



## APPENDIX 5 TECHNICAL RISK AND OPPORTUNITY SCHEDULE

HDV - Station Road Offices site - Technical Risk and Opportunity Register

<b>Project Name:</b>	HDV - Station Road Offices site	<b>Assessment Area</b>		<b>Type</b>	
<b>Site:</b>	Site Wide - Master Register	H&S	S	Des	Design
<b>Facilitator:</b>	Conor McCormack	Environment	E	Con	Construction
<b>Stage:</b>	Bid	Programme	P	User	Operations / Maintenance
<b>Date of Review:</b>	14-Sep-16	Quality / Reputation	Q	Demo	Decommissioning

<b>Risk / Opportunity Level</b>			<b>Version No:</b>	<b>1.0</b>
High Risk / Opp	P1	P1		<b>Status</b>
Medium Risk / Opp	P2	P2		
Low Risk / Opp	P3	P3		
				Open
				Closed

Item No.	Risk or Opp	Description	Ass't Area	Type	Probability	Impact	Risk / Opp Level	Proposed Solution to remove / mitigate the Risk	Action Taken (if different to proposed solution)				Residual Risk (construction, operation or maintenance periods)	Status	
									Owner	Date	Owner	Date			
<b>AVAILABILITY OF EXISTING INFORMATION (AV)</b>															
A.1	Risk	Survey information to date is limited and is at strategic desktop level.	E	Des	High	High	P1	Full Survey Strategy to be developed.	DPM						Open
A.2	Risk	Title information is limited. The exact setting out of boundaries and third party rights (wayleaves, easements, rights of way etc) that may have an impact on design approach are not fully understood.	E	Des	High	High	P1	Due diligence on title information is being undertaken	Legal						Open
<b>EXISTING SITE CONSTRAINTS AND HAZARDS (EX)</b>															
E.1	Risk	Broadly, the site is highly unlikely to support any protected species. Bats: unlikely to be present given the lack of roosting features, disturbance levels, and the presence of better habitats in adjacent areas	E	Con	Low	Low	P3	Detailed Ecology report will be required but unlikely to identify any significant risks or constraints	DPM						
E.2	Risk	The site has no habitats that would have the potential for protected or notable species. Tree cover on the site is limited and those specimens present are unlikely to be of significant value or subject to TPOs.	E	Con	Low	Low	P3	Detailed Ecology report will be required but unlikely to identify any significant risks or constraints	DPM						
E.3	Risk	Local and Borough Wide Air Quality is Poor. Traffic and emissions from buildings (heating and power) are the main contributors to poor air quality in the borough. Poorly considered proposals are likely to increase the existing exceedance of NO2 annual mean air quality, especially at roadside locations. Developments not "Air Quality Neutral" have increased CL payments impacting on viability.	E	Des	High	High	P1	Development proposals to carefully consider options to ensure it provides a net benefit to local air quality by carefully considering energy strategy and by encouraging sustainable modes of transport (walking cycling, car clubs with ULEV vehicles etc.) and through planting etc. Air Quality Assessment required for Planning and to ensure necessary design measures incorporated into scheme	DPM					Negative impact on local and wider air quality with wider impact on Health and Well being	
E.4	Risk	Local and Borough Wide Air Quality is Poor. Traffic and emissions from buildings (heating and power) are the main contributors to poor air quality in the borough. Poorly considered proposals are likely to increase the existing exceedance of NO2 annual mean air quality, especially at roadside locations. Developments not "Air Quality Neutral" have increased CL payments impacting on viability.	E	Con	High	High	P1	The GLA's SPGs set requirements on emission limits form local plant and for development emissions to meet the "air quality neutral" benchmarks. Construction and logistics planning to carefully consider air quality issues. Air Quality Assessment required for Planning and to ensure necessary design measures incorporated into scheme	PM					Negative impact on local and wider air quality with wider impact on Health and Wellbeing	
E.4	Risk	An Area of Archaeological Interest covers part of the site and Wood Green Station, a listed building, is adjacent.			Medium	High	P1	Archeological Desktop study to be commissioned to identify risks and to allow programming of necessary works to mitigate against delay. Design and delivery to ensure no impact on adjacent listed buildings.	DPM					Time and cost.	
