

**TRANSPORT AND WORKS ACT 1992**  
**TRANSPORT AND WORKS (INQUIRIES PROCEDURES)**  
**RULES 2004**  
**NETWORK RAIL (HUDDERSFIELD TO WESTTOWN**  
**(DEWSBURY) IMPROVEMENTS) ORDER**

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**ENGINEERING AND DESIGN**  
**SUMMARY PROOF OF EVIDENCE**  
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*Summary Proof of Evidence – Engineering and Design*

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**1. QUALIFICATIONS AND EXPERIENCE**

1.1.1 I am an Associate Director at Ove Arup & Partners “Arup”. During my 34 years at Arup, I have been involved with the planning, design, and construction of major civil engineering infrastructure in the rail, highway and other industry sectors working in the UK and overseas.

**1.2 My current role and position on the project including key responsibilities**

1.2.1 I have led the design development of the Huddersfield to Westtown Scheme (TRU West Project W3) – the Order Scheme - from the commencement of GRIP Stage 3. Following the completion of GRIP3, I became a member of the W3 Project Leadership Team in the role of Design Lead where I have accountability for the overall strategic direction, development, and delivery of all design activities.

## **2. SCOPE OF EVIDENCE**

### **2.1 Response to Statement of Matters**

2.1.1 My evidence given in Section 3 of my main Proof covers all required points. In this summary I have covered the following points affected by the preferred design:

- **Point 2.** The main alternative options considered.
- **Point 3.** The likely impact on local businesses, tenants, and occupiers.
- **Point 6.** The impact of the Scheme on other development.

### **2.2 Response to Objections**

2.2.1 My evidence given in Section 4 of my main Proof responds to all the objections affected by the preferred design. In this summary I have briefly outlined the design process undertaken and responded to significant objection points.

### **3. ENGINEERING AND DESIGN RESPONSE TO STATEMENT OF MATTERS**

#### **3.1 Alternatives Considered**

##### The Network Rail GRIP Process

- 3.1.1 Governance for Railway Investment Projects (GRIP) is Network Rail's 8-stage management process for delivering projects.
- 3.1.2 Stages 1 and 2 covered Output Definition and Pre-Feasibility. My evidence covers GRIP 3 and 4 defined as Option Selection and Single Option Development.

##### Background to Option Selection

- 3.1.3 Following GRIP2, the target TRU Programme outputs against the Interim Train Service Specification (ITSS) included:
- Manchester-Leeds journey time: 40\* minutes (\* 42 minutes post GRIP3)
  - Manchester-York journey time: 62\* minutes (\* 67 minutes post GRIP3)
  - Capacity for 4 fast, 2 semi-fast and 2 stopping trains per hour.
  - Capacity to accommodate existing freight paths.
  - Capability to operate express trains 192m in length.
  - A Passenger Performance Measure (PPM) of 92.5%.
  - Electrification between Stalybridge and Leeds\* (\* current commitment is for partial electrification Leeds-Huddersfield).
- 3.1.4 Between York and Manchester there are several very constrained sections, the unlocking of which is fundamental to achieving the TRU Programme outputs. The most important of these is the section between Huddersfield and Ravensthorpe.
- 3.1.5 Along this section there are significant train movement conflicts as the Transpennine corridor is crossed by the Brighouse to Wakefield route. These conflicting train paths severely limit capacity, causing late running services to have an enormous impact on performance over the entire Transpennine route.
- 3.1.6 The GRIP2 study established that Huddersfield to Ravensthorpe was a vital component of the overall TRU Programme because:

- **Capacity.** It provides the operational capacity to run the ITSS including the ability for fast trains to overtake slow trains within this route section.
- **Journey Time.** It provides approximately 2 minutes improved running times contributing significantly towards the TRU journey time targets.
- **Performance.** It reduces train service conflicts substantially, thereby significantly contributing towards the overall PPM.

