

The background is a vibrant red color. It is decorated with several abstract geometric shapes: a large white circle with a blue border in the upper right; a smaller white circle with a blue border in the lower left; a large teal shape in the bottom right corner; and various other shapes in blue, green, and white scattered throughout the corners and edges.

Appendix A
Designer's Risk
Assessment

Preliminary Design - SID Assessment

AECOM Project Name:

AECOM Project No:

Date: 10/05/2021

Bus Connects Package A - Lucan to City Centre CBC
60599126

Risk Rating (Probability x Severity)		Severity				
Probability	5 - Catastrophic	4 - Critical	3 - Major	2 - Moderate	1 - Minor	
5 - Frequent	25	20	15	10	5	
4 - Probable	20	16	12	8	4	
3 - Occasional	15	12	9	6	3	
2 - Remote	10	8	6	4	2	
1 - Improbable	5	4	3	2	1	

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 H&S 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	
<p>Significant Hazards are those which are: not obvious to a competent contractor; unusual; or difficult to manage.</p>																						
PARTICULAR RISKS																						
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																				
1.a.1	Risk of falling into excavations		Structure foundations, Bridge foundation (Ballydowd, Liffey Valley, CHR), Maps 01, 08, 20. SuDS & 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					
1.a.2	Risk of falling from embankments		Replacement of existing ped/ cycle bridge, Map 1; Widening of embankment Slip Road, Map 2; New Cycle Way at Hermitage Medical Clinic, Map 03-04; New bridge at Ballyowen Road, Map 01; New Bus Stops at Chapelzod Hill Rd, Map 20.	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					
1.a.3	Risk of falling while working at height fixing signs; poles; and lightning columns		Demolition and/or Construction of footbridges, Maps 01 & 08; Relocation of gantry, Map 4 Replacement of Gantry Signages (numerous locations including Maps 6, 8, 9, 12, 14); Proposed Bus Stops, Map 20;	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					
1.a.4	Working at height on new Structures ST01 and ST03 over the N4, and ST02 over Chapelzod Hill Road		Risk of fall of plant, materials and people	Death or serious injury from falling to site, either 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 of the N4. Simple connection details such as bolting have been considered as part of the preliminary design to avoid the need for welding from height. Back span/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, either 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	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 Risk of trench collapse		Installation of pedestrian ramps, removal of bridge retaining wing walls and construction of new retaining walls, Map 20. Stability of old stone walls sitewide Drainage excavations throughout the scheme. Notable deep drainage excavations in earthworks at Chapelzod Hill Road	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&B tender stage to explore if an alternative solution is possible [a series of back drop manholes]				NO	4	1	4	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 Risk of encountering areas of soft ground while working in some areas		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			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 contracting 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, fuel, 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 silane		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 all substances in line with manufacturers recommendations				NO	4	1	4	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																				

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4.1	Risk of contact with buried or overhead electricity cables	Utility Service Drawings from identified service providers	Overhead electric Luas cables Map 31; No high voltage underground cables require diversions along the length of the route. There are six sections of medium voltage cables which diversions along the length of the route. There are six sections of low voltage cables which require diversions along the length of the route. Table 10-3 of the Preliminary Design Report (10-3) outlines the required diversions of existing ESB 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 anticipated. Safe procedures when working in the vicinity of overhead services as per the ESB 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	5	1	5	Electricity cable locations throughout the scheme; to be reviewed pending receipt of Phase 2 Utility surveys. Overhead electric Luas cables Map 31	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 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; ESB - 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 Old Lucan Road the LV overhead electric cables are carried on dual purpose lighting columns, Maps 7-8	Death or serious injury from contact with live buried or overhead electricity cables	Site personnel & members of the public	5	1	5	Diversions 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 Liffey River - Frank Sherwin Bridge, Map 31 No actual works along the South Quays as part of this team. Working over large masonry arch Cammock River Culvert - sheet 31 - anticipated cover is estimated to be 2.5-3.0m so not to be impacted by full depth construction.	Risk of drowning for site personnel	Site personnel	4	1	4	Safe procedures should be highlighted by the designer when working in the vicinity of River Liffey; Continue ongoing liaison with Irish Rail re proposals for Dart Underground relining/ reinforcing of Cammock Culvert (assumed limited to footprint to building - but what is the transition detail like...wing walls?)	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		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 for Heuston Station and EIR building basements. 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 masonry arch Cammock River Culvert - sheet 31 - anticipated cover is estimated to be 2.5-3.0m so will not be impacted by full depth construction.	Death or serious injury from cellar collapse	Site personnel & members of the public	3	1	3	None	NO	3	1	3	None	None					
7	Work carried out by divers at work having a system of air supply																			
8	Work carried out in a caisson with a compressed-air atmosphere																			
9	Work involving the use of explosives																			
10	Work involving the assembly or dismantling heavy prefabricated components																			
10.1	Risks associated with the assembly and dismantling of Pipes		Drainage design envisages use of oversized concrete pipes for attenuation 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		RW01 - Piling operations to be undertaken in close proximity to a live road RW02 - Piling operations to be undertaken in close proximity to a live road RW05 - 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 DSR	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				
10.3	Risks associated with the assembly and dismantling of Trench boxes		Installation during drainage works; Notable deep drainage excavations in earthworks at Chapelzod Hill 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	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		No works envisaged required in design	N/A	N/A															
10.6	Risks associated with the assembly and dismantling of other heavy construction materials		Demolition or/and Construction of new footbridges and bridge widening, Gantries, and gantry signage, Maps 01, 04, 06, 08, 09, 12, 14, 20; See also separate tabs for RW01, RW02, RW05, ST01, ST02, ST03	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 - ST01		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 - ST01		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					