E.5	Risk	Preliminary UXO investigation has identified no recorded strikes within 100 m of the site but bomb strikes have occurred in within 500m. Whilst post war development has minimised the likelihood of the remaining presence of UXO, the possible presence cannot be eliminated.	E	Con	Medium	High	P1	A more detailed UXO risk assessment should be undertaken as part of the next phase of works, including obtaining any additional UXO records from the local council and other archives. The risk assessment should identify what risk management measures should be adopted for the works, particularly for demolition, and piling.	DPM					Risk of explosions and death.	
E.8	Risk	Flood Risk. The site falls within Flood Zone 1 where flooding from rivers and the sea are unlikely and a strategic FRA confirms the site is not in a critical drainage area, and is outside reservoir flood extent. The site is larger than 1 Hectare.	E	Des	Low	Low	P3	A Flood Risk Assessment is required for planning and findings and recommendations will need to be incorporated into design.	DPM						
E.9	Risk	Desktop analysis of the site has identified a potential for contamination and these sources are listed in order of potential significance (highest to lowest): 1. Metal hose factory and engineering works 2. Bus garage/depot 3. Existing generator (centre of site, externally adjacent to council offices) 4. Existing electricity substations The site has undergone at least two phases of development. Made Ground may include a range of contaminants including asbestos, and is a potential source of ground gas. The potential for significant contamination requiring remediation from on-site sources is anticipated to be moderate to high, particularly from the metal hose factory and the bus garage/depot. If identified, then contamination may limit the potential for reuse of soils. Increased waste disposal costs may be incurred to dispose of contaminated soil. Additional time and cost may be required to characterise and remediate the site.	E	Des	High	High	P1	A Full ground and soil investigation report will be required and should properly establish the levels of contamination and should be used to identify the proper strategies to be adopted both in site clearance/demolition and in design. Typical considerations are: i. Site characterisation (ground investigation) ii. Contamination risk assessment iii. Remediation (if required) iv. Verification of any remediation.  A suitable thickness of clean cover soils are likely to be required for any soft landscaping/garden areas. The London Clay is anticipated from surface which will restrict the mobilisation of contamination protecting deeper groundwater in the Chalk. Contamination will be limited to Made Ground (near surface).	DPM					Significant health risks in construction and operations.	
E.10	Risk	Contamination of soil and/or groundwater from off-site sources. Historical rail land, laundry, sheet metal works and plastic moulding works were located to the south, beyond the road. The potential for significant contamination to be present from the other sources is anticipated to be low.	E	Des	Low	Medium	P3	The presence of the London Clay will limit the potential for on-site migration of contamination but soil investigations and geo reports should further investigate risks and likely impact.	DPM						
E.11	Risk	Heave - Stress changes within excavations that penetrate the London Clay leading to differential movement and pressure build up beneath slabs	E	Des	Medium	Medium	P2	Soil testing as part of the ground investigation to identify heave potential	DPM						
	Risk	Softening in the London Clay. Culverted watercourse (New River) to south of site. Water present in this location may have caused localised softening of the ground. The material in this area may be less stiff than elsewhere, leading to increased movements under loading. There may also still be groundwater present.	E	Des	Medium	Medium	P2	Material may need to be excavated and replaced or piled through to avoid differential ground movements. Site investigation to target the area and identify the extent of any seepage or softening in the area	DPM						
		Damage to the Piccadilly line tunnels located under High Road, close to eastern site boundary. Groundworks could potentially cause strains in the tunnel lining leading to cracking or damage.	E	Con	Medium	High	P1	Design the structure and construction sequence giving due consideration to the tunnels. Impact or vibrating piling techniques not likely to be practicable. Liaison with TfL London Underground to ensure proposed construction methodologies are acceptable/appropriate. Obtain the as built details for the tunnel. Undertake a condition survey prior to and following construction works. Monitor the tunnel during works where required.	DPM						

