

Adran yr Economi a'r Seilwaith  
Department for Economy and Infrastructure



Llywodraeth Cymru  
Welsh Government

**The M4 Motorway (Junction 23 (East of Magor) to West of Junction 29 (Castleton) and Connecting Roads) and The M48 Motorway (Junction 23 (East of Magor) Connecting Road) Scheme 201-**

**The M4 Motorway (Junction 23 (East of Magor) to West of Junction 29 (Castleton) and Connecting Roads) and The M48 Motorway (Junction 23 (East of Magor) Connecting Road) (Amendment) Scheme 201-**

**The London to Fishguard Trunk Road (East of Magor to Castleton) Order 201-**

**The M4 Motorway (West of Magor to East of Castleton) and the A48(M) Motorway (West of Castleton to St Mellons)(Variation of Various Schemes) Scheme 201-**

**The M4 Motorway (Junction 23 (East of Magor) to West of Junction 29 (Castleton) and Connecting Roads) and the M48 Motorway (Junction 23 (East of Magor) Connecting Road) and The London to Fishguard Trunk Road (east of Magor to Castleton) (Side Roads) Order 201-**

**The Welsh Ministers (The M4 Motorway (Junction 23 (East of Magor) to West of Junction 29 (Castleton) and Connecting Roads) and the M48 Motorway (Junction 23 (East of Magor) Connecting Road) and the London to Fishguard Trunk Road (East of Magor to Castleton)) Compulsory Purchase Order 201-**

**The M4 Motorway (Junction 23 (East Of Magor) to West of Junction 29 (Castleton) and Connecting Roads) and The M48 Motorway (Junction 23 (East Of Magor) Connecting Road) (Supplementary) Scheme 201-**

**The Welsh Ministers (The M4 Motorway (Junction 23 (East Of Magor) to West of Junction 29 (Castleton) and Connecting Roads) and The M48 Motorway (Junction 23 (East Of Magor) Connecting Road) and The London to Fishguard Trunk Road (East of Magor to Castleton)) Supplementary Compulsory Purchase Order 201-**

**Proof of Evidence**

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**Welsh Government, Construction**

**Document Reference: WG 1.6.1**

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## 1. Author

### Personal Profile and Qualifications

- 1.1 I am Barry Jonathan Woodman. I am a Programme Director for Costain Limited and the Project Manager for the Costain, Vinci Joint Venture who would construct the proposed Scheme, should the Scheme proceed.
- 1.2 I have a BSc (Hon) degree in Civil Engineering and I am a Chartered Civil Engineer and a Fellow of the Institution of Civil Engineers, I am also a member of the Chartered Institution of Highways and Transportation and a Fellow of the Institution of Highway Engineers. In addition, I have a Master's Degree in Business Administration.
- 1.3 As a member of the Institution of Civil Engineers I am bound by their "Code of Conduct" to "act professionally and ethically" with "full regard for the public interest" and the "environment and the sustainable management of natural resources" The evidence which I have prepared and provide in this Proof of Evidence is true and has been prepared and is given in accordance with the guidance of my professional institution and I confirm that the opinions expressed are my true and professional opinions.
- 1.4 I have over forty years' experience in the construction industry starting as a Trainee Draughtsperson in 1975 with design consultants Ove Arup progressing to my current position of Programme Director with Costain Limited in 2012. I have over 35 years' experience on major civil engineering projects both overseas and in the United Kingdom predominantly on major highway Schemes, including 20 years in senior management positions.
- 1.5 My most recent relevant experience includes the following:
  - a) Transport for London STIP2 Hammersmith Flyover refurbishment. Early contractor involvement and construction phase.

- b) A465 Heads of the Valleys Section 2, Early contractor involvement phase.
- c) A8 Belfast to Larne, Early contractor involvement and construction phase.
- d) Church Village Bypass, Early contractor involvement and construction phase.
- e) M6 Heysham Link Road, Early contractor involvement phase.
- f) Sirhowy Enterprise Way Highway Scheme including a 200m span cable stayed bridge, construction phase.
- g) A2/M2 Widening (including a 1km long major motorway crossing of the River Medway), construction phase.
- h) Dockland Light Railway Extension to Lewisham (including the 1km long Deptford Viaduct with five river crossing passing through both Lewisham College and an urban industrial area in South East London, construction phase.

### **Personal Role in the Scheme**

- 1.6 Prior to the award of this contract to the Costain Vinci Joint Venture in March 2015, I was the Bid Manager for our tender for the M4 Corridor around Newport. My role on the M4 Corridor around Newport is Costain Vinci Joint Venture Project Manager both in the Early Contractor Involvement (ECI) phases and the Construction Phase.
- 1.7 I am responsible for working with the Welsh Government Officers and their agents to deliver this Scheme and manage the design, environmental and construction teams. Atkins and Arup were appointed as our Designers for the Scheme which includes RPS as an Environmental Sub Consultant selected for their extensive environmental expertise. My role is to ensure the efficient organisation, management and coordination of the construction and design team.
- 1.8 At all stages of the project my role is to ensure that the Scheme is delivered safely to the required quality, programme and budget and that



the Scheme can be constructed within the land identified in the Draft Orders. I am responsible for adopting the appropriate management processes and best practice construction methodologies to ensure we meet the environmental requirements set out in the Pre-Construction Environmental Management Plan and minimise the impact on our neighbours during construction. (Document 2.3.2)

## **2. Scope of Proof of Evidence**

- 2.1 My evidence will address the construction buildability and programme aspects for the Scheme.
- 2.2 I will begin by explaining the contractor's role in Section 3 which describes the involvement of the Contractor during the design development phase and the statutory process up to Public Local Inquiry.
- 2.3 Second I will describe in Section 4 the overall construction programme for the proposed Scheme and the key elements within it.
- 2.4 I will then cover the following aspects of the Scheme construction;
  - a) In Section 5, project management proposals that would be implemented during the construction phase.
  - b) In Section 6, the requirement for temporary land needed to construct the Scheme for various uses such as: office facilities, material storage fabrication and works access areas.
  - c) In Section 7, outlines of the Scheme logistics including the estimated number of people that are expected to work on the project and vehicle movements on the site during the construction phase including designated access and delivery routes.
  - d) In Section 8, temporary traffic management required while constructing elements of the work such as the new M4 Junctions at Castleton and Magor, the various side road crossing the project and the two new link roads at Glan Llyn and Docks Way.

- e) In Section 9, the approach and methods that would be used to construct the different elements of the proposed Scheme.
- 2.5 I will then explain the general responses to queries and objections received relating to the construction methodology and temporary land requirements in Section 10.
- 2.6 I will conclude with Section 11 which summarises my view in respect of the construction evidence relating to the programme, project management, construction approach and temporary measures and facilities required to construct this Scheme.
- 2.7 Section 12 contains Appendices that I shall be referring to in my evidence including material in the form of Tables and Figures all being labelled as ‘Tables’ or ‘Figures’ as appropriate and numbered for ease of reference.

### **Links with Other Evidence**

- 2.8 As already stated, this evidence relates to the construction buildability aspects of the proposed Scheme. The approach has been derived, in conjunction with the various design and environmental studies undertaken for this project. That work is covered in the following Proofs of Evidence provided by other Expert Witnesses including:
- a) Chief Witness (WG 1.1.1) Mr Matthew Jones
  - b) Economics (WG 1.3.1) Mr Stephen Bussell
  - c) Engineering (WG 1.5.1) Mr Ben Sibert
  - d) Environment (WG 1.7.1) Dr Peter Ireland
  - e) Landscape (WG 1.8.1) Mr Nicholas Rowson
  - f) Cultural Heritage (WG 1.9.1) Mr Mick Rawlings
  - g) Land Use, Community and Recreation (WG 1.10.1) Ms Julia Tindale
  - h) Contamination (WG 1.11.1) Mr Andy Clifton
  - i) Air Quality (WG 1.12.1) Dr Michael Bull
  - j) Carbon (WG 1.13.1) Mr Tim Chapman

- k) Noise and Vibration (WG 1.14.1) Mr Phillip Evans
- l) Water Quality (WG 1.15.1) Mr Richard Graham
- m) Flood Consequences Assessment (WG 1.17.1) Mr Mike Vaughan
- n) Ecology and Nature Conservation (WG 1.18.1) Dr Keith Jones
- o) Ecology – Dormice and Water Voles (WG 1.19.1) Mr Jon Davies
- p) Ecology – Bats (WG 1.20.1) Mr Richard Green
- q) Ecology – Ornithology (WG 1.21.1) Dr Simon Zisman
- r) Sustainable Development (WG 1.23.1) Mr John Davies

## Terminology and Guidance

2.9 The following acronyms are used throughout this Proof of Evidence

- a) AAJV            Atkins, Arup Joint Venture
- b) ABP            Associated British Ports
- c) ADT            Articulated Dump Truck
- d) BIM            Building Information Modelling
- e) CBGM          Cement Bound Granular Material
- f) CCTV        Closed Circuit Television
- g) CEMP          Construction Environmental Management Plan
- h) CFA            Continuous Flight Augured Piles
- i) CPO            Compulsory Purchase Order
- j) CVJV          Costain Vinci Joint Venture
- k) D2AP          Dual Two Lane All Purpose Road
- l) DCWW        Dwr Cymru Welsh Water
- m) DfT            Department for Transport
- n) DJV            Design Joint Venture
- o) ECI            Early Contractor Involvement
- p) EHO            Environmental Health Officer

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q)	ES	Environmental Statement
r)	HaSEMP Plan	Health and Safety Environmental Management
s)	HGV	Heavy Goods Vehicle
t)	ICE	Incidents Complaints and Enquiries Database
u)	LDZ	Large Diameter Augured Piles
v)	MCC	Monmouthshire County Council
w)	NCC	Newport City Council
x)	NG	National Grid
y)	NMU	Non-Motorised User
z)	NR	Network Rail
aa)	NRW	Natural Resources Wales
bb)	ORSR	Outline Remediation Strategy
cc)	PACT	Partnership and Communities Together
dd)	PCB	Polychlorinated Biphenyls
ee)	PLO	Public Liaison Officer
ff)	Pre-CEMP	Pre-Construction Environmental Management Plan
gg)	PSA	Port Security Authority
hh)	SAC	Special Area of Conservation
ii)	SAR	Steelworks Access Road (A4810)
jj)	SDR	Southern Distributer Road (A48)
kk)	SHE	Safety Health and Environment
ll)	SPMT	Self Propelled Modular Transport
mm)	SSSI	Site of Special Scientific Interest
nn)	SU	Statutory Undertakers
oo)	SWML	South Wales Main Line
pp)	SWTRA	South Wales Trunk Road Agency

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qq)	TM	Traffic Management
rr)	WG	Welsh Government
ss)	WPD	Western Power Distribution

### **3. Contractor's Role**

#### **Introduction**

3.1 The advantages of the Welsh Government ECI approach can be summarised as follows:

- a) Costain Vinci Joint Venture (CVJV) were appointed with their designers, Atkins Arup Joint Venture (AAJV) with RPS appointed as environmental sub-consultants to the AAJV to take the Scheme through the Statutory process and develop the Preliminary Scheme Design. Subject to the outcome of the Local Public Inquiry The CVJV will construct the Scheme and the AAJV will carry out the detailed design.
- b) Buildability issues and impacts are addressed by the Contractor and his Designer during the Preliminary Design Stage prior to publication of the Draft Orders. This enables sufficient land to be included in the Draft Orders to ensure the proposed works can be constructed safely and efficiently avoiding un-necessary land or rights acquisition.
- c) Whilst undertaking the preliminary design the Contractor and Designer develop a clear understanding of the potential environmental impacts which may occur during construction and appropriate mitigation measures so as to better inform the Environmental Statement.
- d) There is a clear understanding of construction issues, costs and risks at an early stage to inform all stages of the design which is of

particular relevance where complex technical solutions and specialist construction methods are required.

- e) Early involvement of the Contractor enables an assessment of cost at an early stage with input from experienced Contracting Estimators.
- f) A realistic construction programme to completion with contractor expert construction Planner input can be developed subject to the completion of the statutory consent procedures and the Welsh Government decision to proceed to construction.
- g) Mitigation measures to avoid or minimise adverse environmental impacts can be incorporated into the design.

### **Design Development**

- 3.2 The involvement of the Contractor with our designers Arup, Atkins and RPS at an early stage of the design development has provided the opportunity to consider and assess the construction sequencing, temporary works requirements and programming, together with the selection of appropriate safe construction methods of work. It also enables input and review of updated environmental and engineering surveys.
- 3.3 This enables comprehensive integration of the appropriate construction approach and environmental mitigation into the design development, statutory consent process by the CVJV and AAJV. The requirement to mitigate the impacts on the Sites of Scientific Interest (SSSI) and Special Area of Conservation (SAC) have been considered throughout this process. This has been progressed in concert with extensive discussions with Natural Resource Wales and additional environmental surveys and investigations. This can be illustrated with the integrated environmental mitigation and construction sequencing shown in Annex 7 of the Environmental Statement, Vol 3, Appendix 3.1 (Document 2.3.2).
- 3.4 The requirements of section 28G of the Wildlife and Countryside Act 1981 (Document 3.1.7) “to take reasonable steps, consistent with the

proper exercise of the authority's functions, to further conservation and enhancement of the flora, fauna or geological or physiographical features by reason of which the site is of special scientific interest" have been considered in the development of the design.

- 3.5 The design has followed an iterative process involving the Contractor, our Designer including the environmental team, key stakeholders and the Welsh Government. This ensures the most appropriate solutions have been identified and developed incorporating additional environmental, archaeological and ground investigation throughout the Scheme, including the Gwent Levels and stakeholder information as it became available improving the robustness of the solution and reducing Scheme risk. Examples of this approach are the development of the earthworks strategy to minimise the land take within the SSSI's by minimising the embankment heights, within the Gwent and Wentlooge Levels and the sourcing of all fill materials outside the Gwent and Wentlooge Levels and disposing of all material unsuitable for engineering use outside the Gwent Levels.
- 3.6 Extensive collaboration between the Contractor, Designer the Welsh Government and key supply chain partners co located in our project office has occurred since March 2015 ensuring a coordinated approach to review and challenge of the design, construction solutions and environmental mitigation measures to be included within the Scheme. Construction impacts have been based upon the Contractors chosen methods and programme and the associated environmental mitigation measures proposed within the Environmental Statement Register of Commitments (Environmental Statement, Volume 3, Appendix 18.1, Document 2.3.2) that would be implemented by the Contractor. The CVJV has worked closely with Design Joint Venture (DJV) lead by Ben Sibert including the Environmental team lead by Peter Ireland throughout the development of the Preliminary Design. Examples of this approach are the introduction of new replacement reens for those lost as a result

of the works and the retention of the Berry Hill Farm buildings which contain bat roosts.

- 3.7 Principal subcontractors for elements of the work such as earthworks, piling, structural steelwork and treatment of contaminated materials have been fully involved in the development of the proposed construction methodology to ensure the most appropriate solutions are adopted. For example, trials on waste material to be excavated within the TATA treatment lagoons and subsequent meetings with NRW identified that the material could be stabilised for reuse as a general fill within the Scheme. This approach would avoid disposal of the waste off site and reduce the amount of imported fill material necessary to construct the Scheme.
- 3.8 The essential temporary land required for construction outside the permanent land required for the Scheme post construction has been identified and incorporated within the draft Compulsory Purchase Order (Document 2.1) This land is included so that the Scheme can be constructed efficiently and safely whilst minimising the environmental impact. The temporary land identified is consistent with the selected construction methodology detailed in Volume 3, Appendix 3.1 of the Environmental Statement (Document 2.3.2).
- 3.9 The most suitable areas for construction compounds have been identified, having due regard to the impact on land owners, construction methodology, site access safety, minimising use of local public highway, environmental issues and programme requirements. Details of the temporary land use, location and reasoning are given in Section 6 of this Proof of Evidence.

### **Severed Land**

- 3.10 Where an existing access has been lost as a result of the highway alignment, an alternative access would be provided to the parcel of



land severed by the new road from the affected land owner's estate, this would be provided as Accommodation Works. During the design development of the scheme, several parcels of land severed by the alignment of the road with no means of alternative access from the affected land owner's estate, have been included in the land take for the scheme for environmental purposes, refer to Mr Nicholas Rowson's Landscape Proof of Evidence (WG 1.8.1).

### **Construction Budget and Risk**

3.11 The involvement of the Contractor early in the scheme design development enables:

- a) Input from the CVJV team with expertise and experience of delivering major infrastructure Schemes and associated price benchmarking, cost estimation and planning knowledge.
- b) Early involvement of the contractor's extensive supply chain and sub-contractors to input into the most appropriate construction methodology, temporary works, plant and materials for the Scheme and provide cost estimates for the works to improve budget certainty and reduce Scheme risk.
- c) Development of detailed staff, workforce and over heads costs and Scheme programme to inform the Scheme construction budget.
- d) Management and development of a comprehensive assessment of risks as the scheme develops to inform the Scheme budget. Specialist risk management software (Active Risk Manager) has been used to monitor Client, design and construction risks. Central to this approach has been the introduction of risk mitigation measures into the Scheme where appropriate.
- e) Periodic review and audit of the construction budget and risk as the Scheme develops by both the Welsh Government and the

Employers Agent (Arcadis) to improve budget certainty and reduce Scheme risk. Examples of this are that during the design development further cost updates from supply chain partners has been possible to improve cost certainty and further ground investigation has been undertaken to further inform the approach to ground treatment and foundations to structures, enabling the ground conditions risk to be updated.

- 3.12 A summary of the Scheme and construction budget and associated risk allowances can be found in Mr Steve Bussell's Proof of Evidence (WG 1.3.1) and Mr Matthew Jones Proof of Evidence (WG 1.1.1).

## **4. Construction Programme**

### **Introduction**

- 4.1 This Section explains the proposed Preliminary Construction Programme for the Scheme and the principal construction activities that are required. The assumptions that are described below are the best estimate of the works that would be required to construct the proposed Scheme taking into account the current available Scheme knowledge and construction methods.
- 4.2 The assessment of construction activities and the derived construction programme are those which would follow a favourable decision to proceed to construction by the Welsh Government subject to the outcome of this Public Local Inquiry.

### **Overall Duration**

- 4.3 Construction works are planned to commence in the Summer of 2018 and continue for a three and a half year period to achieve an opening date in the Winter of 2021. These timescales are subject to the completion of the statutory consent procedures, a decision to proceed by the Welsh Government and land acquisition.

- 4.4 Maintenance and Aftercare of the proposed Scheme landscaping by the CVJV would continue for a period of 5 years after the final completion of the construction work in 2021. General highways maintenance (excluding landscape maintenance) would be carried out by the South Wales Trunk Road Agency (SWTRA) for the Welsh Government following completion of the scheme. SWTRA would continue the required landscape maintenance follow the CVJV 5 year aftercare period.
- 4.5 Following the opening of the new section of motorway, the bypassed section of the existing M4 and the A48(M) would be reclassified as trunk roads. These works, including the re-opening of Junction 25, would be carried out by others as a separate contract to be tendered and awarded by the Welsh Government prior to completion of the Scheme.

### **Programme Constraints**

- 4.6 The construction programme is complex, principally due the technical complexity and variety of construction methods necessary for a Scheme of this scale and their interface with numerous other constraints that have been taken into consideration including:
- a) Seasonal environmental and weather constraints.
  - b) Sites of Special Scientific Interest (SSSI) and Special Areas of Conservation (SAC).
    - i. River Usk SAC – presence of a range of fish species and Otter.
    - ii. Lower Usk SSSI – Rare flowering plants, Otter, fish species and rare Craneflies.
    - iii. St Brides SSSI – Gwent Levels – reed and ditch habitat.
    - iv. Nash and Goldcliff SSSI – Gwent Levels – reed and ditch habitat.
    - v. Whitson SSSI – Gwent Levels – reed and ditch habitat.

