









Appendix A - Detailed MCA table

Donabate Substation Optioneering MCA Matrix

Comparison Criteria Legend ignificant comparative advantage over other options ome comparative advantage over other options omparable to other options / neutral ome comparative disadvantage over other options

	isadvantage over other opt		Economy															
				ure (CAPEX): Construction,		I costs (IÉ or other entities), dvancements and future	Train Operation	ns Functionality/Economic		ionality and associated								
			Qualitative appraisal of potential infrastructure costs of proposed options	tion, temporary works Rationale		ng / obsolescence	Qualitative appraisal of potential ongoing operational costs of proposed options		Qualitative appraisal of potential wider benefits of proposed options	vities and opportunities Rationale								
Works Description Summary of requirements		Option Number	Estimate high level cost o Extent and type of 3rd pa Extent and type of 3rd pa temporary works during o	rty lands required permanently rty land required temporarily for	Effects of infrastructure Provision of ways of un	money. frastructure over the whole life. maintenance to services. dertaking routine inspections and while minimising the effect on	Potential improvement conditions of the line (r interruption of service) Rolling stock & staff uti	reduction or increase of the risk of	Potential benefit to vehicular traffic flows in the vicinity of the works during construction and associated economic activities and opportunities in the vicinity Consideration of duration of traffic disruption and length of diversions To minimise the impacts on traffic and transportation durin the construction and operational stages									
		1		Construction of long access road required		Although there are minor differences, is length of access road for example, which could affect maintenance costs, overall the options are comparable/neutral		All options are comparable - options of substation locations do not impact the train operations functionality and its economic benefits		Minimal impacts to traffic functionality								
Electrification of Northern Line: Traction Substation Locations	Electrification of the line from the end of the current electrified section at Malanide to Drogheda with 1500V DC overhead.	2		Construction costs are minimal, with a short access road required (when compared to Option 1)		Although there are minor differences, it length of access road for example, which could affect maintenance costs, overall the options are comparable/neutral		All options are comparable - options of substation locations do not impact the train operations functionality and its economic benefits		Access through residential estate during construction and impact on local traffic, pedestrian and cyclists expected.								
	oc. overnead.				DC overhead.			DC overhead.		3		Construction costs are minimal, with a short access road required (when compared to Option 1)		Although there are minor differences, it length of access road for example, which could affect maintenance costs, overall the options are comparable/neutral		All options are comparable - options of substation locations do not impact the train operations functionality and its economic benefits		Impact on existing parking, pedestrians and cyclists at Park and Ride during construction
		4		Construction costs are minimal, with a short access road required (when compared to Option 1)		Although there are minor differences, it length of access road for example, which could affect maintenance costs, overall the options are comparable/neutral		All options are comparable - options of substation locations do not impact the train operations functionality and its economic benefits		Impact on existing parking, pedestrians and cyclists at Park and Ride during construction								

Comparison Criteria Legeno gnificant comparative advantage over other option ome comparative advantage over other options

Some comparative disadvantage over other options

				Saf	ety			
			Emp	oloyer's Safety	Public safety			
			Qualitative appraisal on the safety impacts on IÉ or railway staff	Rationale	Qualitative appraisal on the safety impacts on the public (road/rail/cycle/pedest rian)	Rationale		
Works Description	Summary of requirements	Option Number	maintenance and opera	ssociated with construction titions. for incidents or near-misses for	To reduce safety risks associated with passengers at platforms, public adjacent to the railway and road, pedestrian and cycle users at level crossings. To reduce the potential for accidents for members of the public/passengers on railway infrastructure. To reduce the potential for conflict between rail and road users.			
		1		All options are comparable, with no differences between the options with regards to employer's safety		All options are comparable, with no differences between the options with regards to public safety		
Electrification of Northern Line: Traction Substation Locations	Electrification of the line from the end of the current electrified section at Malahide to Drogheda with 1500V DC overhead.	2		All options are comparable, with no differences between the options with regards to employer's safety		All options are comparable, with no differences between the options with regards to public safety		
		3		All options are comparable, with no differences between the options with regards to employer's safety		All options are comparable, with no differences between the options with regards to public safety		
		4		All options are comparable, with no differences between the options with regards to employer's safety		All options are comparable, with no differences between the options with regards to public safety		

			Environment															
			Landscape	and Visual Qualitative	E	Biodiversity	Nois	e and Vibration	Wa	ter resources	Archaeology, Ar	chitectural and Cultural Heritage	Geo	ology & Soils	Agricultura	al and non-agricultural	Air Qualit	y & Climate Change
			Appraisal of landscape and visual impacts of options based on the sensitive viewpoints	Rationale	Qualitative appraisal on the impact on biodiversity	Rationale	Qualitative appraisal of the potential noise and vibration impact	Rationale	Qualitative appraisal on the potential impacts to surface ground or coastal waters	Rationale	Qualitative appraisal of the potential impacts of proposed options on potential sub surface archaeology and impact on foundations and above ground elements of architectural heritage	Rationale	Qualitative appraisal of the potential of the proposed options on waste and material resources including the reuse of site won materials.	Rationale	Qualitative appraisal of impacts on valued resources either from a human or natural origin with value arising for economic or cultural reasons. These assets on be existing utilities or non-renewable resources	Rationale	Qualitative appraisal of air quality and climate impacts both on the operational and construction phases	Rationale
Works Description	Summary of requirements	Option Number	To avoid / minimise impact on designated amenities, landscapes, protected trees or views. To avoid / minimise visual impact on properties & amenities. To avoid / minimise removal of trees / hedgerows. To avoid / minimise impact from light pollution. To provide opportunities to enhance the local amenity ar green infrastructure.		•To ensure that the solution provided minimises the effects on biodiversity of the area and/or provides opportunities to enhance it.		•To provide a solution v noise and vibration	vhich ensures minimum levels of		ters and associated floodplains,		on cultural heritage such as on below ground istoric buildings (individual and areas), and arks.	•To provide a solution v carbon. •To minimise waste.	vhich minimises total capital	To provide a solution	which minimises total capital carbon.	greenhouse gas emissio	rhich comprises a reduction in ns. sen solution preserves or enhances
		1		Secluded setting requires relatively lon, access road. Potential for screening.	:	Some comparative disadvantage. Potential for indirect impacts on nearby designated sites (Malahide Estuary SAC SPA, and pNHA, and Rogerstown Estuary SPA, SAC and pNHA), include potential for water quality impacts or disturbance to birds, also new lighting which could impact on birds. Closer to SAC/SPA than other options but would likely be smillar impacts on designated sites with other options. Potentially some treeling-findegenow removal for access road required and grassland removal for substation location, with potential for impacts on birds, bats, small mammals, and invertebrates.	,	Furthest from any sensitive receptors		Zone C - limited flood risk: Access road required increasing flood and surface water impact. Coacted along the perimeter of a 250m buffer, 500m location accuracy well used for agricultural and domestic use and classified as 'good'.		There are no recorded monuments located in vicinity of this proposed substation. There is a greenfield potential to reveal below ground archaeological features. This option is located Distributor Road currently under construction. Finds or features of an archaeological significance may have been revealed during this process but have not been recorded yet in the public record. This area is noted as agricultural fields on the historic OS mapping. There are no features of architectural heritage interest in the vicinity of this option.		There is potential for loss of topsoul/growing soil. The location for the proposed work will require the construction of an access road thereby generating earthworks.		Some comparative disadvantages over other options because this option is located on agricultural land.		No operational air quality or climate impacts. Slightly preferred due to greatest separation from sensitive receptors potential for minor dust impacts during the construction phase. No real differentiator.
Electrification of Northern Line: Traction Substation Locations	Electrification of the line from the end of the current electrified section at Malahide to Drogheda with 1500V DC overhead.	2		Close to residential properties but view mitigated by presence of road embankment. Potential for screening.	s	Some comparative disadvantage. Potential for indirect impacts on nearby designated sites (Malahide Estuary SAC SPA, and pNHA, and Rogerstown Estuary SPA, SAC and pNHA), include potential for water quality impact on birds. Closer to disturbance to birds, also new lighting which could impact on birds. Closer to SAC/SPA than other options but would likely set similar impacts on designated sitely set with other options. Some habitat removal required, good quality grassland (from street view) and likely some treelines/hedgerrows. Also adjacent to bridge with bat roosting potential.		Close to sensitive residential receptors		Zone C - limited flood risk. Short access road increases flood and surface water impacts slightly, Located within the 250m buffer, 500m location accuracy well used for agricultural and domestic use and classified as "good".		There are no recorded monuments located in the vicinity of this proposed substation. There is a greenfield potential to reveal below-ground archaeological features. This option is located immediately to the north the Donabate Distributor Road currently under construction. Finds or features of archaeological significance may have been revealed during this process bu have not been recorded yet in the public recorn its area is noted as agricultural fields on the historic OS mapping. There are no features of architectural heritage interest in the vicinity of this option.		There is potential for loss of top/growing soil. The location for the proposed work will require the construction of an access road thereby generating earthworks.		Some comparative disadvantages over other options because this option is located on agricultural land.		No operational air quality or climate impacts. Least preferred due to proximity to sensitive receptors - potential for minor dust impacts during the construction phase. No real differentiator
		3		Impact on green space with trees and potential impact to trees on boundary with graveyard.		Some comparative advantage. Potentia for indirect impacts on nearby designated sites (Malahide Estuary SAC SPA, and pNHA, and Rogerstown Estuary SPA, SAC and pNHA), include potential for water quality impacts or disturbance to birds, also new lighting which could impact on birds. Slightly further from European sites from Options 18.2 Removal of mature hedgerow and trees has the potential timpact birds. Slass, and small manusals Substation very close (c. 10m) to high potential bat roost building across the road (old church?) will need to be determined if bats roosting here.	0	Close to sensitive residential receptors		Zone C - limited flood risk. No access road required minimizing increased flood risk.		There are no recorded monuments located in vicinity of this proposed substation. There is a greenfield potential to reveal below ground archaeological features in the grassed area and possible foundations or remnants of structures (now demolished) shown on the 1st edition six in CS mapping and later editions. This site is located immediately to the west of Donabate Cemetery which is of cultural heritage significance. The proposed location adjoins Donabate cemeterly RIAH 1336016. There is potential for damage to the cemetery.		There is potential for excavation of made ground/contaminated land. From a geology and soils perspective, it is preferable to have the works done in a previously developed site/built-up area		Some significant advantages over other options because this option is not located on agricultural land.		No operational air quality or climate impacts. Slightly less preferred due to proximity to sensitive receptors - potential for minor dust impacts during the construction phase. No real differentiator.
		4		Located within existing station carpark but close to residential properties.		Significant comparative advantage over other options. Potential for indirect impacts on nearby designated sites (Malahide Estuary SAC, SPA, and NNHA, and Rogerstown Estuary SPA, SAC and NNHA), include potential for water quality impacts or disturbance to birds. However, further away from designated sites than other options (182), also little - no vegetation removal required (from satellite view) as habitats primary look like hard standing/artificial in nature.		Close to sensitive residential receptors		Zone C - limited flood risk. No access road required minimizing increased flood risk.		Partially located within the zone of notification for a recorded monument, an enclosure (DUDI 067), located in Beaverstown townland. The site was revealed through test exvavation (Hagen 2006). Potential to reveal subsurface archaeology at this location. There are no architecturally sensitive features in this location. There is a potential impact on setting of adjoining heritage structures but it is minor.	2	There is potential for excavation of made ground/contaminated land . From a geology and soils perspective, it is preferable to have the works done in a previously developed site/built-up area		Some significant advantages over other options because this option is not located on agricultural land.		No operational air quality or climate impacts. Slightly preferred due to greatest separation from sensitive receptors. No real differentiator.

Comparison Criteria Legend
Significant comparative advantage over other options
Some comparative advantage over other options
Comparable to other options / Options /

ome comparative disadvantage over other options Accessibility & Social Inclusion Accessibility Social Inclusion Qualitative appraisal of capacity of options to facilitate the movement of people (either within, on to or across the rail system) Qualitative appraisal of capacity of options to provide ease of access for the mobility and visually impaired Works Description Capacity of options to facilitate the movement of people (either within, on to or across the rail system) Impact on the wellbeing of the passenger and public. Positive impact towards vulnerable groups Improvement of accessibility to public transport facilities, in Improve accessibility to public experience. Improve accessibility to public transport facilities, in Improvement of accessibility to public transport Improvement of accessibility to public Improvement of accessibility to Improvement of accessibility to Improvement of Improvem 1 All options are comparable - options of substation locations do not impact accessibility in this area. All options are comparable - options substation locations do not impact social inclusion in this area. 2 Electrification of Northern Line: Traction Substation Locations Electrification of the line from the end of the current electrified section at Malahide to Drogheda with 1500V DC overhead. All options are comparable - options of substation locations do not impact accessibility in this area. All options are comparable - options of substation locations do not impact social inclusion in this area. 3 All options are comparable - options of substation locations do not impact accessibility in this area. All options are comparable - options of substation locations do not impact social inclusion in this area. 4

