

Department for Regional Development - TransportNI

YORK STREET INTERCHANGE

Public Inquiry

November 2015

Proof of Evidence:

**Scheme Development up to Publication of Draft Orders
(Summary)**

by

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1. INTRODUCTION

My name is Michael Megarry and I am an Associate with URS, Consulting Engineers. I have a BEng (Hons) degree in Civil Engineering. I am a Chartered Engineer (CEng) and a Member of the Institution of Civil Engineers (MICE).

URS was acquired by AECOM in October, 2014. Together AECOM and URS are one of the world's premier, fully integrated infrastructure and support services firms.

Any references I make to URS include references to its former legacy companies, including Scott Wilson.

In April 2009 I was appointed URS' Project Manager for the development of the Proposed Scheme. I am responsible for the general progression of the project, overseeing the roads design input and co-ordinating the other design teams, who specialise in areas such as structural and geotechnical design, environmental assessment and traffic and economic analysis.

TransportNI has outlined its strategy for the Proposed Scheme and the brief under which URS was initially appointed in June 2008 to carry out the assessment work on this project. Under its brief URS has completed the following tasks:

- Stage 1 Scheme Assessment in accordance with the procedures in the Design Manual for Roads and Bridges (DMRB);
- Stage 2 Scheme Assessment in accordance with the procedures in the DMRB;
- Stage 3 Scheme Assessment in accordance with the procedures in the DMRB; and
- preparation of Environmental Statement, Designation Order, Vesting Order, and Economic Appraisal documents in support of the statutory procedures.

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2. SCOPE OF EVIDENCE

A significant volume of detailed information has been prepared during the development of the Proposed Scheme, which has been published in report form or has been summarised for Public Exhibition at various stages.

In addition to the submission and attendance at this Inquiry, the Department is represented by other experts who are available to provide clarification on elements of the scheme, such as Environment, Traffic & Economics, Noise, Air Quality and Ecology.

This submission will provide a summary of the technical aspects of the road scheme presented in the draft statutory orders. It will focus on the decisions made at the corridor and route selection stages and provide a summary of the Proposed Scheme.

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3. SUMMARY OF EXISTING CONDITIONS

3.1 Topography

The natural topography within the study area is relatively flat, given its proximity to sea level, with typical levels at York Street junction being approximately 2.0 metres Above Ordnance Datum (mAOD).

The M2 is elevated to a level of approximately 10.0mAOD, approximately 8.0m above the surrounding streets from Dock Street underbridge and increases to tie-in with the Lagan Bridge and Dargan Bridge, which are elevated to approximately 12.0mAOD. Within the study area, the M3 is supported on the Lagan Bridge.

The Westlink is located at the west of the study area in a depressed section at Clifton Street, approximately 7m below the surrounding streets. The carriageway rises out of this cutting and approaches the existing York Street junction on an embankment falling from approximately 9.0mAOD at North Queen Street underbridge to meet the typical street level of 2.0mAOD at the York Street junction.

The Lagan Bridge was constructed between 1991 and 1994 as part of the Cross-Harbour Links contract. The main bridge comprises a viaduct structure with associated ramp structures which cross over numerous city streets and the River Lagan, supporting the M3 motorway. The bridge deck for the structure generally comprises of post-tensioned precast concrete box segments and is supported in turn on reinforced concrete piers.

The Dargan Bridge operated by Translink was constructed as part of the same works contract as the Lagan Bridge and comprises a viaduct structure which crosses over both city streets and the River Lagan. The bridge supports a single track railway line with passing points, opening to twin tracks on the main river span. The bridge is of similar construction to the Lagan Bridge, with the deck comprising of a series of post-tensioned precast concrete box segments supported on reinforced concrete piers and piled foundations.

3.2 Ground Conditions

The information on the ground conditions on the site was primarily obtained from the ground investigation conducted in 2013 by Causeway Geotech Ltd.

3.3 Hydrology and Drainage

The low lying nature of the area and its close proximity to a tidal section of the River Lagan and Belfast Harbour has significantly influenced the development of drainage infrastructure within the study area over the years.