- vi. Redwick and Llandeenny SSSI – Gwent Levels – reed and ditch habitat.
- c) Diversion of significant Statutory Undertakers plant.
- d) Interface with land owners, businesses and other stakeholders directly and indirectly impacted by the Scheme footprint and construction activities.
- e) Archaeological and environmental management and mitigation.
- f) Managing the interface with the public and their safety while providing appropriate access through the works for the various side roads and footpaths that cross the Scheme, link road tie ins to the Newport Southern Distributor Road (A48), the Steelworks Access Road (A4810) and the new motorway junctions at Castleton and Magor.
- g) Methodology and work sequence to ensure the safety of the Scheme workforce and members of the public.
- h) Minimising the use of the local road network by construction traffic where possible.
- i) Managing the known and potentially unknown contaminated material present on the site.
- j) Meeting the requirements of Network Rail for the construction of new and temporary crossings of the rail network including the South Wales main line and rail links to Uskmouth Power Station and Newport Docks.
- k) Managing the significant logistical, vehicle and material movements on a Scheme of this scale.

### **Sequencing of Operations**

4.7 Subject to completion of the statutory procedures it is intended for Construction Works to start in the summer of 2018 after serving the notice to treat and enter. Key dates subject to satisfactory completion of the statutory process are as follows:

**Table 4.7 – Key Dates**

Key Event	Date
Ministers Decision	January 2018
Land Entry	Summer 2018
New Sections of Motorway Open	Winter 2021
Landscape Aftercare Period Completion	Summer 2027

4.8 It should be noted that construction completion relates to completion of the new M4 motorway and excludes the reclassification works of the existing M4 motorway, which would be subject to a separate Welsh Government tender and contract award.

4.9 From the access date in the summer of 2018, enabling and site establishment works would immediately commence in all areas of the Scheme (see also paragraph 9.8 of this Proof of Evidence). The initial focus would be on establishing the environmental mitigation measures in advance of the construction works. This would be followed by construction of key temporary bridge structures at Duffryn and Llandevenny railway crossings, and the Castleton interchange overbridge on the new M4 westbound off slip that would help facilitate general access and earthwork movements through the Scheme, avoiding the public road network.

4.10 The earthworks to embankments in the Wentlooge and Caldicot levels less than 5 metres high, would predominantly be constructed in two stages with a settlement period in between to allow for consolidation of the main embankments. On completion of the settlement period and removal of the surcharge the carriageway construction would commence. Embankments greater than 5 metres in the Wentlooge and

Caldicot levels would be supported on piles to ensure the stability of the embankments, avoid excessively long settlement periods and potentially high and unpredictable settlements of the finished carriageway.

4.11 The programme has been aligned with applicable ecological seasonal windows within each area of the works, refer to the various Proofs of Evidence as listed in paragraph 2.8 of this Proof of Evidence. Also refer to Annex 7 of the Environmental Statement, Vol 3, Appendix 3.1, Buildability Report.

4.12 The sequence to be adopted during the construction phase would be as follows:

### **Castleton Interchange**

4.13 The programme approach in this area would be to construct the new M4 eastbound and westbound links north and south of the existing M4 and to allow the existing M4 traffic to be diverted onto these new carriageway links. This would provide sufficient working space for the bulk excavation of the existing M4 and construction of the new M4 tie in while maintaining through traffic on the M4 throughout.

4.14 Translocation of dormice in this area and site clearance is necessary prior to starting works in this area. The bulk material excavated north of the M4 is required to be moved as early as possible, for deposition in the docks link embankment and embankments on the Wentlooge Levels. The material to be moved to the Wentlooge Levels would utilise the existing Pound Hill Bridge to cross the M4, thus avoiding significant movements on the local highway network. Material for the docks link embankment will have to utilise the Southern Distributor Road (SDR) to access the area for construction of the embankment. Once the bulk excavation of the material north of the M4 is completed and the material transported, Pound Hill Bridge over the M4 would be demolished.

- 4.15 Construction of the new A48 under bridges and M4 Westbound viaduct would have to be complete to switch the traffic in advance of the final Scheme tie-in.
- 4.16 A schedule of activities and programme dates is given in Appendix 1.1 and the construction sequence for Castleton Interchange is illustrated in the Environmental Statement, Vol 3, Appendix 3.1: Buildability Report (Document 2.3.2).

### **Wentlooge and Caldicot Levels**

- 4.17 The programme sequence in these areas would be primarily driven by the environmental mitigation and protection measures including the installation of re-en culverts and re-en diversions. Other key activities necessary in this area would be statutory authority diversions, sewer protection measures, installation of stone working platforms required to provide a drainage layer below the road embankment and access across the soft ground in the Wentlooge and Caldicot Levels. Band drains would then be installed to aid embankment consolidation when surcharged. Driven concrete piles would be installed for the higher embankments. The required settlement period for the embankments below 5 metres would be the activity dictating the overall programme duration in this location.
- 4.18 The construction sequence for a typical area within the Wentlooge and Caldicot Levels is illustrated in The Environmental Statement, Vol 3, Appendix 3.1: Buildability Report (Document 2.3.2). This outlines the approach to implementing, integrating and managing the environmental constraints, mitigation and protection measures with the construction of the Scheme to indicate how we would typically meet the commitments detailed in the ES, Volume 3, Appendix 18.1, Register of Commitments (Document 2.3.2) in a given area of the scheme.

- 4.19 A temporary bridge over the South Wales main line at Duffryn would be required to allow earthworks material from Castleton to be transported to the east of the railway line, as far as the River Ebbw. A second temporary bridge over the South Wales main line would be required at Llandeenny to allow earthworks materials from Magor and Ifton Quarry to be transported to the Caldicot levels.
- 4.20 On completion of the embankment settlement period excavation of the surcharged material to road formation would be undertaken from embankments lower than 5 metres high and used to fill the piled embankments (over 5 metres high) at Duffryn Rail Bridge and River Ebbw Bridge in the Wentlooge Levels area and Glan Llyn Junction and Llandeenny Rail Bridge in the Caldicot Levels area.
- 4.21 The various side road overbridges would be constructed in parallel with the main carriageway works and constructed off line from the existing roads. This would minimise disruption to existing road users to short tie in periods when the side roads would be subject to restricted signalised one way working.
- 4.22 Berryhill Farm would be used as a borrow pit in conjunction with the highway earthworks cuttings at Castleton to generate the earthwork to fill the embankments in the Wentlooge levels. Berryhill Farm borrow pit would be refilled with the arisings from the works west of the River Ebbw that are inappropriate for engineering use. Berryhill Farm would then be used for landscape mitigation planting (refer to table 6.8 for location).
- 4.23 For embankments on the Caldicot levels, material would be required from the Magor Interchange area. This would be obtained from the new highway cuttings north of the existing M4/M48 and borrow pits at Magor early in the programme in order to construct working platforms for band drains and driven concrete piles on the Caldicot Levels. The borrow pits would then be filled using material generated from the Caldicot levels that would be inappropriate for engineering purposes, to avoid disposal



off site to licenced tips. Borrow pits would be reinstated to close to the existing ground level and returned to the land owner or used as a landscaping area (refer to table 6.8 for borrow location).

### **River Ebbw Bridge, River Usk Crossing and Approach Viaducts**

4.24 The principal access for construction of the works in this area would be:

- a) River Ebbw west bank – accessed along the Scheme west of the River Ebbw and the timing would therefore be dictated by the progress of these works.
- b) River Ebbw East Bank, Dock Junction Viaduct and the River Usk West Viaduct – accessed from the new Dock Way Link Road from the A48.
- c) River Usk West Pylon and bridge deck – principally from Dock Way Link via the ABP internal road network with limited access from the ABP main port entrance.
- d) River Usk East Pylon and East Viaduct – accessed from Corporation Road and along the Scheme east of the River Usk.

4.25 From the access date the construction sequence including the requirements of the Stephenson Street Flood Defence Scheme (refer to Matthew Jones, Chief Witness, Proof of Evidence, WG 1.1.1) would be:

- a) Install boundary fencing, carryout statutory and private utilities diversions works and office establishment.
- b) Construct Docks Way Link piling, earthworks embankment and surcharge.
- c) Construct bridge and viaduct piled foundations, abutments, piers and pylons.
- d) Dependant on the timing of the completion of the Stephenson Street flood defence scheme all existing flood defences within the Scheme land take would be maintained at current levels until the completion of the Stephenson Street flood defence scheme.

Following completion of Stephenson Street flood defence scheme, flood defences within the Scheme would be maintained at levels required for the Stephenson Street flood defence scheme.

Agreement of temporary measures require during construction of the Scheme would be agreed with NRW.

- e) Construct the bridge decks by a launch and precast method for the River Ebbw and River Usk Bridge Viaducts and a gantry and precast installation method for the River Usk main span.
- f) Complete roadworks, drainage and surfacing.

### **Magor Interchange**

#### 4.26 The cutting between Llandeenny Railway Bridge and St Brides

Underpass would need to be excavated and ramps constructed to enable the creation of temporary crossings over the South Wales Main Line and B4245 Newport Road to haul material onto the Caldicot Levels for embankment construction. On completion of the required embankment settlement period needed on the Caldicot Levels, the surcharged material would be removed and used to fill the piled embankments approaching Llandeenny Rail Bridge. The remaining surcharge material would be used to construct the D2AP link road that will run on the north side of the M4 between Junction 23 and Magor Junction 23A.

4.27 The new B4245 Side Road and bridge would be constructed off line in parallel with the bulk excavation in that area so that statutory diversions could be diverted into the new Overbridge. Traffic would then be diverted off the existing Newport Road onto the new bridge. This would enable the site haul road at this location to be re-routed from the south east side of the new alignment to run within the cutting along the line of the new carriageway to reduce the construction impact to local residents adjoining the Scheme at the earliest opportunity.

- 4.28 A section of St Bride's Road would be closed for the duration of the construction works to allow its dedicated use for construction earthworks traffic. A diversion route would be available from J23A gyratory around Magor Services linking to St Brides Road north of the works.
- 4.29 The new Windmill Hill Overbridge which would carry the permanently diverted Bencroft Lane over the M48 would be constructed early in the construction programme to enable local traffic to maintain access and divert local traffic using this route away from the construction works.
- 4.30 Extending the structures at St Bride's, Knollbury Lane and Rockfield Lane would be undertaken during the required settlement period for embankments on the Caldicot Levels at a time when earthworks movements from Magor to the Caldicot Levels would be reduced from the peak requirement. Rockfield Lane and Knollbury Lane would not be closed at the same time to maintain access via diversion routes for local traffic, as discussed with Monmouthshire County Council (refer to Appendix 1.2 for diversion routes).
- 4.31 The construction of the new M4 Westbound viaduct spanning the M4 and other structures at Magor East Junction would progress throughout the construction period. There would be a requirement for various westbound carriageway closures of the M4 and M48 to allow for installation of the bridge deck in these locations. For installation of the bridge deck over the eastbound M4 a single total closure of the Second Severn Crossing would be required. The exact timing of the closures would need to be agreed with SWTRA, Welsh Government Network Management, Second Severn Crossing Plc and Highways England. See the Environmental Statement, Vol 3, Appendix 3.1: Buildability Report (Document 2.3.2) and Appendix 1.3 of this Proof of Evidence for details of closures.
- 4.32 A schedule of activities and programme dates is given in Appendix 1.1 and the construction sequence for Magor is illustrated in the

Environmental Statement, Vol 3, Appendix 3.1: Buildability Report  
(Document 2.3.2).

## 5 Project Management

### Introduction

5.1 The construction activities would be managed using Scheme specific management systems that comply with legal and regulatory requirements and internal mandatory procedures and processes of the respective Construction Joint Venture organisations. A Scheme specific Project Management Plan has been developed setting out these management systems to ensure that an integrated and co-ordinated approach to project management is achieved. The following management aspects would be covered:

- a) Client's Scheme specific requirements.
- b) Document and Information Management for the Scheme.
- c) Design management.
- d) Commercial management.
- e) Change control.
- f) Logistics management.
- g) Supply chain management and procurement.
- h) Subcontractor and supplier management.
- i) Quality control.
- j) Safety, health and environment.
- k) Sustainability.
- l) Communication and co-ordination with third parties.
- m) Reporting.
- n) As built records.
- o) Further project specific requirements.

5.2 The management systems would ensure the efficient co-ordination and integration of the activities of the design team, the construction team,

including the supply chain and interface coordination with the public and local businesses and statutory stakeholders, from commencement of the works through to Scheme completion.

## **Safety, Health and Environmental**

### **Introduction**

5.3 The proposed Safety, Health and Environmental (SHE) Management System would be accredited to both BS OHSAS 18001 and ISO 14001. An integrated Health, Safety and Environmental Management Plan (HaSEMP) would be prepared for the Scheme to manage these issues during the construction works. This plan would consist of three principle parts: general issues; health and safety issues; and environmental issues. At this time, i.e. pre-construction phase, the environmental section of the plan has been prepared. This document is referred to as the Pre-Construction Environmental Management Plan (Pre-CEMP) and is contained in Vol 3, Appendix 3.2 of the Environmental Statement (Document 2.3.2). The Costain Vinci Joint Venture Project Manager would be responsible for the implementation of the HaSEMP and ensure that all members of the Project Team, including subcontractors comply with the stated procedures.

### **Health and Safety Management**

5.4 The Costain Vinci Joint Venture have been appointed as Principal Contractor and Principal Designer in accordance with the Construction Design and Management Regulations 2015 (Document 13.2.12).

5.5 The Construction Joint Venture SHE policies and the procedures are used to ensure a high standard of health safety and environmental compliance that would meet or exceed the requirements of all relevant health, safety and environmental legislation, codes of practice and guidelines.

- 5.6 Risk assessments, method statements, work plans, permits, inspection and test plans and non-conformance reporting amongst other management documentation, would be produced prior to commencing any work activity to demonstrate compliance with the appropriate legislation and SHE policies. These would be subject to periodic inspection and audit both by the project quality management team and internal company governance auditors. Independent periodic external audits would be undertaken by the Welsh Government Employers Agent (Arcadis) to verify both that the quality of the construction works are to the required safety and workmanship standards and ensure compliance with the Register of Environmental Commitments (Environmental Statement Vol 3 Appendix 18.1 Document 2.3.2).
- 5.7 Compliance throughout the construction of the Scheme would be monitored by Dr Peter Ireland and his environmental team who in the unlikely event of the identification of non-compliance would have full authority to suspend construction or require prompt implementation of additional environmental mitigation measures as necessary. In this event appropriate investigation and Improvement Plans would identify procedural improvements to prevent a future recurrence. Similarly, authority and weight would be given to the Safety Advisor and Quality Managers and their teams to ensure the safety of the workforce, staff and public and the quality of the constructed Scheme.

### **Environmental Management**

- 5.8 The CEMP would provide the management framework needed for the planning and implementation of construction activities in accordance with the environmental requirements and Schedule of Commitments (Environmental Statement Volume 3 Appendix 18.1 Document 2.3.2) identified within the published Environmental Statement. The CEMP identifies potential construction impacts and proposed mitigation for subjects such as noise, vibration, dust, water, archaeology, ecology, waste management pollution control and emergency procedures. The

plan is currently issued at the pre-construction phase status and would be further developed and updated prior to commencement of the construction phase and periodically throughout the construction phase. Dr Peter Ireland in his Environment Proof of Evidence (WG 1.7.1) will provide further detail on the preparation and content of the CEMP.

5.9 A full time Environmental Management Team would be present on site throughout the construction phase, led by the Environmental Coordinator Dr Peter Ireland and his team of Environmental Clerks of Works to ensure robust monitoring and compliance with both Statutory and Scheme requirements and Schedule of Commitments (Environmental Statement Volume 3 Appendix 18.1 Document 2.3.2). This team would also liaise closely with NRW and other bodies such as the Archaeological Curator appointed to the Scheme to ensure compliance with all Statutory requirements and the Schedule of Commitments found in the Environmental Statement, Vol 3, Appendix 18.1 (Document 2.3.2). They will have the power to immediately stop any non-compliant activities.

5.10 The environmental mitigation works has been a primary driver and are integrated into the construction sequence to ensure the various ecological constraints and commitments would be accommodated within the construction programme. To illustrate this the Environmental Statement, Vol 3, Appendix 3.1: Buildability Report (Document 2.3.2) shows the construction sequence in the North Row area of the scheme which represents the approach typical of the mitigation and sequence that will be adopted throughout the Scheme.

## **Consents**

5.11 Some specific construction related activities would be subject to regulatory controls requiring consents, licences or permits would be obtained prior to construction, advised or led by Environmental

Coordinator Dr Peter Ireland and his team following liaison with the relevant statutory authority such as:

- a) Marine Licence (NRW) – Mr Barry Woodman (Construction)
- b) Flood Defence Consents (NRW) – Mr Mike Vaughan (Flood Consequences)
- c) Land Drainage Consents (NRW) – Mr Richard Graham (Water Quality)
- d) Abstraction Licences (NRW) – Mr Richard Graham (Water Quality)
- e) Mobile Plant Licences (EHO) – Mr Barry Woodman (Construction)
- f) Water Discharge Permits (NRW) – Mr Richard Graham (Water Quality)
- g) Environmental Permits (NRW) – Mr Andy Clifton (Contamination)
- h) Protected Species Licences (NRW) – Mr Keith Jones (Ecology)
- i) Schedule Monument (CADW) – Mr Mick Rawlings (Cultural Heritage)
- j) Listed Building Consent (CADW) – Mr Mick Rawlings (Cultural Heritage)

### **Water Pollution Control Measures**

5.12 Mr Richard Graham and Mr Mike Vaughan in their Water Quality / Flood Consequences Proof of Evidence (WG 1.15.1 / 1.17.1) will provide further detail on water protection measures within the SSSI. They would be implemented throughout the construction phase under the direction of Dr Peter Ireland and his environmental team and would be detailed in the CEMP.

5.13 The importance of water quality within the SSSI's and SAC has been addressed in the development of our methodology and explained in the paragraphs 5.14 and 5.15 below. Although the Environment Agency Wales Pollution Prevention Guidelines (PPG6) (Document 17.2.8) document has been withdrawn, construction phase operations would be carried out in accordance with the guidance contained within this



document, as no alternative has been published. In addition, the guidance contained within CIRIA C648 Control of Water Pollution from Linear Construction Projects (Document 12.2.20) would be followed.

5.14 Mitigation measures have been developed to prevent runoff from the works directly entering watercourses adjoining the works. These measures would be included in the CEMP and carried out during the construction phase.

5.15 Measures would be implemented to protect watercourses and these would include the following:

- a) Water quality monitoring to criteria agreed with NRW.
- b) All fuel, oil and chemical storage areas would be bunded and remote from water courses.
- c) All plant and equipment would be stored in areas remote from watercourses with the appropriate use of drip trays with no refuelling of plant permitted adjacent to watercourses.
- d) Emergency spill teams would be established on site to respond to an unplanned event.
- e) Designated washout facilities would be provided for concrete delivery lorries which would be maintained.
- f) Bunded settlement lagoons and other best practice control measures such as Silt Fencing, Silt Busters etc. would be deployed to manage silt run off and suspended solids. The primary temporary runoff settlement lagoons would typically be located within the areas of land also identified for the permanent road carriageway drainage balancing ponds.
- g) Due to the linear nature of the Scheme and the nature of the ground conditions generally, linear bunding at the site boundary would be used to contain surface water run-off and direct flows to settlement lagoons prior to discharge (see Environmental Statement, Vol 3, Appendix 3.1: Buildability Report, Document 2.3.2).

