# *APPENDIX X – Health and Safety Hazard Elimination Residual Risk Register (HERRR)*

# F302e Hazard elimination and residual risk register (HERRR)

## Designer's Hazard Checklist

**Notes:**

1. The following example hazard checklist identifies a number of potential hazards that may be present in a generic Med / Highways setting. Each discipline is required to develop and maintain a hazard checklist that that reflects potential hazards likely to be encountered in the industries or setting in which they work.

2. The list of potential hazards is not exhaustive. For each new project the entire checklist should be reviewed by competent staff as part of a mini workshop or brainstorming exercise to help prompt the identification of hazards in addition to those listed or already considered during an earlier review.

3 An individual hazard or an entire section (by ticking the heading) may be marked as not applicable. This records that the hazard area has been considered and judged it to be not applicable.

4. All hazards that may result in a medium to Med / High risk rating must be thoroughly assessed and recorded in the Hazard Elimination and Residual Risk Register (HERRR).

5 Low risk hazards are those that should they occur/be realised may result in at worst first aid treatment only or no damage to assets.

SCHEDULE 3 Regulation 12(2) - Work involving particular risks

1. Work which puts workers at risk of burial under earthfalls, engulfment in swampland or falling from a height, where the risk is particularly aggravated by the nature of the work or processes used or by the environment at the place of work or site.

2. Work which puts workers at risk from chemical or biological substances constituting a particular danger to the health or safety of workers or involving a legal requirement for health monitoring.

3. Work with ionizing radiation requiring the designation of controlled or supervised areas under regulation 16 of the Ionising Radiations Regulations 1999(a).

4. Work near Med / High voltage power lines.

5. Work exposing workers to the risk of drowning.

6. Work on wells, underground earthworks and tunnels.

7. Work carried out by divers having a system of air supply.

8. Work carried out by workers in caissons with a compressed air atmosphere.

9. Work involving the use of explosives.

10. Work involving the assembly or dismantling of heavy prefabricated components.

**Greyed out sections to be completed by others**

| Ref: | | Risk (without designer's elimination / management measures) N / A | Low | Med/Med / High - transfer to HERRR | Comments |
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| **1** | **Existing Environment** | | | | |
| 1.1 | Existing buildings / adjacent walls / structures | Y | Low | | This should be addressed by the contractor. Contractor to supply the principal designer with method statements and H&S risk assessments for approval. |
| 1.2 | Adjacent Land uses / property types | Y | Low | | Permenant and temporary works or structures will impact on the operation of adjacent land or properties. Not anticipated to be a medium / high health and safety issue. |
| 1.3 | Verges / hedges / ditches / overhanging trees | Y | | Med / High | There is likely to be an impact on these features, particularly around existing properties. Potential health and safety issue to construction workers. Design consideration should be given as to how this can be minimised in the flood defence alignment. |
| 1.4 | Adjacent roads / junctions / rdbts etc. | Y | Low | | Disruption anticipated through improvements to existing road drainage, pump stations, temporary construction traffic which will affect members of the public and contractors. Design to only undertake works which are necessary to minimise distruption. Contractor to supply the principal designer with method statements and H&S risk assessments for approval. |
| 1.5 | Levels of illumination (street lighting) | Y | Low | | This could be an issue and will have to be explored further in the next phase of the project. Health and safety hazards are however considered low. |
| 1.6 | Impaired visibility (geometry / furniture etc.) | Y | Low | | Flood defence walls will impair existing view of river channel in certain locations. Designers will consider visual impact of scheme on public, environment and operation. |
| 1.7 | Cellars / basements / subways etc. | Y | Low | | Not many basements etc are anticipated to be present within the village or be affected. |
| 1.8 | Traffic | | | | |
| | • Volume (tidal / shift orientated) | Y | Low | | This should be addressed by the contractor. Contractor to supply the principal designer with method statements and H&S risk assessments for approval. |
| | • Type (buses / HGVs etc.) | Y | Low | | This should be addressed by the contractor. Contractor to supply the principal designer with method statements and H&S risk assessments for approval. |
| | • Speeds | Y | Low | | This should be addressed by the contractor. Contractor to supply the principal designer with method statements and H&S risk assessments for approval. |
| | • Bus Route / wide load route / EDR | Y | Low | | This should be addressed by the contractor. Contractor to supply the principal designer with method statements and H&S risk assessments for approval. |
| | • Accident 'hot-spots' | Y | Low | | This should be addressed by the contractor. Contractor to supply the principal designer with method statements and H&S risk assessments for approval. |
| 1.9 | Pedestrians | | | | |
| | • Crossing points (type of crossing) | N/A | | | |
| | • School crossing patrol | N/A | | | No schools are located within Comrie. |
| | • Footway availability | Y | Low | | Potential reduction in footway due to temporary construction sites and road closures. Scheme design to consider ways to minimise this. |
| | • Disabled facilities / access arrangements | Y | Low | | Access points for disabled residents to be considered from a health and safety perspective, particularly for flood gate access points. Not considered to be a medium / high health and safety risk. |
| 1.10 | Access restrictions | | | | |
| | • One way / Prohibited movements | Y | Low | | Flood defence alignment may impede existing pedestrian access or resident vehicle access. Designers are to consider minimum disruption to existing access arrangements. |
| | • Weight / width / height | | Low | | It is not envisaged that this would be an issue during construction. |
| | • Geometry / Layout restrictions | Y | Low | | Flood defence alignment may impede existing pedestrian access or resident vehicle access. To be considered from a health and safety perspective. |
| | • On-street Parking / driveways | Y | Low | | Flood defence alignment may impede existing pedestrian access or resident vehicle access. To be considered from a health and safety perspective. |
| | • Deliveries | Y | Low | | Flood defence alignment may impede existing pedestrian access or resident vehicle access. To be considered from a health and safety perspective. |
| 1.11 | Railways (level crossings / bridges etc.) | N/A | | | There are no railways which will affected as part of the works. |
| 1.12 | Bridleways / Public Rights of way | Y | Low | | This should be addressed by the contractor. Contractor to supply the principal designer with method statements and H&S risk assessments for approval. |
| 1.13 | Lakes, Rivers and Streams etc. | Y | | Med / High | There is a health and safety risk to construction workers that during works in the river of drowning. Designer to consider how to reduce this health and safety risk. |
| 1.14 | Ground conditions: | | | | |
| | · Contamination | Y | | Med / High | Permenant and temporary works and structures could disturb contaminated material causing a health and safety risk to construction workers. See geotechnical risk assessment and mitigation. There is one known location of potential contaminated land on the site, where an old gas works was situated. |
| | • Ground water | Y | | Med / High | There is a health and safety risk to construction workers that during works in the river of drowning. Designer to consider how to reduce this health and safety risk. |
| | • Instability | Y | | Med / High | Permenant and temporary works and structures could introduce instability issues in the ground. Designers to consider this during the design process. |
| | • Archaeology / SSSI / reserve | Y | Low | | Permenant and temporary works and structures could impact on archaeology / SSSI / reserves. Refer to Environmental Baseline Report and ecological assessments. However, currently considered to be a low risk. |
| | • Mineral / mine workings | Y | Low | | Permenant and temporary works and structures could impact on mine workings. |
| | • Previous land uses | Y | Low | | Permenant and temporary works and structures will impact on previous land use. See technical report for more details. |
| 1.15 | Working with others (i.e. sharing site) | Y | Low | | Designers to consider land owners throughout the village during the works. |
| 1.16 | Hazardous / Fragile materials | Y | Low | | This is a possibility during the demolition of the existing flood wall. |
| 1.17 | Restricted working hours (nights etc.) | Y | Low | | This should be addressed by the contractor. Contractor to supply the principal designer with method statements and H&S risk assessments for approval. |
| 1.18 | Occupied Properties | Y | Low | | Permenant and temporary works and structures will impact on occupied properties during construction phases and permenant structures. |
| **1.19** | **Flooding** | Y | | Med / High | The works contract and method statements will need to specify a trigger level at which point all works and plant in the watercourses should be removed. |
| **1.20** | **Precipitation (snow/ice/rain)** | Y | Low | | Increased chance of precipitation due to location of town, which could have an adverse impact on operations. |
| **1.21** | **Landowners / members of the public** | Y | Low | | Hostile landowners or members of the public opposed to the proposed flood scheme |
| 1.21 | Topography | Y | Low | | The existing ground levels should be considered during construction e.g. plant stability on the ground, movement of plant and materials across the site. |
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| **2** | **Existing Services** | | | | |
| 2.1 | Underground | | | | |

