



Appendix A
Designer's Risk
Assessment

Preliminary Design - SID Assessment										AECOM Project Name: Bus Connects Package A - Tallaght/Clondalkin to City Centre CBC										AECOM Project No: 60599126										Date: 10/11/2021									
Hazard and Risk Identification										Pre-mitigation assessment					Mitigation					Post-mitigation assessment					Output														
Item No.	Feature, element, structures, process or activity considered	Client's or other HAS information used	Significant Design Hazards Identified	Design Risks Identified	Environment/ Persons at Risk?	Severity	Probability	Risk Factor	Design Input Control to Eliminate or Reduce Hazard and/or Reduce Risk	Has Selected Control created a new Hazard? (Y/N)	Severity	Probability	Risk Factor	Output Significant Residual Hazard to Residual Hazard Log	Output Significant Residual Risk to Residual Hazard Log	Ownership	Output Residual Design Hazard Feedback Location	Closeout date for Output																					
PARTICULAR RISKS																																							
Significant Hazards are those which are:																																							
1.a	Work which puts persons at work at risk of falling from a height where the risk is particularly aggravated by the nature of the work or processes used or by the place of work or construction site	Concept Design Stage Preliminary Safety and Health Plan, February 2019	Structure foundations, Bridge foundation (Naas Road, Greenhills Road, Greenhills Road), CBC08 GA Sheet 7, CBC09 GA Sheet 12; SUBS & Culverts throughout the scheme.	Death or serious injury from falling to site personnel	Site personnel	4	1	4	adequate working space provided in LMA/designs to facilitate safe methods of work	NO	2	1	2	None	None																								
1.a.1	Risk of falling into excavations		Existing carriageway widened to facilitate cycle track and bus lane on New Naas Road/MSO existing overbridge, CBC08 GA Sheet 12; New Greenhills Road pedestrian & cycle bridges, CBC09 GA Sheet 12 (CBC09 ST01 & ST02 over the MSO); New road construction from Greenhills Road to Ballynatt Avenue, CBC09 GA Sheet 13;	Death or serious injury from falling to site personnel	Site personnel	4	1	4	adequate working space provided in LMA/designs to facilitate safe methods of work	NO	2	1	2	None	None																								
1.a.2	Risk of falling from embankments		Existing carriageway widened to facilitate cycle track and bus lane on New Naas Road/MSO existing overbridge, CBC08 GA Sheet 12; New Greenhills Road pedestrian & cycle bridges, CBC09 GA Sheet 12 (CBC09 ST01 & ST02 over the MSO); New road construction from Greenhills Road to Ballynatt Avenue, CBC09 GA Sheet 13;	Death or serious injury from falling to site personnel	Site personnel	4	1	4	adequate working space provided in LMA/designs to facilitate safe methods of work	NO	2	1	2	None	None																								
1.a.3	Risk of falling while working at height fixing signs, poles, and lightning columns		Existing carriageway widened to facilitate cycle track and bus lane on New Naas Road/MSO existing overbridge, CBC08 GA Sheet 12; Construction of Naas Road pedestrian & cycle bridge CBC08 ST01, CBC08 GA Sheet 7; CBC09 ST01 & ST02, CBC09 GA Sheet 12.	Death or serious injury from falling to site personnel	Site personnel	5	1	5	adequate working space provided in LMA/designs to facilitate safe methods of work	NO	3	1	3	None	None																								
1.a.4	Working at height on new Structures CBC08 ST01 over Naas Road, and CBC09 ST01 & ST02 over the MSO.			Death or serious injury from falling to site, other employees or members of the public	Site personnel & road users	5	3	15	The bridge design has been developed to ensure the main bridge span can be lifted into position fully assembled avoiding the need for works from height over live carriageways. Simple connection details such as bolting have been considered as part of the preliminary design to avoid the need for welding from height. Back spans/ramps and stairs have also been designed to be lifted into position fully assembled where practical. Detailed Design and Contractor to consider construction methodology of back span, ramps and stairs to ensure minimal lifts are required. Where these elements are lifted in sections the Contractor shall ensure appropriate guard rails and netting provided to the structure to prevent falling objects. Contractor to ensure suitable fall restraint systems/harnesses to be used when working at height.	NO	4	2	8	Death or serious injury from employees falling of items falling on members of the public	Death or serious injury from falling to site, other employees or members of the public	Detailed design Designer and Contractor																							
1.b	Work which puts persons at work at risk of burial under earthfalls where the risk is particularly aggravated by the nature of the work or processes used or by the place of work or construction site	Concept Design Stage Preliminary Safety and Health Plan, February 2019 - (To be updated at Specimen Design Stage)																																					
1.b.1	Risk of trench collapse		Installation of pedestrian ramps, removal of bridge retaining wing walls and construction of new retaining walls, CBC08 GA Sheets 2, 4, 5, 6, 7, 8 & CBC09 GA Sheet 12. Stability of stone walls alongside. Drainage excavations throughout the scheme.	Death or serious injury	Site personnel	4	2	8	adequate working space provided in LMA/designs to facilitate safe methods of work. Drainage design to be revisited at D&E tender stage to explore if an alternative solution is possible (e.g. series of back drop manholes).	NO	4	1	4	None	None																								
