

## **HS2 Phase 2 Consultation on the route from the West Midlands to Manchester, Leeds and beyond**

### **Response from the Inland Waterways Association**

#### **Introduction**

The Inland Waterways Association (IWA) is a registered charity, founded in 1946, which advocates the conservation, use, maintenance, restoration and development of the inland waterways for public benefit.

IWA members' interests include boating, towpath walking, industrial archaeology, nature conservation and many other activities associated with the inland waterways.

IWA works closely with navigation authorities, other waterway bodies, and a wide range of national and local authorities, voluntary, private and public sector organisations.

IWA accepts that the overall economic and social case for the proposed High Speed Rail network is for Government to make and for Parliament to decide.

If it proceeds it will have major adverse impacts on the local environment and quality of life of many people on its route, both during construction and operation, including impacts on the inland waterways infrastructure and users. The waterways affected include both existing navigations and canals under restoration for which equal consideration and provision should be made.

IWA considers that the project needs to be designed and implemented so as to minimise its impacts, to mitigate those impacts that cannot be avoided, and to fully compensate all those disadvantaged by its construction and operation.

## The Western Leg (West Midlands to Manchester)

### Consultation Question 1: Comments on the Route and Supporting Infrastructure

#### Summary

The route start will need to be adjusted to take account of any changes made to the canal crossings at Fradley. At Great Haywood moving the route further north and extending the viaduct across the River Trent and Trent and Mersey Canal will reduce impact on the Great Haywood marina. The skew crossing of the Middlewich Branch of the Shropshire Union Canal in HSM 10 needs to be carefully designed to minimise adverse landscape impact and maximise light and sightlines, as does the long viaduct crossing of the River Dane and Trent and Mersey Canal. In HSM 12 the route crossing of the Bridgewater Canal requires careful design due to its width and skew crossing, and any moorings displaced need to be replaced with equivalent elsewhere.

The crossing of the Manchester Ship Canal will have an exceptional visual and noise impact on the landscape due to its size, and a suitably iconic design should be implemented. The links connecting the mainline in HSM22 to the West Coast Main Line (WCML) and into Golbourne Maintenance Depot have a significant visual impact on the setting of the Leeds and Liverpool Canal which will need mitigation. The terminus station in an enlarged Manchester Piccadilly provides a great opportunity to continue to open up the middle of Manchester, including the local canals, with a holistic design for the area which encourages train users and the local community to take the public space as their own- exceptional design can make this happen; a poor design will exacerbate existing antisocial behaviour, vandalism and graffiti to the detriment of the railways, canals and community.

The following CFAs on the Western Leg have a Proposed Route waterways impact and are commented on in more detail below:

- Western Leg Birmingham to Manchester
  - HSM 03 Fradley to Swynnerton
  - HSM 10 Hough to Winterbottom
  - HSM 12 Winterbottom to Warburton
  - HSM 21 Warburton to Lowton
  - HSM 22 Lowton to Bamfurlong
  - HSM 26 Ardwick to Manchester Piccadilly Station
  - HSM 30 Rostherne to Warburton

#### HSM 03 Fradley to Swynnerton

1. Near Fradley Junction the HS2 Manchester line starts just north of the Trent & Mersey Canal, where there are three canal crossings in close proximity requiring four rail viaducts at different levels. IWA and the Canal & River Trust (CRT) have put forward an Alternative Alignment for the Phase 1 link to the West Coast Main Line (WMCL) that would avoid two of these crossings and three viaducts, however it is

accepted that the spur for the Phase 2 Manchester route will need to cross the canal between Shade House Lock and Woodend.

2. The Phase 2 line starts on a 6m high embankment close to the canal, within 500 metres of the Fradley Junction Conservation Area and this whole 3 km section of the line lies between 200 and 900 metres from the Trent & Mersey Canal Conservation Area. Because of its elevation it will be readily visible and audible across the open countryside.
3. Further north, the route runs right alongside the canal marina at Great Haywood and crosses the canal on a viaduct about 11 metres high. The toe of the embankment is shown as intruding on the northeast corner of the marina basin, cutting off access to the mooring pontoons on the north side, rendering 30% of the berths unusable. The embankment and viaduct would also probably destroy a line of mature trees along the north side of the marina, including a protected large ancient Elm tree adjacent to the canal, and a large part of the environmental compensation area created as a condition of the marina construction.

#### IWA Consultation Response

- The IWA & CRT Alternative Alignment proposed to avoid three of the four viaducts across the canal at Fradley requires a slightly different alignment of the Manchester main line from the spur. This revised alignment needs to be adopted for the route into HSM 03.
- Visual and noise impacts of the embankments near Fradley need to be mitigated by landscape planting to replace woodland destroyed by the railway and by additional noise barriers on the viaducts to help protect the canal environment from excessive noise
- Impact on the marina at Great Haywood should be lessened by moving the route and canal crossing further north by around 30m or more, subject to the route chosen to mitigate impact on Ingestre Hall.
- Further mitigation should be deployed to reduce noise levels at the crossing of the Trent and Mersey Canal north of Great Haywood at the viaduct crossing and in the adjacent marina. Consideration should be given to extending the viaduct section by around 150m to the East to include the WCML crossing, which would further reduce the impact on the marina. Marina accesses removed in construction need to be replaced with suitable equivalent.
- Headroom for any crossing over the Trent and Mersey Canal needs to be at least 3m over water and 2.75m over towpath in accordance with CRT requirements

#### **HSM 10 Hough to Winterbottom**

1. The route crosses the Middlewich Branch of the Shropshire Union 420m west of Coal Pit Lane near Yew Tree Farm, on a 6.5m high embankment at about 60° skew. No details of the track platform or approach arrangements are provided.

2. The route crosses the Trent and Mersey Canal approx. halfway between bridges 176 and 177 opposite Bostock Hall, where the River Dane returns close to the canal. HS2 crosses the River Dane on a 745m viaduct, with the T&M crossing at the northern end where the landform rises sharply, making planned clearance difficult to assess.
3. The route crossing is close to Bramble Cutting, an old waterway pit and now a boater's picnic and mooring site on the offside of the canal with 48hr moorings, and 14 day moorings on the towpath side. The noise and visual nuisance will mean these moorings need relocating to a more tranquil location.