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| | • Electrical (Eon & private) | Y | | Med / High | This is of critical importance and will be a key constraint during the works. Early consultation with this utility company should be undertaken. |
| | • Gas (low and medium pressure) | Y | | Med / High | This is of critical importance and will be a key constraint during the works. Early consultation with this utility company should be undertaken. |
| | Fuel Pipelines / Med / High pressure Gas Mains | Y | | Med / High | This is of critical importance and will be a key constraint during the works. Early consultation with this utility company should be undertaken. |
| | • Water | Y | | Med / High | This is of critical importance and will be a key constraint during the works. Early consultation with this utility company should be undertaken. |
| | • Telecommunications | Y | | Med / High | This is of critical importance and will be a key constraint during the works. Early consultation with this utility company should be undertaken. |
| | • Other | Y | | Med / High | This is of critical importance and will be a key constraint during the works. Early consultation with this utility company should be undertaken. All utility companies should be contacted and the location of the services located. |
| 2.2 | Overhead Services | | | | |
| | • Electrical | Y | | Med / High | This is of critical importance and will be a key constraint during the works. Early consultation with this utility company should be undertaken. |
| | • Telecommunications | Y | | Med / High | This is of critical importance and will be a key constraint during the works. Early consultation with this utility company should be undertaken. |

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| **3** | **Excavations** | | | | |
| 3.1 | Deep excavations | Y | | Med / High | Deep excavations maybe required to construct defences and could present a health and safety risk to workers, due to the potential of workers / residents falling into deep excavations. Designer to consider ways of keeping construction depths to a minimum. |
| 3.2 | Interface with services / drainage | Y | | Med / High | Possible to strike existing services. Detailed CAT scans of construction area required. |
| 3.3 | Slope / ground stability | Y | | Med / High | Possibly an issue during construction which could be a health and safety issue. |
| 3.4 | Ground water / water courses | Y | | Med / High | Ground water in excavations is a high health and safety issue. Designer to consider how this can be mitigated against. |
| 3.5 | Plant movements | Y | Low | | This should be addressed by the contractor, not an issue designer can greatly influence. |
| 3.6 | Storage / disposal of material | Y | | Med / High | This could be a health and safety issue, particularly for areas of contaminated land. Designer to consider how to avoid areas of contaminated land as much as possible. |
| 3.7 | Vibration though compaction | Y | Low | | This is not envisaged to be a high health and safety hazard but it should be considered during the next phase in more detail. |
| | • Adjacent buildings / cellars / walls etc. | Y | Low | | This is not envisaged to be a high health and safety hazard but it should be considered during the next phase in more detail. |
| | • Buried services (refer 2.1) | Y | Low | | This is not envisaged to be a high health and safety hazard but it should be considered during the next phase in more detail. |
| 3.8 | Unplanned settlement | Y | Low | | This could be an issue for a number of structures which are located in close proximity to the proposed works. |
| 3.9 | Contamination (ground / water) (refer 1.14) | Y | | Med / High | This has been identified as an issue. At least one loction has been identified as a potential source of contaminated land. Designer to consider how this can be mitigated against. |
| 3.10 | Tree roots | Y | Low | | A lot of the works will take place in close proximity to trees and therefore tree roots could be a problem. However, there is limited scope to mitigate against this as part of the design. |
| 3.11 | Adjacent structures (refer 1.8) | Y | Low | | This should be addressed by the contractor. Contractor to supply the principal designer with method statements and H&S risk assessments for approval. No direct health and safety issues. |
| 3.12 | Confined Space Conditions | Y | | Med / High | This is a high risk. A lot of locations where excavations will take place on site. |

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| **4** | **Surfacing Operations** | | | | |
| 4.1 | Adequate safety zones (centre line working) | Y | Low | | This is considered a low risk as there are not envisages to be large areas where surfacing will take place. |
| 4.2 | Coal Tar | Y | Low | | This is considered a low risk as there are not envisages to be large areas where surfacing will take place. |
| 4.3 | Surfacing Materials (hot materials) | Y | Low | | This is considered a low risk as there are not envisages to be large areas where surfacing will take place. |
| 4.4 | Dust / noise / vibration | Y | Low | | This is considered a low risk as there are not envisages to be large areas where surfacing will take place. |
| 4.5 | Hot Materials (bitmac / thermo / tack coat) | Y | Low | | This is considered a low risk as there are not envisages to be large areas where surfacing will take place. |
| 4.6 | Temporary road surfaces | Y | Low | | This is considered a low risk as there are not envisages to be large areas where surfacing will take place. |
| 4.7 | Haul routes | Y | Low | | This is considered a low risk as there are not envisages to be large areas where surfacing will take place. |
| 4.8 | Holding / storing of lorries on site | Y | Low | | This is considered a low risk as there are not envisages to be large areas where surfacing will take place. |
| 4.9 | Delivery / storage of plant / offices on site etc. | Y | Low | | This is considered a low risk as there are not envisages to be large areas where surfacing will take place. |
| 4.10 | Separating Public from the works | Y | Low | | This is considered a low risk as there are not envisages to be large areas where surfacing will take place. |
| 4.11 | Impeding visibility (plant / stores / offices etc.) | Y | Low | | This is considered a low risk as there are not envisages to be large areas where surfacing will take place. |
| 4.12 | Joints / vertical level differences | Y | Low | | This is considered a low risk as there are not envisages to be large areas where surfacing will take place. |
| 4.13 | Removal of rd markings / studs / A.skid | Y | Low | | This is considered a low risk as there are not envisages to be large areas where surfacing will take place. |
| 4.14 | Raised ironwork / increased kerb up-stands | Y | Low | | This is considered a low risk as there are not envisages to be large areas where surfacing will take place. |
| 4.15 | Planing out signal / detector loops | Y | Low | | This is considered a low risk as there are not envisages to be large areas where surfacing will take place. |
| 4.16 | Skid resistance of new surfaces | Y | Low | | This is considered a low risk as there are not envisages to be large areas where surfacing will take place. |