1.c	Work which puts persons at work at risk of engulfment in swampland where the risk is particularly aggravated by the nature of the work or processes used or by the place of work or construction site	Concept Design Stage Preliminary Safety and Health Plan, February 2019																																					
1.c.1	Work which puts persons at work at risk of engulfment in swampland where the risk is particularly aggravated by the nature of the work or processes used or by the place of work or construction site		No soft ground: to be reviewed pending receipt of Phase 2 Geotechnical Data	None	Site personnel	3	2	6	GI Phase 2 Survey to confirm absence of soft ground	NO	1	1	1	Possibility of soft ground: to be reviewed pending receipt of Phase 2 Geotechnical Data	Engulfment in soft ground	Detailed design Designer																							
2	Work which puts persons at work at risk from Chemical or Biological Substances, constituting a particular danger to the safety and health of such persons or involving a statutory requirement for health monitoring	Concept Design Stage Preliminary Safety and Health Plan, February 2019																																					
2.1	Risk of encountering contaminated soil		No contaminated soil identified: to be reviewed pending receipt of Phase 2 Geotechnical Data	None	Site personnel	3	2	6	GI Phase 2 Survey to confirm absence of contaminated ground	NO	3	2	6	Possibility of contaminated ground: to be reviewed pending receipt of Phase 2 Geotechnical Data	Contact with contaminated ground	Detailed design Designer																							
2.2	Risk of encountering asbestos pipes	Utility Service Drawings from identified service providers	Utility locations and watermain, to be reviewed pending receipt of utility information	None	Site personnel	4	1	4	Phase 2 GI survey to include slit trenches to look for presence of asbestos cement	NO	4	1	4	None	None	Detailed design Designer																							
2.3	Risk of contact with invasive or poisonous plant species (i.e. Japanese Knotweed)		None identified	N/A	N/A																																		
2.4	Risk of contractive Weil's disease		Not considered significant design hazard	N/A	N/A																																		
2.5	Risk of exposure to construction chemicals including bitumen, cement, road marking paints, seal oils, etc.		Not considered significant design hazard	N/A	N/A																																		
2.6	Risk of exposure to dust, vapours, and fumes		Not considered significant design hazard	N/A	N/A																																		
2.7	Risk of chemical exposure from construction materials such as waterproofing and bitumens		Exposure to chemicals Project Specific. Specifications have been prepared to identify a number of likely substances to be used in the construction which are hazardous to health	N/A	N/A	4	2	8	Competent Contractor will refer to project specification for further information and will apply at substances in line with manufacturers recommendations	NO	4	1	4	None	None																								
3	Work with ionising radiation requiring the designation of controlled or supervised areas as defined in Directive 96/29/Euratom2	Concept Design Stage Preliminary Safety and Health Plan, February 2019	None identified	N/A	N/A																																		
4	Work near High Voltage Power Lines	Concept Design Stage Preliminary Safety and Health Plan, February 2020																																					
4.1	Risk of contact with buried or overhead electricity cables	Utility Service Drawings from identified service providers	On CBC08, there are three sections of high voltage underground cables that require potential protection/diversion, CBC08 GA Sheet 8; On CBC09, there are seven sections of high voltage underground cables that require potential protection/diversion, CBC08 GA Sheets 3, 8, 10 & 13; On CBC08, there is one section of medium voltage underground cables and one section of medium voltage overhead cables which require diversion and/or protection along the length of the route, CBC08 GA Sheets 7 & 9. On CBC09, there are eighteen sections of medium voltage underground cables that require potential protection/diversion, CBC08 GA Sheets 3, 8, 10, 11, 14, 18, 19, 24, 26, 27 & 29. On CBC08, there are two sections of low voltage overhead cables which require protection/diversion along the length of the route, CBC08 GA Sheet 8. On CBC09, there are twenty two sections of low voltage cables which require protection/diversion along the length of the route, CBC08 GA Sheet 8, 12, 18, 19, 21, 24, 26, 27 & 29. Table 10-3 of the Preliminary Design Report (10-3) outlines the required diversions of existing ESS services.	Death or serious injury from contact with live buried or overhead electricity cables	Site personnel & members of the public	5	2	10	Phase 2 Utility surveys to confirm precise location of underground electric cables where diversions are anticipated. Safe procedures when working in the vicinity of overhead services as per the ESS Code of Practice for Avoiding Danger from Overhead Electricity Lines, and as per the HSA Code of Practice for Avoiding Danger from Underground Services when working in the vicinity of underground services.	NO	6	1	6	Electricity cable locations throughout the scheme: to be reviewed pending receipt of Phase 2 Utility surveys.	Death or serious injury from contact with live buried or overhead electricity cables	Detailed design Designer																							