- h) There would be no pumping to controlled waters without a Discharge Consent obtained from National Resource Wales (NRW).
- i) A regular comprehensive water monitoring regime would be agreed with NRW and implemented and regularly reviewed with the Employers Agent and NRW to monitor compliance.

### **Construction Noise and Vibration**

5.16 All construction activities would be subject to appropriate assessment and Section 61 agreements if required with the Environmental Health Officers (EHO) representing Newport City Council and Monmouthshire County Council. (refer to Section 9.2 – 9.7 for explanation of site working hours).

5.17 Mr Phil Evans in his Noise and Vibration Proof of Evidence (WG 1.14.1) will provide further detail on noise and vibration mitigation that would be implemented throughout the construction phase and would be outlined in the CEMP.

5.18 Construction noise would be minimised by:

- a) Strictly controlled working hours agreed with the Local Authority EHO.
- b) Providing temporary screening or bunding where appropriate.
- c) Use of appropriate well maintained silenced plant and machinery in accordance with construction best practice to minimise noise and vibration disturbance.
- d) Noise monitoring would be provided at key points along the Scheme and agreed and regularly reviewed with the local Environmental Health Officers for Newport City Council and Monmouthshire County Council to ensure compliance.

## **Dust and Air Pollution**

5.19 Good practice mitigation would be adopted during construction including the following:

- a) Regular inspections to monitor compliance with the dust control measures in the CEMP and in agreement with the local Environmental Health Officers for Newport City Council and Monmouthshire County Council.
- b) Use of water bowsers during dry or windy conditions to damp down haul roads, material stockpiles and unsurfaced areas.
- c) Re-vegetation of temporary stockpile where practicable.
- d) Restricting vehicle speeds on unsurfaced access routes and all unsurfaced areas.
- e) Regular maintenance of haul roads.
- f) Regular use of road sweepers around access points, compounds and working areas.
- g) Use of wheel washers at accesses where appropriate.
- h) Use of good practice dust capture and suppression for all cutting, sawing and demolition with appropriate plant and equipment.
- i) Daily inspection and monitoring of sensitive locations by the dedicated Environmental Management Team would be undertaken and mitigation measures reviewed as appropriate.
- j) Air Quality Proof of Evidence by Mr Michael Bull (WG 1.12.1) will provide further details on dust and air pollution mitigation that would be implemented throughout the construction phase and would be outlined in the CEMP.

## **Contaminated Land**

5.20 An Outline Remediation Strategy (ORSR) (set out in Appendix 11.2 of the ES Document 2.3.2) would be further developed prior to construction and approval sought from Natural Resource Wales (NRW) Newport City

Council (NCC) and Monmouthshire County Council (MCC) to address the management and safe remediation of known contaminated sites within the Scheme.

5.21 Ground investigation of permanent and temporary land has been carried out where access has been possible to inform the Outline Remediation Strategy Report including risk assessment of known and potential contaminated sites.

5.22 Although unlikely, potential unknown areas of contamination within the Scheme may be encountered. Prior to construction, appropriate material testing and classification would be undertaken to characterise any further contamination identified to enable appropriate remediation. Procedures for dealing with unexpected contamination are described in the ORSR.

5.23 Regular working group meetings have been held with TATA's Environmental and Engineering Departments, addressing specific topics such as Lagoon Contamination, the internal water management of the dirty and clean ditch systems, Environmental Permit surrender and Licencing.

5.24 Mr Andy Clifton in his Contamination Proof of Evidence (WG 1.11.1) will provide further detail on contamination mitigation that would be implemented throughout the construction phase and would be outlined in the CEMP.

### **Sustainable Construction.**

5.25 The requirements of section 28G of the Wildlife and Countryside Act 1981 (Document 3.1.7) were an integral part of the approach considered during the CVJV tender and has been a central consideration in the collaborative development of the outline Scheme proposals throughout the ECI phase. The CVJV undertook to provide a comprehensive and highly experienced environmental design team and during construction a

management team led by Dr Peter Ireland of RPS would ensure environmental surveys, mitigation measures and compliance would be robust and to high best practice standards. Our team has worked closely with the Welsh Government to refine the technical and environmental solutions for the Scheme such as:

### **Section 28 of the Wildlife and Countryside Act 1981**

5.26 On the River Usk Bridge a range of proposals to monitor and mitigate the impact on the River Usk SAC and the Lower Usk SSSI such as:

- a) Avoiding work in the wetted river channel and appropriate plant selection and methods of work to minimise vibration impact on fish in the river.
- b) Maintaining access for otters and provision of holts along the river bank throughout the construction phase is shown in the Environmental Statement, Vol 3, Appendix 3.1 (Document 2.3.2). These will be further detailed by Cr Keith Jones in his Ecology and Nature Conservation Proof of Evidence (WG 1.18.1).

### **Sustainability**

- a) The appointment of an experienced bridge architect to oversee the aesthetics of the bridge design and the bridge lighting strategy.
- b) The Scheme has been designed to maximise the use of locally sourced material from within its footprint and through the use of borrow pits adjacent to the Scheme footprint thereby:
  - i. Avoiding areas of protected mineral reserves.
  - ii. Providing an earthworks balance thus reducing the need to take material offsite by road using the local road network.
  - iii. Maximising the use of on-site direct hauls using Articulated Dump Trucks (ADT) thus reducing regional emissions of local air pollutants.

- iv. Reducing the impact upon the air quality on the local roads.
  - v. Utilising stabilised contaminated material for reuse and encapsulation within highway embankments.
  - vi. Reducing the volume of material unacceptable for engineering purposes by 180,000 m<sup>3</sup> from the Welsh Government design prior to the appointment of the CVJV and the AAJV.
- c) We have maximised the use of on-site haul routes and site won material from borrows to minimise imported materials and export of inappropriate material off site thereby reducing construction traffic on the local network by 55%.
- d) The CVJV are actively investigating opportunities for Capital Carbon Reduction and where possible they would be adopted. The following gives some examples, but the listing is not exhaustive:
- i. Minimise the use of off-site materials by maximising re-use of site won material or improved waste material
  - ii. Use of GGBS or PFA in concrete (locally sourced)
  - iii. Re-use of waste products
  - iv. Recycling of materials from demolition
  - v. BIM – optimisation of design
  - vi. Grey water recycling in site offices
  - vii. LED lighting in site offices
  - viii. Light sensors in site offices
  - ix. LED street lighting
  - x. LED sign and gantry lighting
  - xi. Solar powered CCTV
  - xii. Solar powered temporary vehicle matrix signs
- e) Further information on Carbon can be seen in Mr Tim Chapman's Carbon Proof of Evidence (WG 1.13.1).
- f) We redesigned the Castleton M4 interchange to enable fewer traffic management phases during construction and maintain three lanes of traffic each way through the works This was achieved by designing the slip roads to be built off line north and south of the existing M4 to carry three lanes east and west bound in the

temporary condition while the new main carriageway is constructed as detailed in the sequence drawings in the Environmental Statement, Vol 3, Appendix 3.1: Buildability Report (Document 2.3.2).

- g) We have introduced grass lined channels and ditches to form the carriageway longitudinal drainage where practicable (the advantages and reasoning behind the use of grass lined channels are given in Richard Graham's Proof of Evidence, WG 1.15.1).

5.27 We would maximise the reuse of contaminated material present within the Scheme such as the 590,000 m<sup>3</sup> of TATA silt and slag lagoon materials that would be remediated by stabilising the lagoon silt with cement. This material would be subject to extensive testing monitoring and review with NRW. Typically, this remediated material would be used for general engineering earthworks fills to embankments thereby avoiding offsite disposal to landfill, also reducing the volume of imported material needed and congestion on the local highway network.

5.28 The above mentioned non exhaustive selection of measures included within the CVJV tender proposal have been developed through the ECI phase to ensure sustainable development is embedded within the approach to the Scheme as detailed in Mr John Davies Sustainable Development Proof of Evidence (WG 1.23.1).

5.29 The Outline Site Waste Management Plan (Annex F, Appendix 3.2 of Environmental Statement, WG 2.3.2) details the approach to minimising and managing waste on the Scheme ranging from prevention of waste to safe disposal from site.

5.30 The Outline Site Waste Management Plan (Annex F, Appendix 3.2 of the ES, WG 2.3.2) would be further developed and discussed with NRW prior to implementation during construction to identify waste streams at the earliest opportunity. Opportunities to maximise recovery and re use

of wastes would continue to be considered both before and during the construction phase.

5.31 The Outline Site Waste Management Plan (Annex F, Appendix 3.2 of the ES, Document WG 2.3.2) would be closely monitored by the CVJV Waste Manager, reviewed and evaluated periodically throughout the construction phase. All waste management will be in accordance with the requirements of Monmouthshire County Council, Newport City Council and NRW. Similarly, the Outline Site Waste Management Plan would include controls and handover procedure's required for the South Wales Trunk Road Agency (SWTRA) and Welsh Government Network Management on completion.

### **Quality Control**

5.32 The Scheme Quality Systems would be used to define workmanship quality management, quality assurance arrangements and the responsibilities of all team members in the planning, resourcing, verifying and certifying of the works.

### **Public Relations and Stakeholder Management**

5.33 A Communications Strategy has been developed for the published Scheme. The strategy would be updated and implemented using a phased approach to reflect the various stages in the lead up to and during the construction phase. It would provide detailed information to the appropriate target groups, as scheduled in Table 5.33. The full time ECI Public Liaison Officer (PLO) Brian Greaves, currently appointed by the Costain, Vinci Joint Venture would stay in this role throughout the construction phase. This would ensure continuity of relationship established during the ECI phase and the PLO would be responsible for implementing the Public Relations and Stakeholder Management Strategy, supported by a further two PLO assistants.



5.34 The strategy would be reviewed at regular intervals using public and stakeholder feedback via various media and personal contact strategies. One of the actions of the strategy would include the formation of a Communications Group comprising members of the Welsh Government and Costain Vinci Joint Venture. Other appropriate stakeholder communication groups would also be formed to ensure they are kept informed throughout the construction stage (e.g. Local Authorities, Community Councils etc.). A summary of the outline strategy is provided in the table below.

**Table 5.33 – Summary of Communication Strategy**

Strategy	Actions
<b>Public Liaison Officer (PLO)</b>	The Costain Vinci Joint Venture PLO Brian Greaves would attend Partnerships and Communities Together (PACT) meetings and other meetings including liaison meetings with local councilors and community groups as appropriate. The PLO would also attend and update at internal meetings including programme coordination, site progress and traffic management meetings. The PLO would be responsible for managing all contacts with local residents groups, schools, emergency services and local business with regard to general construction works issues.
<b>Liaison with Statutory Bodies</b>	Regular liaison meetings would be held by agreement with statutory bodies such as NRW, Cadw, Newport City Council, Monmouthshire County Council, Statutory Undertakers companies, Network Rail, ABP, the Port Security Authority (PSA), SWTRA and Cardiff City Council.
<b>Liaison with Welsh Government</b>	Regular meetings and coordination with the Welsh Government Press Office, SWTRA and Welsh Government Network Management.
<b>Liaison with businesses</b>	Regular liaison meetings would be held by agreement with businesses within the footprint or adjoining the Scheme to coordinate and manage these interfaces during construction, including Severn Bridge Plc.

Strategy	Actions
<b>Media</b>	A range of media approaches (such as website and text messaging) would be adopted to update local people and other interested parties on progress of the works, future work activities, traffic management, job and supply chain opportunities. Key work activities such as road closures or night work would be highlighted in good time to those groups or communities most affected. This will be coordinated with agreed by the Welsh Government Press Office.
<b>Visitor Centre</b>	A visitor and resource center would be established within the main project office. Key attendance times would be established.
<b>Exhibitions</b>	Pre-construction Exhibitions would be held at local venues and would offer a range of information relating to the final Scheme construction proposals.
<b>Newsletters</b>	Quarterly newsletters would be published and distributed to promote the overall progress of the Scheme and forthcoming works. The newsletters would be distributed to residential and business premises close to the construction area and copies would be placed on the project website, available at the visitor center and delivered to local libraries etc.
<b>Leaflet drops</b>	Leaflet drops would supplement newsletters. They would be targeted at residents and businesses that may be directly affected by specific construction activities to provide advanced notice of upcoming events.
<b>Project Information boards</b>	<p>Notice and display boards would be erected in prominent public locations updated periodically with relevant Scheme information.</p> <p>Notification of project progress and forthcoming lane closures and traffic switches would be displayed within motorway service stations along the M4, M48 and M5.</p>
<b>24 hour helpline</b>	A 24-hour public help line would be promoted on all site notice boards, project information boards newsletters, flyers,

Strategy	Actions
	and press releases. A complaints procedure would be managed with the use of the Incidents, Complaints and Enquiries Database (ICE). The company target is for all complaints would be recorded within 24 hours and resolved within 7 days.
<b>Emergency Response</b>	An Emergency and Extraordinary Incident Communication Response Plan would be developed and emergency contact details would be provided. This plan would be agreed and reviewed periodically with the emergency services and the South Wales Trunk Road Agency (SWTRA) and Welsh Government Network Management.

5.35 The approach and performance of public relations, stakeholder management and communication would be monitored and measured in Scheme audits and through the Welsh Government Key Performance Indicators system.

## 6. Temporary Land

### Introduction

6.1 We have worked closely with our Designer and Environmental Consultant teams to identify the minimum additional land that would be required temporarily during construction to provide safe and efficient working conditions and adequate access to the construction work sites. All of these areas are considered essential and therefore included in the Draft Compulsory Purchase Order (See Appendix 1.16). The following types of temporary land would be required:

- a) Site office compounds.
- b) Material and plant storage areas.
- c) Borrow pits and material processing.
- d) Prefabrication areas and onsite production facilities.
- e) Temporary works, works access and safe working area.

**Site Office compounds**

- 6.2 Office compounds are required adjoining the site to facilitate direct access to the work areas to:
- a) Minimise workforce movements on the local highway network between the office and the various work sites.
  - b) Provide appropriate welfare facilities within a reasonable distance of the work site.

**Material and Plant Storage:**

- 6.3 Temporary storage areas are needed to accommodate the significant quantities of materials which would be required to be delivered to a Scheme of this size from external suppliers throughout the construction phase.
- 6.4 Significant quantities of earthworks material generated within the site would at times require temporary storage in stockpiles prior to use in its final location. It is intended that topsoil and subsoil would be stored in separate stockpiles with a 3m maximum height for topsoil and 5m maximum height for subsoil, both at an appropriate slope. Stockpiles would not be positioned within the root or crown spread of trees or adjacent to ditches, watercourses or future excavations as detailed in the pre-CEMP in Vol 3, Appendix 3.2 of the Environmental Statement (Document 2.3.2).
- 6.5 Suitable secure areas need to be available to safely store and maintain construction plant during construction.
- 6.6 Temporary material storage areas would be needed to ensure:
- a) Materials are readily available in advance of construction for the efficient progress of the works.
  - b) The safe and orderly management of deliveries to the work site.

## **Borrow Pits**

6.7 Borrow pits are required on the project for the following reasons:

- a) There is a shortfall of general earthworks fill to form the embankments on the Scheme from the cuttings required for the proposed new motorway. Mr Ben Sibert will explain in his Proof of Evidence (WG 1.5.1) the reason why the engineering design does not provide a balance of earthworks without borrow pits.
- b) There would be a significant quantity of material generated from the works principally from the poor ground across the Gwent levels and within the SSSI that would be inappropriate for reuse as engineering fill on the Scheme. This surplus inert material which would be inappropriate for engineering use would not be permanently placed on land within the SSSI, but deposited as replacement material in the borrow pits, thus ensuring that the SSSI land take for material disposal and associated environmental impact is avoided.

6.8 The requirement for borrow pits would be met using land within the permanent scheme footprint at Magor and Castleton, as far as possible, where suitable general earthworks fills are known to be present. These borrow pits would be used to generate material suitable for the construction of embankments across the Gwent levels. When excavation of the suitable material is completed, the borrow pits would be filled using surplus material inappropriate for engineering purposes removed during the work, principally from the Gwent Levels. In order to acquire the volume of fill suitable for the construction of embankments and disposal of the surplus material inappropriate for engineering use, two borrow pits in the Magor area would be required outside the permanent land take, at Green Farm (OBJ 0233) and Old Court Farm (OBJ 0213)

refer to Appendix 1.16. Berry Hill Farm at Castleton is permanently acquired for landscaping and used as a borrow pit during construction.

Table 6.8, below identifies proposed borrow pit locations.

**Table 6.8 – Borrow Pit Locations**

Location	Plot reference	Description
West	3/1a	Berryhill Farm, south of A48 at Castleton
East	17/5t	Land between existing M4, M48 westbound and B4245 Caldicot Road
	17/1	Highway land between the existing M4 and M48
	17/5m	Land south of current M4 and north of B4245 Caldicot Road
	17/5b, 17/5c, 17/5e, 17/5d	Land south of current M4 and north of B4245 Caldicot Road
	17/6a, 17/5r	Land south of the B4245 Caldicot Road and M4
	17/9a	Land to the north of Bencroft Lane Rogiet, (part of Green Farm)

Refer to Appendix 1.18 for drawing showing borrow pit locations.

6.9 This approach would have the advantage of:

- a) Generating all general fill required for the Scheme from land within the Scheme footprint or adjoining the Scheme.
- b) Enabling material inappropriate for engineering reuse to be retained on site.
- c) Avoiding disposal off site of significant quantities of material to land fill and the associated impact on the local road network.

### **Prefabrication Areas and Onsite Production Facilities**

6.10 Pre fabrication areas and on site production facilities would be required for the following reasons:

- a) Large structural elements (such as long structural steel beams) would have to be delivered to site on the road network in transportable lengths. These would then have to be reassembled prior to erection into the work.
- b) Preassembly of construction items (such as reinforcement cages) from their component parts on site prior to installation is required.

- c) On site production of concrete and associated construction elements. There would be three primary locations for the production of pre-cast concrete elements on site. These would be at Imperial Park, ABP Docks and east of the River Usk. The number and type of pre-cast elements and where they would be produced is shown in Table 6.10 below.
- d) Soil treatment of contaminated material for reuse within the Scheme.

### 6.10– Table of Site Pre-cast elements

Pre-cast Element	Number Cast	Casting Location	Installation Location	Number at Location
Concrete piles – 3m long sections	308,400	Imperial Park	Zone 2	131,700
			Zone 4	176,700
Pile cap Units	57,900	Imperial Park	Zone 2	22,200
			Zone 4	35,700
Bridge deck slabs	2,600	ABP Docks	River Usk Crossing West	1,100
Bridge deck slabs		east of the River Usk	River Usk Crossing East	1,500

### 6.11 Benefits of this approach would be:

- a) Reduced safety risk to the workforce during construction.
- b) Reduced impact on the national and local highway network by reducing the movement of large abnormal construction elements.
- c) Ability to flexibly manage the delivery of base component items outside peak hours thereby reducing traffic congestion on the local network.
- d) Greater control over quality, providing production flexibility and delivery certainty.