3.1.7 The Scheme provides operational capacity by three principal means:

- **4-tracking** to separate fast express from slow passenger and freight trains. This allows fast trains to overtake slow trains, which is a critical feature in creating a workable timetable to support the ITSS.
- **Grade Separation** to deconflict train service patterns within the Heaton Lodge Junction to Thornhill Junction section.
- **Huddersfield Station** Re-modelling to provide additional operational flexibility and resilience to operate the ITSS.

#### Option Selection

3.1.8 The GRIP3 option selection was defined by the following key decision points:

- **Ordering of Fast and Slow Lines** and their effects on existing junctions and infrastructure.
- **Location of the Grade Separation** following on from the selection of operational layouts.
- **Junction Layout and Operational Functionality** particularly at Ravensthorpe where the railway converges back into 2-tracks.
- **Huddersfield Station platform and track layout** where trains are ordered to suit the day-to-day timetable variables.

#### Ordering of Fast and Slow Lines

3.1.9 At GRIP3 two viable operational layouts were developed:

- **Operational Layout 1** – Fast lines positioned to the south of the 4-track corridor between Huddersfield and Ravensthorpe with a grade separation at Ravensthorpe.
- **Operational Layout 5** – Fast lines positioned to the south of the 4-track corridor between Huddersfield and Heaton Lodge. At Heaton Lodge the fast lines are grade separated and positioned on the north side of the 4-track corridor to Ravensthorpe.

#### Location of Grade Separation

3.1.10 The alternative locations for a grade separation were at Ravensthorpe or at Heaton Lodge Junction. Three options were studied:

- Option 1A – Flyover at Ravensthorpe
- Option 1B – Dive-under at Ravensthorpe
- Option 5A – Flyover at Heaton Lodge

3.1.11 After detailed evaluation, the two Ravensthorpe Options (1A and 1B) were taken forward and the Heaton Lodge option (5A) was deferred. The main reasons for preferring the Ravensthorpe location were:

- It concentrates the main civil engineering works into a single location.
- Brownfield land is utilised at Ravensthorpe ideally situated at the convergence of the Transpennine and Wakefield lines.
- Layout 1 is the most economical of the operational layouts. It is safer and simpler to stage for construction leading to a shorter overall schedule.
- There are significant operational benefits created by the Ravensthorpe option, due to the beneficial layout of railway junctions it affords.

3.1.12 After further evaluation, Option 1A (Flyover) was chosen as the preferred option for the grade separation for three key reasons:

- **Cost.** The total Whole Life Cost difference was more than £50m in favour of the Flyover option.
- **Schedule.** The Flyover had the shortest overall schedule duration leading to the earliest possible entry into service date.
- **3<sup>rd</sup> Party Land impacts.** The Flyover option when compared against the Dive-under option had a broadly comparable land and property impact.

3.1.13 Other factors assessed in favour of the Flyover option included Risk, Carbon Cost, Flooding, Safety, Environment and Engineering Complexity.

#### Junction Layouts and Operational Functionality

3.1.14 Layout 1 enabled Fast through lines to be positioned between joining Slow line chords at Ravensthorpe East Junction. This had major benefits over Layout 5:

- It improves capacity by removing a train service conflict point.
- It simplifies the junction layout eliminating a diamond crossing.
- It improves operational safety by removing a collision risk.

#### Huddersfield Station Platform and Track Layout

3.1.15 Several key decisions defined the overall layout:

- 4-through platforms are required for capacity to operate the ITSS.
- The platform 4 face is retained in its existing location.



- The lengthened platforms move eastwards creating space for a new west junction layout without needing to re-build Westgate Overbridge.
- The construction sequence utilises two 30-day blockades, between which the station operates with 2-through platforms and a temporary platform at Hillhouse to provide local connections.

### **3.2 Impacts on Local Businesses, Tenants and Occupiers**

#### Huddersfield Station and Viaduct

- 3.2.1 Design has been developed so that permanent works are predominantly contained within current Network Rail land, taking due account of grade II listed heritage properties adjacent to the western boundary.
- 3.2.2 The Scheme requires works to John William Street, Fitzwilliam Street and Bradford Road bridge spans and attachment of OLE supports. These will cause some temporary disturbance to properties alongside the viaduct during construction.