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<b>Facilitator:</b>	Conor McCormack	Environment	E	Con	Construction
<b>Stage:</b>	Bid	Programme	P	User	Operations / Maintenance
<b>Date of Review:</b>	14-Sep-16	Quality / Reputation	Q	Demo	Decommissioning

<b>Risk / Opportunity Level</b>			<b>Version No:</b>	1.0
High Risk / Opp	P1	P1	<b>Status</b>	Open
Medium Risk / Opp	P2	P2		
Low Risk / Opp	P3	P3		
				Closed

Item No.	Risk or Opp	Description	Ass't Area	Type	Probability	Impact	Risk / Opp Level	Proposed Solution to remove / mitigate the Risk	Action Taken (if different to proposed solution)				Residual Risk (construction, operation or maintenance periods)	Status	
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E.12	Risk	Buried obstructions from previous uses of the site - especially the Station and historical rail cutting, and foundations of existing buildings. Damage to construction equipment, and increased amount of work required to clear the site prior to development with impact on time and cost.	E	Con	High	High	P1	Probing/trial pits in advance of works and site investigation works targeted to identify obstructions. Excavating obstructions and filling of voids properly identified where required. Consideration of measures to maximise mitigation prior to works commencing.	DPM				Ground Risk		
E.13	Risk	Presence of unidentified tunnels. Some 'protected' infrastructure tunnels (e.g. MoD or Post Office tunnels) are not reported in Groundsure reports. Tunnels may impose constraints on new foundation arrangements or construction sequences.	E	Con	Low	High	P2	Liaise with MoD, Post Office and other key authorities to establish whether any such tunnels exist within the site.	DPM				Ground Risk		
E.16	Risk	Energy - Emerging Local Plan requires connection to future decentralised energy networks where feasible.	E	Des	Medium	Medium	P2	Continue to assess availability of local decentralised energy sources. Ensure design is flexible and can allow future connections if not available.							
E.17	Risk	Utilities - There is a water distribution main that runs through site and adjacent to the existing bus garage.	E	Con	High	High	P1	Liaison with Thames Water and establish if build over/diversion is feasible. Building footprints should be positioned such that foundations will have minimal impact on water mains, including clearances.							
E.18	Risk	Utilities - 2no. existing UKPN LV substations are on site and will need to be considered. These sub-stations may serve properties outside the site boundary. Substations must either be retained or relocated close-by (at developer's cost).	E	Con	High	High	P1	Early discussion with UKPN to understand constraints, budget costs and issues for relocation/retention.	DPM						
E.19	Risk	Watson's Road UKPN Primary Sub-station located just outside site boundary. This will serve a wide area, extending well beyond site boundaries. This is major infrastructure asset and the likelihood of relocation is minimal and prohibitively costly. HV and LV cables related to this facility will also pass close to the site boundary and pose a significant risk for highways works.	E	Con	Low	High	P2	Base case should be that primary substation is retained. Early discussion with UKPN to properly understand constraints on nearby development and budget costs for (theoretical) relocation.							
E.20	Risk	Utilities - services onsite and in adjacent footpaths are present but detailed information and location is not yet understood. Locations may prohibit services options.	E	Con	High	High	P1	Full utilities survey and scan will be required together with verification of statutory searches. Further risk assessment will be required.							
E.21	Risk	Utilities - Network Infrastructure limitations. Local utility networks may be at/near capacity and may be unable to meet anticipated demands of the development. Multiple adjacent developments compound problems. Off-site reinforcement may be required (with developer contributing to costs).	E	Des	High	High	P1	Early discussion with utility providers to understand key issues with supply in local area. Utility demands from existing buildings may be off-set against proposed demands. Based on a proposed development UKPN initial thoughts indicate that likely demands potentially could be accommodated by a combination of released loads through demolition and available capacity at the Watsons Road Primary Substation. Dialogue with UKPN will need to continue							
E.22		Utilities - 2no. existing mobile phone masts located on the roof of River Park House. Relocation of mobile phone masts can be complicated and expensive if not considered carefully.	E	Des	Medium	High	P1	Early discussion with mobile phone mast operators to establish opportunities for relocation and to ensure new locations are properly considered and designed into the scheme.							
E.23	Risk	Planning Policy - not meeting policy.	E	Des	Medium	Medium	P2	Continuous review of scheme against all aspects of planning policy and early liaison and engagement with Haringey planning					Time and Cost		
E.24	Risk	Constrained and busy town centre site, close to main transport routes. Phasing and logistics will be complicated and will need to be properly developed to address the many challenges in such a location.	E	Con	High	High	P1	Regular phasing and delivery workshops to assess opportunities in design to minimise the impact on the local infrastructure. Logistics consolidation and off-site prefabrication of components and elements should be considered to address traffic, waste management and Health and Safety issues.							
<b>PROPOSED PROJECT SITE (PS)</b>															
<b>DESIGN ISSUES (DS) - Overall Scheme</b>															
<b>DESIGN OPPORTUNITIES (OP) - Overall Scheme</b>															
<b>Item No.</b>		<i>The following have been identified as potential opportunities in the design to reduce risks through the design, construction and operational phases.</i>	<b>Ass't Area</b>	<b>Type</b>	<b>Probability</b>	<b>Impact</b>	<b>Opp Level (High = Good Low = Poor)</b>	<b>Proposed Solution to realise Opportunity</b>	<b>Owner</b>	<b>Date</b>	<b>Action Taken (if different to proposed solution)</b>	<b>Owner</b>	<b>Date</b>	<b>Residual Opportunity (if change in design introduces risks etc)</b>	<b>Status</b>
O.1	Opp	Poor air quality in area provides opportunity for scheme to contribute to a net improvement to the local air quality by:	E	Des	Medium	Medium	P2	All aspects of design to address Air Quality e.g.: Encourage sustainable transport (Cycling, walking, ULEV vehicles for car club etc). Energy Strategy to address air quality. Planting Use of materials Seek ways of bettering GLA SPG's emission limits to meet "air quality neutral"	DPM						Open
O.2	Opp	Site with Public Transport Accessibility Level of 6a with very good transport links.	E	Des	High	High	P1	The high PTAL rating means car parking can be minimised contributing to wider objectives such as improving air quality.							
O.3	Opp	The site has no habitats that would have the potential for protected or notable species. Tree cover on the site is limited and those specimens present are unlikely to be of significant value or subject to TPOs. Any new development has the potential to significantly increase the extent of habitats on site and to link into adjacent green areas (Alexandra Par, Palace Gate, New River etc)	E	Con	High	Medium	P2	Specify planting for new scheme to maximise benefit to local biodiversity and to enhance links with existing green spaces. Consider measures such as: Habitat Corridors Green/Brown Roofs Native Planting SUDS Bird and Bat boxes Pocket Parks	DPM						