			Integration									Phy	vsical Activity	
			Adapta	bility in the future	Trans	sport Integration	Land	l use integration	Geographical In	Integration	Governme	nt policy Integration	Walking /	cycling opportunities
			Qualitative appraisal of capacity of options to cater for future projects or aspirations	Rationale	Qualitative appraisal of the options and their impact on integration with other transport modes	Rationale	Qualitative appraisal of the options and their impact on integration with land use policies	f Rationale	Qualitative appraisal of the options and their impact on integration with geographical polices	Rationale	Qualitative appraisal of the options and their impact on integration with geographical and government polices	Rationale	Qualitative appraisal of the options and their impact to enable walking and cycling opportunities in a safer environment for the communities along the route	Rationale
Works Description	Works Description requirements Option I		Ability to continue to function successfully despite future changes in circumstances		Scope for and ease of interchange between modes New interchange nodes and facilities Reduce waking and wait times associated with interchange Integration with the cycle networks Modal shifts figures during construction and operations Changes to journey times to transport nodes Impact on the operation of the other transport services bo during construction and in operation stage		plans	use strategies, regional and local	Potential to impact on external lini Potential to impact on external lini Consideration for any community s	nks during operations	integration with nationa policies	l and international plans and	To enable walking and cycling opportunities in a safer environment in the communities along the route To create a healthy environment conducive to active travel Connectivity to adjoining cycling and pedestrian facilities Enhanced connectivity between key attractions/trip generators related to active modes Diversions, duration and impact on journey times and potential to create a negative modal shift (e.g. people opt to drive instead of walk or cycle)	
		1		All options are comparable - options of substation locations do not impact the adaptability in the future in this area		Minimal impacts on transport integration		This option is the least favourable due to the High Amenity zoning	buildings a	options are infrastructural adjoining a railway line and dered neutral.		All international, national, regional and ocal policies encourage improvements in relation to the efficiency of public transport. All the proposed options will facilitate the achievement of greater fediciency in public transportation long part of the east coast of the country and therefore comply with government policy.		All options are comparable - options of substation locations do not impact the walking and cycling opportunities in this area.
Electrification of Northern Line: Traction Substation Locations	Electrification of the line from the end of the current electrified section at Malahide to Drogheda with 1500V DC overhead.			All options are comparable - options of substation locations do not impact the adaptability in the future in this area		Minimal impacts on transport integration		This option is zoned residential. A substation is acceptable.	buildings a	options are infrastructural adjoining a railway line and dered neutral.	1	All international, national, regional and local policies encourage improvements in relation to the efficiency of public transport. All the proposed options disalitate the achievement of greater efficiency in public transportation long part of the east coast of the country and therefore comply with government policy.		All options are comparable - options of substation locations do not impact the walking and cycling opportunities in this area.
		3		All options are comparable - options of substation locations do not impact the adaptability in the future in this area		Impact on existing parking, pedestrians and cyclists at Park and Ride during construction		This option is zoned town centre. A substation is acceptable. However, a more high density use would be more appropriate	buildings a	options are infrastructural adjoining a railway line and dered neutral.		All international, national, regional and local policies encourage improvements in relation to the efficiency of public transport. All the proposed options will acliticate the achievement of greater efficiency in public transportation long part of the east coast of the country and therefore comply with government policy.		All options are comparable - options of substation locations do not impact the walking and cycling opportunities in this area.
		4		All options are comparable - options of substation locations do not impact the adaptability in the future in this area		Impact on existing parking, pedestrians and cyclists at Park and Ride during construction		This option is zoned town centre. A substation is acceptable. However, a more high density use would be more appropriate	buildings a	options are infrastructural adjoining a railway line and dered neutral.	1	All international, national, regional and local policies encourage improvements in relation to the efficiency of public transport. All the proposed options will actilitate the achievement of greater efficiency in public transportation long april of the east coast of the country and therefore comply with government policy.		All options are comparable - options of substation locations do not impact the walking and cycling opportunities in this area.

Rush and Lusk Substation Optioneering MCA Matrix

Significant comparative advantage over other options

Some comparative advantage over other options

Comparable to other options / neutral

Some comparative disadvantage over other options

			Economy							
				ure (CAPEX): Construction, tion, temporary works	entities), Techi	tional costs (IÉ or other nology advancements and pofing / obsolescence	<u> </u>	ns Functionality/Economic Benefit		ionality and associated ivities and opportunities
Works Description	Summary of	Option Number	Qualitative appraisal of potential infrastructure costs of proposed options	Rationale	Qualitative appraisal of potential ongoing infrastructure maintenance costs of proposed options	potential ongoing frastructure Rationale on aintenance costs of		Rationale	Qualitative appraisal of potential wider benefits of proposed options	Rationale
requirements			Estimate high level cost of construction of option Extent and type of 3rd party lands required permanently Extent and type of 3rd party land required temporarily for temporary works during construction		Effects of infrastructure maintenance to services. Provision of ways of undertaking routine inspections and				Potential benefit to vehicular traffic flows in the vicinity the works during construction and associated economic activities and opportunities in the vicinity Consideration of duration of traffic disruption and lengt diversions To minimise the impacts on traffic and transportation during the construction and operational stages	
		1		All options are comparable with costs		Although there are minor differences, in length of access road for example, which could affect maintenance costs, overall the options are comparable/neutral		All options are comparable - options of substation locations do not impact the train operations functionality and its economic benefits		Loss of car parking spaces
Electrification of Northern Line: Traction Substation Locations	Electrification of the line from the end of the current electrified section at Malahide to Drogheda with 1500V DC overhead.	2		All options are comparable with costs		Although there are minor differences, in length of access road for example, which could affect maintenance costs, overall the options are comparable/neutral		All options are comparable - options of substation locations do not impact the train operations functionality and its economic benefits		No car parking spaces lost
		3		All options are comparable with costs		Although there are minor differences, in length of access road for example, which could affect maintenance costs, overall the options are comparable/neutral		All options are comparable - options of substation locations do not impact the train operations functionality and its economic benefits		Loss of car parking spaces

Significant comparative a Some comparative advant	dvantage over other options	ons				
Comparable to other opti						
	antage over other option	S				
Significant comparative d	isadvantage over other or	otions				
				Sa	fety	
			Emp	ployer's Safety	Р	ublic safety
Works Description	Summary of	Option Number	Qualitative appraisal on the safety impacts on IÉ or railway staff	Rationale	Qualitative appraisal on the safety impacts on the public (road/rail/cycle/pedes trian)	Rationale
World Beger proof	requirements	opaci Nameci	maintenance and oper	associated with construction rations. Il for incidents or near-misses for	platforms, public adjac pedestrian and cycle us To reduce the potentia public/passengers on r	I for accidents for members of th

All options are comparable, with no differences between the options with regards to employer's safety All options are comparable, with no differences between the options with regards to public safety Electrification of the Electrification of Northern Line: line from the end of the current electrified All options are comparable, with no differences between the options with regards to employer's safety All options are comparable, with no differences between the options with regards to public safety Traction Substation section at Malahide to 2 Drogheda with 1500V DC overhead. All options are comparable, with no differences between the options with regards to employer's safety All options are comparable, with no differences between the options with regards to public safety

			Environment															
			Landscape	and Visual Qualitative	I	Biodiversity	Nois	e and Vibration	Wa	ater resources	Archaeology, A	chitectural and Cultural Heritage	Ge	ology & Soils	Agricultura	l and non-agricultural	Air Qualit	y & Climate Change
Works Description	Summary of	Option Number	Appraisal of landscape and visual impacts of options based on the sensitive viewpoints	Pationale	Qualitative appraisal on the impact on biodiversity	Rationale	Qualitative appraisal of the potential noise and vibration impact	Rationale	Qualitative appraisal on the potential impacts to surface ground or coastal waters	Rationale	Qualitative appraisal of the potential impacts of proposed options on potential sub surface archaeology and impact of foundations and above ground elements of architectural heritage	Rationale	Qualitative appraisal of the potential of the proposed options on was and material resources including the reuse of site won materials.	Rationale	Qualitative appraisal of impacts on valued resources either from a human or natural origin with value arising for economic or cultural reasons. These assets can be existing utilities or non-renewable resources	Rationale	Qualitative appraisal of air quality and climate impacts both on the operational and construction phases	Rationale
	requirements				on biodiversity of the a	o ensure that the solution provided minimises the effects biodiversity of the area and/or provides opportunities enhance it. *To provide a solution which ensures minimum levels of noise and vibration		enhance the quality of	ct or provide opportunities to surface waters and associated tters and coastal waters.	•To minimise the impac archaeological remains, historic landscapes and	t on cultural heritage such as on below ground historic buildings (individual and areas), and parks.	•To provide a solutior carbon. •To minimise waste.	which minimises total capital	To provide a solution v	which minimises total capital carbon	greenhouse gas emissi	which comprises a reduction in ons. ssen solution preserves or enhances	
		1		Location is close to residential properties, has direct impacts on garden boundaries, some with mature trees, and will be difficult to adequately screen		Some comparative advantage over other options due to construction related impacts. Potential for indirect impacts on nearby designated sites (Rogerstown Estuary SPA, SAC and pNHA), include optential for water quality impacts or disturbance to birds, also new lighting which could impact on birds. If noise generated is higher than what currently exists, further disturbance to birds may occur. Location is partially on artificial ground (carpark?), but may require some vegetation removal of hedgerows adjacent, impacts on birds, bats, small mammals. If additional lighting required could disturb bats commuting and foraging along this hedgerow.		Closest to residential receptors		All options comparable		There are no recorded monuments in the vicinity of the proposed substation. There is the potential to reveal subsurface archaeological finds and deposits during any ground breaking works associated with the construction of the site. Located in what is currently a car park, no features of architectural heritage sensitivity in this location.		Proposed work is on IE land. Minimal impacts from a Geology & Soils perspective.		Comparable to other options because all options located on non-agricultura land		No operational air quality or climate impacts. Similar distance to sensitive receptors for potential dust impacts during construction. No real differentiator.
Traction Substation	Electrification of the line from the end of the current electrified section at Malahide to Drogheda with 1500V DC overhead.	2		Location is distant from residential properties facing railway and station, with good screening on northern, eastern and southern boundaries		Some comparative disadvantage over other options. Potential for indirect impacts on nearby designated sites (Rogerstown Estuary SPA, SAC and pNHA), incudes operatial for water quality impacts or disturbance to birds, also new lighting which could impact on birds. If noise generated is higher than what currently exists, further disturbance to birds may occur. Vegetation removal significantly more for this option than others, impacts on birds (ground and tree nesting), potentially bats if trees removed or extra lighting required, and mammals.		Not as close to residential receptors as Option 1, but closer than Option 3		All options comparable		There are no recorded monuments in the vicinity of the proposed substation. There is the potential to reveal subsurface archaeological finds and deposits during any ground breaking works associated with the construction of the site. The proposed site is a greenfield site with no known architectural heritage features.		Proposed work is on IE land. There is potential for loss of topsoil/growing soil.		Comparable to other options because all options located on non-agricultura land		No operational air quality or climate impacts. Similar distance to sensitive receptors for potential dust impacts during construction. No real differentiator.
		3		Location is distant from residential properties but is visually open from R128 road. Compound would impact some young trees and would be visually intrusive within existing carpark.		Some comparative advantage over other options. Potential for indirect impacts on nearby designated site (Rogerstown Estuary SPA, SAC and pNHA), include potential for water quality impacts or disturbance to birds, also new lighting which could impact on birds. If noise generated is higher than what currently exists, current exists, however already a very disturbed surface to birds may occur. Vegetation removal of low quality hedgerow habitat within the station carpark, however already a very disturbed area so potential impacts would be low. Potential for bat roosts in buildings adjacent to works area. Will need to be assessed for suitability and evidence of bat roosts.		Furthest from residential receptors		All options comparable		There are no recorded monuments in the vicinity of the proposed substation. There is the potential to reveal subsurface archaeological finds and deposits during any ground breaking works associated with the construction of the site. Located in what is currently a car park, no features of architectural heritage sensitivity in this location No direct negative impact anticipated. Potential visual impact.		Proposed work is on IE land. Minimal impacts from a Geology & Soils perspective.		Comparable to other options because all options located on non-agricultura land		No operational air quality or climate impacts. Similar distance to sensitive receptors for potential dust impacts during construction. No real differentiator.

me comparative advantage over other options omparable to other options / neutral

	ions / neutral vantage over other options lisadvantage over other op											
	<u> </u>			Accessibility & Social Inclusion								
			A	Accessibility	So	cial Inclusion						
Works Description	Summary of	Option Number	Qualitative appraisal of capacity of options to facilitate the movement of people (either within, on to or across the rail system)	Rationale	Qualitative appraisal of capacity of options to provide ease of access for the mobility and visually impaired	Rationale						
	requirements		(either within, on to or Impact on the wellbein Positive impact on pass Improve accessibility to	nd healthcare to satisfy transport	Positive impact towards vulnerable groups Improvement of accessibility to public transport facilities, in particular from deprived geographic areas.							
		1		All options are comparable - options of substation locations do not impact accessibility in this area.		All options are comparable - options of substation locations do not impact social inclusion in this area.						
Electrification of Northern Line: Traction Substation Locations	Electrification of the line from the end of the current electrified section at Malahide to Drogheda with 1500V DC overhead.	2		All options are comparable - options of substation locations do not impact accessibility in this area.		All options are comparable - options of substation locations do not impact social inclusion in this area.						
		3		All options are comparable - options of substation locations do not impact accessibility in this area.		All options are comparable - options of substation locations do not impact social inclusion in this area.						

Comparison Criteria Legend

omparable to other options / neutral ome comparative disadvantage over other options gnificant comparative disadvantage over other options

						Integration								Physical Activity	
			Adapta	bility in the future	Trans	sport Integration	Land	use integration	Geogra	aphical Integration	Governm	ent policy Integration	Walking /	cycling opportunities	
Works Description	Summary of requirements	Option Number	Qualitative appraisal of capacity of options to cater for future projects or aspirations	Rationale	Qualitative appraisal o the options and their impact on integration with other transport modes	f Rationale	Qualitative appraisal o the options and their impact on integration with land use policies	f Rationale	Qualitative appraisal o the options and their impact on integration with geographical polices	f Rationale	Qualitative appraisal o the options and their impact on integration with geographical and government polices	Rationale	Qualitative appraisal of the options and their impact to enable walking and cycling opportunities in a safer environment for the communities along the route	Rationale	
			Ability to continue to function successfully despite future changes in circumstances		Scope for and ease of interchange between modes New interchange nodes and facilities Reduce waking and wait times associated with interchange Integration with the cycle networks Modal shifts figures during construction and operations Changes to journey times to transport nodes Impact on the operation of the other transport services bo during construction and in operation stage		Consistency with land use strategies, regional and local plans		Potential to impact on external links during construction Potential to impact on external links during operations Consideration for any community severance impacts		Integration with nation policies	nal and international plans and	To enable walking and cycling opportunities in a saf environment in the communities along the route To create a healthy environment conducive to active Connectivity to adjoining cycling and pedestrian face Enhanced connectivity between key attractions/triggenerators related to active modes Diversions, duration and impact on journey times a potential to create a negative modal shift (e.g. peoplarive instead of walk or cycle)		
		1		All options are comparable - options of substation locations do not impact the adaptability in the future in this area		Loss of car parking spaces		This option is zoned R2/rural cluster. A substation is permissible.		All of the options are infrastructural buildings adjoining a railway line and are considered neutral.		All international, national, regional and local policies encourage improvement in relation to the efficiency of public transport. All the proposed options will facilitate the achievement of greater efficiency in public transportation long part of the east coast of the country and therefore comply with government policy.		All options are comparable - options of substation locations do not impact the walking and cycling opportunities in this area.	
Electrification of Northern Line: Traction Substation Locations	Electrification of the line from the end of the current electrified section at Malahide to Drogheda with 1500V DC overhead.	2		All options are comparable - options of substation locations do not impact the adaptability in the future in this area		No car parking spaces lost		This option is zoned P1/Green Belt. A substation is permissible.		All of the options are infrastructural buildings adjoining a railway line and are considered neutral.		All international, national, regional an local policies encourage improvement in relation to the efficiency of public transport. All the proposed options will facilitate the achievement of greater efficiency in public transportation long part of the east coast of the country and therefore comply with government policy.		All options are comparable - options of substation locations do not impact the walking and cycling opportunities in this area.	
		3		All options are comparable - options of substation locations do not impact the adaptability in the future in this area		Loss of car parking spaces		This option is zoned R2/rural cluster. A substation is permissible.		All of the options are infrastructural buildings adjoining a railway line and are considered neutral.		All international, national, regional an local policies encourage improvement in relation to the efficiency of public transport. All the proposed options will facilitate the achievement of greater efficiency in public transportation long part of the east coast of the country and therefore comply with government policy.		All options are comparable - options of substation locations do not impact the walking and cycling opportunities in this area.	