4.2	Risk of contact with oil filled High Voltage cables (insulated with oil & paper)	Utility Service Drawings from identified service providers	No oil filled high voltage underground cables require diversions along the length of the route.	Death or serious injury from contact with live buried or overhead electricity cables	Site personnel & members of the public	5	1	5	Phase 2 Utility surveys to confirm location of high voltage electric cables. Safe procedures should be highlighted by the designer when working in the vicinity of underground services as per the HSA Code of Practice for Avoiding Danger from Underground Services; ESS + Information on Fluid Filled Cables	NO	5	1	5	Electricity cable locations throughout the scheme: to be reviewed pending receipt of Phase 2 Utility information.	Death or serious injury from contact with live buried HV electricity cables	Detailed design Designer																							

4.3	Risk of contact with overhead electricity cables on lighting columns	Utility Service Drawings from identified service providers	On sections of Walkinstown Roundabout, Walkinstown Avenue & Cornwellford Road & Walkinstown Road, the LV overhead electric cables are carried on dual purpose lighting columns. CBC09 GA Sheets 19 to 22.	Death or serious injury from contact with live buried or overhead electricity cables	Site personnel & members of the public	5	1	5	Diversion of cables may be required to ensure compliance with electrical standards for interface with other utilities and proximity to the proposed bridge & ramp structure	NO	5	1	5	Electricity cable locations throughout the scheme, to be reviewed pending receipt of Phase 2 Utility information.	Death or serious injury from contact with live buried HV electricity cables	Detailed design Designer		
5	Work exposing the persons at work to the risk of drowning					4	1	4		NO	4	1	4	None	None			
5.1	Work exposing the persons at work to the risk of drowning Risk of falling into water during possible work close to watercourses	Concept Design Stage Preliminary Safety and Health Plan, February 2019	Construction Works in vicinity of Oak Road culvert extension, CBC08 GA Sheet 4. Construction Works in vicinity of Cammock River - widening, CBC08 GA Sheet 5. Construction Works in vicinity of the River Podda - widening, CBC09 GA Sheet 7.	Risk of drowning for site personnel	Site personnel	4	1	4	Safe procedures should be highlighted by the vicinity of Cammock River and the River Podda.	NO	3	1	3	None	None			
6	Work on wells, underground earthworks and tunnels																	
6.1	Risk from poor ground conditions; poor ground stability; former quarry sites	Concept Design Stage Preliminary Safety and Health Plan, February 2019	None identified.	N/A	N/A				Phase 2 GI to investigate ground conditions of works areas.									
6.2	Buried structural issues: collapse of cellars; Condition surveys		Limited Cellar surveys undertaken adjacent to Maveli Service station off Naas / Long Mile Road. The Kestrel Pub on Burring Road may be impacted, subject to the jobs confirmation of a cellar org. Burring Road. The works are not expected to impact the basements, further liaison may be required to confirm and agree any necessary monitoring measures during construction.	Death or serious injury from cellar collapse	Site personnel & members of the public	3	1	3	Although the works are not expected to impact the basements, further liaison is required to confirm and agree any necessary monitoring measures during construction.	NO	3	1	3	None	None			
6.3	Buried culverts		Working over large concrete pipe Cammock River Culvert - CBC08 GA Sheet 4 - anticipated cover is estimated to be less than a metre so could be impacted by full depth construction.	Death or serious injury from culvert collapse	Site personnel & members of the public	4	1	4	None	NO	3	1	3	None	None			
7	Work carried out by divers at work having a system of air supply	Concept Design Stage Preliminary Safety and Health Plan, February 2019	None identified	N/A	N/A													
8	Work carried out in a caisson with a compressed-air atmosphere	Concept Design Stage Preliminary Safety and Health Plan, February 2019	None identified	N/A	N/A													
9	Work involving the use of explosives	Concept Design Stage Preliminary Safety and Health Plan, February 2019	None identified	N/A	N/A													
10	Work involving the assembly or dismantling heavy prefabricated components	Concept Design Stage Preliminary Safety and Health Plan, February 2019																
10.1	Risks associated with the assembly and dismantling of Pipes		Drainage design envisages use of oversized concrete pipes for alternation throughout the scheme as DCC won't accept proprietary systems.	Death or injury to members of the public, operatives and staff from contact with moving plant and machinery. Damage to private vehicles	Site personnel & members of the public	3	1	3	Adequate working space provided in LMA/designs to facilitate safe methods of work	NO	2	1	2	None	None			
10.2	Risks associated with the assembly and dismantling of piling equipment and piles		CBC08 ST01, 08 RW01, 08 RW02, CBC08 ST01 09 ST02, 09 RW01, 09 RW02, 09 RW03 - Piling operations to be undertaken in close proximity to a live road.	Death or injury to members of the public, operatives and staff from contact with moving plant and machinery. Damage to private vehicles	Site personnel & members of the public	4	2	8	Appropriately designed working areas for piling plant to be provided during construction.	NO	3	2	6	Contractor to ensure appropriate piling methodology and construction sequences are in place, but this may still be difficult to manage. All proposed piling operations to be agreed with Project Manager and the DSE.	Death or injury to members of the public, operatives and staff from contact with moving plant and machinery. Damage to private vehicles			