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Medium Risk / Opp	P2	P2	
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									Owner	Date		
<b>AVAILABILITY OF EXISTING INFORMATION (AV)</b>												
A.1	Risk	Survey information to date is limited and is at strategic desktop level.	E	Des	High	High	P1	Full Survey Strategy to be developed.	DPM			Open
A.2	Risk	Title information is limited. The exact setting out of boundaries and third party rights (wayleaves, easements, rights of way etc) that may have an impact on design approach are not fully understood.	E	Des	High	High	P1	Due diligence on title information is being undertaken	Legal			Open
<b>EXISTING SITE CONSTRAINTS AND HAZARDS (EX)</b>												
E.1	Risk	Potential loss of areas of vegetation and green space. Loss of green space for people and biodiversity and the eco-system services that the latter delivers such as air quality and human well being. The site is currently relatively green with mature areas of pocket park, grassland, gardens and ornamental shrubbery that together will provide opportunities for biodiversity and delivery of ecosystem services including water attenuation, air purification and mental well-being.	E	Des	Medium	High	P1	Green infrastructure at both ground level and at roof level would need to be incorporated to ensure delivery of sufficient green space. Tree's should be retained where appropriate. Full ecology survey to identify current conditions and to highlight potential improvements.	DPM			
E.2	Risk	The site is close to Alexandra Palace and Park local nature reserve, to the Palace Gates SINC and to the New River SINC.	E	Des	Medium	Medium	P2	The proposals are unlikely to have an impact on these but this needs to be continued to monitored through the design and into construction.				
E.3		Tree cover is relatively high across the site with a number of good specimens that could be subject to TPOs	E	Con	High	High	P1	Arboricultural survey required and confirmation of TPO's required. Tree's should be retained (where appropriate) and included in future design proposals for the site.				
E.4	Risk	Presence of protected species (bats) within the site affecting development works. St Michael's church and Nightingale school, which are adjacent to the site, and the solicitors building within the site present a moderate potential for roosting bats.	E	Des	Medium	High	P1	Broadly the site will need to provide habitat and roosting features for this species group as well as careful consideration of lighting typologies. Full Bat survey to identify likely constraints early. Bat surveys and potential licence applications will be required				
E.5	Risk	Presence of protected species (nesting birds) within the site affecting development works. Particularly affects site clearance activities. Potential for some notable bird species including swift and house martin nesting within built structures. Some more common invertebrate species may be associated with the Civic Centre pocket park	E	Con	Medium	High	P1	Clearance works may need to occur during autumn/ winter period; supervision would be required for site clearance activities if undertaken during nesting season. Ecology survey to confirm constraints and required actions.				
E.6	Risk	Local and Borough Wide Air Quality is Poor. Traffic and emissions from buildings (heating and power) are the main contributors to poor air quality in the borough. Poorly considered proposals are likely to increase the existing exceedance of NO2 annual mean air quality, especially at roadside locations. Developments not "Air Quality Neutral" have increased CIL payments impacting on viability.	E	Des	High	High	P1	Development proposals to carefully consider options to ensure it provides a net benefit to local air quality by carefully considering energy strategy and by encouraging sustainable modes of transport (walking cycling, car clubs with ULEV vehicles etc.) and through planting etc. Air Quality Assessment required for Planning and to ensure necessary design measures incorporated into scheme	DPM			Negative impact on local and wider air quality with wider impact on Health and Well being
E.7	Risk	Local and Borough Wide Air Quality is Poor. Traffic and emissions from buildings (heating and power) are the main contributors to poor air quality in the borough. Poorly considered proposals are likely to increase the existing exceedance of NO2 annual mean air quality, especially at roadside locations. Developments not "Air Quality Neutral" have increased CIL payments impacting on viability.	E	Con	High	High	P1	The GLA's SPGs set requirements on emission limits form local plant and for development emissions to meet the "air quality neutral" benchmarks. Construction and logistics planning to carefully consider air quality issues. Air Quality Assessment required for Planning and to ensure necessary design measures incorporated into scheme	DPM			Negative impact on local and wider air quality with wider impact on Health and Wellbeing
E.8	Risk	The site is a designated conservation area of architectural or historical interest (Trinity Gardens Conservation Area) and adjacent to three listed structures (Obelisk Memorial Drinking Fountain; Trinity primary School; and Church of St Michael and All Angels. Buildings may be damaged as a result of strains from ground movements induced by the proposed development. Cracking or damage to the listed structure requiring repairs or legal action for damages	E	Con	High	High	P1	Design will need to properly respond to the local context and Heritage assets. Construction logistics planning will need to pay proper attention to the risks to these assets.				
E.9	Risk	The site is a designated conservation area of architectural or historical interest. There may Archaeological interest within the site.	E	Con	Medium	Medium	P2	A desk base archaeological study will be required to be undertaken to understand what measures will be required to investigate/identify if there are any remains of archaeological interest on the site. If investigation is required this will need to be considered in the programme.				
E.10	Risk	Preliminary UXO investigation have identified 2 recorded strikes within 100 m of the site and a significant number of other bomb strikes have occurred within 500m. Whilst post war development has minimised the likelihood of the remaining presence of UXO, the possible presence cannot be eliminated.	E	Con	Medium	High	P1	A more detailed UXO risk assessment should be undertaken as part of the next phase of works, including obtaining any additional UXO records from the local council and other archives. The risk assessment should identify what risk management measures should be adopted for the works, particularly for demolition, piling and foundations.	DPM			Risk of explosions and death.