Skerries South Substation Optioneering MCA Matrix



						Ecor	nomy			
				ure (CAPEX): Construction, tion, temporary works	entities), Techn	ional costs (IÉ or other ology advancements and ofing / obsolescence	Train Operation	s Functionality/Economic Benefit		onality and associated vities and opportunities
Works Description	Summary of requirements	Option Number	Qualitative appraisal of potential infrastructure costs of proposed options	Rationale	Qualitative appraisal of potential ongoing infrastructure maintenance costs of proposed options	Rationale	Qualitative appraisal of potential ongoing operational costs of proposed options	Rationale	Qualitative appraisal of potential wider benefits of proposed options	Rationale
			Estimate high level cost of construction of option Extent and type of 3rd party lands required permanently Extent and type of 3rd party land required temporarily for temporary works during construction		Effects of infrastructure maintenance to services.		Potential improvement or deterioration of the operation conditions of the line (reduction or increase of the risk of interruption of service) Rolling stock & staff utilisation		Potential benefit to vehicular traffic flows in the vicinity of the works during construction and associated economic activities and opportunities in the vicinity Consideration of duration of traffic disruption and length of diversions To minimise the impacts on traffic and transportation during the construction and operational stages	
		1		Option 1 is located on a land requiring minimal excavation and no large civil infrastructure		Although there are minor differences, in length of access road for example, which could affect maintenance costs, overall the options are comparable/neutral		All options are comparable - options of substation locations do not impact the train operations functionality and its economic benefits		All options are comparable - options of substation locations do not impact the train operations functionality and its economic benefits
Electrification of Northern Line: Traction Substation Locations	Electrification of the line from the end of the current electrified section at Malahide to Drogheda with 1500V DC overhead.	2		Option 2 is located on a land requiring minimal excavation and no large civil infrastructure		Although there are minor differences, in length of access road for example, which could affect maintenance costs, overall the options are comparable/neutral		All options are comparable - options of substation locations do not impact the train operations functionality and its economic benefits		All options are comparable - options of substation locations do not impact the train operations functionality and its economic benefits
		3		Option 3 involves construction of a retaining wall		Although there are minor differences, in length of access road for example, which could affect maintenance costs, overall the options are comparable/neutral		All options are comparable - options of substation locations do not impact the train operations functionality and its economic benefits		All options are comparable - options of substation locations do not impact the train operations functionality and its economic benefits

Comparison Criteria Legend
Significant comparative advantage over other options
Some comparative advantage over other options
Comparable to other options / neutral
Some comparative disadvantage over other options

				Saf	fety	
			Emp	ployer's Safety	P	ublic safety
Works Description	Summary of	Option Number	Qualitative appraisal on the safety impacts on IÉ or railway staff	Rationale	Qualitative appraisal on the safety impacts on the public (road/rail/cycle/pedes trian)	Rationale
	requirements		maintenance and oper	associated with construction rations. al for incidents or near-misses for	To reduce safety risks associated with passengers at platforms, public adjacent to the railway and road, pedestrian and cycle users at level crossings. To reduce the potential for accidents for members of the public/passengers on railway infrastructure. To reduce the potential for conflict between rail and road users.	
	Electrification of the line from the end of the current electrified section at Malahide to Drogheda with 1500V DC overhead.	1		All options are comparable, with no differences between the options with regards to employer's safety		All options are comparable, with no differences between the options with regards to public safety
Traction Substation		2		All options are comparable, with no differences between the options with regards to employer's safety		All options are comparable, with no differences between the options with regards to public safety
		3		All options are comparable, with no differences between the options with regards to employer's safety		All options are comparable, with no differences between the options with regards to public safety

			Environment														
			Landscape a	and Visual Qualitative		Biodiversity	Noise	e and Vibration	Wa	ater resources	Archaeology, Architectural and Cultural Heritage	Ge	ology & Soils	Agricultura	ll and non-agricultural	Air Qualit	ty & Climate Change
Works Description	Summary of requirements	Option Number	Appraisal of landscape and visual impacts of options based on the sensitive viewpoints	Rationale	Qualitative appraisal on the impact on biodiversity	Rationale	Qualitative appraisal of the potential noise and vibration impact	Rationale	Qualitative appraisal on the potential impacts to surface ground or coastal waters	Rationale	Qualitative appraisal of the potential impacts of proposed options on potential sub surface archaeology and impact on foundations and above ground elements of architectural heritage	Qualitative appraisal of the potential of the proposed options on wast and material resources including the reuse of site won materials.	Rationale	Qualitative appraisal of impacts on valued resources either from a human or natural origin with value arising for economic or cultural reasons. These assets can be existing utilities or non- renewable resources	Rationale	Qualitative appraisal of air quality and climate impacts both on the operational and construction phases	Rationale
	requirements		landscapes, protected to To avoid / minimise vis amenities. To avoid / minimise rei To avoid / minimise im	isual impact on properties & emoval of trees / hedgerows. npact from light pollution. ties to enhance the local amenity	on biodiversity of the area and/or provides opportunities to enhance it.				enhance the quality of	ct or provide opportunities to surface waters and associated tters and coastal waters.	•To minimise the impact on cultural heritage such as on below ground archaeological remains, historic buildings (individual and areas), and historic landscapes and parks.	•To provide a solution carbon. •To minimise waste.	which minimises total capital	ich minimises total capital To provide a solution which minimises total capital carbon.		To provide a solution which comprises a reduction in greenhouse gas emissions. To ensure that the chosen solution preserves or enhances the local air quality	
		1	p	Location is remote from residential property but intrusive in agricultural landscape		Comparable to other options due to construction related impacts. This option would require removal of hedgerow/treeline for the TSS and possibly for access road (difficult to te from figure provided), with potential for impacts on brids, small mammals and bats. Access road adjacent to bridge with the yotential for roosting bats. Additional lighting required for TSS has potential for disturbance impacts on bats, wintering birds (if using agricultural lands for foraging), and other mammals.		Furthest from any residential receptors		All options comparable	There are no recorded monuments in the vicinity of the proposed substation. There is the potential to reveal subsurface archaeological finds and deposits during any earthmoving works associated with the construction of the substation. Located in an agricultural ploughed field. Aerial photography notes a darkened semi-circular patch of soil (135m north-south and 48m eas west) to the south of the proposed substation area, this should be investigated by archaeological test trenching. A historic underpass is indicated at this location and further investigation is required to establish the architectural heritage value of this structure. It is anticipated that the magnitude of impact on the designed landscape would be low resulting in a Negative, slight impact on the architectural heritage value of the site.		There is potential for loss of topsoil/growing soil. The location for the proposed works will require the construction of longer access road thereby generating more earthworks.		This has significant comparative disadvantages because this option is located on land with a medium-high sensitivity enterprise and requires a long entrance road on agricultural lan		No operational air quality or climate impacts. Similar distance to sensitive receptors for potential dust impacts during construction. No real differentiator.
Electrification of lir Northern Line: the Traction Substation Locations Dro	Electrification of the line from the end of the current electrified section at Malahide to Drogheda with 1500V DC overhead.	2		Location is close to residential property		Comparable to other options due to construction related impacts. This option would require removal of hedgerow/treeline for the TSS and possibly for access road (difficult to te from figure provided), with potential for impacts on brids, small mammals and bats. Access road adjacent to bridge with the yotential for roosting bats. Additional lighting required for TSS has potential for disturbance impacts on bats, wintering birds (if using agricultural lands for foraging), and other mammals.	li	Close to residential receptors		All options comparable	There are no recorded monuments in the vicinity of the proposed substation. There is the potential to reveal subsurface archaeological finds and deposits during any earth moving works associated with the construction of the substation in this agricultural field. It is on the site of the former gate lodge of Hackettstown House. There are possible remains of this structure indicated on the current OS maps for the site, and on aerial photographs. A sub-station in this location would negatively impact on the former designed landscape of Hackettstown House. Due to the proposed location, which corresponds to an historic entrance to the demense, it is anticipated that the magnitude of impact would be low. Overall, this option would have a Negative, Slight impact on the architectural heritage value of the site.		There is potential for loss of topsoil/growing soil. The location for the proposed works will require the construction of an access road thereby generating earthworks.		This has some comparative advantages because this option is located on agricultural land with a medium-high sensitivity enterprise		No operational air quality or climate impacts. Less preferred compared to option I for potential dust impacts during construction. No real differentiator.
		3	v	Location is well screened by roadside vegetation and remote from residential properties		Comparable to other options due to construction related impacts. Vegetation removal required for TSS installation, and access road. Disturbance/displacement impacts on birds, bats, manmals. TSS location adjacent to bridge with low potential for rocosting bats. Additional lighting required for TSS has potential for disturbance impacts on bats, winterin birds (if using agricultural lands for foraging), and other mammals.		Close to residential receptors		All options comparable	There are no recorded monuments in the vicinity of the proposed substation. There is the potential to reveal subsurface archaeological finds and deposits during any earth moving works associated with the construction of the substation. Located in an agricultural field in Milleverton townland when there is a tradition of burials in 'stone coffind' being revealed (DUOS-032). Also a fregment of human skull (NMI 1986:140) was found as surface find in a ploughed field in Milleverton known as 'Danes Burial Ground'. A sub-station in this location would negatively impact on the setting of the bridge. It is anticipated that the magnitude of impact would be low. This option would also negatively impact on the complex of early nineteenth century farm buildings to the east of Golf Links Road bridge. The farm buildings would be screened by the railway line and existing mature trees. It is anticipated that the magnitude of impact would be tow. Overall, this option would have a Negative, Slight impact on the architectural heritage value of the site.		There is potential for loss of topsoil/growing soil. The location for the proposed works will require the construction of an access road thereby generating earthworks.		This has some comparative advantages because this option is located on agricultural land with a medium sensitivity enterprise		No operational air quality or climate impacts. Less preferred compared to option 1 for potential dust impacts during construction. No real differentiator.

Comparison Criteria Legend Significant comparative advantage over other options Some comparative advantage over other options Comparable to other option, neutral Some comparative disadvantage over other options Significant comparative disadvantage over other options

			Accessibility & Social Inclusion					
			А	ccessibility	So	cial Inclusion		
Works Description	Summary of	Option Number	Qualitative appraisal of capacity of options to facilitate the movement of people (either within, on to or across the rail system)	Rationale	Qualitative appraisal of capacity of options to provide ease of access for the mobility and visually impaired	Rationale		
	requirements		Positive impact on passenger and public experience.		Positive impact towards vulnerable groups Improvement of accessibility to public transport facil in particular from deprived geographic areas.			
	Electrification of the line from the end of the current electrified section at Malahide to Drogheda with 1500V DC overhead.	1		All options are comparable - options of substation locations do not impact accessibility in this area.		All options are comparable - options substation locations do not impact social inclusion in this area.		
Electrification of Northern Line: Traction Substation Locations		2		All options are comparable - options of substation locations do not impact accessibility in this area.		All options are comparable - options substation locations do not impact social inclusion in this area.		
		3		All options are comparable - options of substation locations do not impact accessibility in this area.		All options are comparable - options substation locations do not impact social inclusion in this area.		