Information relating to the existing drainage network in the area has been received from Department of Agriculture and Rural Development Rivers Agency and NI Water.

3.4 Public Utilities

It has been established that utility infrastructure in the area is owned and maintained by a variety of utility companies e.g. gas, electricity, potable water, storm water, foul sewers, and telecommunications traverse the study area forming potential constraints upon any improvements scheme.

3.5 Land Ownership

Land Registry information available from Land and Property Services has informed the draft vesting schedule.

3.6 Site Constraints

As would be expected for an urban area, the site is bounded on all sides by existing built infrastructure.

The nature of these conditions is such that they form constraints. Options to provide an interchange at the location must therefore be fitted around these constraints, or seek to remove them entirely.

It should be recognised, however, that all constraints cannot be removed, for engineering, environmental or economic reasons. Where this is evident, compromises are required in the layout of the proposed interchange.

At the extent of the site of the Proposed Scheme, it will be necessary to tie back into the existing road network. The constraints of the existing road network create constraints on the provision within the future Proposed Scheme.

4. DEVELOPMENT OF THE PROPOSED SCHEME

4.1 2005 Feasibility Studies

4.1.1 Traffic Management Options Report

In 2005 a feasibility assessment of options to alleviate traffic congestion at the existing York Street junction was undertaken by URS.

To provide some measure of investment scale, the following cost thresholds were identified:

- low cost improvement options with a capital cost of up to approx. £0.5m;
- medium cost improvement options with a capital cost of up to approx. £3m; and
- high cost improvement options with a capital cost of up to approx. £10m.

A total of ten short, medium and long term options for the junction were identified. Of the ten options, one was identified as a sole long-term solution and subject to separate specific assessment.

The remaining nine options were identified as short and medium term traffic management options and assessed and reported upon in a summary Traffic Management Options Report dated June 2005.

4.1.2 Preliminary Appraisal Report

URS assessed the feasibility of a single long-term option to provide grade separation at the existing York Street junction in addition to several short and medium term options.

The single long term option comprised a grade separated interchange, similar to the Proposed Scheme.

The option was subject to an engineering assessment, to determine its feasibility within the site constraints. The findings from this assessment are reported in the summary Preliminary Appraisal Report dated December 2005.

The report concluded that the proposed road layout should be subjected to further scrutiny as part of a DMRB Scheme Assessment process to determine the scheme's engineering, environmental and traffic and economic benefits and disbenefits.

The recommendations of both reports were accepted by Transport NI, with URS subsequently commissioned in 2008 to commence the Scheme Assessment process of the long-term interchange option.

4.2 Scheme Assessment Reports

4.2.1 Scheme Assessment Process

The assessment of Strategic Road Improvements is outlined in DMRB Technical Standard TD 37/93 entitled "*Scheme Assessment Reporting*" and is defined as a three-stage process.

The level of detail and scope of the assessment at each stage are appropriate to the type of decision that can reasonably be taken at that time.

4.2.2 Stage 1 Scheme Assessment

A Stage 1 Scheme Assessment requires the identification of the environmental, engineering, economic and traffic advantages, disadvantages and constraints associated with broadly defined improvement strategies. This concludes in the selection of a number of potential routes or scheme options.

Six preliminary options were identified that comprised elevated, depressed and combined corridors and these were subject to separate engineering, environmental, traffic and economic assessments.

As part of the completed environmental assessment, consultations were undertaken with an identified list of key stakeholders to the project in line with a Communications Plan developed for the scheme and approved by TransportNI.

In March 2009, URS completed its Stage 1 Scheme Assessment with the findings reported in the Preliminary Options Report of March 2009.

The recommendations of the report were endorsed by the TransportNI Board at its meeting of 26th March 2009.

4.2.3 Stage 2 Scheme Assessment

In accordance with the DMRB, a Stage 2 Scheme Assessment requires the identification of the factors to be taken into account in choosing alternative routes or improvement schemes and to identify the environmental, engineering, economic and traffic advantages and constraints associated with those routes or schemes. This concludes in the selection of a preferred option.

Further to the recommendations arising from the Stage 1 Scheme Assessment, four of the six preliminary options were shortlisted for further assessment. The engineering designs of the options were developed in more detail through consultations with various statutory and non-statutory bodies.