10.3	Risks associated with the assembly and dismantling of Trench boxes		Installation during drainage works.	Death or injury to members of the public, operatives and staff from contact with moving plant and machinery. Damage to private vehicles	Site personnel & members of the public	3	1	3	Deep drainage avoided generally. Drainage design to be revisited at tender stage to explore if an alternative solution is possible (a series of back drop manholes)	NO	3	1	3	None	None			
10.4	Risks associated with the assembly and dismantling of Light poles		Not considered significant design hazard	N/A	N/A													
10.5	Risks associated with the assembly and dismantling of Culverts		Construction works in vicinity of Oak Road culvert extension, CBC08 GA Sheet 4.	Death or injury to members of the public, operatives and staff from contact with moving plant and machinery. Death or serious injury from culvert collapse	Site personnel & members of the public	4	1	4	Adequate working space provided in LMA/designs to facilitate safe methods of work	NO	3	1	3	None	None			
10.6	Risks associated with the assembly and dismantling of other heavy construction materials		Existing carriageway widened to facilitate cycle track and bus lane on New Nangor Road/M50 existing overbridge, CBC08 GA Sheet 2; Construction of Naas Road pedestrian & cycle bridge CBC08 ST01, CBC08 GA Sheet 7. Construction of Greenhills Road pedestrian & cycle bridges, CBC09 GA Sheet 12 (CBC09 ST01 & ST02 over the M50). New road construction from Greenhills Road into Ballymore Avenue, CBC09 GA Sheet 13. See also separate tabs for CBC08 RW01, 08 RW02, 08 ST01, and CBC09 RW01, 09 RW02, 09 RW03, 09 ST01 & 09 ST02.	Death or injury to members of the public, operatives and staff from contact with moving plant and machinery. Damage to private vehicles	Site personnel & members of the public	4	2	8	Adequate working space provided in LMA/designs to facilitate safe methods of work	NO	4	2	8	Risks associated with the assembly and dismantling of other heavy construction materials may be difficult to manage	Death or injury to members of the public, operatives and staff from contact with moving plant and machinery. Damage to private vehicles	Detailed design Designer		
10.7	Bridge Superstructure Construction - CBC08 ST01, CBC09 ST01 & ST02		Risks to operatives during cutting & welding of steel members	Death or serious injury	Site personnel & public	5	2	10	The preliminary design has ensured that the bridge superstructure can be fabricated off site in a controlled environment and assembled on site limiting the amount of on-site works required.	NO	2	1	2	None	None			
10.8	Bridge Superstructure Construction - CBC08 ST01, CBC09 ST01 & ST02		Transportation and delivery of bridge superstructure	Death or serious injury	Site personnel & public	5	2	10	The preliminary design has ensured that the bridge superstructure can be fabricated off site and assembled within the site compound. The bridge will be delivered to site in sections to avoid major logistical issues with delivery of the a fully assembled superstructure	NO	2	1	2	None	None			
10.9	Construction of bridge widening		Existing carriageway widened to facilitate cycle track and bus lane on New Nangor Road/M50 existing overbridge, CBC08 GA Sheet 2 Danger of improper lifting of prefabricated beams, formwork and reinforcement.	Death or serious injury	Site personnel & public	5	2	10	Consideration of method of construction has been made during detailed design. Elements have been sized such that they can be easily fabricated and transported to site. Full road closure assumed to facilitate working space. Appropriate location for crane to be determined prior to lifting into place. Contractor to be made aware that they are responsible for ensuring suitable locations are prepared for positioning of plant and crane outriggers etc. during lifting operations.	NO	4	2	8	Danger of improper lifting of prefabricated beams, formwork and reinforcement.	Death or serious injury	Contractor		
10.8	Placement of beams and concrete pour - CBC08 ST01, CBC09 ST01 & ST02		Temporary stability prior to concrete deck widening and integral connection being formed	Death or serious injury	Site personnel & public	5	2	10	Bridge Beams are designed to account for temporary case during lifting and construction.	NO	4	2	8	Additional measures may be required to ensure bridge is adequately restrained prior to establishment of integral connection. Contractor to be made aware of need to safely themselves that bridge is adequately restrained in temporary condition.	Death or serious injury	Detailed design Designer		
10.9	Bridge Superstructure Construction - CBC08 ST01, CBC09 ST01 & ST02		Risks to operatives during cutting & welding of steel members	Death or serious injury	Site personnel & public	5	2	10	The preliminary design has ensured that the bridge superstructure can be fabricated off site in a controlled environment and assembled on site limiting the amount of on-site works required.	NO	2	1	2	None	None			