				Integration										
			Adaptal	bility in the future	Trans	port Integration	Land	use integration	Geogra	ohical Integration	Governme	ent policy Integration	Walking / cycling opportunities	
Works Description	Summary of		Qualitative appraisal of capacity of options to cater for future projects or aspirations	Rationale	Qualitative appraisal of the options and their impact on integration with other transport modes	Rationale	Qualitative appraisal of the options and their impact on integration with land use policies		Qualitative appraisal of the options and their impact on integration with geographical polices	Rationale	Qualitative appraisal of the options and their impact on integration with geographical and government polices	Rationale	Qualitative appraisal of the options and their impact to enable walking and cycling opportunities in a safer environment for the communities along the route	Rationale
works description	requirements			Ability to continue to function successfully despite future changes in circumstances		Scope for and ease of interchange between modes New interchange nodes and facilities Reduce waking and wait times associated with interchanges Integration with the cycle networks Modal shifts figures during construction and operations Changes to journey times to transport nodes Impact on the operation of the other transport services both during construction and in operation stage		Consistency with land use strategies, regional and local plans		Potential to impact on external links during construction Potential to impact on external links during operations Consideration for any community severance impacts		nal and international plans and	environment in the co To create a healthy en travel Connectivity to adjoini Enhanced connectivity generators related to a Diversions, duration a	nd impact on journey times and egative modal shift (e.g. people opt
		1		All options are comparable - options o substation locations do not impact the adaptability in the future in this area		All options are comparable - options or substation locations do not impact transport integration in this area.		Option 1 is zoned G4/Green Belt. A substation is permissible.		All of the options are infrastructural buildings adjoining a railway line and are considered neutral.		All international, national, regional an local policies encourage improvement in relation to the efficiency of public transport. All the proposed options will facilitate the achievement of greater efficiency in public transportation long part of the east coast of the country and therefore comply with government policy.	5 5	All options are comparable - options of substation locations do not impact the walking and cycling opportunities in this area.
Electrification of Northern Line: Traction Substation Locations	Electrification of the line from the end of the current electrified section at Malahide to Drogheda with 1500V DC overhead.	2		All options are comparable - options o substation locations do not impact the adaptability in the future in this area		All options are comparable - options of substation locations do not impact transport integration in this area.		Option 2 is zoned G4/Rural. A substation is permissible.		All of the options are infrastructural buildings adjoining a railway line and are considered neutral.		All international, national, regional an local policies encourage improvement in relation to the efficiency of public transport. All the proposed options will facilitate the achievement of greater efficiency in public transportation long part of the east coast of the country and therefore comply with government policy.		All options are comparable - options of substation locations do not impact the walking and cycling opportunities in this area.
		3		All options are comparable - options o substation locations do not impact the adaptability in the future in this area		All options are comparable - options of substation locations do not impact transport integration in this area.		Option 3 is zoned P1/Green Belt. A substation is permissible.		All of the options are infrastructural buildings adjoining a railway line and are considered neutral.		All international, national, regional an local policies encourage improvement in relation to the efficiency of public transport. All the proposed options will facilitate the achievement of greater efficiency in public transportation long part of the east coast of the country and therefore comply with government policy.		All options are comparable - options of substation locations do not impact the walking and cycling opportunities in this area.

Skerries North Substation Optioneering MCA Matrix

Comparison Criteria Legend
Significant comparative advantage over other options
Some comparative advantage over other options
Comparable to other options / neutral
Some comparative disadvantage over other options

Significant comparative disadvantage over other options

						Ecor	nomy			
				ure (CAPEX): Construction, tion, temporary works	Technology ac	l costs (IÉ or other entities), dvancements and future ng / obsolescence	Train Operation	ns Functionality/Economic Benefit	Traffic functionality and associated economic activities and opportunities	
Works Description	Summary of	Option Number	Qualitative appraisal of potential infrastructure costs of proposed options	Rationale	Qualitative appraisal of potential ongoing infrastructure maintenance costs of proposed options	Rationale	Qualitative appraisal of potential ongoing operational costs of proposed options	Rationale	Qualitative appraisal of potential wider benefits of proposed options	Rationale
	requirements		Estimate high level cost of construction of option		Effects of infrastructure maintenance to services. Provision of ways of undertaking routine inspections and		Potential improvement or deterioration of the operation conditions of the line (reduction or increase of the risk of interruption of service) Rolling stock & staff utilisation		Potential benefit to vehicular traffic flows in the vicinity of the works during construction and associated economic activities and opportunities in the vicinity Consideration of duration of traffic disruption and length of diversions To minimise the impacts on traffic and transportation during the construction and operational stages	
Electrification of Northern Line: Traction Substation	Electrification of the line from the end of the current electrified section at Malahide to	1		Due to the level changes, a number of retaining walls need to be construction around the substation and access road		Maintenance of the retaining walls and access road required		All options are comparable - options of substation locations do not impact the train operations functionality and its economic benefits		All options are comparable - options of substation locations do not impact the train operations functionality and its economic benefits
Locations	Drogheda with 1500V DC overhead.	4		Located on agricultural land therefore no significant retaining walls required.		Maintenance of the access road		All options are comparable - options of substation locations do not impact the train operations functionality and its economic benefits		All options are comparable - options of substation locations do not impact the train operations functionality and its economic benefits

Comparison Criteria Legend

Significant comparative advantage over other option

Some comparative advantage over other options

Comparable to other options / neutral

Some comparative disadvantage over other options

Significant comparative disadvantage over other options

Significant comparative u	isadvantage over other opt	LIOIIS								
				Safety						
			Emį	ployer's Safety	P	ublic safety				
Works Description	Summary of	Option Number	Qualitative appraisal on the safety impacts on IÉ or railway staff	Rationale	Qualitative appraisal on the safety impacts on the public (road/rail/cycle/pedes trian)	Rationale				
	requirements		maintenance and opera	associated with construction ations. I for incidents or near-misses for	To reduce safety risks associated with passengers at platforms, public adjacent to the railway and road, pedestrian and cycle users at level crossings. To reduce the potential for accidents for members of the public/passengers on railway infrastructure. To reduce the potential for conflict between rail and road users.					
Electrification of Northern Line: Traction Substation	Electrification of the line from the end of the current electrified section at Malahide to	1		All options are comparable, with no differences between the options with regards to employer's safety		All options are comparable, with no differences between the options with regards to public safety				
Locations	section at Malahide to Drogheda with 1500V DC overhead.	4		All options are comparable, with no differences between the options with regards to employer's safety		All options are comparable, with no differences between the options with regards to public safety				



Comparison Criteria Legend
ignificant comparative advantage over other options
iome comparative advantage over other options
iome comparative disadvantage over other options
iome comparative disadvantage over other options

							1			Envi	ronment							
			Landscape a	and Visual Qualitative		Biodiversity	Noise	e and Vibration	Wa	ater resources	Archaeology, Ar	chitectural and Cultural Heritage	Geo	ology & Soils	Agricultura	al and non-agricultural	Air Qualit	ty & Climate Change
Works Description	Summary of requirements	Option Number	Appraisal of landscape and visual impacts of options based on the sensitive viewpoints	Rationale	Qualitative appraisal on the impact on biodiversity	Rationale	Qualitative appraisal of the potential noise and vibration impact	Rationale	Qualitative appraisal on the potential impacts to surface ground or coastal waters	Rationale	Qualitative appraisal of the potential impacts of proposed options on potential sub surface archaeology and impact or foundations and above ground elements of architectural heritage	Rationale	Qualitative appraisal of the potential of the proposed options on wast and material resources including the reuse of site won materials.	^e Rationale	Qualitative appraisal of impacts on valued resources either from a human or natural origin with value arising for economic or cultural reasons. These assets can be existing utilities or non-renewable resources	Rationale	Qualitative appraisal of air quality and climate impacts both on the operational and construction phases	Rationale
	requirements		landscapes, protected t • To avoid / minimise v amenities. • To avoid / minimise r • To avoid / minimise ir	isual impact on properties & emoval of trees / hedgerows. mpact from light pollution. ties to enhance the local amenity		llution provided minimises the effects area and/or provides opportunities		which ensures minimum levels of	enhance the quality of	ict or provide opportunities to surface waters and associated aters and coastal waters.		c on cultural heritage such as on below ground historic buildings (individual and areas), and parks.	•To provide a solution carbon. •To minimise waste.	which minimises total capital	To provide a solution	which minimises total capital carbon	greenhouse gas emissi	which comprises a reduction in ons. ons. osen solution preserves or enhances
	Electrification of the line from the end of the current electrified section at Malahide to	1		Further from more residential receptors		Some comparative disadvantage due to construction related impacts. Potential for disturbance from light/noise to brids species feeding on nearby Barnageera Bay Beach (not designated area). Vegetation removal for TSS - potential for habitat loss and disturbance impacts on birds, bats, mammals. Access road in potentially disturbed area so may not cause any additional habitat loss for this. Only have bat rootsing potential. However from Google Street View, roosting potential is low.		Further from more residential receptors		All options comparable		This option is located in Barnageeragh townland where subsurface archaeological features and finds have been revealed through development projects. As such this option is considered to have the potential to reveal sub-surface archaeological features and preconstruction investigation will be required to be carried out. Option 1 is located beside the railway bridge (UBB 53) over Barnageeragh Road is included in Fingal County Council's Record of Protected Structures (FCR PS 78). No direct negative impact anticipated. There is a potential indirect or visual impact the magnitude of which is low. It is anticipated that the proposed location would have a Negative, Slight impact on the architectural heritage value of the site.		There is potential for loss of topsoil/growing soil since in agricultural land. The location for the proposed works will require the construction of a retaining wall and an access road thereby requiring more excavation works and generating considerable earthworks		Some comparative advantages for thi option which is not located on agricultural land.		Good separation from nearest sensitive receptors avoiding potential air quality impacts during the construction phase.
Locations	Drogheda with 1500V DC overhead.	4		Closer to residential receptors		Some comparative advantage to other option due to construction related impacts. Very little to - no scrub/hedgerow/tree removal for this option (TSS or access road). Potential for bird related disturbance in agricultural field it. eground nesting birds, and wintering birds.		Closer to residential receptors		All options comparable		This option is located in Barnaeeragh townland where subsurface archaeological features and finds have been revealed through development projects. As such this option is considered to have the potential to reveal sub-surface archaeological features and preconstruction investigation will be required to be carried out. The proposes site for Option 4 is a greenfield site with no known architectural heritage features. It is anticipated that the magnitude of impact from option 4 on the setting of the historic structures would be negligible. No other buildings or features of architectural heritage interest were identified which could be impacted by a proposed sub-station at this location		There is potential for loss of topsoil/growing soil since in agricultural land. The location for the proposed works will require the construction of an access road thereby generating earthworks. Possibility of encountering alluvial deposits based on geological maps	n	Some comparative disadvantage for this option which is located on agricultural land.		Located closer to sensitive receptors potentially resulting in air quality impacts during the construction phase.

Comparison Criteria Legend

Significant comparative advantage over other optio

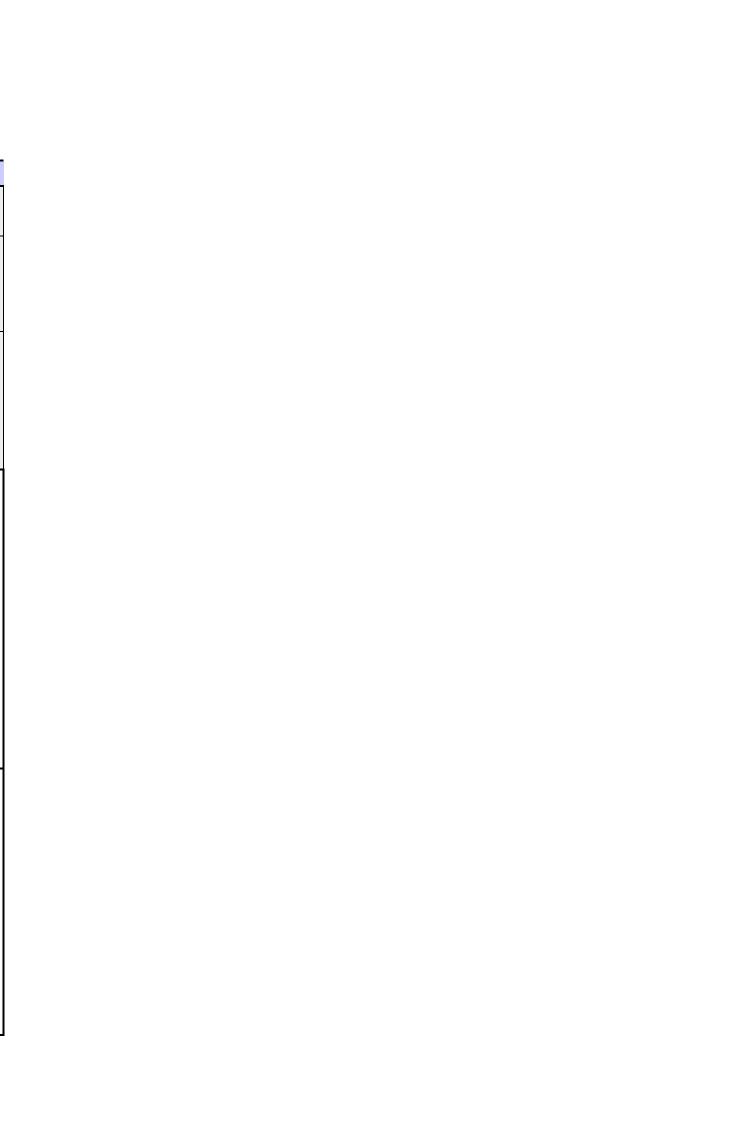
Some comparative advantage over other options

Comparable to other options / neutral

Some comparative disadvantage over other options

Significant comparative disadvantage over other options

				Accessibility &	Social Inclusion	
			А	accessibility	So	cial Inclusion
Works Description	Summary of		Qualitative appraisal of capacity of options to facilitate the movement of people (either within, on to or across the rail system)	Rationale	Qualitative appraisal of capacity of options to provide ease of access for the mobility and visually impaired	Rationale
	requirements		(either within, on to or Impact on the wellbeing Positive impact on pass Improve accessibility to	g of the passenger and public. enger and public experience. key facilities, such as employment, d healthcare to satisfy transport	Positive impact toward: Improvement of access particular from deprive	ibility to public transport facilities, in
Electrification of Northern Line: Traction Substation	Electrification of the line from the end of the current electrified section at Malahide to	1		All options are comparable - options of substation locations do not impact accessibility in this area.		All options are comparable - options of substation locations do not impact social inclusion in this area.
Locations	Drogheda with 1500V DC overhead.	4		All options are comparable - options of substation locations do not impact accessibility in this area.		All options are comparable - options of substation locations do not impact social inclusion in this area.