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| **5** | **Kerbing / Footways** | | | | |
| 5.1 | Manual handling | Y | Low | | This should be addressed by the contractor. Contractor to supply the principal designer with method statements and H&S risk assessments for approval. |
| 5.2 | Excavation (refer to 3) | Y | Low | | This is considered to be a low risk, with excavations not expected to be very deep for new kerbing used as part of the scheme. |
| 5.3 | Services (refer to 2) | Y | | Med / High | This is of critical importance and will be a key constraint during the works. Early consultation with this utility company should be undertaken. |
| 5.4 | Cutting operations / noise / dust | Y | Low | | This should be addressed by the contractor. Contractor to supply the principal designer with method statements and H&S risk assessments for approval. |
| 5.5 | Maintaining access | Y | | Med / High | Existing access points will need to be maintained for the local community. Consideration needs to be given as to how this can be done in a safe way operationally and also during maintenance of the scheme. |
| 5.6 | Pedestrian management (refer to 8) | Y | Low | | This should be addressed by the contractor. Contractor to supply the principal designer with method statements and H&S risk assessments for approval. |
| 5.7 | Existing constraints (refer to 1) | Y | Low | | This is considered a low risk as there are not envisages to be large areas where kerbs and footways will be constructed. |
| 5.8 | Temporary surfaces / raised ironwork etc. | Y | Low | | This is considered a low risk as there are not envisages to be large areas where kerbs and footways will be constructed. |
| 5.9 | New / altered geometry | Y | Low | | It is not envisaged that there will be significant alterations to the geometry of kerbs and footpaths. |
| 5.10 | Location of storage areas | Y | Low | | Consideration should be given to the location of potential storage areas. |
| 5.11 | Materials | Y | Low | | This is considered a low risk as there are not envisages to be large areas where kerbs and footways will be constructed. |

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| **6** | **Drainage and Ducting Works** | | | | |
| 6.1 | Excavations / Ground conditions / Instability | Y | | Med / High | This is a high health and safety hazard during the construction of the drainage works. Ground conditions need to be assessed to determine if this is an issue prior to construction and if instability is to be expected during excavation. |
| 6.2 | Confined spaces | Y | | Med / High | This is a high health and safety hazard during the construction of the drainage works. Design to consider ways to minimise confined spaces during construction and operation. |
| 6.3 | Leptospirosis / Hepatitis B / Tetanus etc. | Y | Low | | This should be addressed by the contractor. Contractor to supply the principal designer with method statements and H&S risk assessments for approval. |
| 6.4 | Existing services | Y | | Med / High | This is a high health and safety hazard during the construction of the drainage works. |
| 6.5 | Manual handling | Y | Low | | This should be addressed by the contractor. Contractor to supply the principal designer with method statements and H&S risk assessments for approval. |
| 6.6 | Lifting operations | Y | Low | | This should be addressed by the contractor. Contractor to supply the principal designer with method statements and H&S risk assessments for approval. |
| 6.7 | Cutting Operations | Y | Low | | This should be addressed by the contractor. Contractor to supply the principal designer with method statements and H&S risk assessments for approval. |
| 6.8 | Future Maintenance | Y | | Med / High | Designers need to consider health and safety of the design from a maintenance perspective. With regards to the drainage, consideration needs to be given to the access requirements of the drainage e.g. consideration of the depth of manholes, manhole safe access, regular access points. |
| 6.9 | Sewage | Y | Low | | No sewage is expected to be encountered as part of the surface water drainage works. Existing foul water should be avoided and considered as part of the design. |
| 6.10 | Traffic | Y | Low | | This should be addressed by the contractor. Contractor to supply the principal designer with method statements and H&S risk assessments for approval. |
| 6.11 | Contamination (ground / water / sewage) | Y | | Med / High | This is a consideration for one location of the site. Designers to consider how the scheme can be implemented so as to mitigate this factor. |
| 6.12 | Removal of contaminated materials | Y | | Med / High | This is currently a medium health and safety hazard during the construction of the drainage works in one particular location of the drainage works. Consideration should be given as to how the drainage works can be constructed to minimise any disturbance of any contaminated material. |
| 6.13 | Hazardous gases | Y | | Med / High | This could be an issue as part of the testing and maintenance for the scheme and should be considered by the scheme designers. |
| 6.14 | Testing operations | Y | Low | | This should be addressed by the contractor. Contractor to supply the principal designer with method statements and H&S risk assessments for approval. |
| 6.15 | Adjacent structures/activities | Y | Low | | Adjacent structures could be adversely affected by the works. This should be mitigated by considering the alignment of the drainage works to avoid affecting any adjacent structures. However considered low health and safety risk. |

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| **7** | **Street Lighting / Mechanical / Electrical Installation** | | | | |
| 7.1 | Positioning of columns | | | | |
| | • Buried services (refer 2.1) | Y | Low | | Lighting columns are not expected to feature highly as part of the scheme. However still considered to be a small risk associated with this. |
| | • Overhead / adjacent obstructions (refer 2.2) | Y | Low | | Lighting columns are not expected to feature highly as part of the scheme. However still considered to be a small risk associated with this. |
| | • Excavations (refer 3) | Y | Low | | Lighting columns are not expected to feature highly as part of the scheme. However still considered to be a small risk associated with this. |
| | • Reducing footway widths / clearances | Y | Low | | Lighting columns are not expected to feature highly as part of the scheme. However still considered to be a small risk associated with this. |

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| | • Impeding access / visibility | Y | Low | | Lighting columns are not expected to feature highly as part of the scheme. However still considered to be a small risk associated with this. |
| | • Nuisance / obtrusive lighting | Y | Low | | Lighting columns are not expected to feature highly as part of the scheme. However still considered to be a small risk associated with this. |
| | • Future Maintenance | Y | Low | | Lighting columns are not expected to feature highly as part of the scheme. However still considered to be a small risk associated with this. |
| 7.2 | Column erection / removal | Y | Low | | This is a small risk associated with the scheme as only few if any columns are expected to be installed as part of the scheme. |
| 7.3 | Cable installation | Y | Low | | This is a small risk associated with the scheme as only few if any columns are expected to be installed as part of the scheme. |
| 7.4 | Electrical works - working with, on or near to live equipment | Y | Low | | Expected to be a risk if any lighting columns are being installed, however not a direct design issue which can be mitigated for at this stage. |
| 7.5 | Levels of illumination | Y | Low | | Lighting columns are not expected to feature highly as part of the scheme. However still considered to be a small risk associated with this. Sufficient levels of illumination will be needed for footpaths to avoid trips and falls for footpath users. |
| 7.6 | Testing operations | Y | Low | | Expected to be a high risk associated with the scheme for pumping stations or any other electrical equipment which is installed. |
| 7.7 | Type of equipment specified | Y | Low | | Expected to be a low risk for the scheme. |
| 7.8 | Working at height (location? Fold downs?) (refer 2.2) | Y | Low | | Expected to be a low risk for the scheme. |
| 7.9 | Chemicals / COSHH / Jointing materials | Y | Low | | Expected to be a low risk for the scheme. |
| 7.10 | Animal excretions | Y | Low | | Expected to be a low risk for the scheme. |
| 7.11 | Insect / rodent infestations | Y | Low | | Expected to be a low risk for the scheme. |
| 7.12 | Traffic Management (refer 8) | Y | Low | | This should be addressed by the contractor. Contractor to supply the principal designer with method statements and H&S risk assessments for approval. |
| 7.13 | Access | Y | Low | | This should be addressed by the contractor. Contractor to supply the principal designer with method statements and H&S risk assessments for approval. |
| 7.14 | Manual handling | Y | Low | | This should be addressed by the contractor. Contractor to supply the principal designer with method statements and H&S risk assessments for approval. |
| 7.15 | Materials/substances | Y | Low | | This should be addressed by the contractor. Contractor to supply the principal designer with method statements and H&S risk assessments for approval. |
| 7.16 | Confined spaces | N/A | | | All working in confined spaces are a risk for the scheme. Design and installation of lighting columns is currently outside the scope of Mouchel at present. Contractor to supply the principal designer with method statements and H&S risk assessments for approval. |
| 7.17 | Pressure systems | N/A | | | All pressure systems are a high risk for the scheme. Design and installation of lighting columns is currently outside the scope of Mouchel at present. Contractor to supply the principal designer with method statements and H&S risk assessments for approval. |
| 7.18 | Fixings | Y | Low | | This should be addressed by the contractor. Contractor to supply the principal designer with method statements and H&S risk assessments for approval. |