10.10	Bridge Superstructure Construction - CBC08 ST01, CBC09 ST01 & ST02		Transportation and delivery of bridge superstructure	Death or serious injury	Site personnel & public	5	2	10	The preliminary design has ensured that the bridge superstructure can be fabricated off site and assembled within the site compound. The bridge will be delivered to site in sections to avoid major logistical issues with delivery of the a fully assembled superstructure	NO	2	1	2	None	None			
OTHER SIGNIFICANT RISKS																		
11	Buried Services	Concept Design Stage Preliminary Safety and Health Plan, February 2019																
11.1	Risk of contact with buried telecom services during excavation works	Utility Service Drawings from identified service providers	On CBC08, there are forty six locations along the route where conflicts with telecommunications infrastructure occur, and potential protection/diversions are required. On CBC09, there are ninety three locations along the route where conflicts with telecommunications infrastructure occur, and potential protection/diversions are required. Table 10.6 of the PDR outlines required protection/diversions of existing Telecommunications services.	serious injury from contact with live buried telecom	Site personnel & members of the public	1	1	1	Phase 2 Utility surveys to confirm precise location of electric cables. Safe procedures should be highlighted by the designer when working in the vicinity of services	NO	1	1	1	None	None			

11.2	Risk of contact with combined sewers collection system	Utility Service Drawings from identified service providers	There are no potential protection/diversions required.	Injury from contact with live buried sewers	Site personnel & members of the public	1	1	1	Phase 2 Utility surveys to confirm precise location of sewers Safe procedures should be highlighted by the designer when working in the vicinity of services	NO	1	1	1	None	None			
11.3	Risk of contact with water-mains	Utility Service Drawings from identified service providers	On CBC08, there are three sections of water mains along the route where conflicts occur, and potential protection/diversions are required. On CBC09, there are twenty eight sections of water mains along the route where conflicts occur, and potential protection/diversions are required. Table 10-4 outlines the required protection/diversions of existing Irish Water watermain services.	Injury from contact with live buried water mains	Site personnel & members of the public	1	1	1	Phase 2 Utility surveys to confirm precise location of electric cables Safe procedures should be highlighted by the designer when working in the vicinity of services	NO	1	1	1	None	None			
11.4	Risk of contact with underground fibre optic cables	Utility Service Drawings from identified service providers	While no fibre optic cables have been identified to date, anecdotal evidence has highlighted the possibility of these being present.	Injury from contact with live buried fibre optics	Site personnel & members of the public	3	2	6	Phase 2 Utility surveys to confirm precise location of electric cables Safe procedures should be highlighted by the designer when working in the vicinity of services	NO	3	2	6	Fibre cable precise locations to be reviewed pending receipt of Phase 2 Utility surveys.	Injury from contact with live buried fibre optics	Detailed design Designer		
11.5	Risk of contact with gas pipelines	Utility Service Drawings from identified service providers	On CBC08, there is one section of high pressure gas mains that require potential protection/diversion. On CBC08, there are four sections of medium pressure gas mains that require potential protection/diversion along the length of the route. On CBC09, there are fifteen sections of medium pressure gas mains that require potential protection/diversion along the length of the route. On CBC08, there is one section of low pressure gas mains that require potential diversion along the length of the route. On CBC09, there are nine sections of low pressure gas mains that require potential protection/diversion along the length of the route. Table 10-2 of the PDR outlines required protection/diversion of existing GNI services.	Death or serious injury from contact with live buried gas mains	Site personnel & members of the public	5	2	10	Utility surveys to confirm location of gas mains Safe procedures should be highlighted by the designer when working in the vicinity of services	NO	5	2	10	There are no actual diversions along the scheme. Table 10-2 of the PDR outlines required diversion of existing GNI services. precise locations to be reviewed pending receipt of Phase 2 Utility surveys.	Death or serious injury from contact with live buried gas mains	Detailed design Designer		
12 Traffic Management																		
12.1	Risk of traffic accident when carrying out works alongside high speed traffic	Concept Design Stage Preliminary Safety and Health Plan, February 2019	All related works on M50 corridor, CBC09 GA Sheet 12. Also see location specific issues relating to the individual structures on the separate Structures Tabs.	Death or serious injury from traffic related accident; Traffic congestion, obstructions/delays	Site personnel, road users & members of the public	5	2	10	Design Stage Temporary Traffic Management Plan to include appropriate speed restrictions and adequate working space	NO	4	2	8	Hazards associated with high speed traffic may be difficult to manage	Death or serious injury from traffic related accident; Traffic congestion, obstructions/delays	Contractor		