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									Owner	Date		
E.11	Risk	Flood Risk. The site falls within Flood Zone 1 where flooding from rivers and the sea are unlikely. A strategic FRA confirms the site is partially in a critical drainage area, but is outside reservoir flood extent. The site is larger than 1 Hectare.	E	Des	High	High	P1	A Flood Risk Assessment is required for planning and findings and recommendations will need to be incorporated into design. The SWMP stipulates that developments in Critical Drainage Areas greater than 0.5ha are "required to reduce runoff to that of a predevelopment greenfield run-off rate" (i.e. restricting flow to typically between 2 and 6 litres/second/ha). This will require large volumes levels of SuDS/attenuation and will need to be considered carefully in the design.	DPM			
E.12	Risk	There are potentially contaminative historical and contemporary land uses identified on the site. The contamination sources are listed in order of potential significance (highest to lowest): 1. Infilled pond (east of the site) 2. Existing car park (west of the site) 3. Historical fire station (south of site) One to two phases of development has occurred on the site. Made Ground may include a range of contaminants including asbestos, and is a potential source of ground gas. The on-site sources of contamination are relatively low risk and limited in extent. The site has not been subject to historical industrial use. The potential for significant contamination requiring remediation from on-site sources is anticipated to be low. Contamination will limit the potential for reuse of soils. Increased waste disposal costs will be incurred to dispose of contaminated soil. Additional time and cost may be required characterise and remediate the site.	E	Con	Medium	Medium	P2	The following actions will be necessary: i. Site characterisation (ground investigation) ii. Contamination risk assessment iii. Remediation (if required) iv. Verification of any remediation. A suitable thickness of clean cover soils are likely to be required for any soft landscaping/garden areas. The London Clay is anticipated from surface which will restrict the mobilisation of contamination protecting deeper groundwater in the Chalk. Contamination will be limited to Made Ground (near surface)				
E.13		A historical garage was located off-site to the north east. An electricity substation is located to the south of the site. Contamination of soil and/or groundwater from these off-site is a risk.	E	Con	Low	High	P2	No significant off-site sources of contamination have been identified which are likely to represent a risk to the soil or groundwater on the site but this will need to be confirmed in further investigation works.				
E.14		The site is located within a SPZ 1 (inner catchment). An active Thames Water abstraction boreholes located approximately 500m to the south west and north west of the site. The abstractions are anticipated to be from the Chalk principal aquifer at depth.	E	Con	Medium	High	P1	Potential for enhanced scrutiny from the regulator to the development within SPZ. EA as specific policy on disturbance and risk to SPZ1 and may object to specific planning applications. There may be restrictions on piling and other deep disturbance (ground source cooling for instance) within the principal aquifer in a SPZ1. The site is underlain by a layer of London Clay (unproductive strata) which will restrict mobilisation of contamination and protect the Chalk principal aquifer at depth. It is considered unlikely that investigation of the deep aquifer for contamination would be required. Even if deep piling is considered through a significant thickness of London Clay this is less significant and may not require investigation. A foundation works risk assessment is likely to be required. Identify if any old wells exist on site which may require decommissioning.				
E.15		"Heave" or Stress changes within excavations that penetrate the London Clay may result in differential movement and pressure build up beneath slabs	E	Con	Medium	Medium	P2	Place heave board beneath slabs, or use a load balance approach to minimise stress changes beneath slabs. Soil testing as part of the ground investigation should identify heave potential and therefore measures to address in foundation design.				
E.16		Piccadilly Line tunnel pass under Bounds Green Road close to southern site boundary. Groundworks causing strains in the tunnel lining could cause cracking or damage to tunnels. LUL clearance zones may affect foundation arrangements along southern site boundary	E	Con	Medium	High	P1	Early discussions with LUL to establish exact alignment for tunnels and relevant constraints on adjacent development. Obtain the as built details for the tunnel. Undertake a condition survey prior to and following construction works. Monitor the tunnel during works where required.				
E.17		Buried obstructions from previous uses of the site. Greatest risks where buildings are known to have been constructed and subsequently demolished, or where buried features (i.e. tanks) may not have been removed. Background research has identified that " A civil defence suite was included in the basement, with walls of two-foot-thick reinforced concrete, theoretically able to withstand a nuclear attack, and escape tunnels to the external gardens." Damage to construction equipment, and increased amount of work required to clear the site prior to development.	E	Con	High	High	P1	Probing in advance of works and site investigation works targeted to identify obstructions. Excavating obstructions and filling of voids where required. Works to better understand extent of such risks to be included and scoped in further ground investigation. The location and extent of the civil defence suite will need to be properly identified and it is likely the suite will need to be removed as part of site enabling works				
E.18	Risk	Utilities - services onsite and in adjacent footpaths are present but detailed information and location is not yet understood. Locations may prohibit services options.	E	Con	High	High	P1	Full utilities survey and scan will be required together with verification of statutory searches. Further risk assessment will be required.				
E.19	Risk	Utilities - Network Infrastructure limitations. Local utility networks may be at/near capacity and may be unable to meet anticipated demands of the development. Multiple adjacent developments compound problems. Off-site reinforcement may be required (with developer contributing to costs).	E	Des	High	High	P1	Early discussion with utility providers to understand key issues with supply in local area. Utility demands from existing buildings may be offset against proposed demands. Based on a proposed development UKPN initial thoughts indicate that likely demands potentially could be accommodated by a combination of released loads through demolition and available capacity at the Watsons Road Primary Substation. Dialogue with UKPN will need to continue				
E.20		Ino. existing UKPN LV substation causing constraints for new development located off Bounds Road adjacent ton ST Michael's Church.						Early discussion with UKPN to understand constraints and budget costs.				

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									Owner	Date			Owner	Date	
E.21	Risk	Constrained and busy town centre site, close to main transport routes. Phasing and logistics will be complicated and will need to be properly developed to address the many challenges in such a location.	E	Con	High	High	P1	Regular phasing and delivery workshops to assess opportunities in design to minimise the impact on the local infrastructure. Logistics consolidation and off-site prefabrication of components and elements should be considered to address traffic, waste management and Health and Safety issues.							
E.22	Risk	Planning Policy - not meeting policy.	E	Des	Medium	Medium	P2	Continuous review of scheme against all aspects of planning policy and early liaison and engagement with Haringey planning							
PROPOSED PROJECT SITE (PS)															
DESIGN ISSUES (DS) - Overall Scheme															
DESIGN OPPORTUNITIES (OP) - Overall Scheme															
Item No.	Risk or Opp	Description	Asset Area	Type	Probability	Impact	Opp Level (High = Good Low = Poor)	Proposed Solution to realise Opportunity	Owner	Date	Action Taken (if different to proposed solution)	Owner	Date	Residual Opportunity (if change in design introduces risks etc)	Status
O.1	Opp	Poor air quality in area provides opportunity for scheme to contribute to a net improvement to the local air quality by:	E	Des	Medium	Medium	P2	All aspects of design to address Air Quality e.g.: Encourage sustainable transport (Cycling, walking, ULEV vehicles for car club etc). Energy Strategy to address air quality. Planting Use of materials Seek ways of bettering GLA SPG's emission limits to meet "air quality neutral" benchmark	DPM						Open
O.2	Opp	Site with Public Transport Accessibility Level of 6a with very good transport links.	E	Des	High	High	P1	The high PTAL rating means car parking can be minimised contributing to wider objectives such as improving air quality.							
O.3	Opp	Provide green infrastructure for local people and enhance biodiversity. The site is close to Alexandra Palace and Park local nature reserve, to the Palace Gates SINC and to the New River SINC.	E	Con	High	Medium	P2	Specify planting for new scheme to maximise benefit to local biodiversity and to enhance links with existing green spaces. Consider measures such as: Habitat Corridors Green/Brown Roofs Native Planting SUDS Bird and Bat boxes Beehive	DPM						