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| **8** | **Traffic Management** | | | | |
| 8.1 | Maintaining access (i.e. programme works) | Y | Low | | This should be addressed by the contractor. Contractor to supply the principal designer with method statements and H&S risk assessments for approval. |
| 8.2 | Controlling access (gatemen etc.) | Y | Low | | This should be addressed by the contractor. Contractor to supply the principal designer with method statements and H&S risk assessments for approval. |
| 8.3 | Safety Zones available | Y | Low | | This should be addressed by the contractor. Contractor to supply the principal designer with method statements and H&S risk assessments for approval. |
| 8.4 | Barrier types / positioning of signs etc. | Y | Low | | This should be addressed by the contractor. Contractor to supply the principal designer with method statements and H&S risk assessments for approval. |
| 8.5 | Setting up equipment / signs etc. | Y | Low | | This should be addressed by the contractor. Contractor to supply the principal designer with method statements and H&S risk assessments for approval. |
| 8.6 | Maintenance of equipment / signs etc. | Y | Low | | This should be addressed by the contractor. Contractor to supply the principal designer with method statements and H&S risk assessments for approval. |
| 8.7 | Separating pedestrians from works (refer 1.9) | Y | Low | | This should be addressed by the contractor. Contractor to supply the principal designer with method statements and H&S risk assessments for approval. |
| 8.8 | Separating vehicles from the works. | Y | Low | | This should be addressed by the contractor. Contractor to supply the principal designer with method statements and H&S risk assessments for approval. |
| 8.9 | Site generated traffic (also see 1.8) | Y | Low | | This should be addressed by the contractor. Contractor to supply the principal designer with method statements and H&S risk assessments for approval. |
| 8.10 | Temporary restrictions (one-way, speeds, signals etc.) | Y | Low | | This should be addressed by the contractor. Contractor to supply the principal designer with method statements and H&S risk assessments for approval. |
| 8.11 | Road closures (diversion routes) | Y | Low | | This should be addressed by the contractor. Contractor to supply the principal designer with method statements and H&S risk assessments for approval. |
| 8.12 | Site generated local congestion | Y | Low | | This should be addressed by the contractor. Contractor to supply the principal designer with method statements and H&S risk assessments for approval. |
| 8.13 | Emergency vehicle access | Y | Low | | This will need to be planned for to ensure any works do not cause restrictions to emergency vehicles. |
| 8.14 | Altering existing signals / road layouts | Y | Low | | This should be addressed by the contractor. Contractor to supply the principal designer with method statements and H&S risk assessments for approval. |
| 8.15 | Phasing / amending traffic management | Y | Low | | This should be addressed by the contractor. Contractor to supply the principal designer with method statements and H&S risk assessments for approval. |
| 8.16 | Level crossings | N/A | | | |

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| **9** | **Welfare** | | | | |
| 9.1 | Location / suitability of office / welfare facilities | | | | |
| | • Buried services | Y | Low | | All buried services need to be considered and left undisturbed. Design of the contractor's compound is outside of the designers scope at this stage. Consideration of this should be given prior to the siting of the contractors office on site. Contractor to supply the principal designer with method statements and H&S risk assessments for approval. |
| | • Overhead obstructions | Y | Low | | Any overhead obstructions need to be assessed and anticipated prior to starting on site. Design of the contractor's compound is outside of the designers scope at this stage. Consideration of this should be given prior to the siting of the contractors office on site. Contractor to supply the principal designer with method statements and H&S risk assessments for approval. |
| | • Parking for workforces | Y | Low | | This should be addressed by the contractor. Contractor to supply the principal designer with method statements and H&S risk assessments for approval. |
| | • Power supply / temporary services | Y | Low | | This should be addressed by the contractor. Contractor to supply the principal designer with method statements and H&S risk assessments for approval. |
| | • Security of compound / barrier type | Y | Low | | This should be addressed by the contractor. Contractor to supply the principal designer with method statements and H&S risk assessments for approval. |
| | • Delivery access | Y | Low | | This should be addressed by the contractor. Contractor to supply the principal designer with method statements and H&S risk assessments for approval. |
| 9.2 | TM for establishment / removal of compound | Y | Low | | This should be addressed by the contractor. Contractor to supply the principal designer with method statements and H&S risk assessments for approval. |

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| **10** | **Foundations** | | | | |
| 10.1 | Adjacent buildings / structures | Y | Low | | This could be an issue for a number of structures which are located in close proximity to the proposed works. The alignment of the defences should consider this. However, only a low direct health and safety risk associated with this. |
| 10.2 | Deep excavations | Y | | Med / High | All deep excavations pose a high health and safety risk to construction workers and the public. Contractor to supply the principal designer with method statements and H&S risk assessments for approval. |
| 10.3 | Plant movements | Y | Low | | This should be addressed by the contractor. Contractor to supply the principal designer with method statements and H&S risk assessments for approval. |
| 10.5 | Interface with services | Y | | Med / High | This is of high importance and will be a key constraint during the works. Early consultation with this utility company should be undertaken. Contractor to supply the principal designer with method statements and H&S risk assessments for approval. |
| 10.6 | Ground contamination | Y | | Med / High | Permenant and temporary works and structures could disturb contaminated material. See geotechnical risk assessment and mitigation. There is one known location of potential contaminated land on the site, where an old gas works was situated. |
| 10.7 | Groundwater | Y | | Med / High | large amounts of ground water located within excavations could result in a large health and safety risk to residents and construction workers e.g. drowning. Contractor to supply the principal designer with method statements and H&S risk assessments for approval. |
| 10.8 | Confined spaces | Y | | Med / High | Confined spaces is a high risk to all construction workers. |
| 10.9 | Piling | | | | |
| | - Noise | Y | Low | | Exact method of construction unknown at this stage. |
| | - Vibration | Y | Low | | |
| | - Plant | Y | Low | | |
| | - Pile Cutting Requirements | Y | Low | | |
| 10.10 | Grouting | | | | |
| | - Drilling works | Y | Low | | Exact method of construction unknown at this stage. |
| | - Dust | Y | Low | | |
| | - Pollution | Y | Low | | |
| 10.11 | Others (insert as necessary) | N / A | | | No other issues as part of future demolition or decommissioning of structures is anticipated as part of this scheme at this stage but new issues to be added when identified. |
| 10.12 | Underpinning; requirements | N / A | | | |

| | | | | | |
|---|---|---|---|---|---|
| **11.0** | **Masonry Construction** | | | | |
| 11.1 | Working at height | Y | | Med / High | |
| 11.2 | Steel work | Y | Low | | This is considered a low risk as there are not envisages to be large areas where masonry will be used as part of the scheme. Contractor to supply the principal designer with method statements and H&S risk assessments for approval. |
| 11.3 | Lifting operations | Y | Low | | This is considered a low risk as there are not envisages to be large areas where masonry will be used as part of the scheme. Contractor to supply the principal designer with method statements and H&S risk assessments for approval. |
| 11.4 | Temporary stability / bracing | Y | Low | | This is considered a low risk as there are not envisages to be large areas where masonry will be used as part of the scheme. Contractor to supply the principal designer with method statements and H&S risk assessments for approval. |
| 11.5 | Connections | Y | Low | | This is considered a low risk as there are not envisages to be large areas where masonry will be used as part of the scheme. Contractor to supply the principal designer with method statements and H&S risk assessments for approval. |
| 11.6 | Unusual sequence or methods | Y | Low | | This is considered a low risk as there are not envisages to be large areas where masonry will be used as part of the scheme. Contractor to supply the principal designer with method statements and H&S risk assessments for approval. |
| 11.7 | Materials, e.g. paints | Y | Low | | This is considered a low risk as there are not envisages to be large areas where masonry will be used as part of the scheme. Contractor to supply the principal designer with method statements and H&S risk assessments for approval. |
| 11.8 | Provisions for temporary access scaffolding supports | Y | Low | | This is considered a low risk as there are not envisages to be large areas where masonry will be used as part of the scheme. Contractor to supply the principal designer with method statements and H&S risk assessments for approval. |