### Temporary Works, Works Access and Safe Working Area

6.12 The construction of highway schemes and their associated structures would require the essential temporary use of land during construction for:

- a) Safe access and land to accommodate and install temporary works such as scaffolding or trench support.
- b) Safe plant access adjacent to the works such as cranes and mobile elevated platforms.
- c) Temporary site access routes along the Scheme such as temporary bridges across the South Wales railway main line.
- d) Enable the most appropriate method of construction and plant use to ensure the safety of the workforce.
- e) Enable efficient timely construction of the works.
- f) Enable the retention of significant earthworks and construction vehicle movements within the site thereby reducing the construction traffic impact on the local network.

6.13 The temporary land identified is the minimum land that would be necessary to achieve the above requirements.

## 7. Scheme Logistics

### Introduction

7.1 The Scheme would require to moving significant quantities of material both from within the Scheme boundary and via deliveries from external plant and material suppliers for example:

a) Earthworks	5,480,000 m3
b) Structural Steel	35,000 t
c) Concrete	250,000 m3
d) Reinforcement Steel	42,000 t
e) Dry stone materials	1,910,000 m3
f) Drainage	28,000 m3
g) Carriageway surfacing	53,000 m3



- 7.2 The approach to managing these movements wherever practicable would be as follows:
- a) Move plant, materials and workforce within the site.
  - b) Avoid peak traffic hours for external deliveries inbound to the site as far as practicable.
  - c) Ensure external deliveries inbound to the site follow designated construction traffic routes agreed prior to the start of construction with Newport CC and Monmouthshire CC.
  - d) A dedicated transport coordinator and logistics team would coordinate and manage all deliveries to the Scheme.

### **Plant, Materials and Workforce on Site Movement**

7.3 The construction programme and land take identified to construct the Scheme incorporates phasing of the works that would enable an access route to be installed through the site as shown in the Environmental Statement, Vol 3, Appendix 3.1: Buildability Report (Document 2.3.2). This would minimise the use of the local highway network. Table 7.3, below gives an assessment of the inbound heavy goods deliveries (actual vehicle movements would be double this number), labour and staff numbers required, split down into the five zones for the works.

**Table 7.3 – Vehicle Movements, Labour and Staff**

<b>Area</b>	<b>Total Goods Deliveries</b>	<b>Average Deliveries per Day</b>	<b>Average Labour Requirement</b>	<b>Average Staff Requirement</b>
Zone 1 – Castleton	19,800	19	130	35
Zone 2 – Wentlooge Levels	61,400	59	160	70
Zone 3 – Ebbw and Usk Crossings	84,900	82	336	113
Zone 4 – Caldicot Levels	34,000	33	165	70
Zone 5 Magor	7,000	7	271	59

7.4 This site haul route necessarily requires:

- a) A temporary bridge to cross the Network Rail South Wales main line at Duffryn and Llandeenny railway bridges. In principle discussions have been held with NR (NR approval required).
- b) A temporary bridge to cross B4245 Newport Road near the proposed, Newport Road Overbridge. In principle discussions have been held with MCC (MCC approval required).
- c) A temporary bridge to cross the existing M4 north of Magor at Junction 23A. In principle discussions have been held with SWTRA and the Welsh Government Network Management. (SWTRA and Welsh Government approval required).
- d) Signalised plant crossings at the various side roads that cross the Scheme North to South across the Gwent Levels. In principle discussions have been held with MCC and NCC (MCC and NCC approval required).
- e) A signalised plant crossing to the A48 at Castleton would be required to take earthworks from the north side of the M4 across Pound Hill Bridge into the embankment construction south of the A48 and into the Wentlooge Levels. In principle discussions have been held with NCC (NCC approval required).

### **Inbound Construction Vehicle Movements via the Local Road Network**

7.5 Designated construction traffic routes have been discussed with the Local Authorities and would be agreed prior to construction and periodically reviewed with the Local Authorities throughout the construction (see the Environmental Statement, Vol 3, Appendix 3.1: Buildability Report Document 2.3.2). These would be notified to our suppliers and coordinated by our dedicated Logistics Manager to ensure appropriate accesses are used and delivery times are selected and adhered to.

- 7.6 Abnormal load movements have been discussed in principle and would be agreed with Gwent Police, South Wales Police, Welsh Government, Highways England and Severn River Crossing PLC and would typically be moved at night to avoid disruption to the local road network.
- 7.6 Due to the size and length of some of these loads local modification may be required to roundabouts and junctions on the local network route by agreement with the relevant Local Authority.
- 7.7 Temporary holding areas would be used to manage the movement of these delivered loads to their final position on site at:
- a) A449 Layby near Newbridge on Usk
  - b) Wilcrick Depot for the east end of the Scheme
  - c) Dock Way Compound for the west side of the River Usk
- 7.8 Construction materials deliveries typically would avoid the hours of 07.00 to 09.00 and 17.00 to 19.00 wherever practicable.

### **Site Accesses**

- 7.9 The principal site accesses (as discussed with MCC, NCC and ABP) would be provided as shown in the Environmental Statement, Vol 3, Appendix 3.1: Buildability Report (Document 2.3.2) with the main plant delivery and office complexes at:
- a) Imperial Park for the West end of the Scheme (NCC).
  - b) Dock Way for the River Usk West Approach Viaducts (NCC and ABP).
  - c) B4239 Lighthouse Road for a short period early in the programme to allow enabling works prior to construction of the through site haul route (NCC).
  - d) ABP main port entrance for the River Usk West Pylon and viaduct when access via Dock Way and the ABP internal network cannot be used (NCC and ABP).

- e) Corporation Road for the River Usk East Pylon and East Viaduct (NCC).
- f) Glan Llyn Link Road for the Gwent Levels east of the River Usk (NCC).
- g) North Row for the works in that area (NCC).
- h) Bareland Street for works in that area and the south side of Llandevenny Rail Bridge (MCC).
- i) Newport Road near Magor to service the eastern section of the Scheme and satellite office (MCC).
- j) Meadows Road alternative access to the eastern viaduct works and works east of Nash Road (NCC).
- k) Temporary access required to access and egress from the M4/M48 eastbound link, under traffic management (SWTRA and Welsh Government Network Management).

## 8. Traffic Management

### Introduction

- 8.0 The principal areas where the direct construction works of the Scheme would impact the travelling public are:
- a) Existing M4 at Castleton.
  - b) Existing M4 at Magor.
  - c) Side roads that cross the Scheme footprint at various locations along the Scheme as illustrated in the Environmental Report, Vol 3, Appendix 3.1: Buildability Report (Document 2.3.2).
  - d) Footpaths and bridleways that cross the footprint of the Scheme (see Environmental Report, Vol 3, Appendix 3.1: Buildability Report Document 2.3.2).
  - e) Link roads at Glan Llyn connecting into the Steelworks Access Road (SAR) and Docks Way connecting into the SDR.
- 8.1 All temporary traffic management would comply with current best practice and Chapter 8 Traffic Safety Measures and Signs for Road Works and Temporary Situations (Document 6.1.13, 6.1.14 and 6.1.15).
- 8.2 To ensure the safety of the travelling public and our workforce during the works on the M4, A48(M) and M48, a typical temporary speed limit of 50mph would be established and enforced with average speed cameras. Temporary CCTV would also be established to monitor traffic flows and to ensure incidents within the traffic management areas receive a prompt response and are managed in a timely manner by the vehicle recovery team.
- 8.3 To ensure the safety of the travelling public and our workforce during the works at other locations along the route where there would be an interface with the travelling public such as the A48 at Castleton, the B4245 on Caldicot Road and at other local roads where temporary signalised plant crossings would be located, Temporary Speed Limits of 30mph would be established.

- 8.4 Emergency breakdown recovery service would be provided for all traffic management required during the construction of the new junctions at Castleton and Magor with vehicle recovery refuges located at Castleton and Glan Llyn compounds.
- 8.5 A Traffic Management liaison group would be established to coordinate the traffic management works and minimise where practicable the impact on the M4, local road networks and major events in South Wales with:
- a) Cardiff City Council, Newport City Council and Monmouthshire County Council.
  - b) Welsh Government Traffic Officers.
  - c) Welsh Government Network Management.
  - d) Highways England.
  - e) South Wales Trunk Road Agency (SWTRA).
  - f) Police, Fire and Ambulance emergency services.
  - g) Major transportation organisations such as Arriva, Road Haulage Association, Freight Transport Association, Newport Bus and Severn River Crossing PLC.
- 8.6 Approval of detailed traffic management proposals would be obtained from the above mentioned Authorities where applicable in advance of the works.
- a) Outline proposals have been discussed in preliminary traffic management meetings with MCC, NCC, Welsh Government Network Management, SWTRA, Severn River Crossing PLC, Cardiff City Council and Highways England.
- 8.7 Road closures and road diversions would be strictly limited to those necessary to ensure the safety of the construction workforce and the travelling public such as lifting bridge beams on to the new A48(M) bridge crossing the existing M4 at Castleton, that would be agreed with MCC, NCC, Welsh Government Network Management, Severn River Crossing PLC, the emergency services, and SWTRA as applicable (See

Appendix 1.3).

- 8.8 Road closures, road diversions and the implementation or change to traffic management on the Scheme would be communicated using a variety of media approaches as appropriate such as, letter drops, text messaging, highway signage and matrix signs and the project web site.

### **Existing M4 at Castleton**

- 8.9 The traffic phasing for the works at Castleton is shown in the Environmental Statement, Vol 3, Appendix 3.1: Buildability Report (Document 2.3.2) has typically been designed to:
- a) Maintain three lanes of traffic in each direction.
  - b) Maintain all traffic movements along the existing M4 and the A48(M) during the works.
  - c) Minimise the requirement to transport earthworks material on the local highway network that would need to be excavated on the North side of the existing M4.
  - d) Minimises the number of major traffic management changes required.

### **Existing M4 at Magor**

- 8.10 The traffic phasing for the works at Magor is shown in the Environmental Report, Vol 3, Appendix 3.1: Buildability Report (Document 2.3.2) has typically been designed to:
- a) Maintain three lanes of traffic in each direction.
  - b) Maintain all traffic movements along the existing M4 and the M48 during the works.
  - c) Minimise the requirement to transport earthworks material on the local highway network that would need to be excavated on the North side of the existing M4 and Ifton Quarry.

- d) Minimises the number of major traffic management changes required.
- e) Minimise the number of total carriageway closures on the Second Severn Crossing to 3 for the installation of the viaduct deck (2 carriageway closures are required for the westbound M4 J22 – J23a and M48 J2 – M4 J23 and 1 total closure, east and westbound of the Second Severn Crossing and the M48 J2 – M4 J23).

### **SDR at Maesglas**

8.11 Traffic Management would be required on the SDR to allow construction of the tie-in for Docks Link Junction. Contraflow would need to be established on the eastbound carriageway of the SDR, for a period of 12 to 15 months. This would allow for widening of the existing embankment, extension to the Westway Road Bridge, protection works to Maesglas Pill Culvert and establishment of the signalised junction for Docks Link.

### **SAR at Glan Llyn**

8.12 To construct the Glan Llyn tie-in with the A4810 Steelworks Access Road, it would be necessary to install traffic management to provide a single lane running configuration on the existing A4810 gyratory and its approaches to provide the necessary safety zones for the works at the tie-in with the existing carriageway.

### **Side Roads**

8.13 Treatment of Side roads generally fall into two categories:

- a) Permanent road closures.
- b) Temporary road closure and diversion during construction.

### **Permanent Road Closures**

8.14 The following roads would be permanently closed as part of the Scheme and alternative permanent arrangements for these routes are detailed on



the scheme General Arrangement Drawings in Chapter 2 of the Environmental Statement (Document 2.3.2).

Roads that are permanently closed and will have no connectivity during and on completion of the construction of the new motorway.

- a) Pound Hill
- b) Duffryn Link Road
- c) Green Lane
- d) Green Moor Lane (becomes NMU route)

8.15 Roads that are permanently diverted after construction to a new alignment over or under the new motorway (access will always be available during the construction process along the listed side roads).

- a) Nash Road
- b) North Row
- c) Church Lane
- d) Lighthouse Road
- e) Bencroft Lane
- f) Meadows Road
- g) Bareland Street
- h) Newport Road

### **Temporary Side Road Closures**

8.16 Temporary road closures are required at the following locations:

- a) St Brides Underpass (39 months)
- b) Knollbury Lane (12Months)
- c) Rockfield Lane (12 months)
- d) Corporation Road – seven overnight closures

Note; Knollbury Lane and Rockfield Lane will not be closed at the same time.

8.18 Improvement to existing passing places will be undertaken along the diversion routes for these closures, within the existing highway boundary (Appendix 1.10).

### **St Brides Underpass**

8.18 A Closure of 39 months would be required to enable earthworks material haulage to and from Ifton Quarry and borrow pits in the Magor area. The frequency, size of vehicle and nature of this operation renders the shared use of this route with public inappropriate on safety grounds. Closure is also required to construct a new on line extension to the existing bridge at this location to accommodate the new section of D2AP and realigned M4.

8.19 The diversion route for the temporary closure of St Brides Underpass is shown in Appendix 1.2.

### **Knollbury Lane Overbridge**

8.20 A closure of 12 months would be required to enable the construction of the new overbridge at this location to pass over the new section of D2AP linking to an existing bridge over the M4.

8.21 The diversion route for the temporary closure of Knollbury Lane is shown in Appendix 1.2.

### **Rockfield Lane Underbridge**

8.22 A closure of 12 months would be required to enable the construction of the new underbridge at this location and allow a new section of the D2AP to pass over, this will link to an existing bridge under the M4.

8.23 The diversion route for the temporary closure of Rockfield Lane is shown in Appendix 1.2.

### **Other Side Road Works**

8.24 The following side roads that cross the Scheme would not require diversion as the new overbridges for these routes would be constructed

adjacent to the existing road and then opened prior to the closure of the old road alignment to avoid diversion of traffic using these roads.

Signalised one way working may be necessary for short periods while tie-in works to the new bridges is carried out.

- a) Church Lane Overbridge
- b) Lighthouse Road Overbridge
- c) New Dairy Farm Overbridge
- d) Nash Road Overbridge
- e) North Row Overbridge
- f) Bareland Street Underbridge
- g) Newport Road Overbridge
- h) Windmill Hill Overbridge (new alignment of Bencroft Lane)

8.25 A construction sequence for North Row is given in Appendix 1.17 to illustrate this approach. This construction sequence assumes that the environmental mitigation works as described in the Environmental Statement, Vol 3, Appendix 3.1: Buildability Report (Document 2.3.2) have been completed.

8.26 Construction sequences for Docks Way and Glan Llyn link tie ins is given in the Environmental Statement, Vol 3, Appendix 3.1: Buildability Report (Document 2.3.2).

### **Footpaths, Cycle Ways and Bridleways**

8.27 Newport City Council, Monmouthshire County Council and Sustrans have been consulted on the impact of the Scheme on footpaths, cycleways and bridleways. Existing routes passing through the site would generally be maintained until the permanent route across the Scheme is complete. Temporary diversions would be necessary in some instances to ensure the safety of the public during the construction works while the revised permanent routes are constructed.

- 8.28 Liaison would continue throughout the construction phase to ensure appropriate safe standards of construction of temporary diversions are reviewed and maintained.
- 8.29 Details of the routes affected and the diversion routes are shown in the Environmental Statement, Vol 3, Appendix 3.1: Buildability Report (Document 2.3.2). Refer to Ms Julia Tindale's Land Use, Community and Recreation Proof of Evidence (WG 1.10.1).
- 8.30 The Cardiff / Newport Cycleway (proposed Route 88) would be maintained through the Scheme near its current location during the construction of Percoed Non-Motorised user (NMU) Bridge which would provide permanent access over the new M4 for the cycleway.
- 8.31 Cycle Route NCN4 and the Wales Coastal Path on the East side of the River Usk, would be diverted for the safety of the public using these routes due to the restricted nature at this location of the construction site and the intensive use of heavy construction plant and materials needed.
- 8.32 A new section of cycle path would be provided between Bareland Street and North Row improving cycle links between Magor and Newport and giving connectivity to Cycle Route NCN4.
- 8.33 A new section of cycle path would be included to avoid the new Newport Road (B4245) / SAR (A4810) junction that would be constructed west of Magor.
- 8.34 A new section of cycle route would be added to Caldicot Road east of Magor on the section of road that would become a Trunk Road as part of this Scheme.

8.35 A new section of Bridleway would be added to the south of the new M4 to connect St. Bride's Road to Grange Road, to be opened on completion of the scheme.

## 9. Construction Approach

### Introduction

9.1 This section will briefly describe the following primary construction methods not addressed elsewhere within this Proof of Evidence that would be adopted and the principal reasons for their selection.

- a) Working Hours
- b) Enabling Works
- c) Statutory and Private service diversions
- d) Earthwork cuts and fills
- e) Piling
- f) Drainage
- g) River Usk Bridge and approach viaducts
- h) Other Structures
- i) Highways Works

### Working Hours

9.2 The site comprises three general areas where construction would be undertaken where mitigation measures for noise dust and vibration during the works would be tailored accordingly namely:

- a) Castleton and Magor Interchanges comprising work adjacent to and on the existing M4 with residential communities in the area.
- b) Brownfield areas such as Newport Dock, and industrial areas east of the River Usk and TATA waste lagoons typically remote from residential properties.
- c) Greenfield areas through the Wentlooge and Caldicot levels with occasional residential properties.

- 9.3 During the construction of the Scheme it is proposed that the normal working hours would be 07.00 to 19.00 Monday to Friday and 07.00 to 17.00 on Saturday excluding public holidays. These would be subject to further discussions and location specific discussions and agreements with the Local Authority Environmental Health Officers (EHO). It is considered these hours provide a balanced approach to provide the expeditious completion of the works without unduly extending the overall construction period and associated disturbance.
- 9.4 In certain circumstances specific works may need to be undertaken outside the agreed normal working hours for reasons such as the safety of the workforce and minimising disruption to the travelling public where road closures or rail possessions are necessary. In these circumstances agreement would be sought from the local Environmental Health Officers (EHO's) at Monmouthshire County Council and Newport City Council. In all cases of extended or unsociable hours, local EHO's, residents, businesses and others likely to be affected by the works would be informed in advance in accordance with the communication strategy summarised in Table 5.33 of this Proof of Evidence.
- 9.5 Night working would be required for a number of operations during the Scheme. This work would be carried out to minimise disruption to road and rail users with due consideration to workforce safety. Road closures or rail possessions would be required for some essential and complex operations such as demolition of the existing A48(M) Overbridge, Park Farm Footbridge and Pound Hill Overbridge. A schedule of the principal closures and rail possessions currently envisaged is given in Appendix 1.3 and would be further developed prior to construction.
- 9.6 Site working hours would be closely managed to avoid complaints from local residents and businesses. Where construction works and related events have a significant impact on neighbouring properties, the affected parties would be advised prior to starting work in accordance with the

communication strategy summarised in Table 5.33 of this Proof of Evidence and mitigation measures would be implemented where appropriate.

- 9.7 Where there is a clear conflict of necessary works such as tugboat crews within Newport Dock who frequently work nights and currently moor near the proposed West Approach Viaduct, mitigation has been considered. In this case provision of alternate moorings has been discussed with ABP.