Comparison Criteria Legend

Significant comparative advantage over other options
Some comparative advantage over other options
Comparable to other options / neutral

Some comparative disadvantage over other options
Significant comparative disadvantage over other options

	_	_		Integration Physical Activity										sical Activity
			Adapta	bility in the future	Trans	port Integration	Land	use integration	Geogra	phical Integration	Governme	ent policy Integration	Walking / o	cycling opportunities
Works Description	Summary of	Option Number	Qualitative appraisal of capacity of options to cater for future projects or aspirations	Rationale	Qualitative appraisal of the options and their impact on integration with other transport modes	Rationale	Qualitative appraisal of the options and their impact on integration with land use policies	Rationale	Qualitative appraisal of the options and their impact on integration with geographical polices	Rationale	Qualitative appraisal of the options and their impact on integration with geographical and government polices	Rationale	Qualitative appraisal of the options and their impact to enable walking and cycling opportunities in a safer environment for the communities along the route	Rationale
	requirements		Ability to continue to function successfully despite future changes in circumstances		Scope for and ease of interchange between modes New interchange nodes and facilities Reduce waking and wait times associated with interchanges Integration with the cycle networks Modal shifts figures during construction and operations Changes to journey times to transport nodes Impact on the operation of the other transport services both during construction and in operation stage		Consistency with land plans	use strategies, regional and local	Potential to impact on	external links during construction external links during operations community severance impacts	Integration with nation policies	nal and international plans and	environment in the con To create a healthy env Connectivity to adjoinin Enhanced connectivity generators related to a Diversions, duration an	d impact on journey times and gative modal shift (e.g. people opt
Electrification of Northern Line: Traction Substation	Electrification of the line from the end of the current electrified section at Malahide to	1		All options are comparable - options o substation locations do not impact the adaptability in the future in this area		All options are comparable - options o substation locations do not impact transport integration in this area.		Option 1 is zoned Open Space. A substation is acceptable.		All of the options are infrastructural buildings adjoining a railway line and are considered neutral.		All international, national, regional and local policies encourage improvements in relation to the efficiency of public transport. All the proposed options will facilitate the achievement of greater efficiency in public transportation long part of the east coast of the country and therefo comply with government policy.		All options are comparable - options of substation locations do not impact the walking and cycling opportunities in this area.
Locations	Drogheda with 1500V DC overhead.	4		All options are comparable - options o substation locations do not impact the adaptability in the future in this area		All options are comparable - options o substation locations do not impact transport integration in this area.		Option 4 is zoned High Amenity. This option is less preferable.		All of the options are infrastructural buildings adjoining a railway line and are considered neutral.		All international, national, regional and local policies encourage improvements in relation to the efficiency of public transport. All the proposed options will facilitate the achievement of greater efficiency in public transportation long part of the east coast of the country and therefocomply with government policy.		All options are comparable - options of substation locations do not impact the walking and cycling opportunities in this area.

Balbriggan Substation Optioneering MCA Matrix

Comparison Criteria Legend

Significant comparative advantage over other options

Some comparative advantage over other options

Comparable to other options / neutral

Some comparative disadvantage over other options

Significant comparative disadvantage over other options

			-				Eco	nomy			
					ture (CAPEX): Construction, tion, temporary works	Technology a	I costs (IÉ or other entities), dvancements and future ng / obsolescence	Train Operation	ns Functionality/Economic Benefit		ionality and associated ivities and opportunities
Works Description	Summary of	Option Number	cost - TO BE HIDDEN FOR	Qualitative appraisal of potential infrastructure costs of proposed options	Rationale	Qualitative appraisal of potential ongoing infrastructure maintenance costs of proposed options	Rationale	Qualitative appraisal of potential ongoing operational costs of proposed options	Rationale	Qualitative appraisal of potential wider benefits of proposed options	Rationale
	requirements		ISSUE	Estimate high level cost o Extent and type of 3rd pa Extent and type of 3rd pa temporary works during o	rty lands required permanently rty land required temporarily for	Effects of infrastructure Provision of ways of un	money. frastructure over the whole life. e maintenance to services. dertaking routine inspections and while minimising the effect on			the works during const activities and opportun Consideration of durati of diversions To minimise the impact	nicular traffic flows in the vicinity of ruction and associated economic ities in the vicinity on of traffic disruption and length ts on traffic and transportation and operational stages
		1	€ 9,607,135		All options are comparable - no major construction works required outside of the standard substation buildings		Although there are minor differences, in length of access road for example, which could affect maintenance costs, overall the options are comparable/neutral		All options are comparable - options of substation locations do not impact the train operations functionality and its economic benefits		All options are comparable - options of substation locations do not impact the train operations functionality and its economic benefits
Electrification of Northern Line: Traction Substation Locations	Electrification of the line from the end of the current electrified section at Malaide to Drogheda with 1500V DC overhead.	2	€ 9,620,73€		All options are comparable - no major construction works required outside of the standard substation buildings		Although there are minor differences, in length of access road for example, which could affect maintenance costs, overall the options are comparable/neutral		All options are comparable - options of substation locations do not impact the train operations functionality and its economic benefits		All options are comparable - options of substation locations do not impact the train operations functionality and its economic benefits
		3	€ 10,571,212		All options are comparable - no major construction works required outside of the standard substation buildings		Although there are minor differences, in length of access road for example, which could affect maintenance costs, overall the options are comparable/neutral		All options are comparable - options of substation locations do not impact the train operations functionality and its economic benefits		All options are comparable - options of substation locations do not impact the train operations functionality and its economic benefits

Comparison Criteria Legend
significant comparative advantage over other options
ome comparative advantage over other options
comparable to other option, 'neutral
some comparative disadvantage over other options

					Sai	fety	
				Em	ployer's Safety	Р	ublic safety
Works Description	Summary of	Option Number	cost - TO BE HIDDEN FOR	Qualitative appraisal on the safety impacts on IÉ or railway staff	Rationale	Qualitative appraisal on the safety impacts on the public (road/rail/cycle/pedes trian)	Rationale
	requirements		ISSUE	maintenance and oper	associated with construction ations.	platforms, public adjace pedestrian and cycle us To reduce the potential public/passengers on ra	I for accidents for members of the
		1	€ 9,607,135		All options are comparable, with no differences between the options with regards to employer's safety		Integration with the public
Electrification of Northern Line: Traction Substation Locations	Electrification of the line from the end of the current electrified section at Malahide to Drogheda with 1500V DC overhead.	2	€ 9,620,736		All options are comparable, with no differences between the options with regards to employer's safety		Integration with the public
		3	€ 10,571,212		All options are comparable, with no differences between the options with regards to employer's safety		All options are comparable, with no differences between the options with regards to public safety

					Environment														
				Landscape	and Visual Qualitative		Biodiversity	Nois	se and Vibration	Wa	nter resources	Archaeology, Ai	chitectural and Cultural Heritage	Geo	ology & Soils	Agricultura	al and non-agricultural	Air Quali	ty & Climate Change
Works Description	Summary of requirements	Option Number	cost - TO BE HIDDEN FOR ISSUE	Appraisal of landscape and visual impacts of options based on the sensitive viewpoints	Pationale	Qualitative appraisal on the impact on biodiversity	Rationale	Qualitative appraisal of the potential noise and vibration impact		Qualitative appraisal on the potential impacts to surface ground or coastal waters	Rationale	Qualitative appraisal of th potential impacts of proposed options on potential sub surface archaeology and impact o foundations and above ground elements of architectural heritage	Danisarda	Qualitative appraisal of the potential of the proposed options on waste and material resources including the reuse of site won materials.	Rationale	Qualitative appraisal of impacts on valued resources either from a human or natural origin with value arising for economic or cultural reasons. These assets can be existing utilities or non- renewable resources	Rationale	Qualitative appraisal of air quality and climate impacts both on the operational and construction phases	Rationale
	requiencie			landscapes, protected To avoid / minimise vamenities. To avoid / minimise r To avoid / minimise i	visual impact on properties & removal of trees / hedgerows. impact from light pollution. nities to enhance the local amenity	•To ensure that the so on biodiversity of the enhance it.	lution provided minimises the effects area and/or provides opportunities t	•To provide a solution c noise and vibration	which ensures minimum levels of	enhance the quality of	ct or provide opportunities to surface waters and associated iters and coastal waters.	•To minimise the impac archaeological remains, historic landscapes and	t on cultural heritage such as on below ground historic buildings (individual and areas), and parks.	•To provide a solution carbon. •To minimise waste.	which minimises total capital	To provide a solution	which minimises total capital carbo	greenhouse gas emiss	which comprises a reduction in ions. osen solution preserves or enhances
		1	€ 9,607,133		Site is partly overlooked from residential development at Cardy Ro and is sited at off the beach access lane. Some screening could be provided.		Some Comparative advantage to othe options due to construction and operation related impacts. Scrub/hedgerow removal required for TSS location and access roads, potential disturbance/displacement impacts on brick, bats, mammals. TSS location adjacent to bridge with high potential for rossting bats. Additional lighting required for TSS has potential for disturbance impacts on bats, wintering birds (if using agricultural lands for foraging), and other mammals. Agricultural field may be used by over wintering birds species, potential disturbance/displacement impacts during construction and operation due to increased human presence, lighting, noise. However location of TSS looks potentially disturbed already, therefore impact may be limited.		Closest to residential receptors		All options comparable		This option is located in Bremore townland where there are the recorded monuments such as Bremore Castle, church and gravepard and the National Monument of Bremore Megalithic Tombs (DU002-00010-005). As such this option is considered to have the potential to reveal sub-surface archaeological features and preconstruction investigation will be required to be carried out. The proposed site is a greenfield site with no known architectural heritage features. There is a potential visual impact on UBBS I located to the SE. It is anticipated that the magnitude of impact on the setting of the bridge would be low. No other buildings or features of architectural heritage interest were identified with could be impacted by a proposed substation at this location.		There is potential for loss of topsoil/growing soil since propose location is in agricultural land. The location for the proposed works will require the construction of an access road thereby generating earthworks.		Located on agricultural land with a short access road		No operational air quality or climate impacts. Similar distance to sensitive receptors for potential dust impacts during construction. No real differentiator.
Traction Substation	Electrification of the line from the end of the current electrified section at Malahide to Drogheda with 1500V DC overhead.	2	€ 9,620,73€	5	Site located within open space, adjoining / impacting on footpaths and along the beach access lane. Site is in close proximity to Bremore Castle.		Some Comparative advantage to othe options due to construction and operation related impacts. hedgerow removal required for TSS location and access roads (less so than Option 3), potential disturbance/displacement impacts on bricks, bats, mammals. TSS location adjacent to bridge with hippotential for rossting bats. Additional lighting required for TSS has potential for rossting bats. Additional lighting required for TSS has potential for rossting bats. Additional lighting required for TSS has potential for disturbance impacts on bats, wintering birds (if using amenity grasslands for foraging). Amenity grasslands for foraging! Amenity grasslands for foraging! Amenity disturbance/displacement impacts during construction and operation dut to increased human presence, lighting to the control of TSS looks potentially disturbed already as a public path and residential area is nearby, therefore impact may be limited.		Further from residential receptors than Option 1 but closer than Option :	3	All options comparable		This option is located in Bremore townland where there are the recorded monuments such as Bremore Castle, church and graveyard and the National Monument of Bremore Megalithic Tombs (DU002-0010-005). As such this option is considered to have the potential to reveal sub-surface archaeological features and preconstruction investigation will be required to be carried out. Option 2 may have a visual impact on impact on the on the setting of St. Molaga's Church and graveyard (FCC RPS 0013) and Bremore Castle (FCC RPS 0014). While these features are approximately 150m away from the proposed substation, due to the open nature of the coastal setting of the historic structure is anticipated to be Medium. Due to the number of sites which would be impacted by a sub-station at this location, it is anticipated that the proposed sub-station at Location 2 would have a Negative, moderate impact on the architectural heritage value of the site.		The location for the proposed works will require the construction of an access road thereby generating earthworks.	n	Not located on agricultural land		No operational air quality or climate impacts. Similar distance to sensitive receptors for potential dust impacts during construction. No real differentiator.
		3	€ 10,571,212		Site is remote and not openly visible. Appropriate screening can be provided. Long section of access roac required.		Some comparative disadvantage othe options due to construction related impacts. Hedgerow removal (c. 370m)will be required for access road unable to determine if good quality hedgerow/well established but would likely have a range of bird species nesting/foraging in this hedgerow, also suitable yellowhammer habitat (red-listed species). Also disturbance impacts on bats, small mammals and inverts, possibly some hedgerow/scrub removal required for TSS location. Agricultural field may be used by over wintering bird species, potential disturbance/displacement impacts during construction and operation due to increased human presence, lighting, noise.		Furthest from any residential receptors		All options comparable		This option is located in Bremore townland where there are recorded monuments such as Bremore Castle, church and graveyard, and the National Monument of Bremore Megalithic Tombs (DU002-001001-005). As such this option is considered to have the potential to reveal sub-surface archaeological features and preconstruction investigation will be required to be carried out. This option incorporates a long access route through a greenfield environment which adds to the potential to reveal below-ground remains. The proposed site is a greenfield site. For option 3, no buildings or features of architectural heritage interest were identified which could be impacted by a proposed substation at this location.		There is potential for loss of top/growing soil since proposed location is in agricultural land. The location for the proposed works will require the construction of longer access road thereby generating more earthworks.	n	Located on agricultural land with a long access road		No operational air quality or climate impacts. Similar distance to sensitive receptors for potential dust impacts during construction. No real differentiator.

Comparison Criteria Legend
Significant comparative advantage over other options
Some comparative advantage over other options
Comparable to other option, 'neutral
Some comparative disadvantage over other options

					Accessibility &	Social Inclusion	
				,	Accessibility	So	cial Inclusion
Works Description	Summary of	Option Number	cost - TO BE HIDDEN FOR ISSUE	Qualitative appraisal of capacity of options to facilitate the movement of people (either within, on to or across the rail system)	Rationale	Qualitative appraisal of capacity of options to provide ease of access for the mobility and visually impaired	Rationale
	requirements		1330E	(either within, on to or Impact on the wellbein Positive impact on pass Improve accessibility to	key facilities, such as employment, nd healthcare to satisfy transport	Positive impact toward: Improvement of access in particular from depri	ibility to public transport facilities,
		1	€ 9,607,135		All options are comparable - options of substation locations do not impact accessibility in this area.		All options are comparable - options of substation locations do not impact social inclusion in this area.
Electrification of Northern Line: Traction Substation Locations	Electrification of the line from the end of the current electrified section at Malahide to Drogheda with 1500V DC overhead.	2	€ 9,620,736		All options are comparable - options of substation locations do not impact accessibility in this area.		All options are comparable - options of substation locations do not impact social inclusion in this area.
		3	€ 10,571,212		All options are comparable - options of substation locations do not impact accessibility in this area.		All options are comparable - options of substation locations do not impact social inclusion in this area.