#### IWA Consultation Response

- The crossing of the Middlewich Branch of the Shropshire Union Canal needs to provide adequate air and water clearance and approach visibility for the navigation. Headroom needs to be at least 3m over water and 2.75m over towpath in accordance with CRT requirements. Noise control technology should be used to reduce the impact of operation, and an appropriate 'waterway intersection' quality and style of design should be used to reduce visual impact.
- Likewise the crossing of the Trent and Mersey Canal between bridges 176 and 177 must provide adequate air and water clearance and approach visibility for the navigation, and minimum headroom of 3m over water and 2.75m over towpath is required. Noise control technology should be used to reduce the impact of operation in this very tranquil location, and an appropriate 'waterway intersection' quality and style of design should be used to reduce visual impact.
- The picnic and mooring sites at Bramble Cutting will need to be relocated to an equivalent site in the locality.

#### **HSM 12 Winterbottom to Warburton**

1. The crossing of the Bridgewater Canal is skewed at about 45<sup>0</sup> and potentially 4 tracks wide at the point 230m north west of Agden Lane crossing at Agden Bridge, equidistant between Lymm and Little Bollington. A clearance of approximately 5m is shown. No details of the viaduct or approach embankment are provided
2. The canal is used by Lymm Cruising Club at this location for boat moorings and other facilities.

#### IWA Consultation Response

- The crossing of the Bridgewater Canal must provide adequate air and water clearance and approach visibility for the navigation. Minimum headroom of 4m is required. Noise control technology should be used to reduce the impact of operation, and an appropriate 'waterway intersection' quality and style of design should be used to reduce visual impact and prevent the canal corridor becoming too gloomy and unwelcoming.

- Facilities provided for and by Lymm Cruising Club which are affected by the crossing need to be replaced by equivalent in a suitable location.

### **HSM 21 Warburton to Lowton**

1. The Manchester Ship Canal is crossed near Partington, 900m north of Warburton Bridge Road just past Hollins Green on a viaduct 1200m long and 26m high.

#### IWA Consultation Response

- The crossing of the Manchester Ship Canal needs to provide adequate air and water clearance and approach visibility for the navigation. Minimum headroom of 22.9m is required. Noise control technology should be used to reduce the impact of operation on this very high structure.
- The crossing will also need an exceptional design, as a future icon of both the rail and waterway routes.

### **HSM 22 Lowton to Bamfurlong**

1. From the point where the HS2 link lines pass to the west of Mossley Hall, they run parallel with and approximately 0.5km across the Hey Brook valley from the Leeds and Liverpool Canal as it runs from Leigh to Wigan.
2. The connections from the link lines into the Golbourne RMD, and from the link lines into the WCML, each have one crossing over an HS2 track, at significant height (12m high in one case) in addition to the visual impact of the HS2 tracks at ground level. These will negatively impact the setting of the Leeds and Liverpool Canal.

#### IWA Consultation Response

- The link lines to the WCML and the Golbourne RMD will have significant effect on the existing setting of the Leeds and Liverpool Canal. Careful landscaping will be required to minimise this visual impact.
- Noise control technology should be used to reduce the impact of operation on this length of track, particularly the very high crossover sections.

### **HSM 26 Ardwick to Manchester Piccadilly Station**

1. Development of the new station complex will have a significant impact on the setting of the junction between the Ashton and Rochdale Canals.

#### IWA Consultation Response

- The restoration in recent years of the Rochdale Canal, and improvements to the setting of its junction with the Ashton Canal, has made some improvement to the safety, use and amenity value of the area immediately to the north of the new station boundary.

- When redeveloping the station care must be taken to use good design to continue these improvements, rather than isolate the canal corridor creating negative areas for the community and rail users and ignoring its potential.

### **HSM 30 Rostherne to Warburton**

1. As in HSM 12 above, the crossing of the Bridgewater Canal is skewed at about 45<sup>0</sup> and potentially 4 tracks wide at the point 230m north west of Agden Lane crossing at Agden Bridge, equidistant between Lymm and Little Bollington. A clearance of approximately 5m is shown. No details of the viaduct or approach embankment are provided
2. The canal is used by Lymm Cruising Club at this location for boat moorings and other facilities.

#### **IWA Consultation Response**

- The crossing of the Bridgewater Canal must provide adequate air and water clearance and approach visibility for the navigation. Minimum headroom of 4m is required. Noise control technology should be used to reduce the impact of operation, and an appropriate 'waterway intersection' quality and style of design should be used to reduce visual impact and prevent the canal corridor becoming too gloomy and unwelcoming.
- Facilities provided for and by Lymm Cruising Club which are affected by the crossing need to be replaced by equivalent in a suitable location.

### **Consultation Question 2: Proposals for Stations**

The inland waterways impact of the preferred station locations need to be mitigated or exploited as described above. Provided this can be assured, the station locations appear appropriate to the route.

### **Consultation Question 3: Additional Stations**

Any additional stations will need to avoid adverse impacts on inland waterways.

## Eastern Leg Birmingham to Leeds

### Consultation Question 4: Comments on the Route and Supporting Infrastructure Summary

This arm of the phase 2 route has more impact, and in particular from a waterways perspective the impact on the Chesterfield Canal restoration and separation of the Leeds Spur from the East Coast Spur at Woodlesford are both unacceptable as set out. On the Chesterfield Canal restoration the route passes along and over already restored canal, partially completed work, planned and financed restoration and valuable industrial archaeology. A completely different route, or one which substantially avoids these impacts, is necessary. At Woodlesford the route as planned will close the Aire and Calder navigation. This is an existing and potential route for commercial and industrial traffic into the centre of Leeds whilst still being a valuable addition to the local landscape, and amenity to the local community. A major rethink of the junction and its impact on the community, landscape and navigation is urgently required.