The developed four options, termed Options A, B, C and D, proposed the introduction of grade separation at the existing junction using various alignments

Consultation formed an important part of the Stage 2 Scheme Assessment process. Consultations were undertaken with an identified list of key stakeholders for the project in line with a consultations strategy developed as part of a Communications Plan approved by TransportNI.

In line with the consultation strategy, a formal public consultation event was held in June 2011 to allow members of the public to view and comment upon the proposals. A summary public consultation report was subsequently prepared and published.

Following their identification and refinement, the options were subject to separate engineering, environmental, traffic and economic assessments in accordance with the requirements of the DMRB. The findings from these assessments were reported in the Preferred Options Report of October 2012.

Taking into consideration its overall performance across the scheme objectives and the views raised in response to the public consultation, it was recommended that Option C be selected as the preferred option for the scheme and further developed in line with the engineering standards set out in the DMRB to a level sufficient for a Stage 3 Scheme Assessment prior to the commencement of statutory procedures.

The selection of Option C as the preferred option was endorsed by the TransportNI Board at its meeting of 26th October 2012 and subsequently announced on 6th December 2012 by the Minister for Regional Development.

4.2.4 **Stage 3 Scheme Assessment**

In accordance with the DMRB, a Stage 3 Scheme Assessment requires clear identification of the advantages and disadvantages, environmental, engineering, economic and traffic terms of the preferred option.

The Stage 3 Scheme Assessment report, termed the Proposed Scheme Report, comprised two distinct sections:

- Part 1: Environmental Statement; and
- Part 2: Engineering, Traffic and Economic Assessment Report.

The Proof of Evidence prepared and submitted separately by Mr. Gareth Coughlin, summarises the findings from the Environmental Statement.

The development of the scheme, now termed the Proposed Scheme, at the Stage 3 Scheme Assessment was based, in part, on the recommendations arising from the Stage 2 Scheme Assessment process. In addition to the COBA and QUADRO models prepared for the Stage 3 traffic and economic assessment, various detailed traffic models were created to assist in the development of the Proposed Scheme.

5. DESCRIPTION OF PROPOSED SCHEME

5.1 Road Links

The Proposed Scheme would provide a fully grade separated interchange to replace the existing signalised gyratory junction. Interchange links between the Westlink, the M2 and the M3 motorways would be provided in underpasses aligned underneath new bridge structures at York Street and under the existing Dargan and Lagan Bridges.

Two lanes would be provided on new interchange links between the Westlink and M2, with one lane provided on the interchange links between the Westlink and M3. Hard shoulders have been provided within the various underpass where space allows.

The existing North Queen Street and Dock Street Bridges and the Whitla Street subway structure would be widened as necessary to accommodate the new road layout, with another new overbridge structure proposed at Dock Street. Retaining walls and piled embankments will be provided as required to support the new road alignments.

To facilitate the online widening of the Westlink between North Queen Street and York Street, the existing embankment requires modification. To avoid works to replace the existing retaining walls at Little Georges Street and Great Georges Street, a strengthened earthwork is proposed on the northern side of the link between North Queen Street bridge and York Street for a distance of approximately 100m, with a steepened side slope. Construction of these strengthened earthworks would require suitable working platforms for piling operations and this would, in turn, require temporary removal of a significant portion of the existing embankment.

Connections from the local street network to the new interchange links would be provided at Clifton Street, York Street, Dock Street and Duncrue Street in the form of on-slips.

Connections from the strategic road network to the local street network would be provided in the form of off-slips from the interchange links at Clifton Street, York Street and Nelson Street. The existing north facing on and off slip roads at Clifton Street would remain open within the proposed road layout. New weaving sections are created between Clifton Street and York Street on both carriageways of the Westlink that provide the Absolute Minimum weaving lengths required under the DMRB.