### **Enabling Works**

- 9.8 The following enabling works would be undertaken including but not limited to:
- a) Construction ecological mitigation described in Dr Keith Jones's Ecology and Nature Conservation Proof of Evidence (WG 1.18.1).
  - b) Construction archaeology mitigation described in Mr Mick Rawlings Cultural Heritage Proof of Evidence (WG 1.9.1).
  - c) Construction Dormice and Water Vole mitigation as described in Mr Jon Davies's Proof of Evidence (WG 1.19.1).
  - d) Construction Bat mitigation as described in Mr Richard Green's Ecology Proof of Evidence (WG 1.20.1).
  - e) Construction Ornithology mitigation described in Dr Simon Zisman's Proof of Evidence (WG 1.21.1).
  - f) Establishment of temporary offices, plant and stores compounds, material storage areas.
  - g) Site accesses, haul roads, hardstandings and signalised plant crossings.
  - h) Temporary fencing of the site and protection of public footways and cycle routes, environmentally sensitive areas and archaeological sites to prevent unauthorised access.
  - i) Site clearance.

- j) Temporary and permanent reed diversions and temporary water management measures.
- k) Demolition works (including Woodland House – refer to Mr Mick Rawlings Cultural Heritage Proof of Evidence WG 1.9.1).
- l) Remediation of contaminated land.
- m) Temporary Bridges.
- n) Utility Diversions and Protection Works.

### **Statutory Undertakers and Private Service Diversions and Protection**

9.9 Numerous meetings have been held with the Statutory Undertakers. Available as built utilities information has been obtained and on-site visual inspections have been carried out, where possible, to identify the location of existing services that would be affected by the scheme, refer to the Environmental Statement, Vol 3, Appendix 3.1, table 6.1 (Document 2.3.2).

9.10 Where SU diversions would be unavoidable the works would be carried out by the relevant SU company whilst private diversions will be undertaken by approved contractors in agreement with relevant Stakeholders. Appropriate timescales for required diversion and protection works have been included within the construction programme.

9.11 During construction the CVJV would employ a full time Statutory Undertaker Coordinator and works supervision team to liaise with SU's to ensure effective forward planning, agreement and approval of working methodology and coordination of our site works to minimise the impact on their service delivery as far as is practicable.

9.12 Discussions have been held and C3 Budget Estimates obtained for all SU plant diversions from the relevant SU. These have been reviewed by the CVJV to ensure diversion routes, are accommodated within the



construction programme. This would enable SU's to maintain continuity of their service delivery where diversions cannot be avoided.

9.13 All SU's have been contacted to inform them of the intention to enter into formal C4 agreements.

9.14 Regular coordination meetings would be held with the various SU's and our dedicated Utilities Manager would coordinate their activity on site in line with the project construction programme.

9.15 Enabling works would be carried out as necessary in advance of SU work on site such as provision of access to work sites by the Costain Vinci Construction Joint Venture. Temporary or permanent protection to existing and diverted services would be agreed with the relevant parties and installed where required to facilitate the safe construction of the works.

9.16 Private landowners such as Solutia, Air Products and Magor Brewery have already been engaged with a number of meetings in order to mitigate the impact of the scheme upon their service supplies.

9.17 Service diversion workgroups have been formed with other Statutory Authorities such as ABP to develop a strategy for undertaking diversion works within their land. These discussions would continue during construction should the Scheme proceed.

9.18 A summary of the service diversions expected to be required is given in the Environmental Statement, Vol 3, Appendix 3.1: Buildability Report (Document 2.3.2).

## Earthworks and Associated Ground Treatment

9.19 The global earthworks strategy is to:

- a) Generate suitable engineering fills from borrow pits at Castleton and Magor to fill the various embankments throughout the Scheme.
- b) Generate processed structural fills and drainage stones from Ifton Quarry in the east and Machen Quarry in the west.
- c) Use all inert materials generated from the Scheme that are inappropriate for engineering purposes to refill and reinstate the borrow pits.
- d) All embankments below 5 metres in height on the poor ground within Gwent Levels that would settle over time, are to be surcharged with an average of 0.75m fill above finished road level. The surcharge is required to pre-consolidate the ground typically for a 12 month duration in conjunction with the installation of vertical band drains prior to construction of the road carriageway to prevent excessive settlement following construction. A stone drainage layer would be required in all areas where band drains are installed below embankments.
- e) All embankments over 5 metres in height within the Wentlooge and Caldicot Levels would be filled on top of piled foundations to control and prevent excessive settlement on these larger embankments. A load transfer platform formed from stone and geotextile reinforcement would be required on top of the piles.
- f) Due to the poor nature of the ground across the Wentlooge and Caldicot Levels the intention is to avoid removal of the topsoil where possible to reduce the disturbance of the desiccated surface soil crust thereby reducing the quantity of material that would be inappropriate for engineering use generated during the works.
- g) The Scheme passes through significant brownfield areas along the route principally:
  - i. ABP Newport docks.

- ii. The industrial area to the east of the River Usk and adjacent to the Solutia chemical site.
  - iii. TATA waste treatment lagoons.
- h) 591,000 cubic metres of contaminated material would necessarily be excavated during construction of the Scheme. Remediation trials have been carried out to verify the feasibility of cement stabilisation and beneficial reincorporation of this material within the Scheme to form the motorway and associated embankments detailed in Mr Andy Clifton's Contamination Proof of Evidence (Ref WG 1.11.1) thereby avoiding removal from site by road to an off-site licenced tip.
- i) Temporary land within the existing TATA site adjoining the Scheme as identified in the Environmental Statement, Vol 3, Appendix 3.1: Buildability Report (Ref WG 2.3.2) would be used to process, remediate the contaminated material and test it before moving this material for inclusion in the works the details of which will be set out in the final Remediation Strategy Report.

9.20 A summary of the principal earthworks quantities and type of material to be excavated and filled by location is given in the Environmental Statement, Vol 3, Appendix 3.1: Buildability Report (ref WG 2.3.2) and summarised in Table 9.20 below (the quantities may vary due to ground conditions and weather during construction):

**Table 9.20 – Principle Earthworks Quantities**

Type of material	Volume
Site Won Excavated General Fill	3,360,000 m3
Excavated Material inappropriate for engineering use and existing surface topsoil strips, some of which is used in re-soil and landscaped areas.	400,000 m3
Borrow Pit Won Material	1,130,000 m3
Total Borrow re-fill including surcharge and some of the excavated material inappropriate for Engineering use.	1,200,000 m3

Treated Contaminated Fill	590,000 m3
Imported aggregates (Ifton)	960,000 m3
Imported aggregates (Machen)	950,000 m3

9.21. The main plant and transportation requirements for the earthworks operations are summarised below in Table 9.21.

**Table 9.21 – Main Plant and Transport Requirements**

Item of Plant	Typical Work Activities
Tracked dozers	Stripping top soil at Borrow Pit areas and Castleton and Magor, spreading stone for working platforms, spreading embankment fill, working to assist scraper boxes during excavation if and where used in large cut areas, spreading topsoil on batters.
Tracked dozers with ripping teeth.	Can be used for activities carried out by a typical dozer, plus used for ripping hard ground and rock. Likely to be used at Castleton and Magor.
Tracked Excavators	Excavating cuttings / loading ADT dump trucks, excavating structure foundations, installing working platforms and drainage blankets.
Hydraulic Hammers	To be used when excavating in rock cuttings
Articulated Dump Trucks (ADT's)	Hauling excavated material from cutting and borrow areas to deposition areas
Vibratory Roller / Sheep's Foot Compacter	Compacting layers of earthworks fill material in accordance with the specification, depending upon the material excavated from Castleton and Magor
Tracked Screener / Crusher	To be used for processing hard material from Castleton and Magor including blasted material from Ifton Quarry. This plant would also be used for processing slag at TATA,, demolition arising's will also be processed for re-use where possible.
Scraper boxers	Excavating large cut areas to fill large deposition areas. Generally worked with tracked dozers to push scrapers when excavating from cut areas and spreading fill at depositions areas.
Road Sweepers	Used to keep works access / egress and plant crossings clean and free from mud
Tractor and bowsers	Use to damp down haul roads during dry weather.

Item of Plant	Typical Work Activities
Well Pointing and Dewatering	Would need to be used at Berryhill Farm borrow pit to control ground water during excavation of suitable fill for use in Highway construction.

9.22 Where earthworks operations and haul routes are in close proximity to residential areas mitigation measures detailed in CEMP would be implemented with Section 61 consents agreed and obtained from the Local Authority where necessary.

9.23 Earthworks operations have the potential to contribute to the release of suspended solids into watercourses. A specific Water Management Plan within the CEMP and outlined within Appendix 3.2 Pre Construction Environmental Management Plan of the ES (Document 2.3.2). would be further developed prior to construction to control this risk.

### Excavation in Rock

9.24 The geology along the length of the Scheme varies with underlying rock strata varying from mudstones in the west to sandstone, limestone and conglomerate in the east of the Scheme. The principle cuttings, method of excavation and approximate rock volumes to be excavated on the Scheme are detailed in Table 9.24 below following an assessment of the available geological information.

**Table 9.24 – Excavation Methods and Volumes**

Location	Excavation method	Volume of rock (m3)
Castleton Interchange and Berry Hill Farm Borrow	Digging of overlying deposits with ripping and excavation of the underlying mudstones	1,190,000 m3 from Castleton 500,000 m3 from Borrow Pit
Magor Interchange Borrows	Digging of overlying deposits with ripping, breaking by hydraulic hammer or	630,000 m3

Location	Excavation method	Volume of rock (m3)
	potentially blasting and excavation of the underlying limestone and sandstone (safety zones as required for blasting)	
M4 Mainline carriageway cutting to the west of Magor	Digging of overlying deposits with ripping, breaking by hydraulic hammer or potentially blasting and excavation of the underlying sandstone (safety zones as required for blasting)	500,000m3
New Dual Two Lane All Purpose carriageway north of Magor and the existing M4	Digging of overlying deposits with ripping, breaking by hydraulic hammer or blasting and excavation of the underlying Limestone or conglomerate (safety zones required for blasting)	360,000 m3
Ifton Quarry	Blasting (control and mitigation measures by quarry operator in accordance with their operating Licence) Required to provide hard standing working platforms, drainage, pavement aggregate and concrete aggregates for works in the Caldicot Levels and Magor Interchange	960,000 m3

9.25 Exceptionally hard rock is present in the Magor area where Sandstone, Limestone and Conglomerates would be encountered. The approach that would be adopted would be to:

- a) Use single toothed ripping techniques where ever possible.
- b) Breaking by hydraulic hammer for isolated hard pockets of rock.
- c) Fracturing by blasting where extensive hard areas of rock are encountered (safety zones would need to be established for blasting operations).

9.26 The primary objective of any blasting on this Scheme would be to fracture the rock strata sufficient only to facilitate ripping and excavation. Vibration due to blasting would be dependent on the specific site geological conditions, the blasting techniques adopted, the amount of

explosives used and the distance from the blast point. Any blasting necessary would be designed using current best practice and explosives technology to ensure that air overpressure and vibration levels would reflect the guidance set out in: BS 6472-2:2008, Guide to evaluation of human exposure to vibration in buildings, Part 2: Blast-induced vibration (Document 14.2.11); BS ISO 4866:2010, Mechanical vibration and shock – Vibration of fixed structures – Guidelines for the measurement of vibrations and evaluation of their effect on structures (Document 14.2.13) ; BS 7385-2:1993, Evaluation and measurement for vibration in buildings, Part 2. Guide to damage levels from ground borne vibration (Document 14.2.2); BS 5228-1:2009+A1:2014 Code of Practice for Noise and Vibration Control on Construction and Open Sites – Part 1: Noise 2014 (Document 14.2.5); and BS 5228-2:2009+A1:2014 Code of Practice for Noise and Vibration Control on Construction and Open Sites – Part 2: Vibration 2014 (Document 14.2.6).

9.27 The methods and timing of any such work would be agreed with Welsh Government, Monmouthshire County Council and Natural Resources Wales and the final assessment and decision on the method to be used would be considered in terms of overall duration and potential physical impact. Pre-condition surveys would be carried out on properties within a zone to be determined by agreement and discussion with Welsh Government, Monmouthshire County Council EHO and the specialist blasting sub-contractor.

9.28 Small trial blasts would be undertaken to assess the transmission properties of the geology between the excavation and local properties. Vibration and noise measurements would be taken to ensure that the levels of vibration established would be within acceptable levels. Monitoring would continue to confirm that the limits set are adhered to. Dust would be managed by pre blast wetting of the blast area and post blast damping down.

9.28a The data recorded during the small trial blasts would be used to determine the methodology and blast zones to be adopted for the main blasting works adjacent to properties and existing roads. In areas close to existing properties and where deeper cuttings are to be formed additional smaller blasts would be required to lower the cutting in a series of lifts to the required excavation level. This approach reduces the size of the charges required and the noise and vibration generated to crack the rock within the acceptable levels set out in the guidance noted in 9.26.

9.29 Ahead of blasting, a public relations and information operation would be undertaken by our PLO Brian Greaves including specific leaflet drops to all those potentially affected. This would describe the requirement to carry out trials and the requirement to blast within the permanent works. Individual visits would be undertaken to those potentially affected ahead of and during the required operations. Contact information would be provided to residents and local businesses to ensure any concerns and feedback as these works progress is captured and addressed. Blast safety exclusion zones would be secured and closely monitored to ensure the security of the safety zone perimeter.

9.30 An experienced Blasting Manager would be in control of the blasting operations and in conjunction with the Public Liaison Officer, Brian Greaves would ensure that contact with potentially affected parties is made well in advance of the planned operations. The blasting programme would be publicised well in advance following all necessary trials and preparatory works.

9.31 It is not envisaged that any relocation of residents would be required.



## Piling

9.32 Due to both the soft nature of the ground and the high concentrated loads arising from the construction of some elements of the works, a range of piling methods is required to support a variety of structures on the Scheme such as:

- a) Earthworks embankments
- b) Bridge piers and abutments
- c) Drainage culverts
- d) Temporary structures necessary to construct the works

9.33 The piling that would be required would be further detailed in the Engineering Proof of Evidence by Mr Ben Sibert (WG 1.5.1).

9.34 The piling methods adopted where necessary would generally be as follows:

- a) Embankments as detailed below in Table 9.34 typically within the Gwent Levels would require Precast concrete driven piles to be used due to the soft nature of the ground, large areas and number of piles that would need to be installed and the relative speed of installation. Pre-casting also enables flexibility in the concrete demand for the Scheme with manufacture of piles in advance of installation.

**Table 9.34 - Embankments**

	Location	Distance	Description
<b>Mainline</b>	CH 6,193 – CH 6,868	675m	Approaches either side of Duffryn Rail Crossing (SWML)
	CH 8,090 – CH 8,442	350m	Approach to the River Ebbw Crossing
	CH 11,383 – CH 11,561	180m	Approach to the River Usk Crossing
	CH 19,140 – CH 20,105	965m	Approach to Llandevenny Railway Crossing (SWML)

	Location	Distance	Description
<b>Side Roads</b>	CH 7,330 – CH 7,394	65m	Lighthouse Road overbridge approaches
	CH 8,000 – CH 8,050	65m	New Dairy Farm overbridge approaches
	CH 12,574 – CH 12,640	65m	Nash Road overbridge approaches
	CH 14,450 – CH 14,660	210m	Glan Llyn west facing slip road embankment
	CH 14,660 – CH 14,835	175m	Glan Llyn east facing slip road embankment
	CH 17,513 – CH 17,579	65m	North Row overbridge approach embankment

- b) Bridge structures generally require rotary bored piling or Continuous Flight Augured cast in-situ piles due to the high loads that would be required to be transferred to competent ground at depth. Installation of bored piles also generates less vibration and therefore would be the method of choice in sensitive areas such as areas adjoining the River Usk SAC.
- c) Culverts would typically be supported on either driven precast concrete, driven steel piles or ground improved by soil mixing with cementitious material dependant on the location and ground conditions of the particular culvert.
- d) Temporary works –would use driven precast concrete, rotary bored cast in-situ or driven steel piles dependant on the location and ground conditions.

9.35 Noise and vibration associated with this operation would be managed using modern low noise equipment and current piling best practice with monitoring and mitigation measures noted in Section 5, Project Management Paragraph 5.18 where appropriate.

9.36 The following Tables 9.36A and 9.36B summarise the type of piling and estimated number of each pile type required in the various locations within the Scheme.

**Table 9.36A – Piling Types**

Type of Pile	Typical Location
Band Drains	Used beneath embankments up to 5m in height in conjunction with surcharge and settlement across the Gwent Levels.
Precast Driven Piles	Used beneath embankments greater than 5m in height, beneath piled culverts, to support side road overbridge embankments
Steel Tubular Piles	Used beneath all National Grid pylon crossings and beneath some Western Power Distribution pylon crossings to support the highway embankment
Permanent Sheet piles	Used to form walls for some culverts across the Gwent levels
Continuous Flight Augured Piles (CFA)	Used where required to support some structures across the Scheme and sensitive areas such as Junction Cut.
Large Diameter Augured Piles (LDA)	

Refer to Drawings M4CaN-CJV-GEN-ZG\_GEN-DR-ZM-0007 to 0009 for locations of Band Drains, Precast Driven and Steel Tubular Piles contained in the Environmental Statement, Vol 3, Appendix 3.1: Buildability Report (Document 2.3.2).

**Table 9.36B – Pile Numbers**

Type of Pile	Typical diameter / cross section	Typical length	Approx No required
Band Drains	100mm diameter	6m – 9m	212,200
Precast Driven Piles	325mm x 325mm	9m – 12m	57,900
Steel Tubular Piles	300mm diameter	9m – 12m	3,000
Permanent Sheet Piles	PU22 Piles (U type steel piles)	12m	3,500

Type of Pile	Typical diameter / cross section	Typical length	Approx No required
	600mm x 450mm)		
Continuous Flight Augured Piles (CFA)	600mm – 1200mm diameter	20m – 44m	550
Large Diameter Augured Piles (LDA)	900mm – 2100mm diameter		

9.37 The following table 9.37 illustrated the typical range of plant required to carry out the above piling operations.

**Table 9.37 – Typical Piling Plant**

Item of Plant	Typical Work Activities
Piling Augured Rig Large Diameter Augured [LDA] & Continuous Flight Augured [CFA]	Installation of bored concrete piles in soft ground at structure locations. CFA piles generally used for diameters of up to 900mm, LDA used for piles 900mm diameter up to 2.1m diameter. LDA piles are generally excavated using steel casings in poor ground to support bore during construction.
Precast driven piling rig	Used to install precast concrete driven piles on highway embankments greater than 5m in height.
Mini piling rig	Used to install tubular steel piles at highway embankments beneath areas of low headroom clearances (National Grid & WPD pylon crossing points)
Band Drain Rigs	Installation of band drains in areas of low embankments in soft ground where embankments less than 5m in height will be constructed.
Crawler Crane	Servicing piling rig, lifting and installing pile cages, skipping concrete, lifting augers and casings.
Tracked / wheeled excavator	Used to remove pile arisings from piling platform when excavated by the rig, used to expose installed piles when cured, used to support pile cropper once installed.
Dumper	Used to move pile arisings to dedicated stockpile area for collection and reused within earthworks is deemed suitable.
Agitator / pump	Used when installing CFA piles to pump concrete through the piling rig into the pump.
Pile cropper	Used to trim the installed concrete pile to the right level. Cropper operated from the tracked excavators hydraulics

Item of Plant	Typical Work Activities
Road Sweepers	Used to keep works access / egress and plant crossings clean and free from mud

## Drainage

9.38 See Section 5, Project Management paragraph 5.12 to 5.15 for the temporary run off management measures we would adopt prior to completion of the permanent road drainage system. The estimated quantities of the various types of drainage required on the Scheme is summarised in Table 9.38 below:

**Table 9.38 – Drainage Quantities**

Drainage type	Length (m)
Grass lined Channels	29,100
Slipform Concrete 'V' Channel	34,800
Piped Drainage	38,600
Piped Culverts	2,100
Precast Concrete and cast in-situ Box Culverts	1,900
Field Ditches	9,800
Reens	2,700

9.39 Typically the plant and types of construction method that would be adopted are outlined in Table 9.39.

**Table 9.39 – Typical Plant and Construction Methods**

Item of Plant	Typical Work Activities
Tracked / wheeled excavator	Used to excavate trenches where pipework will be installed, used to construct Water Treatment Areas, used for lifting pipework into position, used for installing trench support used for constructing culvert headwalls.
Crawler cranes	Used for installing sheet piles for culvert installation, used for installing precast concrete

	box units at Culvert locations
ADT's Dumpers	Moving excavated trench arisings to stockpiled areas, hauling pipe bedding and clean stone to surround the installed pipework.
Rock wheel trenchers	To be used where drainage is required in rock cuttings
Hydraulic hammers	Required in areas of rock cutting to trim excavation
Trench Compactor	Used when back filling drainage pipes when using cohesive material.