From its first separation from the Manchester route alongside the M42, the route dominates the landscape due to its height, creating noise and visual nuisance. In HSL 06 it travels across a tranquil section of canal and country park, destroying or displacing local museums and businesses, and leisure, business and residential moorings on the Coventry Canal. Adjustment of the route, and substantial mitigation, is needed here. In HSL 09 the route makes a significant landscape impact on crossing the Trent and Soar Valleys, again mooring and other facilities are affected and mitigation is needed. In HSL 13 and 14 the route moves into a confined and well populated area, along the corridor occupied by the Erewash Canal, and the detailed design will need to address several potentially unacceptable impacts from the rail route and possible M1 realignment. The noise and visual impact on canal recreational users as well as local residents will be significant and extensive efforts to provide mitigation and betterment are needed.

The route moves on to Staveley, where a connection into an Infrastructure Maintenance Depot is sited, and continues north past Renishaw and Killamarsh then up the Rother Valley towards Sheffield. In this area, as discussed above the route as planned runs over the top of an ongoing and very successful restoration of the Chesterfield Canal and the Rother Link, supported by the local community and local authorities due to its amenity and economic development value. The impact of HS2 on this restoration is carelessly considered, inadequate and unacceptable and the route and design need to be changed to ensure the complete restoration, and as much of the industrial archaeology as possible, is maintained for all to see and use.

The route passes through the eastern edge of Sheffield via the new Meadowhall Station, which itself will overlook the Sheffield and Tinsley Canal as well as the River Don with a wide platform section needing careful design consideration to minimise adverse impact. As the

route moves further north and to the east of Barnsley, it crosses another canal restoration in several places, and route adjustment and mitigation to ensure the restoration can go ahead is needed. At Cold Hiendley the planned route passes across the foot of a large water retaining structure, and a mixture of route adjustment, investigation and mitigation will be required to ensure structural integrity is not compromised by construction or long term operation. The route crosses the Aire and Calder Navigation in several places before reaching the Woodlesford area already mentioned, where the Leeds Spur separates from the East Coast Spur and severs the navigation.

The following CFAs on the Eastern Leg have a Proposed Route waterways impact and are commented on in more detail below:

- Eastern Leg Birmingham to Leeds
  - HSL 01 Marston to Birchmoor
  - HSL 06 Birchmoor to Tongue
  - HSL 09 Tongue to Long Eaton
  - HSL 12 Long Eaton to Trowell
  - HSL 13 Trowell to Killamarsh
  - HSL 14 Killamarsh to Tinsley
  - HSL 15 Tinsley to Blackburn
  - HSL 16 Blackburn to Cold Hiendley
  - HSL 17 Cold Hiendley to Church Fenton
  - HSL 21 Cold Hiendley to Woodlesford
  - HSL 22 & 31 Woodlesford to Hunslett and Hunslett to Leeds New Lane Station

### **HSL 01 Marston to Birchmoor**

The route begins at the Leeds Branch spur planned in Phase 1, to the east of the M42 north of Junction 9 and the A4097. The Birmingham and Fazeley Canal runs on the west side of the motorway at this point, where it is crossed by the HS2 Manchester Line.

#### **IWA Consultation Response**

- After emerging from cutting within 280m of the Birmingham and Fazeley Canal, the route continues for 1.9km on viaduct and embankment overlooking the M42 in cutting, and the canal diverging to a distance of 840m away.
- Noise control technology will be needed to reduce the impact of operation on this length of track, given the existing noise levels in the area and the proximity of the canal and Kingsbury Water Park.

### **HSL 06 Birchmoor to Tongue**

1. The viaduct crossing of the Coventry Canal is shown as about 9.5m from track bed to canal, crossing above the easternmost tail of the 'island' created by the Pooley Hall Colliery Basin moorings outside the Pooley Fields Heritage Centre, on the site of Pooley Hall Colliery.

2. The old colliery basin provides attractive and tranquil moorings for residential and leisure canal boats, and a base for holiday hire boats.
3. The rail crossing will apparently run over the existing Heritage Centre requiring its relocation. Access to the Heritage Centre, moorings and canal is currently provided by Pooley Lane. No access is shown on the plans, apparently isolating the area between the HS2 route and the M42.
4. The route proposed for the restored Ashby Canal runs along the bed of a disused railway to the north of Burton Road, Measham and is crossed by both the HS2 route and by the diverted A42. Leicestershire County Council, North West Leicestershire District Council, Ashby Canal Trust, Ashby Canal Association and other local authorities have already implemented work to bring the canal nearer to Measham and rejoin the previously restored but separate section at Moira.
5. The route up to the A 42 is part of a scheme for reinstatement of this part of the canal in conjunction with an associated housing development by The Measham Land Company Ltd (which has the benefit of planning consent), which will provide significant funding for the canal restoration.
6. An opportunity exists to provide the necessary clearance under both the HS2 Leeds route and the A42 in this project.

#### IWA Consultation Response

- Route alignment in the vicinity of the Coventry Canal crossing should be re-examined to see if it could be moved either to the northwest, closer to the M42, or to the southeast nearer to the edge of the Country Park, to reduce the impact on the country park and the canal moorings.
- Visual and noise impacts of the embankment and viaduct crossings in this area need mitigation by additional noise barriers and landscape planting to help protect the canal environment and what will remain of the Country Park
- The crossing of the Coventry Canal needs to provide adequate air and water clearance and approach visibility for the navigation. Headroom needs to be at least 3m over water and 2.75m over towpath in accordance with CRT requirements
- Access should be maintained along Pooley Lane. Either the viaduct could be extended across the site, or a bridge provided over Pooley Lane to reinstate access.
- Plans to realign the A42 near Measham and to pass HS2 alongside should include as a minimum provision for the route of the restored Ashby Canal by means of bridges under both road and rail. The two Ashby Canal crossings should be designed to the satisfaction of Leicestershire County Council and North West Leicestershire District Council to maintain required canal level and headroom under HS2 and the realigned A42 in accordance with the Canal and River Trust requirements for a broad canal.
- Ideally enhancements to counterbalance the environmental impact of the HS2 scheme on Measham could be included as part of the project. One example could be

to reopen the Burton - Leicester railway line to passenger traffic to reinforce the tourism potential of the Ashby Canal to the area, as part of the works.