It should be noted that the proposed changes to York Street would reintroduce two-way running of a form to provide a new bus/cycle lane in the southbound direction. The southbound bus/cycle lane would be provided from the new signalised junction at the connection with the York Street to M2 on-slip and would terminate at the Inner Ring. Provision of the southbound bus/cycle lane would require an associated reduction in the northbound

lane provision, with three lanes proposed, opening to four at the junction with the M3 off-slip to Great Georges Street. In addition, a northbound cycle lane of 1.5m in width would be included, with footways widened to 3m where possible within the existing building constraints and reflected in the proposed cross-section on the new York Street bridges.

Following the completion of the statutory public consultation, TransportNI has further engaged with Sustrans and DRD Cycling Unit to review provision for non-motorised users on York Street. A revised layout has been prepared and submitted to this Inquiry for consideration.

On the south-east wingwall of the North Queen Street bridge, it is noted that there are several memorials associated with the McGurk's bar bombing. All such memorials would require removal as part of the works, this will be undertaken in consultation with victims' representatives and TransportNI.

The existing private access onto York Street for Galway House would be removed as part of the scheme to accommodate the new York Street to M2 on-slip. To maintain access to the current development and indeed, any future development within the overall business park, a new signalised access is proposed at the north-west corner of the existing car park to Galway House.

5.2 Design Speeds and Speed Limits

Design Speeds of 70A kph will be generally applied to the interchange links between the Westlink, M2 and M3. Associated slip roads will generally have a Design Speed of 60B kph, with the exception of the York Street to M2 slip road, which will have a slightly higher Design Speed of 70A kph. The various surface streets will have Design Speeds of 60B kph.

Owing to the constraints on the horizontal and vertical geometries of the various links within the interchange, it is proposed to implement a 40mph speed limit on the interchange links between Westlink, M2 and M3.

For the M2 to Westlink movement, the existing 50mph speed limit on the M3 motorway will be extended north along the southbound carriageway of the M2 from a position near the Duncrue Street off-slip.

The existing surface streets will retain their existing 30mph speed limits, with complementary speed limits on slip roads to and from the interchange links and mainlines as appropriate.

5.3 Traffic Classifications

With reference to the published draft Designation Order, it should be noted that:

- the roads described in Parts I and III of the Schedule shall be used only by traffic of Classes I and II as set out in Schedule 1 to the Roads (Northern Ireland) Order 1993; and
- the roads described in Part II of the Schedule shall be used by traffic of all Classes as set out in said Schedule 1 except Classes VII and IX.

5.4 Site Clearance

The existing TransportNI section office and associated outbuildings at Corporation Street, in addition to the larger Driver and Vehicle Agency office building, would require demolition and removal. Other privately owned buildings scheduled for demolition would include the existing Focus Security Solutions premises at Corporation Street and Jack Kirk Garage at Shipbuoy Street and the single storey buildings located to the north of Philip House at York Street.

5.5 Drainage

The drainage solution developed for the Proposed Scheme seeks to maximise the drainage catchment area that would discharge storm water to a pumping station and which would then be conveyed onwards via a new pumping main arrangement to the outlet point near Gamble Street. An existing redundant combined sewer overflow culvert would be utilised to discharge through an outfall structure in the quay wall to Belfast Harbour.

5.6 Flood Risk Assessment

The existing York Street junction lies within the identified coastal floodplain of Belfast Lough, based on a 1 in 200 year (Q200) storm surge flooding event.

Following discussions with TransportNI, it was agreed that the Proposed Scheme should include sufficient flood protection measures to reduce the risk of coastal flooding to the various underpasses.

Following this agreement, a number of measures were developed to provide the Proposed Scheme with flood protection. These measures included the provision of permanent flood barriers, in the form of flood walls (or the extension of adjoining underpass walls upwards to the identified 3.9mAOD flood protection level).

5.7 Traffic Signals

The proposed scheme would include the provision of new traffic signal controlled junctions at the following locations:

- York Street/Great Georges Street;
- York Street/Westlink; and
- York Street/Cityside Retail Park/Galway House.

In addition, the following existing signal controlled junctions would require revision to reflect changes introduced by the Proposed Scheme:

- York Street/Great Patrick Street;
- York Street/Dock Street;
- Nelson Street/Great Patrick Street;
- Dock Street/Nelson Street; and
- Duncrue Street/M2 off-slip.