12.2	Risk of traffic accident when carrying out works alongside live traffic		Applicable throughout the scheme.	Death or serious injury from traffic related accident; Traffic congestion, obstructions/delays	Site personnel, road users & members of the public	4	2	8	Design Stage Temporary Traffic Management Plan to include appropriate speed restrictions and adequate working space	NO	3	2	6	Risk of traffic accident when carrying out works alongside live traffic may be difficult to manage	Death or serious injury from traffic related accident; Traffic congestion, obstructions/delays	Contractor		
12.3	Risk of vehicles losing control and unexpectedly entering the work area		All works on M50 corridor, CBC09 GA Sheet 12.	Death or serious injury from traffic related accident; Traffic congestion, obstructions/delays	Site personnel, road users & members of the public	4	2	8	Design Stage Temporary Traffic Management Plan to include appropriate speed restrictions and adequate working space	NO	3	2	6	Risk of traffic accident when carrying out works alongside live traffic may be difficult to manage	Death or serious injury from traffic related accident; Traffic congestion, obstructions/delays	Contractor		
12.4	Risk of collision between construction and public vehicles at site entrances and exits		Applicable throughout the scheme.	Death or serious injury from traffic related accident; Traffic congestion, obstructions/delays	Site personnel, road users & members of the public	3	2	6	Separation of traffic and pedestrians from the works including partial closing of roads and footpaths; Warning sign layout details	NO	3	2	6	Risk of collision between construction and public vehicles at site entrances and exits may be difficult to manage	Death or serious injury from traffic related accident; Traffic congestion, obstructions/delays	Contractor		
12.5	Risk of restricting visibility at adjacent junctions and property entrances during the works		Applicable throughout the scheme.	Death or serious injury from traffic related accident; Traffic congestion, obstructions/delays	Site personnel, road users & members of the public	3	2	6	Layouts in accordance with Chapter 8; high use accesses to be identified	NO	3	2	6	Risk of restricting visibility at adjacent junctions and property entrances during the works	Death or serious injury from traffic related accident; Traffic congestion, obstructions/delays	Contractor		
12.6	Risk of cyclists, those with mobility impairment (e.g. wheelchairs etc.) and pedestrians being injured by coming into contact with the works, or slipping on uneven ground during works on the footpath		Applicable throughout the scheme.	Death or serious injury from traffic related accident; Traffic congestion, obstructions/delays	Site personnel, road users & members of the public	3	3	9	Separation of traffic and pedestrians from the works including partial closing of roads and footpaths; Warning sign layout details	NO	3	3	9	Risk of cyclists, those with mobility impairment (e.g. wheelchairs etc.) and pedestrians being injured by coming in contact with the works, or slipping on uneven ground during works on the footpath	Death or serious injury from traffic related accident; Traffic congestion, obstructions/delays	Contractor		
12.7	Risk to bus operators and users during the works due to inadequate temporary bus stop facilities		Applicable throughout the scheme.	Death or serious injury from traffic related accident; Traffic congestion, obstructions/delays	Site personnel, road users & members of the public	1	3	3	Layouts in accordance with Chapter 8; temporary bus stop locations where necessary	NO	1	3	3	None	None			
12.8	Added risks at traffic management during hours of darkness		Applicable throughout the scheme.	Death or serious injury from traffic related accident; Traffic congestion, obstructions/delays	Site personnel, road users & members of the public	3	3	9	Designer to minimise unavoidable night work	NO	3	3	9	Added risks at traffic management during hours of darkness	Death or serious injury from traffic related accident; Traffic congestion, obstructions/delays	Contractor		
12.9	Risks to pedestrians during the works		Applicable throughout the scheme.	Death or serious injury from traffic related accident; Traffic congestion, obstructions/delays	Site personnel, road users & members of the public	2	3	6	Separation of traffic and pedestrians from the works including partial closing of roads and footpaths; Warning sign layout details	NO	2	3	6	Risks to pedestrians during the works	Death or serious injury from traffic related accident; Traffic congestion, obstructions/delays	Contractor		
12.10	Maintaining safe access to houses, businesses, schools, churches, hospitals, shopping centres, major car parks etc. during working hours		Applicable throughout the scheme. St Cilla's National School, CBC08 GA Sheet 8; Assumption Primary and Secondary Schools, CBC08 GA Sheet 11; St. Mary's National School, CBC09 GA Sheet 7; Assumption National and Senior School, CBC09 GA Sheet 21; Loreto Primary/Junior National College, CBC09 GA Sheet 27 & 28; Marist National School, CBC09 GA Sheet 42 Saint Maehann's Church of Ireland, CBC09 GA Sheet 5; St Marys Priory, CBC09 GA Sheet 6; St Marys Parish Church, CBC09 GA Sheet 37; Our Lady Of Dolours Church, CBC09 GA Sheet 20; St Patrick's Cathedral, CBC09 GA Sheet 35. Tabaght University Hospital, CBC09 GA Sheet 3; Our Lady's Hospital for Sick Children, CBC09 GA Sheet 23; Oki County Road Health Centre, CBC09 GA Sheet 27; Coombe Women's Hospital, CBC09 GA Sheet 29 & 30; The Square Shopping Centre, CBC09 GA Sheet 1 & 2; SuperValu Shopping Centre, CBC09 GA Sheet 21; Crumlin Shopping Centre, CBC09 GA Sheet 27.	Death or serious injury from traffic related accident; Traffic congestion, obstructions/delays	Site personnel, road users & members of the public	2	4	8	Layouts in accordance with Chapter 8; high use times for accesses to be identified	NO	2	4	8	Maintaining safe access to houses, businesses, schools, churches, hospitals, shopping centres, major car parks etc. during working hours	Death or serious injury from traffic related accident; Traffic congestion, obstructions/delays	Contractor		