### **HSL 09 Tongue to Long Eaton**

1. The viaduct over the M1 and River Soar crosses about 14m above and 140m north (downstream) of Ratcliffe Lock, and 14m above & 85m southeast of Redhill Marine's mooring basin. Both locations hold residential boats in addition to others, and will be significantly impacted by noise and visual intrusion.
2. A planning application, that has been amended twice and is now 'non-determined' by the planning authority, has been submitted for gravel extraction followed by restoration to a new 553 boat marina on the site around Redhill Marine's mooring basin. That site will be crossed by the HS2 viaduct.
3. The viaduct over the M1 and River Soar also passes 14m above and 300m east of Redhill Lock and Redhill Marina, where there are extensive boat moorings some of which are residential.
4. There are also boat moorings along the banks of the River Soar from Ratcliffe Lock to the confluence with the River Trent.
5. The viaduct over the River Trent crosses Cranfleet Cut midway between the bridge carrying the access track to the Trent Valley Sailing Club, and the jetty moorings towards Cranfleet Lock. The north bank of the cut is used for linear boat moorings at the viaduct crossing, and the south bank is used for jetty moorings and linear moorings 140m from the site of the viaduct crossing. All locations hold residential boats in addition to others, and will be significantly impacted by noise and visual intrusion.
6. The Nottingham Yacht Club base is 330m east of the viaduct crossing.

### **IWA Consultation Response**

- Visual and noise impacts of the viaduct crossings in this area should be mitigated by additional noise barriers and careful landscaping to help protect the river & canal environment and associated businesses.
- The crossings of the River Soar Navigation and the Trent Navigation (Cranfleet Cut) need to provide adequate air and water clearance and approach visibility for the navigation. Headroom needs to be at least 3m over water and 2.75m over towpath in accordance with CRT requirements
- Moorings lost to the viaducts, whether due to direct placement of infrastructure or indirect impact by overshadowing and high levels of local disturbance should be replaced by HS2 with equivalent elsewhere.
- During construction work, access must be maintained to boat moorings.

## HSL 12 Long Eaton to Trowell

1. The East Midlands Hub Station will be a significant structure in this location, and will create visual and noise impacts on the setting of the Erewash Canal 250m away.
2. The viaduct rising to cross the river, canal and floodplain will create major noise and visual impact, due to its height, parallel running and proximity to the canal as it climbs.
3. The embankment at the end of the section is shown as impinging on half of the width of the canal at its most northern end near Stanton Gate, and on the working area needed to operate Pasture Lock.

### IWA Consultation Response

- Visual and noise impacts of the East Midlands Hub Station in this area should be mitigated by good design of the station structures and additional noise barriers and careful landscaping to help protect the river & canal environment.
- The crossing of the Erewash Canal must provide adequate air and water clearance and approach visibility for the navigation. Headroom needs to be at least 3m over water and 2.75m over towpath in accordance with CRT requirements
- There are several locations of moorings along the Erewash Canal, whether at the end of residential plots or at canal junctions and these will require mitigation for noise and visual intrusion.
- Visual and noise impacts of the viaduct crossing near Pasture Lock should be mitigated by additional noise barriers and careful landscaping.
- Adequate clearance around Pasture Lock is necessary to allow its operation, and the embankment needs to avoid impinging on the waterway. Lock operating space should be the greater of 2m from the side of the lock, or 0.5m from the ends of the balance beams. One alternative may be to increase the length of the viaduct around the lock.

## HSL 13 Trowell to Killamarsh

1. The northern end of the embankment at the beginning of the section is shown as impinging on half of the width of the Erewash Canal near Stanton Gate, and on the working area needed to operate Pasture Lock. The route is approximately 15m above the canal at this point.
2. The M1 currently crosses the Erewash Canal about 500m north of Pasture Lock, midway between Stanton Gate road bridge and an existing railway bridge. This section of motorway is shown as requiring realignment. Any realigned crossing needs to maintain navigable clearances and should be well designed to modern standards to reduce noise and visual impact of the motorway and its traffic.
3. There exist several Permissive Footpaths alongside the disused Nottingham Canal at Trowell-one being the former towpath. Both footpaths and canal are shown as blocked by the proposed embankment carrying the route. One footpath currently

continues under the M1, using the same underbridge as the A609. The A609 is shown as requiring realignment at this location. Permissive Footpaths and navigation continuity need to be maintained, by either providing a combined pedestrian and navigation crossing through the embankment or combining them with the A609 crossing.

4. As the route passes between Staveley and Mastin Moor on a 4-5m high viaduct two chords branch west to and from the proposed Staveley Infrastructure Maintenance Depot (IMD), to be sited to the west of Staveley on a site bounded to the south by the River Rother and to the north by an existing mineral railway connected to the existing main line. The depot site overlooks the Chesterfield Canal (currently undergoing restoration) and at its closest is approx 190m from the canal.
5. The South Connection Spur to the Staveley IMD drops from the HS2 main line just after the crossing of the A619, to cross approx. 5m above the River Doe Lea and curve round to the west on an 895m viaduct before joining the North Connection Spur.
6. The combined tracks to the IMD then cross south of Franklyn Drive and rise, briefly taking over the bed of a mineral railway and crossing the B6053 apparently on a level before splitting. Here the southern most track crosses the River Rother then Hall Lane and enters the IMD site and the northern track crosses the River Rother then Hall Lane and continues ahead to the existing railway connection.
7. The combined connections into the Staveley IMD run for around 500m directly over the Chesterfield Canal, on its way under the Northern Loop Road (also known as Ireland Close) via the canal bridge constructed in 2011 into the new lock currently under construction, which passes boats into the Staveley Basin. HS2 Ltd have confirmed the route does pass along the existing mineral railway trackbed parallel to the canal, and not over the B6053 road at a level as incorrectly shown on drawing C321-MMD-RT-DPP-190-550701. Much new and recent canal construction design and implementation will be impacted.
8. The Northern Connection Spur separates from the HS2 Main Line just south of Huggester Farm, running on a low viaduct across the floodplain of the River Doe Lea and the route of the Chesterfield Canal, curving to run due west and join the Southern Spur and run into the depot. The spur runs across the line of the canal at the beginning and end of its 700m length, severing the canal and the water feed into the lower sections.
9. The main line runs across the floodplain of the River Doe Lea on a low (4-5m high) viaduct past the two 'flat' junctions to the IMD described above, briefly moves onto embankment alongside the sewage works then back onto viaduct for 420m, then onto low embankment much of which is along the route of the Chesterfield Canal. At this point the route also crosses the Trans Pennine Way footpath along the disused railway line and through Lower Clinker Wood before switching back to viaduct to cross over the A6135 and River Rother floodplain. Finally the route moves onto low

embankment and exits the section. In this area the route occupies or cuts across the bed of the Chesterfield Canal in several places, sections of which have already been restored and other sections of which are being restored.