## River Usk Bridge and Approach Viaducts

### Introduction

9.40 The River Usk Bridge with a cable stayed main span of 440 metres and associated approach viaducts giving a total elevated bridge length (excluding Dock Way Junction Viaduct) of 2.1 kilometres would be a structure of significant size and complexity. To service these works and the associated workforce a compound would be required on both the east and west sides of the river. Appropriate access into the worksite would be required for the anticipated 22,530 HGV deliveries and 76,000 light vehicle deliveries needed to construct the East side of the River Usk and 15,360 and 73,000 vehicles respectively on the West side.

9.41 The principal constraints associated with the River Usk Crossing are as follows:

- a) Shipping clearance over the River Usk and at the 'Junction Cut' between North Dock and South Dock (allowance of 25.2m clearance plus a 1.0m safety zone) (refer to Mr Matthew Jones, Chief Witness, Proof of Evidence WG 1.1.1).
- b) Maintenance of land access for activity associated with the following businesses:
  - i. Associated British Port (ABP) and their tenants
  - ii. Marshalls PLC

- iii. Birdport
  - iv. Eastman Solutia
  - v. Liberty Steel Newport
  - vi. Hansons Quarry Products Europe Ltd
- c) Active Network Rail and ABP lines running north to south on either side of the River Usk.
- d) Polychlorinated biphenyls (PCB) waste disposal cell beneath the East Viaduct at Solutia.
- e) Workforce and plant access between the east and west sides of the River Usk and the Junction Cut (between North and South Docks), stakeholder accesses through the work sites and the Network Rail and ABP lines.

9.42 The accesses, compounds and above constraints are shown in Appendix 1.4.

### **Security**

9.43 West side of the River Usk - the worksite will be securely fenced to an appropriate standard agreed with ABP and the Port Security Authority (PSA) for worksites within ABP's Newport Dock.

9.44 East side of the River Usk - the worksite will be securely fenced to an appropriate standard with working protocols to manage site accesses, on site crossing points and plant, workforce and materials movements which would be agreed prior to construction with the associated businesses affected by the works.

9.45 The Costain Vinci Joint Venture (CVJV) and Welsh Government would be fully co-operative with the PSA, and, where appropriate and necessary, would provide all necessary information and support to the PSA for their preparation of a revised Designation Order (SI 3180 Dec 2013) and Port Security Plan to accommodate the revised security

arrangements arising from the construction and operation of the Scheme. This would be carried out through the following measures:

- a) The CVJV would comply with the requirements, protocols and audit requirements of the PSA Port Security Plan and DfT.
- b) The CVJV would employ a full time Security Manager to represent the CVJV in managing the security interface with the Port and the PSA through a single point of contact.
- c) The Security Manager would have a team of security personnel to manage and monitor all construction related workforce, plant and material movements within the 'Designated Area'.
- d) A biometric access and pass system would be enforced for staff and workforce entering and leaving the site.
- e) Vehicle tracking devices and real time monitoring for all primary mobile plant moved between work sites within the 'Designated Area'.
- f) 24 hour 7 days a week, security with supervised and recorded access and egress to and from work sites within the 'Designated Area'.
- g) Deliveries via the main port gate would be subject to normal port entry inspections and checks.

9.46 Within the 'Designated Area' (SI 3180 Dec 2013) working protocols would be agreed prior to construction with ABP, their tenants and the Port Security Authority and all other affected stakeholders. These would cover the management of offsite accesses, on site crossing points and in dock plant, workforce and materials movements prior to construction with ABP and their tenants where appropriate, the Port Security Authority and all other affected stakeholders.

### **River Usk Crossing and Viaduct Construction**

9.47 Safety boats would be provided where works over water are required to ensure appropriate rescue provision is available during the works.



- 9.48 Advanced accommodation works prior to the primary construction activities would be necessary to make the work site available including the:
- a) Diversion of Statutory and private utilities supplies.
  - b) Relocation and or modification of existing buildings where necessary prior to CVJV commencing construction.
- 9.49 The bridge piers and two main span pylons would be supported on bored cast in-situ concrete piled foundations requiring piles up to 2.1m diameter.
- 9.50 The Main span pylons serviced by two tower cranes would be constructed using reinforced in-situ concrete and a bespoke designed climbing formwork system as illustrated in the Environmental Statement, Vol 3, Appendix 3.1: Buildability Report (Document 2.3.2).
- 9.51 The approach viaducts piers and crossheads would support a deck comprising composite steel beams with a precast concrete deck slab. Similarly, the River Usk main span would be a composite steel beam with a precast concrete deck slab.
- 9.52 Steel beams have been selected to minimise the amount of on-site construction combined with a precast deck solution to ensure rapid construction and provide programme and quality certainty. Due to the size of the pre-cast deck units they would necessarily need to be cast adjacent to the bridge site prior to installation onto the bridge deck.
- 9.53 The River Usk Crossing and its approach Viaducts would span three rail branch lines. One line beneath the eastern approach viaduct managed by Network Rail, one beneath the western approach viaduct and one adjacent to the West Pylon of the main span, are managed by ABP. These lines are operational and would be required to be kept open at all times. Works above these lines would be managed to ensure

unobstructed access for rail traffic. The management of the interface with Network Rail is covered in Section 10.36 and with ABP in Section 10.28.

9.54 Three principal methods have been chosen to erect the bridge deck.

### **River Usk Main Span**

- a) A bespoke temporary works gantry system would be employed to progressively lift and place steel beams and deck units over the leading construction edge of the deck working from the pylon towards the mid-span. With the use of the proposed gantry lifting system for deck construction and the available headroom there would be a limited requirement for navigation restrictions (under the Highways Act 1980) in the River Usk, which would be for short periods of up to 48 hours, as a precautionary measure during critical lifting operations which would be coordinated with stakeholders such as Hanson Sand Wharf to avoid any disruption to their business operations and the Newport Harbour Commissioners with the issue of appropriate Notices to Mariners, signage and lighting on the bridge.

### **River Usk Back Spans and Approach Viaducts**

- b) The River Usk back spans and approach viaducts would be principally constructed at discrete deck assembly locations at bridge deck level and then progressively launched along the bridge enabling the next section of bridge deck to be assembled and launched as illustrated in the Environmental Statement, Vol 3, Appendix 3.1: Buildability Report (Document 2.3.2). With the use of the proposed launching system for the deck construction there would be a limited requirement for navigation restrictions in the Junction Cut between the ABP North and South Dock, Short periods of up to 48 hours on no more than 5 occasions would be required as a precautionary measure during deck launching

operations which would be coordinated with ABP to minimise any impact, where possible.

### Approach Viaduct and Slip Road Interface

- c) Due to the complex geometry of these structures some elements of the structure could not be constructed using the above methods which would then be constructed using conventional cranes to lift and assemble the beams and deck units.

9.55 The deck gantry and launch assembly methods have been selected to limit the number of worksite delivery and assembly points to optimise production cycle repetition, aid workforce safety and improve programme and quality certainty. This approach would also minimise the impact on existing road, rail and ship traffic reducing the impact on ABP port activities and shipping using the River Usk during construction.

9.56 The principal material quantities that would be required to construct the River Usk Bridge and approach viaducts are summarised below in Table 9.56 below:

**Table 9.56 – Usk Crossing Principal Quantities**

Element	Material	Quantity
Western Approach Viaduct & Abutment	Concrete	18,460 m <sup>3</sup>
	Reinforcement Bar	3,700 t
	Steel	7,250 t
Cable Stayed Bridge	Concrete	39,430 m <sup>3</sup>
	Reinforcement Bar	7,230 t
	Steel	7,770 t
Eastern Approach Viaduct & Abutment	Concrete	23,480 m <sup>3</sup>
	Reinforcement Bar	4,940 t
	Steel	10,740 t
<b>Total</b>	<b>Concrete</b>	<b>81,370 m<sup>3</sup></b>
	<b>Reinforcement Bar</b>	<b>15,870 t</b>
	<b>Steel</b>	<b>25,760 t</b>

9.57 The primary types of plant required to construct the River Usk Bridge and approach viaducts are summarised below in Table 9.57

**Table 9.57 – Primary Plant for Usk Crossing Construction**

Item of Plant	Typical Work Activities
Piling Augured Rig (Large Diameter Augured [LDA] & Continuous Flight Augured [CFA])	Installation of bored concrete piles in soft ground at structure locations. CFA piles generally used for diameters of up to 900mm, LDA used for piles 900mm diameter up to 2.1m diameter. LDA piles are generally excavated using steel casings in poor ground to support bore during construction.
Crawler Cranes	Servicing piling rigs, lifting and installing pile cages, skipping concrete, lifting augers and casings, assembling / lifting / installing bridge beams and unloading deliveries at the work site..
Mobile Cranes	General service lifts, major complex lifting operations, assembling / lifting / installing bridge beams and unloading deliveries at the work site.
Tower Cranes	To service construction of the Pylons on the east and west banks of the River Usk

**Other Structures**

9.58 A range of other structures are required within the Scheme. The principal types and form of construction are summarised in Tables 9.58 below.

**Table 9.58 – Construction Methods of Other Structures Castleton Interchange Structures**

Type	Number of Structures	Method of Construction
Composite steel and reinforced concrete bridges	5	Reinforced concrete foundations piers and abutments cast in-situ. Structural steelwork pre-fabricated and transported and positioned by Self Propelled Modular Transport (SPMT). Reinforced concrete deck cast in-situ.
Reinforced Concrete	1	Reinforced concrete foundations and

Type	Number of Structures	Method of Construction
Culvert		abutments cast in-situ. Pre-cast, pre-stressed concrete beams positioned and deck slab cast in-situ.
Structural Steel NMU Bridge	1	Reinforced concrete foundations and abutments cast in-situ and steel bridge pre-assembled, transported and lifted into position.

### Wentlooge Levels Structures

Type	Number of Structures	Method of Construction
Reinforced Concrete Overbridges	3	Reinforced concrete foundations, piers and abutments cast in-situ. Pre-cast, pre-stressed concrete beams positioned and deck slab cast in-situ.
Reinforced Concrete Rail Tunnel	1	Reinforced concrete foundations and abutments cast in-situ. Pre-cast, pre-stressed concrete beams positioned and deck slab cast in-situ.
Steel NMU Bridges	2	Reinforced concrete foundations piers and abutments cast in-situ. Structural steelwork pre-fabricated, transported and then positioned by crane.
Major Pre-cast Concrete Culverts	2	Culverts would be constructed in two halves to maintain access through the site. Drive temporary sheet piles, excavate and install pre-cast concrete culvert segments. Withdraw sheet piles and backfill. Sequence repeated for the second half of the culvert.
Major Sheet Piled Wall Culverts	7	Culverts would be constructed in two halves to maintain site access through the site. Drive sheet pile walls, excavate and cast in-situ reinforced concrete base slab and roof. Sequence repeated for the second half of the culvert.

**Docks Way Link Road and River Ebbw Structures**

Type	Number of Structures	Method of Construction
Composite steel and reinforced concrete bridge over the River Ebbw.	1	Construct reinforced concrete foundations, piers and abutments in-situ. Pre-fabricate steelwork for deck and install by launching. Cast in-situ the reinforced concrete deck. Safety boats would be provided where works over water are required to ensure appropriate rescue provision is available during the works.
Major Reinforced Concrete Viaduct	1	Reinforced concrete foundations, piers and abutments cast in-situ. Pre-cast, pre-stressed concrete beams positioned and deck slab cast in-situ.
Major Sheet Piled Wall Culverts	1	Drive sheet pile walls, excavate and cast in-situ reinforced concrete base slab and roof. Connect to existing culvert under SDR.
Reinforced Concrete Underbridge Extension	1	Construct reinforced concrete foundations, abutments and deck slab in-situ.

**Caldicot Levels Structures**

Type	Number of Structures	Method of Construction
Reinforced Concrete Overbridges	4	Reinforced concrete foundations, piers and abutments cast in-situ. Pre-cast, pre-stressed concrete beams positioned and deck slab cast in-situ.
Reinforced Concrete Rail Bridge	1	Reinforced concrete foundations and abutments cast in-situ. Pre-cast, pre-stressed concrete beams positioned and deck slab cast in-situ.
Pre-cast Concrete Culverts	6	Culverts would be constructed in two halves to maintain access through the site. Drive temporary sheet piles, excavate and install pre-cast concrete culvert segments. Withdraw sheet piles and backfill. Sequence repeated for the second half of the culvert.

Type	Number of Structures	Method of Construction
Sheet Piled Wall Culverts	21	Culverts would be constructed in two halves to maintain access through the site. Drive sheet pile walls, excavate and cast in-situ reinforced concrete base slab and roof. Sequence repeated for the second half of the culvert.
Reinforced Concrete Underbridges	2	Reinforced concrete foundations, piers and abutments cast in-situ. Pre-cast, pre-stressed concrete beams positioned and deck slab cast in-situ.

### Magor Interchange Structures

Type	Number of Structures	Method of Construction
Reinforced Concrete Overbridges	3	Reinforced concrete foundations, piers and abutments cast in-situ. Pre-cast, pre-stressed concrete beams positioned and deck slab cast in-situ.
Composite Steel Concrete Box Girder Bridge	1	Reinforced concrete foundations piers and abutments cast in-situ. Structural steel box girder pre-fabricated and transported and positioned by SPMT, complete with reinforced concrete deck cast in-situ in fabrication yard. Sections stitched together in-situ.
Reinforced Concrete underbridges	2	Reinforced concrete foundations and abutments cast in-situ. Pre-cast, pre-stressed concrete beams positioned and deck slab cast in-situ.
Reinforced Concrete Underbridge Extensions	2	Reinforced concrete foundations and abutments cast in-situ. Pre-cast, pre-stressed concrete beams positioned and deck slab cast in-situ. Extension tied to existing structure
Reinforced Concrete Culvert Extension	1	Construct reinforced concrete foundations, abutments and arched roof in-situ.

## Highways

9.59 The principal material quantities that would be required to construct the carriageway and associated infrastructure are summarised below in Table 9.59.

**Table 9.59 – Material Quantities for Carriageway**

Material description	Volume m3
Concrete for kerb, drainage etc.	27,000
Sub-base Type 1 (Roads & Tracks)	28,900
Cement Bound Material (CBGM)	363,100
Bituminous bound material	142,600

9.60 The primary types of plant required to construct carriageway and associated infrastructure are summarised below in Table 9.60.

**Table 9.60 – Plant for Carriageway Construction**

Item of Plant	Typical Work Activities
Tracked / wheeled excavator	Used to excavate road box along embankments and cuttings and to trim formation.
ADT / Dumper	Used to move excavated material from piled embankment areas to complete road embankment construction. Used to haul CBGM to paver from on-site batching plant where CBGM is used.
Tracked dozer	Placing Capping (where required), preparing formation prior to CBGM or subbase
Grader	To trim formation / subbase prior to installing CBGM / Base Course
Roller	To prepare formation prior to installing road foundation
Tracked Paver	Used to Install CBGM Layers (Where CBGM is used), used to lay bituminous layers.
Drum Rollers (vibratory or dead – depending upon specification)	To compact capping, subbase, CBGM and Bituminous layers.
Tractaire (tractor with front loader & compressor)	Used to prepare tie-in's and joints between pavement layers, feeds paver as and when required where tipper lorries



Item of Plant	Typical Work Activities
	cannot be used (i.e. beneath overhead power lines)
Water Bowser	To supply water to paver, planer and rollers
Road Planer	Used to remove old pavement layers from abandoned sections of carriageway, used to prepare tie-ins and to remove worn out pavement layers prior to placing new layers.
8 Wheeled Tipper lorries	Used to deliver capping, Subbase, CBGM and Bituminous layers and would also be used to haul road planings to dedicated stockpile for reprocessing.
Tack Coat Bowser and Sprayer	Used to place bituminous tack coat between each pavement layer.
Road Sweepers	Used to keep installed pavement layers clean prior to placing next layers

9.61 Carriageway construction would require Cement Bound Granular Material (CBGM) to form the pavement foundation. This material would be batched on-site from mobile plants using the network of haul roads to transport it to the works location thus reducing the need to use the local road network. Bituminous layers would be produced in a similar manner using mobile asphalt plants. It is envisaged that these mobile plants would be established either side of the River Usk and River Ebbw crossings (probably Glan Llyn and Imperial Park).

9.62 The carriageway running surface would use low noise wearing course.

## 10. Responses to Objections

### Introduction

10.1 The following section will address the various specific objections received as these relate to the construction phase of the works and associated impacts and concerns. General concerns relating to construction noise, dust and vibration will be covered first. As many of the remaining concerns are both location specific and can be grouped

by type of concern the remainder of this section will be structured by location and then type of concern.

**General Construction Noise, Dust and Vibration (OBJ0003, 0022, 0330, 0150, 0096, 0279, 0234, 0239)**

10.2 Construction noise, dust and vibration has been generally raised as a concern (OBJ0003, 0022, 0330, 0150, 0096, 0015, 0279, 0234 and 0239) and mitigation measures that would be adopted are detailed in paragraphs 5.8 to 5.10 and 5.16 to 5.19 of this Proof of Evidence and is further detailed within the Pre CEMP in the ES Appendix 3.2 (Ref WG 2.3.2). The Pre CEMP would be further developed prior to construction and would ensure compliance with the Control of Pollution Act 1974 and include:

- a) Best practice mitigation measures will be deployed where appropriate to reduce any impact. Reference should be made to paragraphs 5.16 to 5.19 of this Proof of Evidence and also to BS 5228 Parts 1 and 2 (Document 14.2.5 and Document 14.2.6).
- b) Agreed working hours, and noise, dust and vibration limits with the Local Authority EHO.
- c) Monitoring to verify compliance with Section 61 requirements and periodic review and improvement planning.
- d) Close communication and effective response to issues raised via a dedicated Public Liaison Officer and a comprehensive 'Communications Plan' as detailed in the ES Appendix 3.2 Section 8 (Document 2.3.2).