			<u>, </u>	Adaptability in the future Transport Integration Landuce integration Geographical Integration								Physical Activity			
				Adapta	ability in the future	Trans	port Integration	Land	use integration	Geogra	phical Integration	Governme	ent policy Integration	Walking /	cycling opportunities
	Summary of		cost - TO BE HIDDEN FOR	Qualitative appraisal of capacity of options to cater for future projects or aspirations	Rationale	Qualitative appraisal of the options and their impact on integration with other transport modes	Rationale	Qualitative appraisal of the options and their impact on integration with land use policies	Rationale	Qualitative appraisal of the options and their impact on integration with geographical polices	Rationale	Qualitative appraisal of the options and their impact on integration with geographical and government polices	Rationale	Qualitative appraisal of the options and their impact to enable walking and cycling opportunities in a safer environment for the communities along the route	
Works Description	requirements	Option Number	ISSUE	Ability to continue to f changes in circumstan	function successfully despite future ces	New interchange node: Reduce waking and wa interchanges Integration with the cy Modal shifts figures du Changes to journey tim Impact on the operatio	it times associated with cle networks ring construction and operations	Consistency with land uplans	ise strategies, regional and local	Potential to impact on	external links during construction external links during operations community severance impacts	Integration with nation policies	al and international plans and	environment in the co To create a healthy en Connectivity to adjoini Enhanced connectivity generators related to a Diversions, duration ar	d impact on journey times and egative modal shift (e.g. people opt
		1	€ 9,607,135		All options are comparable - options of substation locations do not impact the adaptability in the future in this area		All options are comparable - options of substation locations do not impact transport integration in this area.		Option 1 is zoned Open Space. A utility installation is considered open for consideration. However, the area is included in a Part XI approval for a recreational park, it is considered less likely in planning terms.		All of the options are infrastructural buildings adjoining a railway line and are considered neutral.		All international, national, regional an local policies encourage improvement in relation to the efficiency of public transport. All the proposed options w facilitate the achievement of greater efficiency in public transportation long part of the east coast of the country and therefore comply with government opticy.	5	All options are comparable - options of substation locations do not impact the walking and cycling opportunities in this area.
Electrification of Northern Line: Traction Substation Locations	Electrification of the line from the end of the current electrifical section at Malahide to Drogheda with 1500V DC overhead.	2	€ 9,620,73€		All options are comparable - options of substation locations do not impact the adaptability in the future in this area		All options are comparable - options of substation locations do not impact transport integration in this area.		Option 2 is zoned Open Space. A utility installation is considered open for consideration. However, the area is included in a Part XI approval for a recreational park, it is considered less likely in planning terms.		All of the options are infrastructural buildings adjoining a railway line and are considered neutral.		All international, national, regional an local policies encourage improvement in relation to the efficiency of public transport. All the proposed options we facilitate the achievement of greater efficiency in public transportation longart of the east coast of the country and therefore comply with government policy.	5	All options are comparable - options of substation locations do not impact the walking and cycling opportunities in this area.
		3	€ 10,571,212		All options are comparable - options of substation locations do not impact the adaptability in the future in this area		All options are comparable - options of substation locations do not impact transport integration in this area.		Options 3 is zoned High Amenity. A utility installation is open for consideration.		All of the options are infrastructural buildings adjoining a railway line and are considered neutral.		All international, national, regional an local policies encourage improvement in relation to the efficiency of public transport. All the proposed options w facilitate the achievement of greater efficiency in public transportation longart of the east coast of the country and therefore comply with government policy.	s	All options are comparable - options of substation locations do not impact the walking and cycling opportunities in this area.

Gormanston Substation Optioneering MCA Matrix

Comparison Criteria Legend
ignificant comparative advantage over other options
ome comparative advantage over other options
omparable to other options / neutral
ome comparative disadvantage over other options
institut comparative disadvantage over other options
institut comparative disadvantage over other options

significant comparative ti	sadvantage over other opti	Uns				Ecoi	nomy			
				ture (CAPEX): Construction,	Technology a	Il costs (IÉ or other entities), dvancements and future	Train Operation	ns Functionality/Economic Benefit		ity and associated economic and opportunities
Works Description	Summary of	Option Number	Qualitative appraisal of potential infrastructure costs of proposed options	Rationale	Qualitative appraisal of potential ongoing infrastructure maintenance costs of proposed options	ng / obsolescence	Qualitative appraisal of potential ongoing operational costs of proposed options	Rationale	Qualitative appraisal of potential wider benefits of proposed options	Rationale
	requirements		Estimate high level cost o Extent and type of 3rd pa Extent and type of 3rd pa temporary works during o	rty lands required permanently rty land required temporarily for	Effects of infrastructure Provision of ways of un	money. Frastructure over the whole life. maintenance to services. detraking routine inspections and while minimising the effect on service	conditions of the line (r interruption of service)		the works during const activities and opportun Consideration of durati diversions	on of traffic disruption and length of s on traffic and transportation during
		1		Although Option 1 has a longer access road compared to other options however overall the options are comparable/neutral		Although there are minor differences, in length of access road for example, which could affect maintenance costs, overall the options are comparable/meutral		All options are comparable - options of substation locations do not impact the train operations functionality and its economic benefits		All options are comparable - options of substation locations do not impact the train operations functionality and its economic benefits
Electrification of	Electrification of the line from the end of the current electrified	2		Although Option 2 has a longer access road compared to other options however overall the options are comparable/neutral		Although there are minor differences, in length of access road for example, which could affect maintenance costs, overall the options are comparable/neutral		All options are comparable - options of substation locations do not impact the train operations functionality and its economic benefits		All options are comparable - options of substation locations do not impact the train operations functionality and its economic benefits
Northern Line: Traction Substation Locations	section at Malahide to Drogheda with 1500V DC overhead.	3		Overall the options are comparable/neutral		Although there are minor differences, in length of access road for example, which could affect maintenance costs, overall the options are comparable/meutral		All options are comparable - options of substation locations do not impact the train operations functionality and its economic benefits		All options are comparable - options of substation locations do not impact the train operations functionality and its economic benefits
		4		Overall the options are comparable/neutral		Although there are minor differences, ilength of access road for example, which could affect maintenance costs, overall the options are comparable/neutral		All options are comparable - options of substation locations do not impact the train operations functionality and its economic benefits		All options are comparable - options of substation locations do not impact the train operations functionality and its economic benefits

Comparison Criteria Legend
Significant comparative advantage user under options
Some comparative advantage over other options
Comparable to other options / neutral
Comparable to other options / neutral
Gome comparative disadvantage over other options

			Safety								
			Em	ployer's Safety	Р	ublic safety					
Works Description	Summary of requirements	Option Number	Qualitative appraisal on the safety impacts on IÉ or railway staff	Rationale	Qualitative appraisal on the safety impacts on the public (road/rail/cycle/pedest rian)	Rationale					
			maintenance and opera	sssociated with construction ations. If or incidents or near-misses for	To reduce safety risks associated with passengers at platforms, public adjacent to the railway and road, pedestrian and cycle users at level crossings. To reduce the potential for accidents for members of th public/passengers on railway infrastructure. To reduce the potential for conflict between rail and roausers.						
Electrification of Northern Line: Traction Substation Locations		1		Option 1 is located on the western side of the railway corridor, away from the firing range		All options are comparable, with no differences between the options with regards to public safety					
	Electrification of the line from the end of	2		Option 2 is located close to the firing range zone of the Defence Forces		All options are comparable, with no differences between the options with regards to public safety					
	the current electrified section at Malahide to Drogheda with 1500V DC overhead.	3		Option 3 is located close to the firing range zone of the Defence Forces		All options are comparable, with no differences between the options with regards to public safety					
		4		Option 1 is located on the western side of the railway corridor, away from the firing range		All options are comparable, with no differences between the options with regards to public safety					

			Environment																
			Landscape	and Visual Qualitative		Biodiversity	Nois	e and Vibration	Wa	ater resources	Archaeology, Ar	chitectural and Cultural Heritage	Ge	ology & Soils	Agricultura	l and non-agricultural	Air Quali	ty & Climate Change	
Works Description	Summary of requirements	Option Number	Appraisal of landscape and visual impacts of options based on the sensitive viewpoints	Rationale	Qualitative appraisal on the impact on biodiversity	Rationale	Qualitative appraisal of the potential noise and vibration impact	Rationale	Qualitative appraisal on the potential impacts to surface ground or coastal waters	Rationale	Qualitative appraisal of the potential impacts of proposed options on potential sub surface archaeology and impact on foundations and above ground elements of architectural heritage	Rationale	Qualitative appraisal of the potential of the proposed options on waste and material resources including the reuse of site won materials.	Rationale	Qualitative appraisal of impacts on valued resources either from a human or natural origin with value arising for economic or cultural reasons. These assets can be existing utilities or non- renewable resources	Rationale	Qualitative appraisal of air quality and climate impacts both on the operational and construction phases	Rationale	
			landscapes, protected t • To avoid / minimise v amenities. • To avoid / minimise re • To avoid / minimise ir	mpact on designated amenities, trees or views. visual impact on properties & "emoval of trees / hedgerows. mpact from light pollution. titles to enhance the local amenity and	on biodiversity of the a enhance it.	ution provided minimises the effects rea and/or provides opportunities to	•To provide a solution noise and vibration	which ensures minimum levels of	enhance the quality of	ct or provide opportunities to surface waters and associated ters and coastal waters.	•To minimise the impact archaeological remains, historic landscapes and p	on cultural heritage such as on below ground historic buildings (individual and areas), and parks.	•To provide a solution carbon. •To minimise waste.	which minimises total capital	To provide a solution	which minimises total capital carbon	greenhouse gas emissi	e chosen solution preserves or enhances	
		1		Site in open and exposed location on land side of railway.		Some comparative disadvantage over other options due to construction and operational impacts. Potential for indirect impacts on nearby designated sites (River name, Estuary and Shore SPA), include potential for water qualify impacts or disturbance to birds, also new lighting which could impact on of birds. The habitat under the footprint of the TSS and the access road is improve grassland, which is suitable as an inland feeding site for wintering birds (i.e. geese). Increased human presence, lighting, and noise could have significant impacts on qualifying interest species from the nearby SPA. The access road may require scrub/hedgerow removal, with impacts on bats, nesting birds, and other small mammals.		Further from residential receptor than Option 3 or 4 but closer than Option 2		All options comparable		There are no recorded monuments at this location for the substation. A recent review of acreal photography identified subsurface archaeological enclosure sites in the agricultural fields to the northwest in rishtown townland. While there are no known or recorded archaeological constraints at this location, there is the potential to reveal subsurface archaeological features and finds at this greenfield location. The proposed site is a greenfield site with no known architectural heritage features.		The location for the proposed works will require the construction of longer access road thereby generating more earthworks.	s	Comparable to other options because not located on agricultural land		No operational air quality or climate impacts. Similar distance to sensitive receptors for potential dust impacts during construction. No real differentiator.	
Electrification of	Electrification of the line from the end of	2		Site in open and exposed location on coastal side of railway. Screening would be difficult. Also impact coastal views from trains.		Some comparative disadvantage over other options due to construction and operational impacts. Potential for indirect impacts on nearby designated sites (River namy Estuary and Shore SPA), include potential for water quality impacts or disturbance to birds, also mew lighting which could impact on birds. The habitat under the footprint or the TSS and the access road is improve grassland, which is suitable as an inland feeding site for wintering birds (.e. geses), increased human presence, lighting, and noise could have significant impacts on qualifying interest species from the nearby SPA. The access road may require scrub/hedgerow removal, with impacts on bats, nesting birds, and other small mammals.		Furthest from residential receptor		All options comparable		There are no recorded monuments at this location for the substation. A recent review of aerial photography identified subsurface archaeological enclosure sites in her agricultural fields to the northwest in irishtow townland. While there are no known or recorded archaeological constraints at this location, there is the potential to reveal subsurface archaeological features and finds at this greenfield location. The proposed site is a greenfield site with no known architectural heritage features.		The location for the proposed works will require the construction of longer access road thereby generating more earthworks.	s	Comparable to other options because not located on agricultural land	Impacts. Similar distance to se receptors for potential cities to se receptors for potential cities to during construction. No real differentiator. No operational air quality or impacts. Similar distance to se impacts.		
Northern Line: Traction Substation Locations	section at Malahide to	3		Site in open and exposed location on coastal side of railway. Screening woulc be difficult. Also impact coastal views from trains.	s	Some comparative advantage over other options. Whilst there is still potential for indirect impacts on nearly designated sites (New Panny Estuary and Shore SPA), the impact would be to a lesser extent in this location, as the access road does not cross the improved grashand field, and the TSS footprint is located in the far corner of the fields od slitvainace to foraging and/or roosting birds would be minimal and likely not significant. This location is adjacent to a low suitability bridge for roosting bats, however this images two displaced would not be considered to be significant. Elikely no hedgerow removal required in this location (or very minor if present).	i	Further from residential receptor than Option 4 but closer than Option 1 or 2		All options comparable		There are no recorded monuments at this location for the substation. A recent review of aerial photography identified subsurface archaeological enclosure sites in the agricultural fields to the northwest in rishtown townland. While there are no known or excorded archaeological constraints at this location, there is the potential to reveal subsurface archaeological features and finds at this greenfield location. Option 3 would impact on the setting of the road bridge (OBB 68) in Irishtown townland. The magnitude of impact is anticipated to be low. Overall, this option would have a Negative Slight impact on the architectural heritage value of the site.		The location for the proposed works will require the construction of an access road thereby generating earthworks.		Comparable to other options because not located on agricultural land		No operational air quality or climate impacts. Similar distance to sensitive receptors for potential dust impacts during construction. No real differentiator.	
		4		Site has low setting between local road and railway. Well screened in views on approach but visually open locally. Good potential for additional screening		Some comparative advantage over other options. Whilst there is still potential for indirect impacts on nearby designated sites (River Namy Estuary and Shore SPA), the impact would be to a lesser extent in this location, as the improved grassland field, and the TSS tootprint is located in the far corner of the field so disturbance to foraging and/or roosting brids would be minimal and Ulley not significant. This location adjacent to a loss ustability bridge for roosting bats, however this impact would not be considered to be significant. Likely no hedgerow removal required in this location (or very minor if present).		Close to residential receptor		All options comparable		There are no recorded monuments at this location for the substation. A recent review of acreal photography identified subsurface archaeological enclosure sites in the agricultural fields to the northwest in irishtown townland. While there are no known or recorded archaeological constraints at this location, there is the potential to reveal subsurface archaeological features and finds at this greenfield location. Option 4 would impact on the setting of the road bridge in institutous most process of the proposed low. A negative impact is also candicated on the setting of the farm complexes to the west. The magnitude of impact is anticipated on the setting of the farm complexes to the west. The magnitude of impact is anticipated to be low due to the distance between the proposed building and the sites, and existing trees which would provide screening. Overall, this option would have a Negative, Sight impact on the architectural heritage value of the site.	c	The location for the proposed works will require the construction of an access road thereby generating earthworks.		Comparable to other options because not located on agricultural land		No operational air quality or climate impacts. Similar distance to sensitive receptors for potential dust impacts during construction. No real differentiator.	