#### IWA Consultation Response

- Crossings of the Erewash Canal must provide adequate air and water clearance and approach visibility for the navigation. Headroom needs to be at least 3m over water and 2.75m over towpath in accordance with CRT requirements
- Visual and noise impacts of the viaduct crossing near Pasture Lock should be mitigated by additional noise barriers and careful landscaping.
- Adequate clearance around Pasture Lock needs to be maintained to allow its operation, and the embankment design or position needs to be altered to avoid impinging on the waterway. Lock operating space should be the greater of 2m from the side of the lock, or 0.5m from the ends of the balance beams. One alternative may be to increase the length of the viaduct around the lock.
- Permissive Footpaths alongside the disused Nottingham Canal at Trowell- including the former towpath- should be preserved and continuity maintained in the process of realigning the A609 at the HS2 railway crossing.
- The continuity of the Chesterfield Canal in this section needs to be assured, preferably by altering the route of HS2 and/ or the entry into the IMD to facilitate retention of as much original structure as feasible. Detailed and substantive negotiations should take place between HS2 Ltd, Derbyshire County Council, the Chesterfield Canal Trust and Canal and River Trust, to formally and speedily agree how this can best be achieved.
  - a. Alternatives for the IMD chords include rerouting the canal in the vicinity to the south, in part along the line of the redundant Norbriggs Cutting then returning to the original line in the vicinity of Bell House Lane. This route will require new canal embankments and river crossings, and the HS2 mainline will need elevating to provide the necessary headroom. The south chord to the IMD will also require redesign and relocating.
  - b. Alternatives for the section west of Renishaw include moving the HS2 route alignment west onto the existing railway alignment, or constructing a parallel engineered alignment with the canal to the east and HS2 route to the west, in an environmentally sympathetic cutting/ tunnel with noise and visual impact mitigation inherent in the design.
- Crossings of the Chesterfield Canal by main line railway and IMD chords need to provide adequate air and water clearance and approach visibility for the navigation. Minimum headroom of 3.0m over water and 2.75m over towpath is required.
- As much of the heritage value of the Chesterfield Canal, its existing and previous routes and infrastructure, its settings and its amenity value needs to be preserved.

This includes the Staveley Puddlebanks and the original route at the north end of the section, where the only remaining Georgian tramway/ canal interchange wharf is sited, the Sepcup Railway to Eckington and the Chapel Wheel Dam where maintaining public access is essential.

- Whatever final design for the Chesterfield Canal is agreed in this area, there will still in all probability be significant visual and noise impacts. These should be mitigated by good design of the HS2 structures, additional noise barriers and careful landscaping to help protect what remains of the river & canal environment

### HSL 14 Killamarsh to Tinsley

1. For the first 1.2km of this section, from Boiley Farm to Forge Lane Killamarsh, the route runs in cutting over the restored Chesterfield Canal, currently in navigable condition and used as fishing pools pending linking to the existing navigable network. HS2 is planned at a lower level than the canal, effectively destroying it.
2. The route takes over the trackbed of an existing railway for a 3.5km length requiring its realignment. In this length, the new HS2 route crosses the River Rother initially at 90° then 240m further on, on a 90m viaduct across one corner as the river loops back on itself, with a height difference of about 6m indicated. These two interactions are on the line of the Rother Link, a planned waterway restoration connecting the restored Chesterfield Canal to the South Yorkshire Navigation in Rotherham. These heights are unlikely to provide full navigable clearance at all reasonable water conditions on the river.
3. As the route passes to the west of Aughton and east of Orgreave, it makes a third crossing of the River Rother 750m beyond its crossing under the B6200 as it runs along a 1460m viaduct. The route plans show a height of 8m above 'indicative ground level' which seems likely to provide adequate navigable clearance for the Rother Link Restoration.

### IWA Consultation Response

- The continuity of the Chesterfield Canal in this section needs to be assured, preferably by altering the route of HS2 to facilitate retention of as much original structure as feasible. Detailed and substantive negotiations must take place between HS2 Ltd and Derbyshire County Council, the Chesterfield Canal Trust, and Canal and River Trust, to formally and speedily agree how this can best be achieved.
  - a. Alternatives for the first 1.2km of this section include moving the HS2 route to the west, or running the HS2 route below the restored canal in some form of tunnel with noise and visual impact mitigation inherent in the design.
- Crossings of the Chesterfield Canal by the railway need to provide adequate air and water clearance and approach visibility for the navigation. A minimum headroom of 3.0m over water (2.75m over towpath) is needed.

- As much of the heritage value of the Chesterfield Canal, its existing and previous routes and infrastructure, its settings and its amenity value should be preserved. The 3 HS2 interactions with crossings of the River Rother need to allow sufficient clearance for the Rother Link Restoration at all reasonable water levels. In order to permit navigation minimum headroom of 3.5m above water level will be required. In addition it will be necessary to provide sufficient lateral clearance to permit footpaths along both banks of the navigation.
- Whatever final design for the Chesterfield Canal, and the Rother Link crossings is agreed in this area, there will still in all probability be visual and noise impacts. These should be mitigated by good design of the HS2 structures, additional noise barriers and careful landscaping to help protect what remains of the river & canal environment

### **HSL 15 Tinsley to Blackburn**

1. The 4025m viaduct across the section will have a considerable impact on the area, given its width (approx 60m at its widest) and height, including on the setting of the Sheffield and Tinsley Canal and River Don.
2. The Sheffield Meadowhall Station will also have a significant impact on the setting of the Sheffield and Tinsley Canal and River Don in the vicinity of Meadowhall.