**Castleton Interchange Area, Access to Properties South of A48 Stopping up of the existing access to Tyn-y-Brwyn Farm (OBJ0003 and 0330)**

10.3 Following correspondence received (OBJ0003 and OBJ0330) relating to the publication of draft Orders in March 2016, a concern with the access arrangement off the A48 to Tyn-y-Brwyn Farm was raised and

has been reviewed and alternatives considered. A modification to the access would be made within the land in the draft Orders (March 2016) to address this concern and the original access reinstated following construction as follows:

- 10.4 The published Draft Orders would have permanently stopped up the eastern access to Tyn-y-Brwyn Farm. The project team have reconsidered these proposals and have developed a solution for reinstating the eastern access as shown in Appendix 1.5, after completion of the construction works, this would give similar provision to that of the existing access off the A48.
- 10.5 If the Scheme progresses to construction, the eastern access would be required to be closed temporarily for a period of approximately 9 months to construct the new bridge over the A48, carrying the proposed M4 carriageway. During this time the improved western access, provided in the Side Roads Order (2/13a), would be used to access the properties at Tyn-y-Brwyn. Traffic Management would be in place on the A48 for the safety of road users. After these works are carried out the eastern access would be permanently reinstated as noted in paragraph 10.4.

#### **Access to Old Rectory Barn (OBJ0022)**

- 10.6 Within OBJ0022 continued provision of access to the Old Rectory Barn south of the A48 during construction was raised as a concern. No modification to the access during construction is proposed and no direct impact on the residents' ability to access the property is envisaged. Traffic Management will be in place on the A48 for the safety of road users during the construction phase.

**Traffic Management on A48 (OBJ0022)**

10.7 With regard to the concerns of OBJ0022 and the installation of traffic management on the A48 at Castleton during construction, temporary traffic management (TM) on the A48 would be required to allow for the safe construction of a bridge over the A48 east of the properties on the south side of the A48. Several configurations of TM would be required over a period of two and a half years from the summer of 2018. There would be a need to reduce the carriageway to 1 lane in each direction for a large part of that time and a signalised plant crossing provided to enable the safe movement of earthworks vehicles across the A48. During the detailed design phase, the TM requirements will be refined further and would be agreed with Newport City Council and advised to local residents. The Scheme would have a dedicated Public Liaison Officer who will work with residents to mitigate the effects on residents as far as possible. Advanced signing and notification of TM in this location would be notified using a variety of social media methods. An assessment of the traffic figures on the A48 has been made for the provision of a temporary plant crossing. It is estimated that where the haul road is given a green light when two ADT's are queueing there would be an estimated delay to traffic on the A48 of 2.5 minutes at peak times. This would be achieved by a haul road green light and the A48 red light phase approximately once every five minutes.

**Castleton Interchange Area, - Use of land for Storage Near Residential Properties (OBJ 0003 and 0330 – residents, OBJ 0228 - landowner)**

10.8 Concerns have been raised by OBJ0330 and OBJ0003 living nearby to a proposed temporary material storage area, and OBJ0228, the land owner of this plot. With reference to the labelled plot 2/18k on draft Compulsory Purchase Order (CPO) Plan 2, which is required to be used temporarily during the construction of the Scheme for stockpiling

and processing materials, this area has been selected for the following reasons. It:

- a) Is located outside the Wentlooge Levels SSSI.
- b) Adjoins the main construction site to provide ready access to and from the Scheme avoiding use of the local highway network.
- c) Is close to the place where the material would finally be used to minimise the distance moved reducing dust, noise and carbon footprint.
- d) Avoids proximity to residential properties as far as possible.
- e) Is close to Water Treatment Area 2, which would be used as a temporary water treatment area during construction. This would allow surface water run-off from the temporary land used for processing to be collected and easily transferred to the treatment area.

10.9 Where properties are affected, topsoil which would be stripped at the start of construction in the Castleton area and generally cannot be placed into the final works until the later stages of construction would be placed in bunds and seeded along the field boundary adjoining the residential properties to form a noise screen from other construction areas. The temporary stockpiling of material inappropriate for engineering use generated from the Scheme would be placed beyond this screen. Temporary storage of this material is necessary pending the removal of all required suitable engineering materials from Berryhill Farm borrow prior to refilling with the temporarily stockpiled material inappropriate for engineering use.

10.10 The Highways Act 1980 and the Acquisition of Land Act 1981 gives the Welsh Government the powers to acquire land necessary to construct the Scheme. This applies to temporary land requirements. No further planning permission is required if the Orders are made.

10.11 The land would be reinstated and returned to the owner once the Scheme construction is complete. Appendix 1.16 contains a series of drawings showing the temporary land requirements and reasoning behind each.

### **Castleton Interchange and Magor M4 Interchange Construction, Traffic Management (OBJ0081)**

10.12 OBJ0081 has raised concerns with the impact of traffic management and lane reductions on M4 capacity during construction of the new interchanges at Castleton and Magor. Measures that would be taken to address these concerns are detailed in Section 8 Paragraph 8.10 and 8.11 of this Proof of Evidence.

### **Magor - Construction Traffic Disruption and Congestion (OBJ0152, 0052, 0150, 0096, 0015, 0081, 0279)**

10.13 Concerns with the impact of the construction traffic on the local network has been raised (OBJ0152, 0052, 0150, 0096, 0015, 0081, 0279) As detailed in the Environmental Statement, Vol 3, Appendix 3.1 Section 4 (Document 2.3.2) our access strategy for construction traffic would be to avoid the use of the local road network wherever possible. At Magor we would create a specific construction access road within the proposed Scheme temporary site boundaries of the new road alignment shown in Appendix 1.6 with dedicated access points off the existing M4, M48 and our site compounds. Manned plant crossings would be in place at each public side road crossings to ensure the safe passage of the construction traffic.

10.14 Site compounds would include car parking for operatives at the compounds with shuttle buses running to the main works areas along the route where appropriate. All the works would be carried out within our proposed site boundary, with the exception of

connections/diversions of existing services where required. The compounds and proposed accesses along with site haul routes are shown in Appendix 1.7.

10.15 The principal compound for the Magor works would be located at Glan Llyn where there is sufficient land available with good access roads which would not directly affect the local residents of Magor. We would however require smaller satellite compounds within the Magor area to provide accommodation for engineering staff required for the works associated with the construction of new bridges and the adaption and refurbishment of existing structures in the area.

10.16 A summary of the expected compound arrangements will be as shown in the table below:

**Table 10.15 – Office Compounds Servicing Magor Area**

Location	Type of compound	Expected duration	Purpose	Expected Access route
Glan Llyn	Section Office	Project duration	Sections 4 & 5 main office	Via A4810 SAR
North Row	Satellite Compound	Approx. 2.5 years	Bridge and culvert construction works	Via A4810 SAR and North Row
Barelands Street (Llandevenny South)	Satellite Compound	Approx. 2.5 years	Rail Bridge Construction	Via A4810 SAR and Bareland Street
Magor (A4810) (old gritting depot)	Abnormal Loads holding area	Project Duration	Managing oversized deliveries to the project	Via A4810 SAR
Magor Newport Road (B4245)	Satellite compound	Project Duration	Bridge and road works construction	Via B4245 Newport Road
Knollbury Lane	Satellite compound	Approx. 12 – 15 months	Bridge construction, refurbishment & utility diversions	Via site haul road for deliveries. Via B4245, Dancing Hill & Grange

Location	Type of compound	Expected duration	Purpose	Expected Access route
				Road for staff vans and cars
Magor Fabrication Area	Satellite compound	Approx. 24 months	Bridge construction works	Via M48 TM
Caldicot Road (B4245)	Satellite compound	Project duration	Bridge construction and road works	Via B4245 Newport / Caldicot Road for light vehicles. Via temp slip roads within M48 TM for HGV's

10.17 Main offices would provide full facilities ranging from car parking, offices, welfare, canteens to material storage. Satellite compounds would provide the essential facilities such as; offices, toilets and limited parking for staff.

10.18 The ES Appendix 3.1 Section 14 (Document 2.3.2) sets out the working space requirements showing that approximately 20% of the total staff and operatives would be based at the compounds at Magor.

10.19 Construction traffic would substantially be contained within the construction site with external deliveries confined to construction traffic routes agreed in advance with Monmouthshire County Council.

10.20 In addition to mitigation measures noted in paragraph 10.2 and noting the concerns raised in OBJ0096, 0150, and 0015 Appendix 1.8 details specific measures that would be adopted on the haul road between St Bride's Underpass and Llandevenny Railway Bridge Furthermore we would:

- a) Provide temporary topsoil bund screening between the temporary haul road and residential properties between Newport Road and St Bride's Underbridge where possible.



- b) Move the position of the temporary haul road to the north west side of the proposed M4 alignment to maximise the distance from residential properties. where possible between Newport Road and Llandeenny Rail Bridge.
- c) Provide temporary noise fence to the elevated haul Road over the temporary bridge crossing of Newport Road.

**Magor – Alternate Traffic Routes During the Construction Works at St Brides, Rockfield, Knollbury and Bencroft Lane (OBJ0152, OBJ0209 and OBJ0052)**

- 10.21 Following stakeholder feedback and concerns over maintaining side road access, we have reviewed our proposed diversion routes with Monmouthshire County Council and revised the diversion route for the proposed Knollbury Lane and Rockfield Lane closures to avoid the use of Vinegar Hill. Note:- Rockfield Lane and Knollbury Lane would not be closed at the same time.
- 10.22 The works at Knollbury Lane would require the road over the current M4, between Grange Road and Daffodil Lodge to be closed for around 12 months. These works would involve constructing a new bridge just to the north of the existing M4, upgrading the existing motorway overbridge and major utility diversion works. Refer to drawing in Appendix 1.2.
- 10.23 The construction of the works around Bencroft Lane has been substantially changed, amending both the Side Roads Order (SRO) and the CPO to enable the new alignment Bencroft Lane and the construction of the new Windmill Hill Bridge to be complete before removal of the existing lane thereby enabling access along Bencroft Lane to be maintained throughout the construction phase. Refer to drawing in Appendix 1.9.

10.24 Traffic diversion routes during the closures of St Brides Underpass, Rockfield Lane and Knollbury Lane are detailed in Appendix 1.10. Concerns over the condition and restricted width on the proposed diversion routes would be addressed by the inclusion of upgraded passing places within the highway boundary along the diversion routes. Localised improvements, within the existing highway boundary, would also be made at the junction of Rockfield Lane and Bencroft Lane.

### **Reopening of Ifton Quarry and Associated Activities (Blasting) (OBJ 0206 and 0210)**

10.25 OBJ0206 and OBJ0210 notes concerns relating to the potential disturbance caused by reopening and using Ifton Quarry. The operation of Ifton Quarry would not be under the control of this Scheme, but the quarry operator who would be working in accordance with their operating licence and in accordance with current legislation and best practice monitoring and blasting techniques. However, as the reopening would be linked to the proposed Scheme providing 962,400m<sup>3</sup> of crushed stone necessary for the construction, we would work with the operator to minimise the impact on the local residents.

Measures that would be adopted are:

- a) Dedicated off road haul route from the quarry to the M4CaN similar to that used during the construction of the Second Severn Crossing, thereby avoiding significant earthworks HGV traffic on the local network through Rogiet and on the B4245.
- b) Implementation of our communications plan to inform residents as appropriate as detailed in Paragraph 5.32 to 5.34 of this Proof of Evidence.

10.26 Use of Ifton quarry would significantly reduce the number of vehicles using the local road network by the provision of direct off road site access. This would also reduce site vehicle travel distance thereby reducing the carbon footprint, noise and air quality impact of the

Scheme compared to importing the stone from a more distant quarry. Off road earthworks plant would also have greater carrying capacity than road going vehicles thereby reducing the total number of vehicle movements for this activity compared to on road vehicles by 55%.

### **Industrial Sites East and West of the River Usk Hanson – Hanson Sand Wharf and Ready Mix Operation (OBJ0305)**

10.27 Detailed discussions with Hanson were held on the 25<sup>th</sup> August 2016 (OBJ0305) and a further meeting held on 21<sup>st</sup> October 2016 reviewing construction access requirements and concern raised by Hanson on the impact on their business operation. The area is required for construction due to the limited access to the tower crane required at the River Usk Bridge East Pylon and requirement to minimise working area within the River Usk SAC.

10.28 Following this meeting the working area required within this land holding was reviewed and amended to enable operations to remain in the current location as shown in Appendix 1.11.

10.29 It was agreed with Hanson that regular coordination meetings during the construction phase would be required to manage the interface between marine deliveries to Hanson Sand Wharf whilst works on the River Bridge were undertaken thereby minimising disruption to their operation. The land-take required has been modified to avoid the relocation of the primary concrete batching plant. Further discussions have been held between the Welsh Government and Hanson to review the remaining implications for Hanson and the necessary reorganisation of aspects of their business to remain in operation during the construction phase and business case for the associated compensation.

**PSA (OBJ0095), ABP and Associated Tenants (OBJ0031)**

- 10.30 Concerns have been raised over the land take required during construction and the impact on the security and operation of the port (reference should be made to paragraphs 6.10 to 6.11 and 7.8 in this Proof of Evidence).
- 10.31 The construction of the River Usk Bridge, West Approach Viaduct and Dock Way Junction and link Road would present a significant interface with ABP operations (OBJ0031 Refers) and their tenants. This would require temporary land generally described in Section 6 of this Proof of Evidence within the port during construction and temporary access to move plant and materials within the port as outlined in Section 7 of this Proof of Evidence. The required use of temporary land and access within the Port is detailed in Appendix 1.4 of this Proof of Evidence.
- 10.32 Temporary land within ABP is required for the following essential requirements:
- a) Office and welfare facilities for the workforce and staff.
  - b) Construction working space around the bridge for safe access of plant, crange, temporary works and materials.
  - c) Storage of materials prior to installation.
  - d) Pre assembly of large structural items necessarily transported to site in sections.
  - e) Onsite pre-casting of reinforced concrete bridge deck sections too large to transport by road.
- 10.33 To minimise the interface with ABP and their tenants and segregate our operations as far as possible the temporary land identified would be securely fenced to a standard agreed with ABP, their tenants and the Port Security Authority. A dedicated construction access would be formed onto this secure area at Dock Way to minimise the interface with the ABP Port entrances.

10.34 Due to the requirement to maintain shipping access through the ‘Cut’ between the North and South Docks, access through ABP’s main dock entrance and internal access roads would be necessary to construct the West Pylon of the River Usk Bridge and associated deck works. A number of measures would be required to ensure the maintenance of security within the port with appropriate protocols agreed with ABP, the the Port Security Authority (PSA) and ABP tenants where appropriate as detailed in Paragraphs 9.43 to 9.46 of this Proof of Evidence.

10.35 CVJV would employ a dedicated Port Interface Liaison Manager, a single point of contact for ABP and their tenants to coordinate day to day activities and ensure a prompt response to concerns or issues as they arise. A dedicated Port Security Manager would also be employed to manage security matters with ABP and the PSA.

10.36 Weekly coordination meetings with ABP and their tenants would be held to ensure the safety of all parties, timely prior notifications and to provide clear communication and coordination of planned activities. There would also be a need for prior agreement of acceptable operating and emergency procedures and the satisfactory resolution of any concerns or issues arising.

10.35 Works within Newport Dock to launch the West Approach Viaduct over the Junction Cut would be coordinated with ABP and their tenants (Newport Harbour Commission to be kept advised) to avoid disruption to their activities and shipping for the short period required to launch to bridge deck structure across Junction Cut detailed in paragraph 9.54 of this Proof of Evidence.

### **Network Rail (NR) (OBJ0025)**

10.36 Network Rail has raised concerns over the impact of the Scheme on operational railway land (OBJ0025). CVJV and the Welsh Government

have attended frequent meetings with NR throughout 2015 and 2016 to address the interface issues associated with the construction of Duffryn Rail Bridge and Llandevenny Rail Bridge.

10.37 During construction the CVJV would employ a full time Network Rail Coordinator to liaise with NR to ensure effective forward planning, agreement and approval of working methodology and coordination of our site works to minimise the impact on NR service delivery as far as is practicable.

10.38 Amendments to the design and modifications to the method of work that have been adopted to address these concerns are as follows:

**10.39 Duffryn Railway Bridge**

- a) The height and clear span of the bridge has been amended and agreed with NR to accommodate the ongoing electrification of the mainline at this location.
- b) The position of the bridge abutments has been agreed such that it would be possible (subject to NR formal approval) to construct the abutments using a travelling gantry system and associated piling during normal day time working without any requirement for rail possessions and NR service disruption.
- c) The bridge deck design has been selected to enable rapid installation of pre cast concrete beams during a 52 hour railway possession spread over the Easter period (2020) and four weekend overnight (Saturday) rail possessions to minimise disruption to NR peak day time travel.

**10.40 Llandevenny Railway Bridge.**

- a) The bridge deck design has been selected to enable rapid installation of pre cast concrete beams utilising four weekend overnight (Saturday) rail possessions to minimise disruption to NR peak day time travel. The possessions for the construction of

Llandeenny bridge will not be on the same weekends as the possessions for the construction of Duffryn bridge.

#### 10.41 **Branch Line on the East Bank of the River Usk**

- a) Works on the eastern approach viaduct would take into account the fact that this line is in continuous use. The construction methodology would take into account the clearances required by Network Rail and their approval processes. Also refer to Paragraph 9.53 and 10.37

#### **Statutory Undertakers (SU's) (General and OBJ0321,0304 and 0090 specifically)**

10.42 Concerns have been raised by a number of Statutory Undertakers with regard to the potential impact on their service provision to customers and provision of protection to their plant or appropriate diversions.

10.43 Refer to Paragraph 9.9 in this Proof of Evidence.

**National Grid (OBJ0205)** Refer also to Paragraph 9.9 in this Proof of Evidence.

10.44 National Grid (NG) have raised concerns over the impact of the Scheme on their plant (OBJ0205). CVJV and the Welsh Government have attended 8 constructive meetings (6 number face to face meetings and 2 number conference calls) with National Grid throughout 2015 and 2016 to address the interface issues associated with the construction of the Scheme.

10.45 Amendments to the design and modifications to the method of work that have been adopted to address these concerns are as follows:

- a) There are five significant crossings of the Scheme by NG cables and five occasions where work would be in close proximity to their towers. Extensive re modelling of the highway alignment in these

locations has been undertaken within the draft Orders (March 2016) land take, working in close collaboration with NG who has reviewed these changes in conjunction with alternative future maintenance methods. With the exception of cables between towers SD001 and SD002 NG has now accepted that diversions of these lines would not now be required.

- b) A consequence of the above approach to maximise the clearance below the existing NG cables, the Scheme is necessarily close to one of NG towers (SE001). NG are currently assessing the impact on this tower foundation and the CVJV have developed a range of potential engineering solutions to mitigate this impact for agreement with NG once NG have completed their assessment. Allowance for this development and diversion work has been included in our proposed construction programme.

**Western Power Distribution (WPD) (OBJ0303)** Refer also to Paragraph 9.9 in this Proof of Evidence.

10.46 WPD have raised concerns over the impact of the Scheme on their plant (OBJ0303). CVJV and the Welsh Government have attended numerous constructive meetings with WPD throughout 2015 and 2016 to address the interface issues associated with the construction of the Scheme.

10.47 Amendments to the design and modifications to the method of work that have been adopted to address these concerns are as follows:

- a) A concern was raised that the Substation near Corporation Road would need to be relocated. The CVJV have reviewed the method of work in this area and have confirmed to WPD that this Sub Station would not now require relocation.
- b) The horizontal and vertical alignment of the main carriageway was adjusted locally as shown in the draft Orders (March 2016) to avoid WPD's 'P' Circuit at CH12,700 near Nash Road. This circuit is a Radial Feed (one way), to Sudbrook which powers



the pumps at the Severn Tunnel. CVJV were advised by WPD to avoid the need to divert this critical circuit. The Scheme has been modified to achieve this.

- c) North Row overbridge was repositioned ,around 400m further west as shown in the draft Orders (March 2016) to avoid the need to divert WPD's 'P' Circuit for the same reasons as indicated above. The construction of North Row overbridge at this location will allow the side road to connect with the existing road network at the junction of North Row and Rush Wall and the roundabout on the A4810 outside TATA's Llanwern House.