#### A62 Leeds Road

- 3.2.3 A62 Leeds Road Bridge must be re-built. A prime design consideration was to keep this busy road open, except for very short closure periods, to avoid disruption to businesses and travelling public. This was achieved by designing a temporary highway alignment and a bridge structure built in two-halves.

#### B6118 Colne Bridge Road

- 3.2.4 Colne Bridge Road overbridge is demolished and replaced to accommodate the 4-track electrified railway. The preferred design is an off-line reconstruction to the east to minimise disruption to highway users and nearby businesses.

#### Calder Road Re-Alignment, Ravensthorpe

- 3.2.5 All options studied required the re-alignment of Calder Road. Extensive design development has sought to minimise impacts on adjacent land and businesses. This includes optimisation of the grade separation railway alignments to allow Calder Road Bridge to be re-built as close as reasonably possible to its original position.

### **3.3 Scheme Effects on Local Development Proposals**

#### Huddersfield Station Area

- 3.3.1 The Scheme future-proofs the station subway and footbridge designs, so that they can be extended to support 3<sup>rd</sup> party development proposals, such as a new western station entrance.

Ravensthorpe Area

- 3.3.2 The Scheme affects development land known as “Dewsbury Riverside”. This is Kirklees largest housing allocation and envisages 4000 new homes built over a 20-year period.
- 3.3.3 The Scheme re-locates Ravensthorpe Station to the west. This directly complements Dewsbury Riverside plans and fully supports local planning policy.
- 3.3.4 The Scheme re-routes overhead HV electricity cables. This directly benefits adjacent development land as well as other nearby businesses.

## **4. ENGINEERING AND DESIGN RESPONSE TO OBJECTIONS**

### **4.1 Huddersfield Area**

#### Station Western Boundary (OBJ 14 and OBJ 23)

- 4.1.1 The station requires 4-through platforms and a new Leeds facing bay platform. Additionally, the grade I listed tea rooms are retained on the existing island platform. These features define the minimum dimensions across the station and resulting track positions adjacent to Brian Jackson House and the Goods Lift structure.

#### Impacts on Castlegate Retail Park (OBJ 15, OBJ 16, OBJ 43 and OBJ 45)

- 4.1.2 Works have been designed to, where reasonably practicable, be delivered from within the railway boundaries or from the public highway. However, some access is required from adjacent land, resulting in temporary effects on the Castlegate Retail Park.

### **4.2 Ravensthorpe Area**

#### Option Selection and Design Development (OBJ's 18 to 22 and OBJ 29)

- 4.2.1 Option selection and development of the grade separation scheme has followed a comprehensive, objective, and auditable process, which spans a period of approximately 3 years. Appendix 1 submitted with my main proof provides extensive evidence of this process, which has been shared with the affected parties.

#### Design Development to Minimise Land, Property and Business Impacts (OBJ's 18 to 22, OBJ 29 and OBJ 42)

- 4.2.2 Both Flyover and Dive-under options evaluated at Ravensthorpe require off-line reconstruction of Calder Road Bridge and consequential re-alignment of the highway. The design of the railway was extensively refined, including the plan position of the grade separation, to optimise impacts on land and property. This was accounted for in the option selection decision made.

#### Design Development to Minimise Scheme Impacts on the Newlay Site (OBJ's 18 to 22 and OBJ 29)

- 4.2.3 As stated in section 3.2, the Calder Road Bridge is re-built in a position to minimise its impact on the Newlay site. Refer to the summary evidence provided by Chris Williams for development of the highway design.

**5. WITNESS DECLARATION**

**5.1 Statement of declaration**

- 5.1.1 My proof of evidence includes my declaration as an expert witness which also applies to my summary of my evidence.