#### **IWA Consultation Response**

- Visual and noise impacts of the viaduct crossing over the Sheffield and Tinsley Canal should be mitigated by additional noise barriers and careful design of the viaduct and associated landscaping. The design needs to avoid encouraging antisocial behaviour.
- Crossings of the Sheffield and Tinsley Canal need to provide adequate air and water clearance and approach visibility for the navigation. A minimum headroom of 3.5m is required in accordance with CRT requirements.
- Visual and noise impacts of the Sheffield Meadowhall Station in this area should be mitigated by good design of the station structures and additional noise barriers and careful landscaping to help protect the river & canal environment, and encourage positive public interest and activity rather than antisocial behaviour.

### **HSL 16 Blackburn to Cold Hiendley**

1. The route runs along the Dearne and Dove Canal (Worsborough Branch) from the HS2 viaduct across an existing railway for 500m to a point adjacent to The Manor House, Swaithe on a 10m embankment, and along a nearby 200m length at Caulkwell in cutting approximately 10m below the canal bed. The route then runs under the proposed canal main line before entering the twin tunnel under Ardsley

(the route for a restored Dearne & Dove Canal main line uses the trackbed of the former Midland (Swinton to Royston) Railway). This canal and branch is the subject of a projected restoration by the Barnsley Dearne and Dove Canals Trust ([www.bddct.org.uk/](http://www.bddct.org.uk/)) supported by the Barnsley Canal Consortium including a group of Local Authorities, IWA, the Royston and Carlton Community Partnership, and other interested bodies, and the existing route should be preserved by provision of a viaduct (or extension of proposed viaducts) and aqueduct at each location respectively, or equivalent alternative such as including a short local canal diversion as part of the HS2 project.

2. The viaduct crossing of the River Deane provides 15m air clearance and should be adequate for restoration of the Dearne and Dove Canal at this point.
3. Cold Hiendley and Winterset Reservoirs were both built as feeder reservoirs for the Barnsley Canal, which is the subject of a restoration project. The proposed viaduct crossing at the eastern end of Cold Hiendley Reservoir also crosses the Coal Arm navigable feeder from Winterset Reservoir to the route of the Barnsley Canal. Winterset Dam was built in 1854 and possibly of earth bund construction. Specific knowledge of its construction and water retaining design may not be available.
4. The proposed HS2 viaduct passes across the front of Winterset Dam and the embankment north of the viaduct is shown as constructed on top of the access road to the dam control and spillway area, which also provides access to the end of the Coal Canal arm of the Barnsley Canal and site of the Cold Hiendley Pump Station.

#### IWA Consultation Response

- The route of the Dearne and Dove Canal including the Worsborough Branch is impacted by HS2 at several points, which if progressed without mitigation will make the restoration on the existing line impossible. The existing route needs to be preserved by provision of crossings suitable for future navigation, but failing this, clear and acceptable alternatives must be provided by HS2.
  - a. One alternative mitigation could include replacing the embankment between the River Dove viaduct crossing and the 'existing railway' viaduct at CH11100-CH11300 with a continuous viaduct across both, leaving clearance underneath for the Worsborough Branch future realignment
  - b. An alternative for the Dearne and Dove Main Line which is crossed by the HS2 route at CH12250- CH12400 approx. could include providing a 5m water width aqueduct crossing point where the HS2 route is dipping down to enter the twin tunnel under Ardsley, to the north of A633 Wombwell Lane.
- Crossings or potential crossings of the route of the Dearne and Dove Canal restoration including the Worsborough Branch need to provide adequate air and

water clearance and approach visibility for the navigation. Minimum headroom of 3.1m is required.

- The reservoirs at Cold Hiendley and Winterset are both subject to regulation under the Reservoirs Act 1975 and the Water Management Act 2010, as impounding reservoirs with a volume greater than 25,000m<sup>3</sup>. Their functionality and safety must not be compromised by the construction or operation of the HS2 viaduct crossing. HS2 Ltd will need to conduct all necessary structural assessment of existing dams, water retaining structures and operating equipment and design, obtain all necessary regulatory approval for, construct and hand over to the owners where appropriate any mitigating and monitoring measures before route construction work can commence. Failure of the water retaining structures either during construction or operation of the route is likely to have significant consequences including extended closure of the route.
- The viaduct HS2 proposes potentially impacts existing access to dam and reservoir management equipment as well as headroom over the Coal Arm navigable feeder. Access needs to be maintained, and navigable headroom of 3m provided.
- Visual and noise impacts of the viaduct crossings over the River Dearne and Cold Hiendley Reservoir should be mitigated by additional noise barriers and careful design of the viaduct and associated landscaping, to preserve the setting and associated recreational activity as much as possible.
- Other mitigation measures at the Cold Hiendley/ Winterset crossing could usefully include providing a launching ramp and area of hard standing suitable for trail-boat launching near the viaduct crossing into the Coal Canal arm.

### **HSL 17 Cold Hiendley to Church Fenton**

1. The Leeds Spur separates from the East Coast Spur, and one track passes under the East Coast Spur and descends to join the other as it curves round to Leeds. This separation is commented on in HSL 21 below.
2. The main line runs due north between Wakefield and Normanton, passing approx 300m east of a non-navigable loop of the River Calder on viaduct before crossing the Aire and Calder Navigation and several loops of the River Calder on a single 1030m viaduct providing 16m air clearance. The HS2 East Coast Spur route passes on a viaduct over the Oulton Beck flood plain then returns to embankment, passing 20m above and within 380m of Lemonroyd Marina on the Aire and Calder Navigation. This marina provides extensive boat moorings some of which are residential.

### **IWA Consultation Response**

- Air and water clearances and approach visibility need to be maintained for the Aire and Calder Navigation, an important commercial and leisure waterway scheduled for upgrading to Euro Class 2, requiring 5.5m headroom. This need includes the

navigation width, and the towing path and connecting footpaths should also be maintained.

- Visual and noise impacts of the viaduct crossings in this area should be mitigated by additional noise barriers and careful landscaping to help protect the river & canal environment and associated businesses.
- Moorings lost to the viaducts, whether due to direct placement of infrastructure or indirect impact by overshadowing and high levels of local disturbance should be replaced by HS2 with equivalent elsewhere.