HDV - Wood Green Library site -Technical Risk and Opportunity Register

Project Name:	HDV - Wood Green Station Road	Assessment Area		Type	
Site:	Site Wide - Master Register	H&S	S	Des	Design
Facilitator:	Conor McCormack	Environment	E	Con	Construction
Stage:	Bid	Programme	P	User	Operations / Maintenance
Date of Review:	14-Sep-16	Quality / Reputation	Q	Demo	Decommissioning

Risk / Opportunity Level			Version No:	1.0
High Risk / Opp	P1	P1		Status
Medium Risk / Opp	P2	P2		
Low Risk / Opp	P3	P3		
				Open
				Closed

Item No.	Risk or Opp	Description	Ass't Area	Type	Probability	Impact	Risk / Opp Level	Proposed Solution to remove / mitigate the Risk	Action Taken (if different to proposed solution)		Residual Risk (construction, operation or maintenance periods)	Status
									Owner	Date		
AVAILABILITY OF EXISTING INFORMATION (AV)												
A.1	Risk	Survey information to date is limited and is at strategic desktop level.	E	Des	High	High	P1	Full Survey Strategy to be developed.	DPM			Open
A.2	Risk	Title information is limited. The exact setting out of boundaries and third party rights (wayleaves, easements, rights of way etc) that may have an impact on design approach are not fully understood.	E	Des	High	High	P1	Due diligence on title information is being undertaken	Legal			Open
EXISTING SITE CONSTRAINTS AND HAZARDS (EX)												
E.1	Risk	The site has no habitats that would have the potential for protected or notable species. Bats: unlikely to be present given the lack of roosting features, disturbance levels, and the presence of better habitats in adjacent areas Tree cover on the site is limited and those specimens present are unlikely to be of significant value or subject to TPOs.	E	Con	Low	Low	P3	Detailed Ecology report will be required but unlikely to identify any significant risks or constraints	DPM			
E.2	Risk	Brownfield site is relatively new (circa 7 years) and accordingly has limited ecological value and may provide some limited nesting habitat for common bird species.	E	Con	Low	Low	P3	Clearance may need to be undertaken in autumn/winter period. Ecological Supervision would be required for site clearance activities if undertaken during the nesting season	DPM			
E.3	Risk	Local and Borough Wide Air Quality is Poor. Traffic and emissions from buildings (heating and power) are the main contributors to poor air quality in the borough. Poorly considered proposals are likely to increase the existing exceedance of NO2 annual mean air quality, especially at roadside locations. Developments not "Air Quality Neutral" have increased CIL payments impacting on viability.	E	Des	High	High	P1	The GLA's SPGs set requirements on emission limits for local plant and for development emissions to meet the "air quality neutral" benchmarks. Construction and logistics planning to carefully consider air quality issues. Air Quality Assessment required for Planning and to ensure necessary design measures incorporated into scheme	DPM			Negative impact on local and wider air quality with wider impact on Health and Well being
E.4	Risk	The site is adjacent to an Area of Archaeological Interest and to a listed building (Grade II Top Rank Club: The Dominion Centre)	E		Medium	High	P1	Design, Construction and phasing should carefully consider the location of these sites . A Desk Top Archaeological report will be required to assess the requirements for investigation on site.	DPM			Time and cost.
E.5	Risk	Preliminary UXO investigation have identified one recorded strike within 100 m of the site but with more strikes having occurred within 500m. Post war development, and removal of embankment minimises UXO risk but will still need to be considered.	E	Con	Medium	High	P1	UXO desktop report required to provide the necessary risk assessment.	DPM			Risk of explosions and death.
E.6	Risk	Flood Risk. The site falls within Flood Zone 1 where flooding from rivers and the sea are unlikely and a strategic FRA confirms the site is not in a critical drainage area, and is outside reservoir flood extent. The site is larger than 1 Hectare, however, and therefore a Flood Risk Assessment will be required for EIA/Planning purposes and the findings will need to be addressed. The site is not in a critical drainage area.	E	Des	Low	Low	P3	A site specific Flood Risk Assessment will be required as part of a planning application.	DPM			
E.7	Risk	The site is partially within 'National Reservoir Inundation Flood Zone' which means that no sleeping accommodation is permitted in basements.	E	Des	Medium	Medium	P2	The SFRA stipulates that a) no sleeping accommodation is permitted in basements, b) internal access to upper levels from basements must be provided, and c) egress from the development to an area outside the mapped flood outline must be provided. A site specific Flood Risk Assessment will be required as part of a planning application.	DPM			
E.8	Risk	Desktop study has identified rail cutting and use in the north of the site, historic garages in the south and general Made Ground across the site. The contamination sources are listed in order of potential significance (highest to lowest): 1. Historical railway line in cutting (north east of the site) and associated backfill (1970s) 2. Former maintenance garage (southern third of site) The site has undergone at least two phases of development. Made Ground is anticipated to be present, and may locally be deep associated with backfill to rail, and may include a range of contaminants including asbestos. Made Ground is also a potential source of ground gas. Contamination will limit or complicate the potential for reuse of soils. Increased waste disposal costs will be incurred to dispose of contaminated soil.	E	Des	High	High	P1	Consider the potential financial implications of the contamination during site acquisition and effect on value (for instance HCA guide on remediation costs 2015) The following actions would be necessary: i. Site characterisation (desk study and ground investigation) ii. Contamination risk assessment iii. Remediation (if required) iv. Verification of any remediation. A suitable thickness of clean cover soils are likely to be required for any soft landscaping/garden areas. The London Clay is anticipated from surface which will restrict the mobilisation of contamination protecting deeper groundwater in the Chalk. Contamination will be limited to Made Ground (near surface).	DPM			Significant health risks in construction and operations.
E.9	Risk	Contamination of soil and/or groundwater from off-site sources. Historical garages were located to the south east and north west of the site and a petrol filling station was located to the south on land which has since been developed. A dry cleaners is present to the north	E	Des	Low	Medium	P3	The absence of a shallow aquifer/ permeable deposits and aquifer and presence of the London Clay will limit the potential for on-site migration of contamination. Investigation as above.	DPM			
E.10	Risk	The site is located within a SPZ 1 (inner catchment). An active Thames Water abstraction boreholes located approximately 500m to the south west and north west of the site. The abstractions are anticipated to be from the Chalk principal aquifer at depth. Enhanced scrutiny from the Environment Agency to development within SPZ. There is a restriction on piling within the principal aquifer in a SPZ1.	E	Des	Medium	Medium	P2	The site is underlain directly by London Clay (unproductive strata) which will restrict mobilisation of contamination and protect the Chalk principal aquifer at depth. It is considered unlikely that investigation of the deep aquifer for contamination would be required. Even if deep piling is considered through a significant thickness of London Clay this is less significant and may not require investigation. A foundation works risk assessment is likely to be required. Identify if any old wells exist on site which may require decommissioning.				