12.11	Interaction with other transport systems such as Luas and Dart		Not Applicable	Death or serious injury from traffic related accident; Traffic congestion, obstructions/delays	Site personnel, road users & members of the public	3	3	9	Layouts in accordance with Chapter 8; high use accesses to be identified	NO	3	3	9	Interaction with other transport systems such as Luas and Dart	Death or serious injury from traffic related accident; Traffic congestion, obstructions/delays	Contractor		
13 Use of Heavy Machinery																		
13.1	Risk of accidents involving the use of heavy machinery		Heavy machinery will be used throughout the works	Death or serious injury	Site personnel & public	4	2	8	allow sufficient working space in designs to facilitate safe methods of work.	NO	3	1	3	None	None			
13.2	Heavy plants working over basements, cellars, culverts		No significant hazard identified	N/A	N/A													
13.3	Structural Instability - widening of existing structure		Instability of structural elements of existing bridge during construction	Death or serious injury	Site personnel & public	5	3	15	Design for construction stage loading thus reducing the requirements for temporary works.	NO	4	2	8	Where required temporary works will be provided on site to ensure structural stability during construction.	Death or serious injury	Detailed design Designer		
13.4	Structural Instability - CBC08 ST01, CBC09 ST01 & ST02		Instability of structural elements during construction	Death or serious injury	Site personnel & public	4	3	12	Works to assemble the superstructure within a site compound; land identified at site of proposed structures.	NO	3	2	6	Where required the Contractor shall ensure that temporary works are provided on site to ensure structural stability during construction. All temporary works required are to be designed by a temporary works designer.	Death or serious injury	Detailed design Designer		

14	Demolition Works	Concept Design Stage Preliminary Safety and Health Plan, February 2019																	
14.1	Risk of illness to operatives or members of public due to inhalation of concrete (and other) dust emitted during the demolition of the existing infrastructure, road surface, kerbs, footpaths, etc.		Scheme wide & specific locations for demolition Potential relocation of gantry, CBC09 GA Sheet 12. Proposed demolition of wing walls, CBC08 GA Sheet 7 & CBC09 GA Sheet 12.	Illness	Site personnel & members of the public	4	2	8	Designated exclusion zones to be identified at tender design stage; barrier tape and banks men to be in place when working close to the perimeter of the site; Competent Contractor will develop a detailed method statement and risk assessment for all demolition works. Safe working limits are to be established and any damages that occur to the existing N4 road must be repaired.	NO	2	2	4	None	None				
14.2	Risk of exposure to excessive noise & vibration		None identified	N/A	N/A														
14.3	Risk of disturbance to surrounding businesses from the generation of excessive noise, vibration and dust		Piling for retaining walls / footbridges at: CBC08 ST01, CBC08 GA Sheet 7 (Construction of Naas Road pedestrian & cycle bridge). CBC09 ST01 & ST02, CBC09 GA Sheet 12 (Construction of new Greenhills Road pedestrian & cycle bridges over the M50). <u>Businesses</u> CBC08 GA Sheets 4 & 5 (An Post Parkwest, SOLU/Irish Soft Drinks Ltd, Activo & Air Products); CBC08 GA Sheet 6 (Premier Postop & Service Centre Ltd & Harsco/Rohm&Haas); CBC09 GA Sheets 6 & 7 (GPV Hire & Woodies); CBC09 GA Sheet 7 (Maxol Long Mile Road & Height Platforms Ltd); CBC08 GA Sheet 9 (Motor Distributors Ltd); CBC09 GA Sheets 9 & 10 (Fiat Chrysler Automobiles Ireland Ltd); CBC09 GA Sheet 14.2 (The Square Shopping Centre); CBC09 GA Sheet 7 (Talight Athletics Club); CBC09 GA Sheet 8 (Greenhills Retail Park); CBC09 GA Sheet 9 (Harvey Norman); CBC09 GA Sheet 12 (Talight Truck Dismantlers); CBC09 GA Sheet 13 (Ballymount Recycling Centre/Depo); CBC09 GA Sheet 14 (M50 Business Park); CBC09 GA Sheet 17 & 18 (M50 Distribution LTD T/A German Auto Components); CBC09 GA Sheet 19 (Fisher's Cafe Limited, Chadwicks (Plumb Centre) & B&G Ltd); CBC09 GA Sheet 19 (Kestral Pub); CBC09 GA Sheet 21 (SuperValu Shopping Centre)	Disturbance	Site personnel & members of the public	4	2	8	Designated exclusion zones to be identified at design stage; barrier tape and banks men to be in place when working close to the perimeter of the site; suitable noise control measures in place	NO	2	2	4	None	None				
14.4	Risks associated with working in private residential properties (e.g. where taking land from gardens etc.) - risks during demolition of garden walls, keeping the works separate from private property, prevention of access by children etc.		None identified	N/A	N/A														