### **HSL 21 Cold Hiendley to Woodlesford**

1. Separation of the Leeds Spur tracks occurs 14m above and within 330m of Lemonroyd Marina, on the Aire and Calder Navigation. This marina provides extensive boat moorings some of which are residential.
2. The Leeds Spur viaduct impinges on the navigation just below Woodlesford Lock, and the lock chamber itself, as it curves across one side of the navigation with an apparent difference of 7.5m between the navigation and the track bed below the bottom gates of the lock. This is inadequate to maintain navigation at this point.
3. The Leeds Spur viaduct recrosses the Aire and Calder Navigation 760m beyond the top gates of Woodlesford Lock, below Fishpond Lock with a difference of 5m between the navigation and the track bed. This is inadequate to maintain navigation at this point.
4. Above Fishpond Lock the HS2 route runs onto a 240m viaduct which impinges on the south bank of the navigation as it curves towards and away from the route, with a difference in level of 7.5m between the track bed and the navigation level above Fishpond Lock.
5. Where the route crosses under the M1 using the track of an existing railway which is shown as requiring realignment, it runs alongside the towpath on a 7.5m high vertical retained embankment into the next section, at the point where the navigation turns through 90<sup>0</sup> to run due north away from the route. Neither the retaining wall abutting the towpath or the realigned existing railway should reduce the working width of the towpath or the navigation at this crossing and boat turning point.
6. Both banks of the navigation above Woodlesford Lock are used for boat moorings, and significant visual and noise impact will be caused by the route.
7. The setting of the navigation from below Woodlesford Lock to the 90<sup>0</sup> turn beyond the crossing under the M1, which is widely used by the local community and others as a leisure amenity resource and described as a 'recreational honeypot' in Temple ERM's P2C12a Appendix E1 Landscape report for HS2 Ltd, will be significantly affected by the route and associated noise and visual intrusion.

8. The section of bank between the navigation and the river Aire is very narrow and potentially unstable over the long term in this area. Temple ERM's P2C12e Appendix E5 Water report for HS2 Ltd notes in section 3.3.1 'The entire route section through the valley is on viaduct and is likely to result in a need to divert the River Aire at two locations.'

#### IWA Consultation Response

- Air and water clearances must be maintained for the Aire and Calder Navigation, an important commercial and leisure waterway scheduled for up grading to Euro Class 2, requiring 5.5m headroom. This includes the navigation width, and the towing path and connecting footpaths should also be maintained.
  - Alternative routes to that proposed need to be found, and could include not lowering the viaduct sections between CH 13839 and CH 16294 to provide the necessary navigation headroom, however this would exacerbate noise and visual nuisance in the area.
  - Another alternative could include moving the Leeds Spur separation approx. 1km further north, maintaining the necessary link lines headroom over the navigation when crossing below Woodlesford Lock and turning to run north of the River Aire back into the M1 crossing, crossing the navigation below Fishpond Lock maintaining the necessary headroom. This would impact the setting of Leventhorpe Hall, and still cause significant noise and visual intrusion.
  - The better alternative would be to use a different route into the city centre.
- Visual and noise impacts of the viaduct crossings in this area should be mitigated by additional noise barriers and careful landscaping to help protect the river & canal environment and associated businesses.
- Moorings lost to the viaducts, whether due to direct placement of infrastructure or indirect impact by overshadowing and high levels of local disturbance should be replaced by HS2 with equivalent elsewhere.

#### **HSL 22 and HSL 31 Woodlesford to Hunslett and Hunslett to Leeds New Lane Station**

1. Development of the new station complex will have a significant impact on the setting of the River Aire and junction with the Leeds and Liverpool Canal.
2. Provision of a pedestrian link over the river and canal area to the existing Leeds City Station is an opportunity to add something to the waterside in this area, whilst maintaining navigation clearances.

#### IWA Consultation Response

- The improvements in recent years to the Leeds waterscape have been an important addition to the city.
- Ensuring the canal and river are available for appropriate commercial and recreational use is essential to preserve activity on the navigations, and air and water clearances including navigation widths must be maintained. The pedestrian footbridge linking to Leeds City Station needs to provide as a minimum the same headroom clearance as under the existing Victoria Bridge which spans the navigation between Neville Street and Victoria Road. Use of the bridge may impact on maintenance and usage of the navigation and riverside areas, and CRT should be involved in its design to ensure impacts are positive.
- When redeveloping the Leeds New Lane station environment care must be taken to continue these improvements, and exploit the potential of the waterside both with the station itself and the pedestrian link to the existing station. Good design and careful setting of the new structures in the existing landscape must add to the city's style and culture, rather than be imposed on it.

### **Consultation Question 5: Proposals for Stations**

The inland waterways impact of the preferred station locations need to be mitigated or exploited as described above. This refers in particular to Leeds New Station, which requires the route to enter via Woodlesford where the current design impact on waterways is unacceptable. Significant changes to this approach need to be agreed to mitigate the currently unacceptable impact on the commercial and leisure waterways, and recreation/amenity benefit of the existing Woodlesford area navigation.

### **Consultation Question 6: Additional Stations**

Any additional stations will need to avoid adverse impacts on inland waterways.

## **The Entire Route (West Midlands to Manchester and Leeds)**

### **Consultation Question 7: Appraisal of Sustainability**

Inland waterways, whether commercial, leisure or mixed use, are a key resource in leisure amenity provision for communities and users who are able to access them. They provide tranquil environmentally significant corridors linking habitat and providing a place to exercise, ramble, educate and enjoy a holiday, as well as facilitating economic activity from the provision of such services. The increasing value of this resource is under represented in the Appraisal of Sustainability (People and communities, Landscape and cultural heritage), giving rise to the risk that the benefits may be underestimated in the overall case for avoidance and mitigation of impact along the route. In particular, IWA believes the general case for protection of waterways, the issue of noise nuisance and the need for much higher emphasis to be placed on good design of HS2 structures along the waterway corridor and its context is poorly represented in the AoS, and makes the following additional points on these below.