**Dwr Cymru Welsh Water (DCWW) (OBJ 0321)** Refer also to Paragraph 9.9 in this Proof of Evidence.

10.48 DCWW have raised concerns over the impact of the scheme on their plant OBJ 0321. CVJV and Welsh Government have attended numerous face to face meetings through our 2015 and 2016 to address the interface issues associated with the construction of the scheme.

10.49 The DCWW objection is such that the scheme is currently preliminary and no formal agreement to protect and divert the apparatus to fully comply with the Street Works (Sharing of Costs of Works) (Wales) Regulations 2005 has been entered into. Discussions are ongoing between the Welsh Government and the DCWW legal team.

**Bovis Homes Housing Development (OBJ 0103)**

10.50 Bovis Homes have raised concern over the impact of the scheme on their housing development.

10.51 To carry out the necessary refurbishment to the existing overbridge and construction of the new overbridge at Knollbury Lane, Knollbury Lane will be closed for a period of 12 months. A diversion route via Elms

Lane and Rockfield Lane underpass would be provided as detailed in Appendix 1.2. Access from the housing site to Grange Road would be unaffected by the construction works.

10.52 Throughout the construction period our dedicated Public Liaison Officer would maintain regular contact with Bovis Homes to address any concerns and arrange meetings as necessary to deal with any specific issues or matters arising as outlined in our Communication Strategy as outlined in Paragraphs 5.32 to 5.34 of this Proof of Evidence.

10.53 Dust and noise will be closely monitored and managed in accordance with current best practice as detailed in Paragraphs 5.16 to 5.19 of this Proof of Evidence.

10.54 Where properties are adjoining the works on the eastern boundary of the Bovis housing development, topsoil which would be stripped at the start of construction in the Magor area. This soil generally cannot be placed into the final works until the later stages of construction would be placed in bunds and seeded along the field boundary adjoining the residential properties to form a noise screen from other construction

#### **Newport Harbour Commissioners (NHC) (OBJ 0071)**

10.55 NHC have concerns on the impact on navigation from the Scheme.

10.56 The CVJV have had preliminary meetings and have agreed to hold regular liaison meetings with the Newport Harbour Commission to update them on the progress of the Scheme and programme of work in the area of the River Usk and the River Ebbw. A Maritime Management Plan would be agreed with the NHC to formalise working protocols and communications.

10.57 A Navigation Risk Workshop has been held, attended by CVJV, Welsh Government, ABP, Newport Harbour Commissioners, Hansons Aggregates, SMS Towage, Royal Yachting Association and Maritime and Coastguard Agency. A second meeting was later held with The Corporation of Trinity House and Cargo Services UK Ltd (Birdport operators). Restrictions to navigation in the River Usk during construction are not expected to be significant and would be limited to short periods of up to 48 hours as a precautionary measure beneath critical lifting activities on the River Usk Bridge deck. A communication and operating Maritime Management Plan would be agreed with the Harbour Commissioners and key stakeholders to ensure disruption to river traffic is minimised. Refer to Matthew Jones, Chief Witness, Proof of Evidence (WG 1.1.1).

10.58 Suitable signage and warning lighting would be provided along with the publication of Notices to Mariners by agreement with the Newport Harbour Commission.

10.59 Similarly works within Newport Dock to launch the West Approach Viaduct over Junction Cut would be coordinated with ABP and their tenants (Newport Harbour Commission would be kept informed) to avoid disruption to their activities and shipping for the short period required to launch to bridge deck structure across Junction Cut detailed in paragraph 9.54 of this Proof of Evidence.

### **Tarmac Limited (OBJ 0097)**

10.60 Tarmac Ltd have raised concerns over the the impact of Scheme land take on the operation of their business. Discussions with Tarmac have been held with a site visit on 20/05/2016. Following this meeting a modification to the engineering design at this location has been developed to steepen the embankment slopes in this location to reduce the land take and impact on the Tarmac site detailed in Appendix 1.12.

Further discussions with Tarmac are ongoing to confirm whether this is acceptable.

10.61 The CVJV would hold regular liaison meetings during the construction period with Tarmac to update them on the progress of the Scheme and programme of work in the area to coordinate and minimise the impact on their operation as far as is practicable.

### **Birdport (OBJ 0137)**

10.62 Discussions with Birdport have been held concerning the impact of the temporary land required within their site and the impact on the operation of their business and tenant (Cargo Services Ltd.) including the potential disruption of construction activity on their business as follows:

- a) To provide access for a number of heavy crane lifts to construct the East Approach Viaduct over the Network Rail line at this location, Corporation Road would need to be diverted onto Birdport land.
- b) As a result of (i) above the weighbridge servicing the Birdport business would need to be temporarily relocated with their existing site and access modifications undertaken.
- c) The location of the East Approach Viaduct as described in Mr Ben Sibert's Engineering Proof of Evidence (WG 1.5.1) would require the Birdport rail offloading facility to be relocated to the east of its current location. Relocation of this facility will be arranged and carried out by Cargo Services Ltd the current tenant on the Birdport site.

10.63 A drawing illustrating the land required for temporary and permanent relocation of their facilities and construction usage is given in Appendix 1.13.

10.64 The CVJV would hold regular liaison meetings during the construction period with Birdport to update them on the progress of the Scheme and programme of work in the area to coordinate both construction activities

and management of rail and road deliveries to Cargo Services Ltd to minimise the impact on their operation as far as is practicable.

**Marshalls Limited (OBJ 0329)**

10.65 A number of meetings have been held with Marshalls to discuss the concerns raised regarding the impact on their land and business operation. This land is essential for construction, due to the following:

- a) The location of the River Usk Bridge, East Approach Viaduct. The reasoning and constraints dictating the location of the River Usk Bridge are detailed in Ben Sibert's Engineering Proof of Evidence (Ref WG 1.5.1).
- b) Temporary access for deliveries to service the tower crane essential for the construction of the River Usk Bridge East Pylon.
- c) Further temporary land is required to store and prefabricate reinforcement cages for the piers, pylon and deck works of the River Usk Bridge.
- d) Temporary Land would also be necessary to the River Usk Bridge East Back Span Deck launching operation and subsequent main span construction.

10.66 A drawing illustrating the land required and usage is given in Appendix 1.14.

**Rontec and Roadchef (OBJ 0026 and 0292)**

10.67 Rontec and Roadchef have concerns with the impact of the Scheme on the access to their business. Temporary land would be required within the land comprising the Magor Service area to form a temporary access and diversion route for local traffic diverted from St Brides Underpass closed during construction.

- 10.68 The diversion route is detailed in Appendix 1.2. Traffic Management required during the construction of this diversion would be discussed with Rontec and Roadchef to minimise the impact on their business as far as practicable.
- 10.69 The CVJV would hold regular liaison meetings during the construction period with Roadchef and Rontec to update them on the progress of the Scheme and programme of work in the area to coordinate and minimise the impact on their operation as far as is practicable. For concerns relating to general access to the services from the new motorway, refer to Mr Matthew Jones Proof of Evidence (WG 1.1.1).

#### **Liberty Steel (OBJ 0308)**

- 10.70 Liberty Steel have concerns with the loss of land and the associated impact on their business. An area of land to the south east of the Birdport site is required in the permanent works to construct a balancing pond to manage water runoff from the highway prior to discharge to the adjoining water course and the River Usk. This aspect of the scheme requirement will be addressed in Engineering Proof of Evidence by Mr Ben Sibert (WG 1.5.1).
- 10.71 During construction this land would also be used temporarily to provide construction access for the above drainage works and precast slab production factory and storage.
- 10.72 The CVJV would hold regular liaison meetings during the construction period with Liberty Steel to update them on the progress of the Scheme and programme of work in the area to coordinate and minimise the impact on their operation as far as is practicable.
- 10.73 A drawing illustrating the land required and usage is given in Appendix 1.14.

**Mr Stephen Charles Phillips and Miss C M Phillips – Elder Cottage,  
Green Farm (borrow pit) (OBJ0322 and 0233)**

10.74 Mr Phillips has concerns with the impact of the temporary loss of land during construction on their dairy business. The suitability of a number of possible borrow pit sites were considered and rejected due to accessibility, environmental and planned future housing development. The essential land that would therefore be required within the Green Farm to provide an source of suitable general fill material ( 350,000m<sup>3</sup>) and material processing area is shown in Appendix 1.16 of this Proof of Evidence. Subsequent to abstraction, the location would be used for disposal of material unsuitable for engineering use ( 350,000m<sup>3</sup>), generated from the Scheme. This material is generated from within the Caldicot Levels and associated SSSI as detailed in paragraph 6.8 and 9.19 to 9.31 of this Proof of Evidence. See also Ms Julia Tindale's Land Use, Community and Recreation Proof of Evidence (WG 1.10.1).

10.75 Use of this borrow pit is essential to:

- a) Avoid the import from remote sources of 350,000m<sup>3</sup> of general fill necessary to form the highway embankments on the Caldicot Levels and the associated impact on the local road network (77,800 number of vehicle movements).
- b) Avoid the export off site to licenced tips of 350,000m<sup>3</sup> of material unsuitable for engineering use and the associated impacts on the local road network (77,800 number of vehicle movements).

10.76 To minimise the impact on the adjoining dairy farm operations the following measures will be adopted:

- a) Topsoil striped from the temporary land would be stockpiled in a bund along the north east and south east boundary of the site and seeded to provide a temporary noise bund and visual screening for the duration of the construction period.

- b) The processing area has been located distant from the dairy buildings to reduce the noise impact as far as possible.
- c) Best practice measures to mitigate the noise and dust impact as detailed in paragraph 5.16 to 5.19 of this Proof of Evidence would also be adopted.
- d) Connectivity via Bencroft Lane (on existing alignment or new alignment) will be available at all stages of the construction.
- e) The track from Green Farm to Hill Barn will be fenced and access maintained throughout the construction process (exact details to be agreed with Mr Phillips).

### **Air Products (OBJ0289)**

10.77 Air products have concerns with the potential impact of the Scheme on their pipeline and associated supply and its protection. A series of meetings has been held with Air Products and a legal agreement is currently being drawn up in order to address their concerns.

10.78 The CVJV would hold regular liaison meetings during the construction period with Air Products to update them on the progress of the Scheme and programme of work in the area of their plant to coordinate and minimise the impact on their operation as far as is practicable.

10.79 In the Glan Llyn Link tie in to the Southern Distributor Road we would propose to retain the Air Products pipeline in its current location and agree suitable provision of protection slabs during construction, with appropriate review and agreement of the slab design and installation methodology with Air Products.

10.80 Similarly, appropriate protection and working methods would be agreed with Air Products in the River Usk East Approach area and Corporation Road where Air Products plant is present.



10.81 The locations of Air Products plant with an interface with the Scheme construction is detailed in Appendix 1.15.

**Other Land Owners Objections (OBJ0207, 0209, 0213, 0214, 0215, 0216, 0217, 0219,0220, 0221, 0223, 0224, 0225, 0227, 0229, 0230, 0231, 0235, 0238, 0240, 0241 and 0322)**

10.82 Several land owners have objected to the use of their land, especially with respect to that land taken under Essential Licence. This is land that is essential and required temporarily to allow construction of the scheme. This land would be handed back to the land owner at the end of the construction process. The requirements for this land is shown in tabular and pictorial form in Appendix 1.16.

## **11. Conclusion**

### **The Early Contractor Involvement Phase**

11.1 In my opinion the Welsh Government's Early Contractor Involvement (ECI) process has ensured that buildability and construction issues have been appraised during the design development phase prior to the publication of draft Orders. In conjunction with our Designers, Environmental Consultants, sub-contractors and suppliers we have developed the most appropriate solutions to some complex problems thereby optimising the land requirements for the scheme. I am therefore confident that all construction activities have been adequately addressed in the engineering and environmental designs of the Scheme.

11.2 The requirement to mitigate the impacts on the Sites of Special Scientific Interest (SSSI) and Special Area of Conservation (SAC) have been considered throughout the ECI phase. This has been progressed in concert with extensive discussions with Natural Resources Wales and additional environmental surveys and investigations.

- 11.3 A better understanding of the construction programme, methods, costs and Scheme risks has also been achieved, together with early development of the required traffic management and environmental mitigation requirements.
- 11.4 Extensive consultation has been undertaken during this design development phase, the results of which have been used where appropriate to inform the Scheme design and other considerations. The majority of the engagement undertaken by the contractor and his team has been highly beneficial in the development of the proposed Scheme and would be continued, subject to a successful Public Inquiry outcome through the detailed design and construction phases.
- 11.5 We have identified temporary land and access requirements which are essential to enable the works to be constructed. These are included within the draft Compulsory Purchase Order (WG 2.2) and provide for the necessary accommodation, welfare facilities and other construction related activities.
- 11.6 Relationships have been developed with individuals, businesses and groups that would continue to benefit the future Scheme development, design and construction phases. These groups include local authorities and the statutory consultees and landowners along the route of the Scheme.
- 11.7 The ECI approach has ensured that an integrated and balanced approach has been adopted to accommodate the required environmental mitigation within the design, construction methodology and programme.

## Management Systems

11.8 The Costain Vinci Joint Venture would have in place a project management, health, safety, welfare and environmental management systems for the Scheme that in my opinion would represent best practice in the construction industry necessary for the efficient delivery of this Scheme meeting the commitments made in the Environmental Statement, Vol 3, Appendix 18.1 (Document 2.3.2). The management systems would meet the requirements of:

- a) BS EN ISO 9001 Quality Management System.
- b) BS EN ISO 14001 Environmental Management System.
- c) BS EN OHSAS 18001 Health and Safety Management System.

11.9 Scheme specific plans, procedures and details would be further developed and finalised prior to construction, to ensure a high quality product is delivered safely and in compliance with our environmental commitments given in the Environmental Statement, Vol 3 Appendix 18.1 (Document 2.3.2).

## Construction Programme

11.10 An outline construction programme has been prepared for the Scheme. The programme has been developed to accommodate timely implementation of environmental mitigation measures, minimise land take, generally and specifically within the Gwent Levels SSSIs and minimise disruption to traffic and the general public, whilst allowing the construction works to be completed safely and efficiently.

11.11 The construction methodology and programme has been carefully considered to maximise the onsite haulage of the primary bulk earthworks thereby avoiding significant quantities of road haulage. Further detailed construction methodology and programme development

would continue prior to construction and take due consideration of ongoing stakeholder discussions prior to construction as appropriate.

11.12 In my opinion the programme and construction methodology has been developed in sufficient detail to provide confidence that the Scheme can successfully be delivered in an efficient and timely manner with adequate recognition of the various environmental, engineering, resource and stakeholder constraints identified.

### **Construction Traffic**

11.13 Access and the logistics for the movement of people and materials around the Scheme during construction have been considered. The site access would be constrained due to the proximity of the SSSI and residential areas such as Magor and Castleton. A running route, on the new motorway alignment, for earthworks plant movements throughout much of the Scheme length would be provided. This, I consider significantly reduces the impact of construction traffic on the local road network. It would however still be necessary on a scheme of this scale to use the existing highway to transport incoming deliveries and carry out certain enabling works. An outline traffic management strategy has been developed to ease congestion, as shown in the Environmental Statement, Vol 3, Appendix 3.1: Buildability Report (Document 2.3.2). Wherever practicable construction vehicles would be excluded from the local road network.

### **Road User Traffic**

11.14 The effect of the construction works on the M4 and local roads has been considered and would be managed by a dedicated traffic management team who would plan and agree all traffic management works with the relevant Highways Authorities. Prior to commencing construction, a Scheme traffic management plan would be fully

developed to alleviate disruption and congestion wherever possible. Outline traffic management proposals have been developed during the ECI phase in sufficient detail to give confidence that the works can be delivered while minimising the disruption to road users. For example, traffic management phasing proposals to maintain three lanes in each direction on the existing M4 throughout the Castleton and Magor junction remodelling works and building side road overbridges off line to minimise side road closures during construction would be adopted (refer to the Environmental Statement, Vol 3, Appendix 3.1: Buildability Report Document 2.3.2). Limited closures would occasionally be required to carry out exceptional items such as lifting bridge beams into place over existing carriageways (refer to the Environmental Statement, Vol 3, Appendix 3.1: Buildability Report Document 2.3.2). These instances are typically required for reasons such as workforce or public safety or technical practicalities of alternative construction methods.

### **Non-Motorised Users**

11.15 Measures have been considered for Non-Motorised Users at all areas where construction would impact on the usual passage and availability of rights of way to ensure NMU access is maintained or suitable diversions routes are made available – Non-Motorised User Context Report – March 2016 (Document 6.2.18). Some construction activities such as the temporary diversion of the Newport / Cardiff Cycleway (proposed Route 88) would be prioritised in the early stages of the programme to provide continuity for users and minimise severance.

### **Construction Disturbance**

11.16 Despite mitigation measures identified in the Construction Environmental Management Plan some disturbance would inevitably occur adjacent to the construction works. The adoption of, and adherence to, a robust Construction Environmental Management Plan (a

copy of the Pre-Construction Environmental Management Plan is included in the Environmental Statement, Vol 3, Appendix 3.2 Document 2.3.2) with strict enforcement of the management procedures contained therein would ensure that the construction would be achieved with a high level of care for the environment, with the least possible inconvenience to the general public. Early and continued consultation and the adoption of best practice processes, construction methods and plant would underpin our approach.

### **Disruption to Businesses/Residents**

11.17 Where construction activities or the permanent works would impact directly on businesses and residents, regular liaison meetings with affected parties such as ABP. would be continued throughout the construction phase. In particular, any change in access arrangements, either temporary or permanent, would be discussed and resolved in advance of the works being undertaken.

11.18 Proposed construction methods outlined in the Buildability Report (Environmental Statement, Vol 3, Appendix 3.1: Document 2.3.2) would be further developed prior to construction to ensure specific measures are built into the construction programme and methodology to ensure impacts on businesses are assessed and reduced as far as possible, with due consideration of discussions.

### **Environmental and Ecological Mitigation Measures**

11.19 A clear understanding of the environmental risks and impacts arising from the proposed construction works has been developed by the construction team during the Scheme development to date in conjunction with Environmental Coordinator Dr Peter Ireland and his team. The necessary mitigation requirements have been built into the

Scheme through liaison between the Environmental Coordinator, Dr Peter Ireland and Statutory consultees and through the Environmental Impact Assessment process. The works would be constructed with proper care for the receiving and surrounding environment and its ecology in adherence with the Construction Environmental Statement (Document 2.3.2) and Register of Commitments found in the Environmental Statement, Volume 3, Appendix 18.1 (Document 2.3.2).

11.20 Dr Peter Ireland will provide further details of environmental mitigation measures within the Environmental Proof of Evidence (WG 1.7.1).

### **Public Liaison**

11.21 Extensive liaison would be carried out in advance of works to ensure that as far as is reasonably practicable, local residents, businesses and the travelling public are informed in advance of the works. This approach would be led by a team of dedicated Public Liaison Officers deploying a range of media communication tools and personal contacts with stakeholders to ensure a high standard of communication is maintained throughout the construction phase. Effective communication routes and processes will be in place to ensure any complaints are quickly responded to and addressed expeditiously.

11.22 In my opinion the adoption of the ECI approach to the development of this scheme has enabled the significant construction and environmental challenges of this scheme to be considered in a level of detail sufficient that the risks can be mitigated and managed to deliver this scheme successfully should it proceed following the Public Local Inquiry.