collision with supports	Vehicles (e.g. street sweepers, service vehicles etc.) collide with support structures	Damage to blade / supports	3	2	6	Locate supports carefully to provide sufficient clearance for vehicles to move around. Consider painting/appearance of supports to make them visible.	Hull 2017	
	High winds during operation	High winds during operation create significant forces on structure. Support structures are heavily loaded. Blade "flaps" excessively in wind.	Damage to blade. Damage to public realm if supports move.	3	2	6	Design supports to resist high wind loads. Check assumptions with Siemens.	Hull 2017	Blade is designed to withstand far higher wind loads (i.e. North Sea) than are experienced in the city centre.
	Blind people - DDA compliance	Blind people may walk into blade. Need to ensure installation is DDA compliant	Not compliant with DDA regs. Poor PR. Health & Safety risks	2	3	6	Install physical barrier (e.g. bench) & tactiles/edge to warn blind people that they are approaching an obstacle	Hull 2017	
	Transport Route	A suitable transport route cannot be identified.	Project cannot be realised	1	5	5	Consider alternative modes of transport.	Siemens	Initial surveys have been undertaken and feasible transport route identified
	Supply of Blade	Loan Agreement with Siemens is not in place.	Project cannot be realised	1	5	5	Siemens to confirm offer by end of June 2017.	Siemens	Siemens & HCC are well progressed with Sponsorship Contract Discussions. Loan Agreement discussions to be commenced
	Blade from Denmark	Blade cannot be transported from Denmark to UK in time.	Delay to realising project.	1	5	5	Track blade delivery date - put milestone on programme	Siemens	
	Blade damaged during transport	Blade becomes damaged during transport - e.g. collision, dropped during lifting	Damage to blade. Potential impact on Loan Agreement	1	5	5	ALE appointed to transport blade. Ensure method statement are written prior to transport - method statement to be reviewed by team. ALE & Hull 2017 to carry sufficient insurances	ALE	
	Buses below blade	Bus operators object to proposals to position the Blade above Carr Lane. Fear of collision with buses	Potential objection to planning application. Poor PR	2	2	4	Set out and confirm highway clearances as part of Planning application submission. Engage with Bus operators to explain how design proposals do not impact on bus operations.	Hull 2017	
	Secretary of State Call In	Planning Application is called in by Inspector / Secretary of State	Delay to implementing project	1	4	4	Undertake full consultation and work to address concerns of potential objectors. Explain the aims of the Hull UK City of Culture programme.	Hull 2017	
	Judicial Review	Objectors object to scheme and mount Judicial Review	Delay to implementing project. Additional costs to defend JR	1	4	4	Abort project if planning application is refused or JR is mounted	Hull 2017	A JR process would take more than 3 months.
	Blade supports obstruct manholes/chambers	Access to manholes and chambers to underground are blocked by blade supports - objections from Utility Companies	Physical obstruction created	2	2	4	Carefully position supports to avoid impacting manholes, inspection chambers etc.	Hull 2017	
	Breakdown during transport	Transport vehicle(s) breakdown en route. Potential to cause congestion due to extended road closure.	Delay to installation process	1	4	4	Check vehicles are properly maintained. Check vehicles one week before installation date.	ALE	
	Conflict with other Events	Installation / removal of blade clashes with other events in Hull City Centre, i.e. Hull 2017 Launch event. Blade prevents other events in Queen Victoria Square taking place	Relationships with other organisations potentially impaired	2	2	4	Hull 2017 to engage with HCC Events Team to coordinate events and minimise potential for conflict.	Hull 2017	
	Emergency Services	Blade causes an obstruction to emergency services accessing Queen Victoria Square.	Health & Safety	2	2	4	Engage with emergency services during Planning to understand their requirements. Track vehicles to ensure emergency access to Queen Victoria Square can be maintained at all times.	Hull 2017	
	Birds and bird droppings	Birds sit on blade. Birds defecate on blade which is unsightly	Unsightly image	4	1	4	Allow budget to clean blade with cleaners working from cherry picker	Hull 2017	Blade surface very smooth - difficult for birds to land, especially if blade is installed at an angle.
	Lighting strike	Lighting strikes blade	Damage to blade. Health and safety risk	2	2	4	Position blade so that it is lower than surrounding buildings	Hull 2017	Blade has an in-built lighting conductor.
	Static electricity	Movement of blade could generate build up of static electricity	Risk of electric shock	2	2	4	Ensure that blade is earthed via supports	Hull 2017	
	Police escort delayed / not available	Police escort does not arrive on time and therefore transport of the blade is delayed.	Delay to installation process	1	3	3	Engage with Police prior to installation date. Hold regular meetings to make sure police are fully engaged with project. Try to get names & meet officers who will be involved in project	Hull 2017	

	Road signage	Incidents and road safety issues arise as a result of the temporary removal of regulatory and information signs.	Increased risk of accidents	1	3	3	Make sure that all signs removed are reinstalled after blade has moved through affected area. Take photographic survey before/after to confirm. Address as part of Quality Control procedures.	Hull 2017	
	Congestion	Rolling road closures during transport of blade causes significant traffic disruption on A63 and local highway network.	Public Relations	3	1	3	Engage with HCC and Highways England operations early to understand constraints and gain their support to proposals. Move blade during periods of low traffic flows (e.g. early Sunday morning, night-time etc.)	Hull 2017	
	Support Structures in Queen Victoria Square	Support structure not assembled/ready in time to accept blade.	Delay to installation process	1	2	2	Undertake "Mock Up" at Siemens Yard to practice assembly of supports. Use lessons learnt to develop Programme for the real installation process. Plan float to avoid any delays impacting on overall installation	Hull 2017	
	Damage to Third Party Property	Private property is damaged during delivery of blade.	Additional costs	1	2	2	Track routes to avoid blade over sailing private property. Consider organising photographic survey before and after blade installation/removal	Hull 2017	
	Projectiles	People try to "shoot" blade (e.g. with air rifle) or throw objects at blade	Damage to blade	2	1	2	Security presence to deter vandals. Use CCTV surveillance	Hull 2017	Siemens have confirmed that blade is constructed of thick resin and fairly resistant to impact.
	Blade Root	Root of blade is hollow. People could access into the blade	Health & Safety risk	2	1	2	Board up end of blade with plywood or similar to prevent access	Hull 2017	
	Planning submission delayed	Planning Application not registered - further information required by planners	Delay to implementing project	1	1	1	Agree requirements for planning application submission with Planners as part of Pre-application process.	Hull 2017	
	Damage to Highway Infrastructure	Highway infrastructure damaged during delivery/removal of blade.	Additional costs	1	1	1	Undertake enabling works to put infrastructure in sockets to facilitate easy removal & reinstallation. Highway Authority asset managers (or representatives) to be available to assess damage and mitigate impact.	Hull 2017	
	Insurances	Insurances do not cover risks of damage to blade, third party damage and/or members of public	Additional costs to fight claims	1	1	1	Hull 2017 to confirm insurances in place prior to mobilisation. Hull 2017 to engage with insurance companies to check that they are covered - share this Risk Assessment with insurers.	Hull 2017	
	Litter	Litter collects under supports.	Unsightly. Potential fire risk	1	1	1	Implement cleaning regime - liaise with Hull City Council Streetscene	Hull 2017	
	Flood Risk	Blade creates barrier to surface water movement - dam effect. Hull is flooded and blade floats	Flooding of adjacent properties. Damage to blade.	1	1	1	Blade is position above the ground - will not create a dam effect and will be above any flood waters. Blade will be firmly attached to supports	Hull 2017	