### **IWA General Principles for Protection of Waterways Impacted by HS2**

The following principles with respect to waterways need to be applied to HS2's proposals for phase 2:

- Protection of Routes – No canal should be lost or blocked, whether a restoration project or a navigation in use, and where the route crosses a waterway, the waterway should be restored to a minimum of navigation standard, whether the navigation is presently extant or not.
- Navigation – There should be minimal disruption to navigation during the construction phase, and any necessary impacts should be integrated with the navigation authority's planned stoppage programmes.
- Waterway gauge - there should be no detriment to the constructed gauge of any waterway due to HS2, particularly in respect of headroom, taking account of any proposed enhancements on freight waterways. Any waterway crossings or other alterations to the waterway should comply with the appropriate navigation authority's policy of headroom over water, over towpaths, and on minimum width.
- Mitigation – wherever possible mitigation should be completed in advance of construction.
- Betterment – opportunities should be sought to achieve betterment for waterways within the planning process as compensation for environmental and heritage damage caused by HS2's construction and operation.

### **IWA Position on Noise Affecting Waterway Users**

UK government noise policy sets out three aims, the first of which is to 'avoid significant adverse impacts on health and quality of life.' The policy states:

‘any receptor forecast to experience an absolute ‘end state’ exposure from the source that exceeds the relevant SOAEL [Significant Observable Adverse Effect Level] should be identified as being subject, in EIA terms, to a likely significant adverse effect. This would reflect the aim to avoid significant effects on health and quality of life.’

In the Environmental Statement accompanying the Phase 1 Hybrid Bill, noise appendices set out upper limits for the SOAEL for the project by reference to WHO and UK Noise Insulation regulations:

‘For night-time, the World Health Organization’s Night Noise Guidelines for Europe<sup>21</sup> introduced an Interim Target of 55 dB  $L_{pAeq,8hr}$  measured outdoors. This is the noise threshold used for category ‘C’ of the ABC impact criteria at night (refer to section 14 of the SMR) and again can be taken to be a SOAEL [significant observable adverse effect level] During the daytime the free-field level of 65 dB  $L_{pAeq,0700-2300}$  is considered a SOAEL. This is consistent with the daytime trigger level in the UK Noise Insulation (Railways and other guided systems) Regulations...’

It then quantified change in noise levels as another aspect of sound from the project which can be identified by receptors as noise, by reference to the table below:

Table 7: SMR Table 33 Airborne sound from operational train or road movements - impact criteria

Long term Impact Classification	Short term Impact Classification	Sound level change dB $L_{pAeq,T}$ (positive or negative) T = either 16hr day or 8hr night
Negligible	Negligible	≥ 0 dB and < 1 dB
Minor		≥ 1 dB and < 3 dB
Minor	Moderate	≥ 3 dB and < 5 dB
Moderate	Major	≥ 5 dB and < 10 dB
Major		≥ 10 dB

Annexes set out the basis for modelling sound generation and transmission from HS2 by reference to HS1, and academic papers on European high speed trains. From these, a maximum noise level within 15m of an HS2 train is indicated as >90dB and <100dB.

However the appendices consider users of such facilities as Public Rights of Way and locations that have temporary and static moorings or permit occasional overnight stays such as static moorings, camp sites or caravan parks but do not permit long term residential use, as transient receptors. Users of such facilities are not considered to be significantly affected by noise due to construction or operation of the Proposed Scheme due to the short and irregular exposure to noise from the Proposed Scheme. Permanent moorings are however treated as residential, whilst allowing for the lower sound insulation provided by the ‘shell’ of a boat compared to a house.

On this basis, HS2 expects (amongst others) waterway users whether on boats or towpaths to be exposed to levels of noise above the project-determined SOAEL of 65dB (daytime) 55dB (night time), or a 'Major' change in noise levels of  $\geq 5$ dB because the impact will be transient. In practice these levels could be as high as  $>90$ dB for a boat or towpath user passing under a low bridge whilst a train passes overhead, and represent a change in sound pressure of over 20dB. This is considered acceptable by HS2, despite the context that without the project going ahead waterway users could still enjoy the current absence of noise without detriment, and in many locations no attempt has been proposed to reduce noise levels with best available technology despite the UK Government's stated policy on noise pollution '... to avoid significant effects on health and quality of life.'

It is IWA's position that this is not acceptable, and further 'best available technology' engineering and mitigation effects must be deployed at canal crossings and in the vicinity of marinas, short and long term moorings to reduce transmitted noise as far as possible towards and below the SOAEL level. This would move towards the UK Government's Noise Policy Aims for a:

'...situation where the effect lies somewhere between LOAEL and SOAEL.'

The UK Government policy aims do not differentiate between residential, non-residential and temporary receptors in the arbitrary way the Environmental Statement does.

### **Waterway Design Principles for the HS2 Project**

HS2 will have a significant number of interactions with and impact on waterways as it is constructed and moves into operation. In IWA's experience, these impacts can be significantly improved by good thoughtful design as can the operability and maintainability of the structures both for the railway and the waterway. Canal & River Trust have taken a lead in documenting a series of 'general design principles that guide the post-planning development of HS2 design within the corridor of the waterways.' IWA is very supportive of this work, and believes use of these Design Principles will facilitate good design within the waterway context. Use of these principles should be a requirement of designs with a waterway interface and impact.

### **Consultation Question 8: Freed Capacity**

The documents on deployment of freed- up capacity outline how best use can be made of space on the existing rail network. To the extent that this provides a lower environmental footprint transport solution this is to be welcomed. However the existing rail network will need to continue to see investment in equipment and rolling stock which will reduce the environmental footprint, and consequent nuisance, from this potentially more intensive use

of the facility. Better noise control and mitigation for example will be very welcome to people potentially affected by a change in use of the existing network.

### **Consultation Question 9: Utilities**

The concept of using an existing infrastructure corridor to deploy other utilities does look superficially attractive. However, HS2 Ltd are claiming intensive usage of the new routes as a way of getting best value for the investment, and this will be unachievable if other trackside utilities either require access for repairs, maintenance and upgrades or a breakdown of these utilities' apparatus endangers the safe operation of the high speed network. Great care is therefore needed when deciding which type of apparatus can be deployed over such a network without either compromising the rail network, or the utility's network.

HS2 Phase 2 Consultation on the route from the West Midlands to Manchester, Leeds and beyond -Response from the Inland Waterways Association

Ends.