14.5	Risk associated with post-tensioned structures/bridge: lack of post tensioned special inspection (PTSI)		Proposed amendments to the existing carriageway New Nangor Road/M50 existing overbridge, CBC08 GA Sheet 2;	Failure of existing structure	Site personnel & members of the public	5	4	20	All works to this structure removed from the scheme due to the nature of the bridge. Associated design hazards therefore eliminated	NO	1	1	1	None	None				
14.6	Risk associated with falling trees; lack of proper arborist report		Removal of existing trees at the following locations: New Cycle Track on New Nangor Road, CBC08 GA Sheet 2; New footway on New Nangor Road, CBC08 GA Sheet 4, 6 & 7; New Cycle Track on Long Mile Road, CBC08 GA Sheet 7; New Cycle Track on Naas Road, CBC08 GA Sheets 8 & 9; Long Mile Road median pavement, CBC08 GA Sheet 10; Belgard Square West footway, CBC09 GA Sheet 1; New Talight Blue Interchange, CBC09 GA Sheet 2; Proposed bus only junction on Old Greenhills Rd, CBC09 GA Sheet 7; New Cycle Track on Belgard Square North, CBC09 GA Sheet 3 & 4; New Cycle Track on Greenhills Rd, CBC09 GA Sheet 7, 8, 9, 13 & 14; Greenhills Rd median removal, CBC09 GA Sheet 9 & 10; New footway on Old Greenhills Rd, CBC09 GA Sheet 10; New Cycle Track on Ballymount Avenue, CBC09 GA Sheet 13 & 14; New Cycle Track on Calmount Avenue, CBC09 GA Sheet 14 & 16; New footway on Walkinstown Rd, CBC09 GA Sheet 20 & 21; Drinagh Road median pavement, CBC09 GA Sheet 22; New Cycle Track on Drinagh Road, CBC09 GA Sheet 22, 23 & 24; New footway on Crumlin Rd, CBC09 GA Sheet 24, 25 & 27; New tree planting on Crumlin Rd, CBC09 GA Sheet 28; Nobles Street and High Street median pavement, CBC09 GA Sheet 34; New Cycle Track on Kildare Road, CBC09 GA Sheet 38 & 39; New Cycle Track on Clogher Road, CBC09 GA Sheet 43 & 44.	Falling branches resulting in injury/death	Site personnel & members of the public	3	3	9	Arborist report identifies the location of possible issues	NO	3	3	9	Removal of trees may lead to branches falling from exposed adjacent trees, which may be not obvious and difficult to manage	Injuries from falling branches	Contractor			
15	The Phasing of the Works	Concept Design Stage Preliminary Safety and Health Plan, February 2019																	
15.1	Floor planning / phasing of the works		Risk of causing traffic congestion and accidents; potential verbal and physical abuse from members of the public	Risk of accidents from impatient drivers and frustrated public	Site personnel, road users & members of the public	2	4	8	Implementation strategy developed by NTA to ensure works across the city phased in a manner that minimises congestion	NO	1	4	4	None	None				
16	Security	Concept Design Stage Preliminary Safety and Health Plan, February 2019																	
16.1	Risk of interference with stored materials in compounds and storage depots during the works		Applicable throughout the scheme at the current stage	Risk of vandalism, serious injury for site personnel or member of the public	Site personnel & members of the public	2	3	6	Suitable secure locations for site compounds identified pre-planning	NO	2	2	4	None	None				
16.2	Risk of anti-social behaviour or vandalism carried out on the works		To be reviewed / updated following consultation with stakeholders	Risk of vandalism, serious injury for site personnel or member of the public	Site personnel & members of the public	2	3	6	Alert contractor to any specific locations via PSHP	NO	2	3	6	Areas subject to anti-social behaviour may not be obvious to the contractor	Risk of vandalism, serious injury for site personnel or member of the public	Designer			
16.3	Risk of unauthorised entry into the works sites		Applicable throughout the scheme at the current stage	Risk of vandalism, serious injury for site personnel or member of the public	Site personnel & members of the public	2	3	6	Suitable control of works area to be identified by contractor	NO	2	2	4	None	None				
16.4	Risk of aggression from members of the public		Applicable throughout the scheme at this stage	Risk of vandalism, serious injury for site personnel or member of the public	Site personnel & members of the public	2	3	6	Alert contractor to any specific locations where members of the public are known to be aggressive	NO	2	3	6	Areas subject to aggressive behaviour may not be obvious to the contractor	Risk of vandalism, serious injury for site personnel or member of the public	Designer			
17	Risk of flooding	Site Specific Flood Risk Assessment (scan to City Centre)																	
17.1	Risk of groundwater flooding		On CBC08, groundwater vulnerability varies across the site, with a significant amount of the scheme located within the "Moderate" to "High" groundwater vulnerability classification. No significant excavations, with the exception of manholes 4-6m deep. Not considered a significant hazard	N/A	N/A														
17.1	Risk of pluvial flooding		On CBC08, the risk of pluvial flooding along most of the proposed route is generally low, but there is a higher risk of pluvial flooding along the Nangor Road, parts of Naas Road and Long Mile Road. On CBC09, the risk of pluvial flooding along most of the proposed route is not generally evident, except for instances of medium risk pluvial flooding along Crumlin Road, Clogher Road and Dean Street/Patrick Street.	Flooding of site and property	Site personnel & members of the public	2	3	6	This risk exists in the current scenario and will be reduced as a result of the proposed scheme development. However, the site will need to be managed to ensure the construction works and activities do not exacerbate existing flood risk from overland flow	NO	1	3	3	None	None				