## HDV - Wood Green Library site -Technical Risk and Opportunity Register

<b>Project Name:</b>	HDV - Wood Green Station Road	<b>Assessment Area</b>			<b>Type</b>	
<b>Site:</b>	Site Wide - Master Register	H&S	S	Des	Design	
<b>Facilitator:</b>	Conor McCormack	Environment	E	Con	Construction	
<b>Stage:</b>	Bid	Programme	P	User	Operations / Maintenance	
<b>Date of Review:</b>	14-Sep-16	Quality / Reputation	Q	Demo	Decommissioning	

<b>Risk / Opportunity Level</b>			<b>Version No:</b>	<b>1.0</b>
High Risk / Opp	P1	P1		
Medium Risk / Opp	P2	P2	<b>Status</b>	
Low Risk / Opp	P3	P3	Open	
			Closed	

Item No.	Risk or Opp	Description	Ass't Area	Type	Probability	Impact	Risk / Opp Level	Proposed Solution to remove / mitigate the Risk		Action Taken (if different to proposed solution)				Residual Risk (construction, operation or maintenance periods)	Status
								Owner	Date	Owner	Date	Owner	Date		
E.11	Risk	Heave - Stress changes within excavations that penetrate the London Clay leading to differential movement and pressure build up beneath slabs	E	Des	Medium	Medium	P2	Place heave board beneath slabs, or use a load balance approach to minimise stress changes beneath slabs. Soil testing as part of the ground investigation to identify heave potential	DPM						
E.12	Risk	Softening in the London Clay. Culverted watercourse (Moselle Brook) below site. Water present in this location may have caused localised softening of the ground. The material in this area may be less stiff than elsewhere, leading to increased movements under loading. There may also still be groundwater present.	E	Des	Medium	Medium	P2	Site investigation to target the area and identify the extent of any seepage or softening in the area. Material may need to be excavated and replaced or piled through to avoid differential ground movements.	DPM						
E.13		Damage to the Piccadilly line tunnels located under High Road, close to eastern site boundary. Groundworks could potentially cause strains in the tunnel lining leading to cracking or damage.	E	Con	Medium	High	P1	Design the structure and construction sequence giving due consideration to the tunnels. Impact or vibrating piling techniques not likely to be practicable. Liaison with TFL, London Underground to ensure proposed construction methodologies are acceptable/appropriate. Obtain the as built details for the tunnel. Undertake a condition survey prior to and following construction works. Monitor the tunnel during works where required.	DPM						
E.14	Risk	Buried obstructions from previous uses of the site - Site wide. Greatest risks where buildings are known to have been constructed and subsequently demolished, or where buried features (i.e. tanks) may not have been removed. Damage to construction equipment, and increased amount of work required to clear the site prior to development with impact on time and cost.	E	Con	High	High	P1	Probing/trial pits in advance of works and site investigation works targeted to identify obstructions. Excavating obstructions and filling of voids where required.	DPM				Ground Risk		
E.15	Risk	Presence of unidentified tunnels. Some 'protected' infrastructure tunnels (e.g. MoD or Post Office tunnels) are not reported in Groundsure reports. Tunnels may impose constraints on new foundation arrangements or construction sequences.	E	Con	Low	High	P2	Liaise with MoD, Post Office and other key authorities to establish whether any such tunnels exist within the site.	DPM				Ground Risk		
E.16	Risk	Energy - Emerging Local Plan requires connection to future decentralised energy networks where feasible.	E	Des	Medium	Medium	P2	Continue to assess availability of local decentralised energy sources. Ensure design is flexible and can allow future connections if not available.							
E.17	Risk	The site is adjacent to a Crossrail Safeguarding Zone to the south. Crossrail 2 is not fully defined and safeguarding zones may be amended. This may impose technical limitations for foundation design	E	Des	Medium	High	P1	Crossrail 2 proposals to be monitored continually and to ensure any restrictions are fully understood and incorporated into design.							
E.18	Risk	Utilities - Limited available capacity in local utility networks. Local utility networks may be at/near capacity and may be unable to meet anticipated demands of the development. Multiple adjacent developments may compound problems. Off-site reinforcement may be required (with developer contributing to costs)	E	Des	High	High	P1	Early discussion with utility providers to understand key issues with supply in local area and ensure reinforcement is approached strategically in context of wider HDV and other developments in Wood Green.							