| | | | | | |
|---|---|---|---|---|---|
| **12.0** | **Timber Construction** | N/A | | | |

| | | | | | |
|---|---|---|---|---|---|
| **13.0** | **Roofing and Cladding** | **N/A** | | | |
| **14.0** | **Glazing** | **N/A** | | | |
| **15.0** | **Steel Erection** | | | | |
| 15.1 | Working at height | **Y** | **Low** | | The only steel erection which could take place would be foot gate frames or temporary flood barrier frames. Not expected to be a medium / high risk. Contractor to supply the principal designer with method statements and H&S risk assessments for approval. |
| 15.2 | Lifting operations | **Y** | **Low** | | The only steel erection which could take place would be foot gate frames or temporary flood barrier frames. Not expected to be a medium / high risk. Contractor to supply the principal designer with method statements and H&S risk assessments for approval. |
| 15.3 | Temporary stability / bracing | **Y** | **Low** | | The only steel erection which could take place would be foot gate frames or temporary flood barrier frames. Not expected to be a medium / high risk. Contractor to supply the principal designer with method statements and H&S risk assessments for approval. |
| 15.4 | Connections | **Y** | **Low** | | The only steel erection which could take place would be foot gate frames or temporary flood barrier frames. Not expected to be a medium / high risk. Contractor to supply the principal designer with method statements and H&S risk assessments for approval. |
| 15.5 | Unusual sequence or methods | **Y** | **Low** | | The only steel erection which could take place would be foot gate frames or temporary flood barrier frames. Not expected to be a medium / high risk. Contractor to supply the principal designer with method statements and H&S risk assessments for approval. |
| 15.6 | Materials, e.g. paints | **Y** | **Low** | | The only steel erection which could take place would be foot gate frames or temporary flood barrier frames. Not expected to be a medium / high risk. Contractor to supply the principal designer with method statements and H&S risk assessments for approval. |
| 15.7 | Provisions for temporary access scaffolding supports | **Y** | **Low** | | The only steel erection which could take place would be foot gate frames or temporary flood barrier frames. Not expected to be a medium / high risk. Contractor to supply the principal designer with method statements and H&S risk assessments for approval. |
| 16.0 | **Med / Highways** | | | | |
| 16.1 | Adjacent traffic | **Y** | **Low** | | This could be a health and safety risk for some locations within the village while the scheme is being constructed. |
| 16.2 | Construction materials | **Y** | **Low** | | This could be a health and safety risk for some locations within the village while the scheme is being constructed. |
| 16.3 | Structural works | **Y** | **Low** | | This could be a health and safety risk for some locations within the village while the scheme is being constructed. |
| 16.4 | Adjacent structures | **Y** | **Low** | | This could be a health and safety risk for some locations within the village while the scheme is being constructed. |
| 16.4 | Noise | **Y** | **Low** | | This could be a health and safety risk for some locations within the village while the scheme is being constructed. |
| 16.6 | Vibration | **Y** | **Low** | | This could be a health and safety risk for some locations within the village while the scheme is being constructed. |
| **17.0** | **Concrete Construction** | | | | |
| 17.1 | Working at height | **Y** | | **Med / High** | |
| 17.2 | Plant restrictions | **Y** | **Low** | | This should be addressed by the contractor, as the designer has limited influence over this. Contractor to supply the principal designer with method statements and H&S risk assessments for approval. |
| 17.3 | Lifting operations | **Y** | **Low** | | This should be addressed by the contractor, as the designer has limited influence over this. Contractor to supply the principal designer with method statements and H&S risk assessments for approval. |
| 17.4 | Noise | **Y** | **Low** | | Noise could be very high for residents in close proximity to the works. Potential health damage for residents and construction workers. Designers to consider construction methods which will reduce the noise. However, this is mainly to be managed by the contractor. |
| 17.5 | Vibration | **Y** | **Low** | | Vibration could be very high for residents in close proximity to the works. Potential health damage for residents and construction workers. Designers to consider construction methods which will reduce the vibration. However, this is mainly to be managed by the contractor. |
| 17.6 | Temporary instability | **Y** | **Low** | | This should be addressed by the contractor, as the designer has limited influence over this. Contractor to supply the principal designer with method statements and H&S risk assessments for approval. |
| 17.7 | Pre/post tensioning | **Y** | **Low** | | No pre or post tensioning is anticipated as part of this scheme. |
| 17.8 | Materials | **Y** | **Low** | | Not anticipated to be a high / medium health and safety risk for this scheme. |
| 17.9 | Maintenance | **Y** | **Low** | | Not anticipated to be a high / medium health and safety risk for this scheme. |
| 17.10 | Pre-cast concrete installation requirements / restrictions | **Y** | **Low** | | Not anticipated to be a high / medium health and safety risk for this scheme. |
| **18.0** | **Railway Activities** | **N/A** | | | |
| **19.0** | **Demolition of Existing Structures** | | | | |
| 19.1 | Services | **Y** | | **Med / High** | This is of critical importance and will be a key constraint during the works. Early consultation with all this utility companies should be undertaken. Contractor to supply the principal designer with method statements and H&S risk assessments for approval. |
| 19.2 | Adjacent/adjoining structures | **Y** | **Low** | | This should be addressed by the contractor. Contractor to supply the principal designer with method statements and H&S risk assessments for approval. |
| 19.3 | Materials | **Y** | | | |
| | - Hazardous | **Y** | **Low** | | It is not anticipated at present that the existing wall would contain hazardous substances in it. |
| | - Fragile | **Y** | **Low** | | It is not anticipated at present that the existing wall would contain hazardous substances in it. |
| 19.4 | Working at height | **Y** | **Low** | | This could be an issue during the demolition of the existing flood wall as some working at height maybe required. Contractor to supply the principal designer with method statements and H&S risk assessments for approval. Designers will have little to no input into this activity. |
| 19.5 | Temporary stability | **Y** | **Low** | | This could be an issue during the demolition of the existing flood wall as some stability issues may arise. Contractor to supply the principal designer with method statements and H&S risk assessments for approval. Designers will have little to no input into this activity. |
| 19.9 | Pre/post tensioning | **Y** | **Low** | | Pre or post tensioning is not anticipated as part of this scheme at this stage. |
| 19.7 | Noise | **Y** | **Low** | | Demolition of existing flood walls will impact on nearby residents and could produce a high noise. This should be addressed by the contractor. Contractor to supply the principal designer with method statements and H&S risk assessments for approval. Designers will have little to no input into this activity. |
| 19.8 | Vibration | **Y** | **Low** | | Demolition of existing flood walls will impact on nearby residents and could produce lots of vibrations. This should be addressed by the contractor. Contractor to supply the principal designer with method statements and H&S risk assessments for approval. Designers will have little to no input into this activity. |
| 19.9 | Others (insert as necessary) | **Y** | **Low** | | No other issues as part of future demolition or decommissioning of structures is anticipated as part of this scheme at this stage but new issues to be added when identified. |
| **20.0** | **Future Maintenance and Operation of Facility / Structure, etc.** | | | | |
| 20.1 | Access | **Y** | | **Med / High** | Access could be a high health and safety issue with for some of the scheme e.g. inspection of the river side of the walls or the river works. The scheme should be designed to accommodate access for future maintenance. |
| 20.2 | Safety equipment | **Y** | | **Med / High** | Some safety equipment will however still be required but this will be supplied by the contractor / sub-contractor undertaking the works. |
| 20.3 | Testing/inspection | **Y** | **Low** | | Testing and inspections will be required for the drainage, pumping stations and flood gates once these are in place. Designers to consider all aspects of required testing and inspections as part of their design. |
| 20.4 | Procedures | **Y** | | **Med / High** | Designers to consider operational procedures of the scheme in agreement with PKC. Emergency operational procedures also need to be considered if the scheme overtops or fails in some way. |
| 20.5 | Final Construction Drawings | **Y** | **Low** | | Final as built drawings will be required from the contractor to enable future maintenance to take place effectively. |
| 20.6 | Health and Safety File | **Y** | **Low** | | A final health and safety file will be required from the designer and contractor for the client to use. This will be lead by the Principal Designer. |
| 20.7 | Others (insert as necessary) | **Y** | **Low** | | No other issues as part of the future maintenance of the scheme is anticipated as part of this scheme at this stage but new issues to be added when identified. |
| **21.0** | **Future demolition or decommission of structure** | **Y** | | | |
| 21.1 | Unusual sequence | **Y** | **Low** | | Not anticipated to be a high health and safety risk for this scheme. |
| 21.2 | Pre/post tensioned elements | **Y** | **Low** | | No pre/post tension elements are anticipated at this stage. |
| 21.3 | Materials | **Y** | **Low** | | Not anticipated to be a high health and safety risk for this scheme. |
| 21.4 | Adjacent/adjoining structure | **Y** | | **Med / High** | Demolition of existing flood walls will impact on nearby residents. Designers will have limited input into the demolition but can advise the contractor as to the best and safest demolition method. Contractor to supply the principal designer with method statements and H&S risk assessments for approval. |
| 21.5 | Temporary stability | **Y** | | **Med / High** | Demolition of existing flood walls will impact on nearby residents. Designers will have limited input into the demolition but can advise the contractor as to the best and safest demolition method. Contractor to supply the principal designer with method statements and H&S risk assessments for approval. |
| 21.6 | Imposed Load Restrictions | **Y** | | **Med / High** | Demolition of existing flood walls will impact on nearby residents. Designers will have limited input into the demolition but can advise the contractor as to the best and safest demolition method. Contractor to supply the principal designer with method statements and H&S risk assessments for approval. |
| 21.7 | Stability Concept | **Y** | **Low** | | Not anticipated to be a high health and safety risk for this scheme. |
| 21.8 | Others (insert as necessary) | **Y** | **Low** | | No other issues as part of future demolition or decommissioning of structures is anticipated as part of this scheme at this stage but new issues to be added when identified. |
| **22.0** | **Use of the structure as a workplace** | | | | |
| **23.0** | **Maintenance and Operation of Facility / Structure etc.** | | | | |
| **24.0** | **Other related aspects** | | | | |