Comparison Criteria Legend
Significant comparative advantages over other options
Some comparative advantage over other options
Comparable to other options / neutral
Comparable to other options / neutral
Some comparative disadvantage over other options

			-								
			Accessibility & Social Inclusion								
			A	Accessibility	Social Inclusion						
Works Description	Summary of requirements	Option Number	Qualitative appraisal of capacity of options to facilitate the movement of people (either within, on to or across the rail system)	Rationale	Qualitative appraisal of capacity of options to provide ease of access for the mobility and visually impaired	Rationale					
	requience is		(either within, on to or Impact on the wellbein Positive impact on pass Improve accessibility to	g of the passenger and public. enger and public experience. b key facilities, such as employment, and healthcare to satisfy transport	Positive impact towards vulnerable groups Improvement of accessibility to public transport facilitie particular from deprived geographic areas.						
Electrification of Northern Line: Traction Substation Locations		1		All options are comparable - options of substation locations do not impact accessibility in this area.		All options are comparable - options substation locations do not impact social inclusion in this area.					
	Electrification of the line from the end of	2		All options are comparable - options of substation locations do not impact accessibility in this area.		All options are comparable - options substation locations do not impact social inclusion in this area.					
	the current electrified section at Malahide to Drogheda with 1500V DC overhead.	3		All options are comparable - options of substation locations do not impact accessibility in this area.		All options are comparable - options substation locations do not impact social inclusion in this area.					
		4		All options are comparable - options of substation locations do not impact accessibility in this area.		All options are comparable - options o substation locations do not impact social inclusion in this area.					

			Integration Physical Activity											
			Adapta	bility in the future	Trans	port Integration	Land	d use integration	Geogra	phical Integration	Governme	ent policy Integration	Walking /	cycling opportunities
Works Description	Summary of	Option Number	Qualitative appraisal of capacity of options to cater for future projects or aspirations	Rationale	Qualitative appraisal of the options and their impact on integration with other transport modes	Rationale	Qualitative appraisal of the options and their impact on integration with land use policies	Rationale	Qualitative appraisal of the options and their impact on integration with geographical polices	Rationale	Qualitative appraisal of the options and their impact on integration with geographical and government polices	Rationale	Qualitative appraisal of the options and their impact to enable walking and cycling opportunities in a safer environment for the communities along the route	Rationale
Total Security	requirements	option tunnel.	Ability to continue to fu changes in circumstanc	inction successfully despite future es	Scope for and ease of interchange between modes New Interchange nodes and facilities Reduce waking and wait times associated with interchanges Integration with the cycle networks Modal shifts figures during construction and operations Changes to journey times to transport nodes Impact on the operation of the other transport services both during construction and in operation stage		Consistency with land use strategies, regional and local plans Po		Potential to impact on external links during construction ans Potential to impact on external links during operations Consideration for any community severance impacts		Integration with national and international plans :		environment in the con To create a healthy env Connectivity to adjoining Enhanced connectivity generators related to a Diversions, duration an	d impact on journey times and gative modal shift (e.g. people opt to
		1		All options are comparable - options of substation locations do not impact the adaptability in the future in this area		All options are comparable - options of substation locations do not impact transport integration in this area.		The lands on which the proposed substations are located are not zoned and are considered neutral. This option has impacts on military operations		All of the options are infrastructural buildings adjoining a railway line and are considered neutral.		All international, national, regional and local policies encourage improvements in relation to the efficiency of public transport. All the proposed options will callitate the achievement of greater efficiency in public transportation long part of the east coast of the country and therefore comply with government policy.		All options are comparable - options of substation locations do not impact the walking and cycling opportunities in this area.
	Electrification of the line from the end off the current electric	2		All options are comparable - options of substation locations do not impact the adaptability in the future in this area		All options are comparable - options of substation locations do not impact transport integration in this area.		The lands on which the proposed substations are located are not zoned and are considered neutral. This option has impacts on military operations		All of the options are infrastructural buildings adjoining a railway line and are considered neutral.		All international, national, regional and local policies encourage improvements in relation to the efficiency of public transport. All the proposed options wil facilitate the achievement of greater efficiency in public transportation long part of the east coast of the country an therefore comply with government policy.		All options are comparable - options of substation locations do not impact the walking and cycling opportunities in this area.
Northern Line: Traction Substation Locations	section at Malahide to Drogheda with 1500V DC overhead.			All options are comparable - options of substation locations do not impact the adaptability in the future in this area		All options are comparable - options of substation locations do not impact transport integration in this area.		The lands on which the proposed substations are located are not zoned and are considered neutral. This option has impacts on military operations		All of the options are infrastructural buildings adjoining a railway line and are considered neutral.		All international, national, regional and local policies encourage improvements in relation to the efficiency of public transport. All the proposed options will actilitate the achievement of greater efficiency in public transportation long part of the east coast of the country and therefore comply with government policy.		All options are comparable - options of substation locations do not impact the walking and cycling opportunities in this area.
		4		All options are comparable - options of substation locations do not impact the adaptability in the future in this area		All options are comparable - options of substation locations do not impact transport integration in this area.		The lands on which the proposed substations are located are not zoned. This option has minimal impact on military operations		All of the options are infrastructural buildings adjoining a railway line and are considered neutral.		All international, national, regional and local policies encourage improvements in relation to the efficiency of public transport. All the proposed options will facilitate the achievement of greater efficiency in public transportation long part of the east coast of the country an therefore comply with government policy.		All options are comparable - options of substation locations do not impact the walking and cycling opportunities in this area.

Bettystown Substation Optioneering MCA Matrix

Comparison Criteria Legend									
Significant comparative advantage over other options									
Some comparative advantage over other options									
Comparable to other options / neutral									
Some comparative disadvantage over other options									
Significant comparative disadvantage over other entions									

						Ecor	nomy				
				ure (CAPEX): Construction, tion, temporary works	Technology a	l costs (IÉ or other entities), dvancements and future ng / obsolescence	Train Operation	ns Functionality/Economic Benefit		ity and associated economic s and opportunities	
Works Description	Summary of	Option Number	Qualitative appraisal of potential infrastructure costs of proposed options	Rationale	Qualitative appraisal of potential ongoing infrastructure maintenance costs of proposed options	Rationale	Qualitative appraisal of potential ongoing operational costs of proposed options	Rationale	Qualitative appraisal of potential wider benefits of proposed options	Rationale	
	requirements		Estimate high level cost o Extent and type of 3rd pa Extent and type of 3rd pa temporary works during c	rty lands required permanently rty land required temporarily for	Effects of infrastructure Provision of ways of un	money. frastructure over the whole life. maintenance to services. dertaking routine inspections and while minimising the effect on			Potential benefit to vehicular traffic flows in the vicinity the works during construction and associated economic activities and opportunities in the vicinity Consideration of duration of traffic disruption and lengt diversions To minimise the impacts on traffic and transportation of the construction and operational stages		
		1		Located on the eastern side of the railway, a shorter access road is required		Although there are minor differences, in length of access road for example, which could affer maintenance costs, overall the options are comparable/neutral		All options are comparable - options of substation locations do not impact the train operations functionality and its economic benefits		All options are comparable - options of substation locations do not impact the train operations functionality and its economic benefits	
		2		Located on the western side of the railway, a longer access road is required		Although there are minor differences, in length of access road for example, which could affect maintenance costs, overall the options are comparable/neutral		All options are comparable - options of substation locations do not impact the train operations functionality and its economic benefits		All options are comparable - options of substation locations do not impact the train operations functionality and its economic benefits	
Electrification of Northern Line: Traction Substation Locations	Electrification of the line from the end of the current electrified section at Malahide to Drogheda with 1500V DC overhead.	3		Located on the eastern side of the railway, a shorter access road is required		Although there are minor differences, in length of access road for example, which could affect maintenance costs, overall the options comparable/neutral		All options are comparable - options of substation locations do not impact the train operations functionality and its economic benefits		All options are comparable - options of substation locations do not impact the train operations functionality and its economic benefits	
		4		Located on the western side of the railway, a longer access road is required		Although there are minor differences, in length of access road for example, which could affect maintenance costs, overall the options coverall the control control comparable/neutral		All options are comparable - options of substation locations do not impact the train operations functionality and its economic benefits		All options are comparable - options of substation locations do not impact the train operations functionality and its economic benefits	
		5		Located on the eastern side of the railway, a shorter access road is required		Although there are minor differences, in length of access road for example, which could affect maintenance costs, overall the options are comparable/neutral		All options are comparable - options of substation locations do not impact the train operations functionality and its economic benefits		All options are comparable - options of substation locations do not impact the train operations furctionality and its economic benefits	

Comparison Criteria Le

Comparable to other options / neutral

Significant comparative disadvantage over other options

	sadvantage over other opti		Safety								
			Emi	ployer's Safety		ublic safety					
Works Description	Summary of	Option Number	Qualitative appraisal on the safety impacts on IÉ or railway staff	Rationale	Qualitative appraisal on the safety impacts on the public (road/rail/cycle/pedest rian)	Rationale					
10.0000	requirements	opacintaine.	maintenance and opera	associated with construction ations. for incidents or near-misses for	platforms, public adjace pedestrian and cycle us To reduce the potential public/passengers on ra	for accidents for members of the					
		1		All options are comparable, with no differences between the options with regards to employer's safety		All options are comparable, with no differences between the options with regards to public safety					
		2		All options are comparable, with no differences between the options with regards to employer's safety		All options are comparable, with no differences between the options with regards to public safety					
Electrification of Northern Line: Traction Substation Locations	Electrification of the line from the end of the current electrified section at Malahide to Drogheda with 1500V DC overhead.	3		All options are comparable, with no differences between the options with regards to employer's safety		All options are comparable, with no differences between the options with regards to public safety					
		4		All options are comparable, with no differences between the options with regards to employer's safety		All options are comparable, with no differences between the options with regards to public safety					
		5		All options are comparable, with no differences between the options with regards to employer's safety		All options are comparable, with no differences between the options with regards to public safety					