Hazard and Risk Identification						Pre-mitigation assessment			Mitigation				Post-mitigation assessment				Output			
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10.9	Construction of bridge widening - ST02		ST02 - Widening of existing bridge on Chapelzod Bypass 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 operations. A suitable set down area for steel structure 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 - 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 satisfy themselves that bridge is adequately restrained in temporary condition.	Death or serious injury	Detailed design Designer				
10.9	Bridge Superstructure Construction - ST03		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 - ST03		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	There are seventeen locations along the route where conflicts with telecommunications infrastructure occur, and diversions are required. Table 10-6 of the PDR outlines required 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 four sections of wastewater sewers along the route where conflicts occur, and diversions are required. Table 10-5 of the PDR outlines the required diversions of existing Irish Water wastewater sewer services.	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 electric cables. 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	There are five sections of water mains along the route where conflicts occur, and diversions are required. Table 10-4 outlines the required 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 in the R148 median where widening is proposed at Map 16, and in the southern footway of St John's Road West feeding the Revenue offices.	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. Specifically the R148 median on Map 16 and the southern footway on Map 31	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	No impacts to high pressure gas mains have been identified. There is one location where GNI low pressure gas mains require a diversion along the scheme. Table 10-2 of the PDR outlines required 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 is one location where GNI low pressure gas mains require a diversion 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	Concept Design Stage Preliminary Safety and Health Plan, February 2019																		
12.1	Risk of traffic accident when carrying out works alongside high speed traffic		All related works on N4 corridor, Maps 01-11 & R148 Map 20. 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 N4 corridor Maps 01-11 & Map 20	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 in contact with the works, or slipping on uneven ground during works on the footpath		Applicable throughout the scheme. Significant Risk on: Kennelsfort Rd Lower, Map14; South Circular Rd Junction, Map 28; Heuston Station and surrounding area, Map 31; Ballyowen Rd/Lucan Rd, Map 01.	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				

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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 Michael School Map09, Hermitage Clinic Map 06; school & shops Kennelsfort Rd Lower Map 14; Residential properties, church and creche either side of the Old Lucan Road Map 06-15; school on the vicinity of SCR Map 28; Heuston Station Car Park entrance Map 31	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		Construction Works in the vicinity of Luas line and Stop line at Heuston Station, Map 31	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	Concept Design Stage Preliminary Safety and Health Plan, February 2019				5	2	10					NO	5	2	10					
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	Camac Culvert	Working over large masonry arch Cammock River Culvert – sheet 31 - anticipated cover is estimated to be 2.5-3.0m, so will not be impacted by full depth construction. No significant hazard identified	N/A	N/A																
13.3	Structural Instability - ST02 widening of existing structure		Instability of structural elements of existing bridge during construction	Death or serious injury	Site personnel & public	5	3	15	Designs 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 - new structure ST03		Instability of structural elements during construction	Death or serious injury	Site personnel & public	4	3	12	The preliminary design has been developed for a three-dimensional warren truss construction with a braced pair of trusses chords to ensure stability during construction. Works to assemble the superstructure within the site compound; land identified at site of proposed structure ST01, ST03 to be constructed before ST01				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															All temporary works required are to be designed by a temporary works designer.				
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 Demolition of retaining walls & footbridges, Maps 01 & 08; Relocation of gantry, Map 4 Replacement of Gantry Signages (numerous locations including Maps 6, 8, 9, 12, 14); Proposed Bus Stops including demolition of wing walls Map 20;	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		Demolition of existing footbridges, Map 01 & 08 Piling for HGC retaining wall and chapelzod hill road	Hearing damage	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			
14.3	Risk of disturbance to surrounding businesses from the generation of excessive noise, vibration and dust		Piling for retaining walls / footbridges at: Map 3 - (Surreweld/ Hermitage Golf Club); Map 8 - (Liffey Valley Shopping Centre/ BLOCK B, LIFFEY VALLEY OFFICE CAMPUS; and Map 20 - KNOCKMAREE MANAGEMENT COMPANY/ CDETB Ballyfermot Training 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 Palmerstown village footbridge structure / ramps	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 on following locations: New two-way Cycle Track on Hermitage Golf Club, Map 03-04; New pedestrian ramps on Chapelzod Hill Rd, Map 20; St John's West Rd median pavement, Map 29-30;	Falling branches resulting in injuries/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	Poor 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 Lucan to City Centre																			

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 H&S 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	
17.1	Risk of groundwater flooding		Groundwater vulnerability varies across the site, with a significant amount of the scheme from Lucan to Palmerstown located within "Extreme" 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		The risk of pluvial flooding along most of the proposed route is high. There is a significant risk of pluvial flooding along the Con Colbert Road.	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				