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| **Date** | | | | | | | **25/01/2017 13:17** | | | | | | | | | | | |
| Overall number of Hazards | | | | | | **28** | | | | | **28** | | | | | | **26** | |
| **Hazard information** | | | | | | | | **Initial risk** | | | | **Designer mitigation (POP and ERIC)** | | **risk** | | | | **Review** |
| **Hazard Checklist ref** | **Unique ref** | **Design discipline** | **Designer** | **Activity/element** | **Stage** | **Hazard/ H&S issue** | **Initial RAG** | **Initial L** | **Initial S** | **Initial risk rating** | | **Designer mitigation (POP and ERIC)** | **Designer actions** | **Residual RAG** | **Residual L** | **Residual S** | **Residual risk rating** | **Hazard /risks review date** |
| 1.14, 1.19, 3.4, 6.2 | HZ_D_01 | D | Drainage | Excavations | C | Deep open excavations would pose a risk to construction workers or local residents. High ground water levels could be a hazard to construction workers and local residents (i.e. drowning), if water filled excavations are left open. | R | 4 | 3 | 12 | | Minimise the need for deep excavations as part of the design where possible. | Undertake designer mitigation during next phase of scheme development. | | 4 | 3 | 12 | **01/08/2017** |
| 3.1, 6.1, 6.2, 6.8 | HZ_D_02 | D | Drainage | Deep underground chambers | M | Hazard to maintenance workers of falling down underground chambers. Also hazards are associated with confined spaces. | R | 4 | 3 | 12 | | Minimise the need for deep excavations as part of the design where possible. Safety features for maintenance should be incorporated into the design e.g. safety ladders for access down steep chambers. | Undertake designer mitigation during next phase of scheme development. | | 4 | 3 | 12 | **01/08/2017** |
| 6.2 | HZ_D_03 | D | Drainage | Deep underground chambers | C | Deep excavations / risk of fall / collapse of sides / flooding. | R | 5 | 6 | 30 | | Minimise the need for deep excavations as part of the design where possible. | Undertake designer mitigation during next phase of scheme development. | | 5 | 6 | 30 | **01/08/2017** |
| 2.1, 3.2, 5.3, 10.5 | HZ_GEO_01 | GEO | Geotechnical | Construction / excavations | C | Public utilities strike due to incomplete record of services within site boundary. Damage to pubic and private utilities, and potential hazard to life of contractors or construction works. | R | 3 | 6 | 18 | | As part of the scheme design, look to avoid services as much as possible. A CAT scan could be used as part of the design process to identify the precise location of services in the village. Recommend that the contractor use a CAT scan and hand dig inspection pits prior to excavation. Diversion of utilities which will be affected by construction works. | Undertake designer mitigation during next phase of scheme development. | | 1 | 6 | 6 | **01/08/2017** |
| 10.2 | HZ_GEO_02 | GEO | Geotechnical | Construction / excavations | C | Construction of deep excavations for foundations etc is a potential health and safety hazard due to the possibility of workers / residents falling into deep open excavations resulting in injury. | R | 3 | 5 | 15 | | Designer to consider ways to keep excavation depths to a minimum. Adequately protect the edges by fencing off and batten back the slopes etc. | Undertake designer mitigation during next phase of scheme development. | | 2 | 5 | 10 | **01/08/2017** |
| 1.14, 3.3, 6.1 | HZ_GEO_03 | GEO | Geotechnical | Construction / excavations | C | Instability of existing embankments and / or existing ground. This is a potential hazard to construction workers. | R | 3 | 4 | 12 | | Try and avoid these locations as much as possible. Where this is not possible however, assess current riverbanks identified as eroded or exhibiting features of instability, prior to construction to allow for temporary design measures to be implemented. | Undertake designer mitigation during next phase of scheme development. | | 3 | 4 | 12 | **01/08/2017** |
| 1.14, 1.19, 3.4, 3.12, 6.2, 10.7, 10.8 | HZ_GEO_04 | GEO | Geotechnical | Construction / excavations | C | Working in confined spaces as part of the construction of the scheme and workers could be subject to collapse of ground leading to injury or death. Ground water ingress is also a risk of engulfment to construction workers. | R | 3 | 6 | 18 | | Eliminate / reduce as much as possible working in confined spaces through consideration of designing of the foundations. | Undertake designer mitigation during next phase of scheme development. | | 3 | 6 | 18 | **01/08/2017** |
| 1.14 | HZ_GEO_05 | GEO | Geotechnical | Construction / excavations | C | Sheet piling or excavations next to the cemetary. Unknown area of land which is potentially unstable or is an area of ground contamination. | R | 3 | 4 | 12 | | Try and avoid disturbing these locations as much as possible. Where this is not possible however assess the stability and potential contaminates in this location. If possible use appropriate construction methods in this location which will limit any ground disturbance at this location. | Undertake designer mitigation during next phase of scheme development. | | 3 | 4 | 12 | **01/08/2017** |
| 1.14, 3.6, 3.9, 6.11, 6.12, 6.13, 10.6 | HZ_CL_01 | CL | Contaminated Land | Construction / excavations | C | Encountering contamination due to presence of the old gas works. Potential hazard to construction personnel, public or to the water environment due to exposure to toxic substances. | R | 4 | 4 | 16 | | At this stage, a preliminary phase of sampling and testing for contamination to be undertaken in both areas to assess the need for a more detailed investigations. Mitigation should include avoiding these locations as much as possible as part of the design and construction. Careful treatment and disposal of the contaminated material should be undertaken where encountered on site. | Undertake designer mitigation during next phase of scheme development. | | 4 | 4 | 16 | **01/08/2017** |
| 21.4 | HZ_ST_01 | S | Structures | Operation of Flood Defences | O | The new flood walls / embankments failing / breaching during a flood event. Consideration also of joining the new flood wall with the existing flood defence assets e.g. camp road. These locations could be a weaknessin the scheme. | R | 3 | 5 | 15 | | Ensure the structural design is conservative and considers worst case design scenarios including overtopping scenarios. | Undertake designer mitigation during next phase of scheme development. | | 3 | 5 | 15 | **01/08/2017** |
| 11.1, 17.1 | HZ_ST_02 | S | Structures | Construction / excavations | C | Working from a height during construction in order to construct the flood wall. Potential of falling from height for construction workers. | R | 3 | 5 | 15 | | Look to design flood walls and embankments so as to reduce the need for construction workers to work from height. | Undertake designer mitigation during next phase of scheme development. | | 3 | 5 | 15 | **01/08/2017** |
| 11.1, 17.1 | HZ_ST_03 | S | Structures | Construction / excavations | M | Working from a height during the maintenance of the scheme in order to maintain the scheme assets. Potential for falling from height for construction workers. | R | 3 | 5 | 15 | | Consider maintenance needs of the scheme during the outline and detailed design of the scheme, so that inspections and maintenance can be carried out on flood walls with reduced hazard of falling from height. | Undertake designer mitigation during next phase of scheme development. | | 3 | 5 | 15 | **01/08/2017** |
| - | HZ_ST_04 | S | Structures | Construction / excavations | O | The scheme will restrict flow in the watercourses, this will impose greater loads on the existing structures in the watercourse. | R | 3 | 5 | 15 | | Consideration needs to be given to all existing structures across and in the watercourses as to their stability post scheme and if strengthening works are required. These should be carried out as part of the scheme if required. | Undertake designer mitigation during next phase of scheme development. | | 3 | 5 | 15 | **01/08/2017** |