E.19	Risk	Utilities - Existing services beneath buildings causing constraints for new development. There are existing utilities that pass directly under building footprints (i.e. not within highway corridors) throughout the site and including telecoms, foul and surface water. Diversion and/or abandonment of existing services may be necessary (with developer contributing to costs) as build over is not favoured.	E	Des	High	High	P1	Discussions with utility providers required to establish which services no longer have an ongoing purpose and may be abandoned and/or which services need to be diverted.	DPM						
E.20	Risk	1no. existing UKPN LV substation causing constraints for new development. Existing location unlikely to be optimum for proposed scheme and capacity may not be sufficient. Will also be likely that it supplies properties outside the plot boundary. Substation must be retained or relocated close-by (at developer's cost)	E	Des	High	High	P1	Early discussion with UKPN to understand constraints, budget costs and most appropriate solution.							
E.21	Risk	Culverted watercourse (Moselle Brook) causing constraints for new development. It is likely to pose constraints on foundation design and may be complicated/expensive to divert.	E	Des	High	High	P1	Survey/discussions with the Environment Agency required to establish constraints and to properly understand extent and construction. Building footprints should be positioned such that foundations will have minimal impact on culvert. Mitigation measures maybe required in construction in order to avoid damage.							
E.24	Risk	Constrained and busy town centre site, close to main transport routes. Phasing and logistics will be complicated and will need to be properly developed to address the many challenges in such a location.	E	Con	High	High	P1	Regular phasing and delivery workshops to assess opportunities in design to minimise the impact on the local infrastructure. Logistics consolidation and off-site prefabrication of components and elements should be considered to address traffic, waste management and Health and Safety issues.							
E.23	Risk	Planning Policy - not meeting policy.	E	Des	Medium	Medium	P2	Continuous review of scheme against all aspects of planning policy and early liaison and engagement with Haringey planning					Time and Cost		
<b>PROPOSED PROJECT SITE (PS)</b>															
<b>DESIGN ISSUES (DS) - Overall Scheme</b>															
<b>DESIGN OPPORTUNITIES (OP) - Overall Scheme</b>															
<b>Item No.</b>		<i>The following have been identified as potential opportunities in the design to reduce risks through the design, construction and operational phases.</i>	<b>Ass't Area</b>	<b>Type</b>	<b>Probability</b>	<b>Impact</b>	<b>Opp Level</b> <small>(High = Good Low = Poor)</small>	<b>Proposed Solution to realise Opportunity</b>	<b>Owner</b>	<b>Date</b>	<b>Action Taken</b> <small>(if different to proposed solution)</small>	<b>Owner</b>	<b>Date</b>	<b>Residual Opportunity</b> <small>(if change in design introduces risks etc)</small>	<b>Status</b>



HDV - Wood Green Library site -Technical Risk and Opportunity Register

<b>Project Name:</b>	HDV - Wood Green Station Road	<b>Assessment Area</b>			<b>Type</b>	
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<b>Facilitator:</b>	Conor McCormack	Environment	E	Con	Construction	
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High Risk / Opp	P1	P1		<b>Status</b>
Medium Risk / Opp	P2	P2		Open
Low Risk / Opp	P3	P3		Closed

Item No.	Risk or Opp	Description	Ass't Area	Type	Probability	Impact	Risk / Opp Level	Proposed Solution to remove / mitigate the Risk	Action Taken (if different to proposed solution)		Residual Risk (construction, operation or maintenance periods)	Status	
									Owner	Date			
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O.2	Opp	Site with Public Transport Accessibility Level of 6a with very good transport links.	E	Des	High	High	P1	The high PTAL rating means car parking can be minimised contributing to wider objectives such as improving air quality.					
O.3	Opp	The site has no habitats that would have the potential for protected or notable species. Tree cover on the site is limited and those specimens present are unlikely to be of significant value or subject to TPOs. Any new development has the potential to significantly increase the extent of habitats on site and to link into adjacent green areas (Alexandra Par, Palace Gate, New River etc)	E	Con	High	Medium	P2	Specify planting for new scheme to maximise benefit to local biodiversity and to enhance links with existing green spaces. Consider measures such as: Habitat Corridors Green/Brown Roofs Native Planting SUDS Bird and Bat boxes Pocket Parks	DPM				