The existing controlled crossings at Whitla Street and Nelson Street would also require revision as appropriate to reflect changes introduced by the scheme.

5.8 Structures

The Proposed Scheme would require the construction of several significant structures, summarised below:

- four major underpasses, with retained heights of up to 10m;
- two twin span pre-stressed beam bridges, one highly skewed;
- a single span bridge supported on the walls of the largest underpass;
- a three span bridge carrying traffic over the Dock Street junction;
- two existing bridges to be widened, with parapet improvements, one adjacent to an existing railway structure;
- several retaining walls, several subject to collision loading and/or acting as flood protection walls;

- an extension to a pedestrian underpass;
- several services culverts;
- three overhead sign/signal gantries;
- structures associated with pumping stations required for scheme drainage;
- strengthening works to the substructure of Lagan Road Bridge; and
- strengthening works to the substructure of Dargan Rail Bridge.

5.9 Buildability Assessment

In order to demonstrate to TransportNI that the Proposed Scheme could be built within its constraints whilst maintaining an acceptable level of provision for traffic during construction, a buildability assessment was completed.

The buildability assessment completed by Mr John Fraser of Gareloch Consult Ltd was based on information provided by URS.

Mr. Fraser was satisfied that URS had developed an outline construction sequence which is feasible within its engineering constraints, as explained in more detail in his separate Proof of Evidence.

5.10 Departures from Standard

One hundred and ten Departures from Standard applications required to facilitate the road geometry within the Proposed Scheme have been approved by TransportNI.

5.11 Road Safety Audit

In accordance with the requirements of Standard HD 19 of the DMRB, highway improvement schemes are subject to a Road Safety Audit by an Audit Team during key stages in design and at the end of construction.

For the Proposed Scheme, a Stage 1 Road Safety Audit was commissioned by TransportNI in January 2014 at the time of completion of the preliminary design. The Audit Team comprised members of URS independent of the design team, with the associated Audit Report issued to TransportNI in May 2014.

5.12 Non-Motorised User Audits

The DMRB recognises the importance of the needs of Non-Motorised User (NMUs) in highway schemes, with Standard HD 42/05 requiring the completion of NMU Audits at key stages in their development. NMU Audits consider the implications of the scheme for NMU accessibility, safety, comfort and convenience. While road safety and personal safety of NMUs are considered, it does not duplicate the separate independent Road Safety Audit process.

For the Proposed Scheme, a NMU Context Report was prepared in October 2012 ahead of the commencement of preliminary design.

Following completion of the preliminary design, a Preliminary Design NMU Audit was completed with the findings presented in the summary NMU Audit Report of October 2013, ahead of the Stage 1 Road Safety Audit in January 2014.

5.13 Strategic Advisory Group

During the Stage 3 Scheme Assessment process, a Strategic Advisory Group was established to address concerns relayed by consultees over the integration of the scheme with its urban setting and planning context.

5.14 Traffic and Economic Assessment

The results from the completed traffic and economic assessment of the scheme are summarised separately in the Proof of Evidence prepared by my colleague, Mr. Russell Bissland of URS.

6. CONCLUSIONS

The Proposed Scheme was developed up to publication of draft Orders in accordance with the DMRB and the requirements of TransportNI, resulting in a scheme which:

- provides a solution to the bottleneck of the existing York Street junction on the Strategic Road Network;
- provides new uninterrupted road links between the strategic routes of the Westlink, the M2 motorway and the M3 motorway;
- maintain connections to and from the strategic road network for the communities of North Belfast via slip roads at Clifton Street, York Street and Duncrue Street;
- improves the road user experience on York Street, through the resultant reduction in road traffic volumes and the provision of additional cycling and bus priority infrastructure;
- improves connections to and from the Port of Belfast and the other regional gateways;
- has been robustly assessed for its engineering, traffic and economic benefits at several major hold points over the course of its design development;
- has minimal loss of private property;
- has been assessed to be buildable within its constraints whilst maintaining movements for strategic road traffic;
- would provide significant positive economic returns, with a Benefit to Cost Ratio of 2.33; and
- provides significant improvements in journey times for road users.