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| **Date** | | | | | | | **25/01/2017 13:17** | | | | | | | | | | |
| Overall number of Hazards | | | | | | **28** | | | | | **28** | | | | | **26** | |
| **Hazard information** | | | | | | | | **Initial risk** | | | | **Designer mitigation (POP and ERIC)** | | **risk** | | | **Review** |
| **Hazard Checklist ref** | **Unique ref** | **Design discipline** | **Designer** | **Activity/element** | **Stage** | **Hazard/ H&S issue** | **Initial RAG** | **Initial L** | **Initial S** | **Initial risk rating** | | **Designer mitigation (POP and ERIC)** | **Designer actions** | **Residual RAG** | **Residual L** | **Residual S** | **Residual risk rating** | **Hazard /risks review date** |
| 21.4, 21.5, 21.6 | HZ_ST_05 | S | Structures | Construction / excavations | D/F | Existing flood defences will need to be demolished. | R | 3 | 5 | 15 | | Consideration needs to be given the safest way to demolish existing structures. This will be primarily undertaken by the contractor. However, designer to also provide the contractor with some advice as to the safest way to undertake the demolition for construction workers and the public. Re-use the existing wall where possible. | Undertake designer mitigation during next phase of scheme development. | | 3 | 5 | 15 | **01/08/2017** |
| 1.19 | HZ_HH_01 | HH | Hydraulic Modelling / Hydrology | Operation of Flood Defences | O | Flood Risk - Risk of the defences overtopping and causing injury to residents | R | 3 | 5 | 15 | | Freeboard has been included within the scheme design to reduce the risk of overtopping occurring. An emergency plan should also be developed in consultation with PKC so that if overtopping was to occur, an emergency plan can be implemented. Existing SEPA flood warning measures are currently in place and these should be utilised to warn the local community if a flood event is expected. | Undertake designer mitigation during next phase of scheme development. Ensure that detailed independent reviews are carried out as part of the hydrology and hydraulic modelling. Ensure proper freeboard allowances are added. | | 2 | 5 | 10 | **01/08/2017** |
| 1.19 | HZ_HH_02 | HH | Hydraulic Modelling / Hydrology | Operation of Flood Defences | O | Flood risk increasing in some locations, upstream and downstream of the scheme, causing some locations to flood more frequently than they did pre-scheme. | R | 3 | 5 | 15 | | Design the scheme defence locations to reduce the water level impact the scheme has as much as possible. Also, additional defences maybe required in some upstream or downstream locations to protect against the impact of the scheme. | Undertake designer mitigation during next phase of scheme development. | | 2 | 5 | 10 | **01/08/2017** |
| 5.5 | HZ_PE_01 | PE | Project Engineer | Flood water storage | C | Large temporary bodies of water formed as part of the flood prevention scheme | R | 4 | 6 | 24 | | The use of large storage areas was removed from the scheme due to the potential risk to members of the public, etc | Undertake designer mitigation during next phase of scheme development. | | 0 | 3 | 0 | **01/08/2017** |
| - | HZ_PE_02 | PE | Project Engineer | Use of existing structures | C | The existing flood walls are old and their condition uncertain. Including these walls in the scheme is a potential hazard as they could fail during a flood event if they are not structurally sound. | R | 4 | 4 | 16 | | The existing walls to be structually improved to ensure the flood walls along this stretch are structurally adequate. Care would need to be taken during demolition of the existing wall (see HZ_ST05) | Undertake designer mitigation during next phase of scheme development. | | 0 | 3 | 0 | **01/08/2017** |
| - | HZ_PE_03 | PE | Project Engineer | General scheme activities | C | Upstream scheme design along the River Earn has not been designed and needs to be completed during the next phase. | R | 3 | 5 | 15 | | All health and safety issues associated with the design along this stretch of watercourse need to be considered and eliminated, reduced and controlled as appropriate. | Undertake designer mitigation during next phase of scheme development. | | 3 | 5 | 15 | **01/08/2017** |
| 1.13, 1.19 | HZ_PE_04 | PE | Project Engineer | Works within the watercourses. | C | Hazard due to fast flowing river to cause injury or death to construction workers while constructing the flood walls, flood embankments or the river works. | R | 4 | 5 | 20 | | Consider designs which will reduce the construction work within the watercourses as much as possible. Contractor to provide prinicipal designer with method statements and health and safety risk assessments for approval. | Undertake designer mitigation during next phase of scheme development. | | 4 | 5 | 20 | **01/08/2017** |
| 5.5, 20.2 | HZ_PE_05 | PE | Project Engineer | Falling from the top of the flood wall during access egress to riverside | O | Potential for residents to fall from the top of the flood wall at access points, causing injury. | R | 3 | 4 | 12 | | Designing regular access arrangements in the scheme so that access can be gained from the riverside of the defences to village and from the village to the riverside of the defences with ease. Provide stepped access over the defences at regular intervals with safety hand rails. Designer and Contractor to provide an operational and maintenance manual for the scheme once it is completed. The Principal Designer is to lead on compiling the health and safety file. | Undertake designer mitigation during next phase of scheme development. | | 3 | 4 | 12 | **01/08/2017** |
| 1.19, 20.4 | HZ_PE_06 | PE | Project Engineer | Operation of Flood Defences | O | Flood Risk - Risk of flood water gaining entrance into the town from flood gates being left open. | R | 3 | 4 | 12 | | Reduce the number of floodgates included as part of the scheme design, as much as possible. Have a detailed operational plan in place when the scheme has been constructed. | Undertake designer mitigation during next phase of scheme development. | | 3 | 4 | 12 | **01/08/2017** |
| 1.19, 5.5, 20.1 | HZ_PE_07 | PE | Project Engineer | Operation of Flood Defences | O | Risk of residents being trapped on the riverside of the defences during a flood event. It is possible this could put residents at risk of to injury or drowning. | R | 2 | 5 | 10 | | Designing regular access arrangements into the scheme so that access can be gained from the riverside of the defences to village and from the village to the riverside of the defences with ease. The evacution plan should also cover clearing the riverside of the defences. | Undertake designer mitigation during next phase of scheme development. | | 2 | 5 | 10 | **01/08/2017** |
| 1.3 | HZ_PE_08 | PE | Project Engineer | Construction of embankment and walls | C | Risk of injury to construction workers from overhanging trees and vegetation. | R | 3 | 4 | 12 | | Designer to consider an alignment which will help to reduce the proximity of the proposed defences to existing trees and vegetation where possible. | Undertake designer mitigation during next phase of scheme development. | | 3 | 4 | 12 | **01/08/2017** |
| 19.1, 21.4, 21.5, 21.6 | HZ_PE_09 | PE | Project Engineer | Construction / excavations | D/F | Risk of harm to workers and residents from demolition of the new structures at a later date. | R | 3 | 5 | 15 | | Provide detailed and accurate plans, that can be referred to at a later date when demolition of the scheme is required. | Undertake designer mitigation during next phase of scheme development. | | 3 | 5 | 15 | **01/08/2017** |

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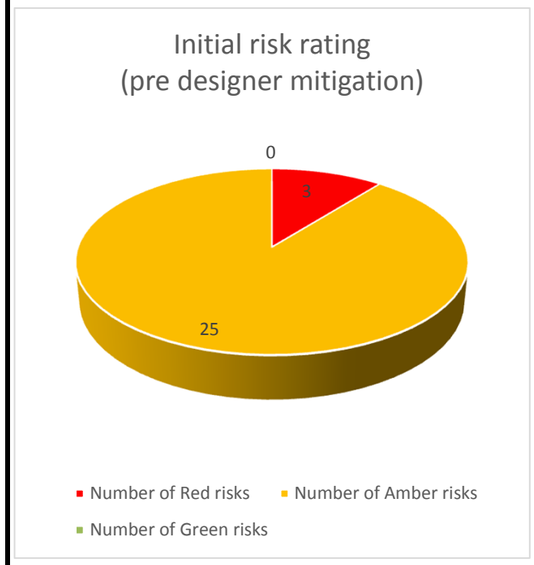
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Date** | | | | | | | **25/01/2017 13:17** | | | | | | | | | | | |
| Overall number of Hazards | | | | | | **28** | | | | | **28** | | | | | | **26** | |
| **Hazard information** | | | | | | | | **Initial risk** | | | | **Designer mitigation (POP and ERIC)** | | **risk** | | | | **Review** |
| **Hazard Checklist ref** | **Unique ref** | **Design discipline** | **Designer** | **Activity/element** | **Stage** | **Hazard/ H&S issue** | **Initial RAG** | **Initial L** | **Initial S** | **Initial risk rating** | | **Designer mitigation (POP and ERIC)** | **Designer actions** | **Residual RAG** | **Residual L** | **Residual S** | **Residual risk rating** | **Hazard /risks review date** |
| 2.2, 6.4 | HZ_PE_10 | PE | Project Engineer | Construction / excavations | C | General services strike of overhead or underground services, resulting in serious injury or death of construction workers. | R | 3 | 5 | 15 | | The location of existing services have been obtained. Be aware of locations of overhead services during outline and detailed design. As part of the scheme design, look to avoid services as much as possible. A CAT scan could be used as part of the design process to identify the precise location of services in the village. Recommend that the contractor use a CAT scan and hand dig inspection pits prior to excavation. Diversion of utilities which will be affected by construction workers. | Undertake designer mitigation during next phase of scheme development. | | 2 | 5 | 10 | **01/08/2017** |
| - | HZ_PE_11 | PE | Project Engineer | Construction | C | Hostile landowners or members of the public opposed to the proposed flood scheme | R | 2 | 3 | 6 | | Carry out regular meetings with the local community to address and resolve issues of concern. Also training can be given to any staff going to site and who may need to engage with the public. | Undertake designer mitigation during next phase of scheme development. | | 2 | 3 | 6 | **01/08/2017** |
| | HZ_PE_12 | PE | Project Engineer | Construction / excavations | C | There is a location within the town where artillery has historically been used and stored. There is therefore a hazard that construction workers / residents could disturb and come into contact with this which are potentially harmful / dangerous. | R | 2 | 4 | 8 | | Consult historical maps as to where the artillery / old shells are likely to be located. Avoid as much work as possible in these locations. If required obtain specialist advice if artillery / shells are encountered. | Undertake designer mitigation during next phase of scheme development. | | 2 | 4 | 8 | **01/08/2017** |
| **Insert above this line** | | | | | | | | | | | | | | | | | | |

# F302e Hazard elimination and residual risk register (HERRR)

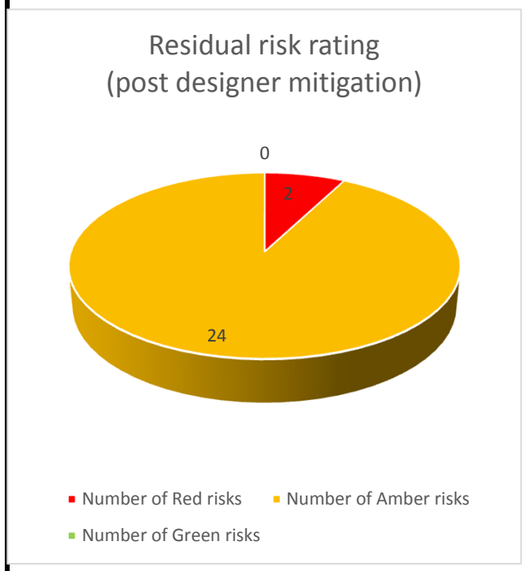
## Pre designer mitigation

| | |
|---|---|
| Total number of hazards identified at start of project | 28 |
| Initial risk rating of hazards Identified | |
| Number of Red risks | 3 |
| Number of Amber risks | 25 |
| Number of Green risks | 0 |
| Number of initial risks | 28 OK |




## Post designer mitigation

| | |
|---|---|
| Number of hazards post design mitigation | 26 |
| Residual risk rating of hazards Identified | |
| Number of Red risks | 2 |
| Number of Amber risks | 24 |
| Number of Green risks | 0 |
| | 26 OK |
| Number of Eliminated Hazards | 2 OK |




| Count of Initial RAG | RAG REF's | Grand Total |
|---|---|---|
| **Row Labels** | | |
| **Grand Total** | | |

| Count of Residual RAG | RAG REF's | Grand Total |
|---|---|---|
| **Row Labels** | **(blank)** | |
| GEO | | |
| D | | |
| PE | | |
| S | | |
| HH | | |
| CL | | |
| **Grand Total** | | |