		1	Environment															
			Landscape	and Visual Qualitative		Biodiversity	Noise	e and Vibration	Wa	ater resources	Archaeology, A	architectural and Cultural Heritage	Ge	ology & Soils	Agricultura	and non-agricultural	Air Qualit	y & Climate Change
Works Description	Summary of	Option Number	Appraisal of landscape and visual impacts of options based on the sensitive viewpoints	Rationale	Qualitative appraisal on the impact on biodiversity	Rationale	Qualitative appraisal of the potential noise and vibration impact	Rationale	Qualitative appraisal on the potential impacts to surface ground or coastal waters	Rationale	Qualitative appraisal of the potential impacts of proposed options on potential sub surface archaeology and impact or foundations and above ground elements of architectural heritage	e n Rationale	Qualitative appraisal of the potential of the proposed options on waste and material resources including the reuse of site won materials.	Rationale	Qualitative appraisal of impacts on valued resources either from a human or natural origin with value arising for economic or cultural reasons. These assets can be existing utilities or non- renewable resources	Rationale	Qualitative appraisal of air quality and climate impacts both on the operational and construction phases	Rationale
	requirements		landscapes, protected to To avoid / minimise volumenities. To avoid / minimise root of To avoid / minimise in To avoid / minimise in the To avoid / minimise volument / minimise volum	risual impact on properties & emoval of trees / hedgerows. mpact from light pollution. ities to enhance the local amenity	•To ensure that the solution provided minimises the effect on biodiversity of the area and/or provides opportunities to enhance it.		*To provide a solution which ensures minimum levels of noise and vibration		*To minimise the impact or provide opportunities to enhance the quality of surface waters and associated floodplains, ground waters and coestal waters.		*To minimise the impact on cultural heritage such as on below ground archaeological remains, historic buildings (individual and areas), and historic landscapes and parks.		To provide a solution which minimises total capital carbon. To minimise waste.		To provide a solution which minimises total capital carbon.		• To provide a solution which comprises a reduction in green-house gas emissions. • To ensure that the chosen solution preserves or enhances the local air quality	
		1		Ste located in open agricultural landscape.		Some comparative disadvantage over other options. This option requires crossing over the Betaghistown was disadvantage over the testing the second of the installation of the access road. Potential Impacts on surface water quality in immediate environment, and downstroad most of the control of the second of th		Closer to residential receptors than Option 2 but further than Options 3, 4, and 5		Construction of access road requires culvert / bridge construction, increasin contamination risks and river works.		There are no recorded monuments at this location for the substation. A recent review of aerial photography identified subsurface, an adjusted the subsurface and applications of the subsurface and subsurface are no known or recorded archaeological constraints at this location, there is the potent to reveal subsurface archaeological features in this agricultural greenfield location. The proposes site is a greenfield site with no known architectural heritage features.	e al	Possibility of encountering soft deposits due to proximity with rever/stream. Potential loss of topsollygrowing soil stock in agricultural land. Construction of access road will be required, thereby generating earthworks.		tocated on agricultural land with a medium sensitivity enterprise - relatively short access road through agricultural land		No operational air quality or climate, impacts, Preferred with option 2 as have greatest separation from sensitive receptors for potential dust impacts during construction. No real
		2		Site located in open agricultural landscape.		Some comparative advantage over other options, mainly due to lack of watercourse crossing. The habitat unde the footprint of the TSS and the access road is mainly agricultural grassland, which can be suitable as an inland feeding site for wintering birds, increased human presence, lightnag an noise could have impacts on qualifying interest species from the nearby SNx. The access road will also require alteration of agricultural grassland, and potentially some hedgerour removal, however this will be minimal and unlikely to be a significant constraint.		Furthest from residential receptors		No river crossing works required.		There are no recorded monuments at this location for the substation. A recent review of aerial photography identified subsurface archaeological enclosus estie (cropmarks) in the archaeological consortant. White there are no known or recorded archaeologica constraints at this location, there is the potent to reveal subsurface archaeological features ar finds at this agricultural, greenfield location. The proposes site is a greenfield site with no known architectural heritage features.	e al	Possibility of encountering soft deposits due to proximity with reversive soft topsoil/growing sol since in agricultural fault construction of longer access road will be required, thereby generating more earthworks.		Located on agricultural land with a medium sensibility enterprise - relatively long access road through agricultural land		No operational air quality or climate impacts. Preferred with option 1 as have greatest separation from sensitive receptors for potential dust impacts during construction. No real affer entiator.
Substation Locations	Electrification of the line from the end of the current electrified section at Malshide to Drogheda with 1500V DC overhead.	3		Site located on previously disturbed ground, with good potential for screening which integrates with adjoining field boundary.		Some comparative disadvantage over other options. This option is very close to the Betaghtstown watercourse. Potential impacts on surface water quality in immediate environment, and downstream environment (outfall is. C. 300m south of SAC). The access road and location of TSA may require small amounts of scrub/hedgerow removal, with potential impacts on bats, nesting birds, and other small manimate of the potential disturbance/displacement impacts on any fauna (otter, bat, fish, caryfish) using the watercourse for commuting and/or foraging due to the close proximity of the TSS.		Closer to residential receptors than Options 3, 2, and 4 but further than Option 5		Located adjacent to watercourse increasing contamination risks		There are no recorded monuments at this location for the substation. A recent review of aerial photography identified subsurface archaeological enclosure site (roymarks)s in it agricultural fields in Ministown townland. White here are no known or recorded archaeological constraints at this location, there is the potent to reveal subsurface archaeological features ar finds at this scrubland, disturbed location. The proposes site is a greenfield site with no known architectural heritage features.	e al	Possibility of encountering soft deposits due to proximity with river/stream. Construction of access road will be required, thereby generating earthworks.		Not located on agricultural land		No operational air quality or climate impacts. Less preferred than options 1 and 2, however good separation from sensitive receptors for potential dust impacts during construction. No real differentiator.
		4		Site located in corner of agricultural fie with potential for screening which integrates with adjoining field boundar		Some comparative disadvantage over other options. This option crossed the Besteplatown watercourse. Potential impacts on surface water quality in immediate environment, and downstream environment, and downstream environment, options outhor 475. The access road and footion of 155. May require unmail water of the surface of 155. The access road and footion of 155. May require unmail with potential group of the surface of 155. The access road that the potential group of the surface of		Closer to residential receptors than Options 1 and 2 but further than Options 3 and 5		Construction of access road requires cudverty bridge construction, increasin contamination mids and river works. located adjacent to watercourse		There are no recorded monuments at this iocation for the substation. A recent review of serial photography identified substations are carchaeological enclosus esite (cropmarks) and agredutural fields in Ministrous trownland. Whithere are no known or eccorded archaeological features are considered to the considered of the considered archaeological features are finds at this agricultural, greenfield location. The proposes site is a greenfield site with no known architectural heritage features.	e al	Possibility of encountering soft growd due to proximity and proverfixeam. Potential local burst proving soli construction of topsolity growing soli construction of longer access road will be required, thereby generating more earthworks.		Located on agricultural land with a medium sensitivity enterprise - entitively long access road through agricultural land		No operational air quality or climate impacts. Less preferred than options 1 and 2, however good separation from sensitive receptors for protential dust impacts during construction. No real differentiator.
		5		Significant impact on existing trees and small woodland area. In close proximit to residential properties.		Some comparative advantage over other options due to lack of watercours within vicinity of the words. Works with the vicinity of the words. Works with require removal of woodland, hedgerow, and stroub for location of TSS and access road, which may have disturbance and displementer impacts on bats, brids, and mammals. Lighting during operation my also have disturbance/displacement impacts on these species.	đ	Closest to residential receptors		No river crossing works required.		There are no recorded monuments at this location for the substation. A recent review of aerial photography identified subsurface in archaeological enclosure site (cropmarks); and agricultural fields in Ministons to combined. With there are in known croorded archaeological area of the control of the contro	e al	Possibility of encountering soft deposits due to proximity with reversiteram. There is potential for excavation of their is potential for excavation of the confection of excess road will be required, thereby generating earthworks.		Not located on agricultural land		No operational air quality or climate impacts. Less preferred than options 1 and 2, however good separation from sensitive receptors for protential during construction. No real differentiator.

Comparison Criteria Legend
Significant comparative advantage love cliter options
Some comparative advantage over other options
Comparable to other options / neutral
Some comparable to other options / neutral
Some comparative disadvantage over other options

Accessibility & Social Inclusion Accessibility Social Inclusion Qualitative appraisal of capacity of options to facilitate the movement of people (either within, on to or across the rail system) Capacity of options to facilitate the movement of people (either within, on to or across the rail system) impact on the wellbeing of the passenger and public. Positive impact towards vulnerable groups Improvement of accessibility to toky facilities, such as employment, education, transport and healthcare to satisfy transport demand for all trip types. 1 Electrification of the line from the end of the current electrified section at Malahide to Drogheda with 1500V DC overhead. All options are comparable - options of substation locations do not impact accessibility in this area. All options are comparable - options of substation locations do not impact soci-inclusion in this area. 5

							I	ntegration					Physical Activity	
			Adapta	bility in the future	Trans	port Integration	Land	use integration	Geogra	phical Integration	Governme	nt policy Integration	Walking /	cycling opportunities
Works Description	Summary of	Option Number	Qualitative appraisal of capacity of options to cater for future projects or aspirations	Rationale	Qualitative appraisal of the options and their impact on integration with other transport modes	Rationale	Qualitative appraisal of the options and their impact on integration with land use policies	Rationale	Qualitative appraisal of the options and their impact on integration with geographical polices	Rationale	Qualitative appraisal of the options and their impact on integration with geographical and government polices	Rationale	Qualitative appraisal of the options and their impact to enable walking and cycling opportunities in a safer environment for the communities along the route	Rationale
	requirements		Ability to continue to fu	unction successfully despite future es	New interchange nodes Reduce waking and wai Integration with the cyc Modal shifts figures dur Changes to journey tim Impact on the operation	it times associated with interchanges cle networks ring construction and operations	Consistency with land uplans	use strategies, regional and local	Potential to impact on	external links during construction external links during operations ommunity severance impacts	Integration with nationa policies	al and international plans and	environment in the com To create a healthy env Connectivity to adjoinin Enhanced connectivity I generators related to a Diversions, duration and	d impact on journey times and gative modal shift (e.g. people opt to
		1		All options are comparable - options of substation locations do not limpact the adaptability in the future in this area		All options are comparable - options of substation locations do not impact transport integration in this area.		This opiion is located in an area zoned as "Rural Area". Utility installations are permitted in principle in this zoning objective.		All of the options are infrastructural buildings adjoining a railway line and are considered neutral.		All international, national, regional and local policies encourage improvement in relation to the efficiency of public transport. All the proposed options we facilitate the achievement of greater efficiency in public transportation long part of the east costs of the country at therefore comply with government policy.	11	All options are comparable - options of substation locations do not impact the walking and cycling opportunities in this area.
		2		All options are comparable - options of substation locations do not impact the adaptability in the future in this area		All options are comparable - options of substation locations do not impact transport integration in this area.		This option is located in an area zoned as "Rural Area". Utility installations are permitted in principle in this zoning objective.		All of the options are infrastructural buildings adjoining a railway line and are considered neutral.		All international, national, regional and local policies encourage improvement in relation to the efficiency of public transport. All the proposed options we facilitate the achievement of greater efficiency in public transportation long part of the east coast of the country at therefore comply with government policy.	11	All options are comparable - options of substation locations do not impact the walking and cycling opportunities in this area.
Electrification of Northern Line: Traction Substation Locations	Electrification of the line from the end of the current electric state of the section at Malahide to Drogheda with 1500V DC overhead.	3		All options are comparable - options of substation locations do not impact the adaptability in the future in this area		All options are comparable - options of substation locations do not impact transport integration in this area.		This option is located in an area zoned as "Rural Area". Utility installations are permitted in principle in this zonling objective.		All of the options are infrastructural buildings adjoining a railway line and are considered neutral.		All international, national, regional an local policies encourage improvement in relation to the efficiency of public transport. All the proposed options we facilitate the achievement of greater efficiency in public transportation long part of the east coast of the country at therefore comply with government policy.	1	All options are comparable - options of substation locations do not impact the walking and cycling opportunities in this area.
		4		All options are comparable - options of substation locations do not impact the adaptability in the future in this area		All options are comparable - options of substation locations do not impact transport integration in this area.		This option is located in an area zoned as "flural Area". Utility installations are permitted in principle in this zoning objective.		All of the options are infrastructural buildings adjoining a railway line and are considered neutral.		All international, national, regional an local policies encourage improvement in relation to the efficiency of public transport. All the proposed options wis facilitate the achievement of greater efficiency in public transportation long part of the east coast of the country at therefore comply with government policy.	11	All options are comparable - options of substation locations do not impact the waking and cycling opportunities in this area.
		5		All options are comparable - options of substation locations do not impact the adaptability in the future in this area		All options are comparable - options of substation locations do not impact transport integration in this area.		This option is located in an area scored as "Rural Area". Utility installations are permitted in principle in this zoning objective.		All of the options are infrastructural buildings adjoining a railway line and are considered neutral.		All international, national, regional an local politics encourage improvement in relation to the efficiency of public transport. All the proposed options will facilitate the achievement of greater efficiency in public transportation long part of the east coast of the country a therefore comply with government policy.	11	All options are comparable - options of substration locations do not impact the weaking and cycling opportunities in this area.

Drogheda Substation Optioneering MCA Matrix

Comparison Criteria Legend
ignificant comparative advantage over other options
ome comparative advantage over other options
omparable to other options / neutral
ome comparative disadvantage over other options
ignificant comparative disadvantage over other options

						Ecoi	nomy			
				ure (CAPEX): Construction, tion, temporary works	Technology a	I costs (IÉ or other entities), dvancements and future ng / obsolescence	Train Operation	ns Functionality/Economic Benefit		ionality and associated ivities and opportunities
Works Description	Summary of	Option Number	Qualitative appraisal of potential infrastructure costs of proposed options		Qualitative appraisal of potential ongoing infrastructure maintenance costs of proposed options	Rationale	Qualitative appraisal or potential ongoing operational costs of proposed options	Rationale	Qualitative appraisal of potential wider benefits of proposed options	Rationale
	requirements		Estimate high level cost of construction of option Extent and type of 3rd party lands required permanently Extent and type of 3rd party land required temporarily for temporary works during construction		Cost to maintain the infrastructure over the whole life. Effects of infrastructure maintenance to services.				Potential benefit to vehicular traffic flows in the vicinity of the works during construction and associated economic activities and opportunities in the vicinity Consideration of duration of traffic disruption and length of diversions To minimise the impacts on traffic and transportation during the construction and operational stages	
		1		Cost of substation and minor civil works		Although there are minor differences, is length of access road for example, which could affect maintenance costs, overall the options are comparable/neutral		The substation location does not impact the train operations functionality and its economic benefits		Impact on existing parking, pedestrians and cyclists at Park and Ride during construction
		3		Cost of substation and the construction works required to raise the substation out of the flood zone		Although there are minor differences, it length of access road for example, which could affect maintenance costs, overall the options are comparable/neutral		Likely impact on the maintenance and operation of the BEMU substation		Impact on existing parking, pedestrians and cyclists at Park and Ride during construction
Electrification of Northern Line: Traction Substation Locations	Electrification of the line from the end of the current electrified section at Malahide to Drogheda with 1500V DC overhead.	6		Cost of substation and minor civil works - mainly the new access road		Although there are minor differences, it length of access road for example, which could affect maintenance costs, overall the options are comparable/neutral		The substation location does not impact the train operations functionality and its economic benefits		No impacts on existing parking, pedestrians and cyclists at Park and Ride during construction
		7		Whilst not costed - it is expected the cost for ESB connection will be significant when compared to the options north of the line.		Although there are minor differences, i length of access road for example, which could affect maintenance costs, overall the options are comparable/neutral		The substation location does not impact the train operations functionality and its economic benefits		No impacts on existing parking, pedestrians and cyclists at Park and Ride during construction
		8		Cost of substation and minor civil works - mainly the new access road		Although there are minor differences, is length of access road for example, which could affect maintenance costs, overall the options are comparable/neutral		The substation location does not impact the train operations functionality and its economic benefits		No impacts on existing parking, pedestrians and cyclists at Park and Ride during construction
		9		Cost of substation and minor civil works - mainly the new access road		Although there are minor differences, it length of access road for example, which could affect maintenance costs, overall the options are comparable/neutral		The substation location does not impact the train operations functionality and its economic benefits		No impacts on existing parking, pedestrians and cyclists at Park and Ride during construction

Comparison Criteria Legeno

Some comparative disadvantage over other options

Safety

				Saf	ety	
			Emp	oloyer's Safety	Р	ublic safety
Works Description	Summary of requirements	Option Number	Qualitative appraisal on the safety impacts on IÉ or railway staff	Rationale	Qualitative appraisal on the safety impacts on the public (road/rail/cycle/pedest rian)	Rationale
			maintenance and opera	ssociated with construction titions. for incidents or near-misses for	To reduce safety risks associated with passengers at platforms, public adjacent to the railway and road, pedestrian and cycle users at level crossings. To reduce the potential for accidents for members of the public/passengers on railway infrastructure. To reduce the potential for conflict between rail and road users.	
	Electrification of the line from the end of the current electrified section at Malhide to Drogheda with 1500V DC overhead.	1		All options are comparable, with no differences between the options with regards to employer's safety		All options are comparable, with no differences between the options with regards to public safety
		3		All options are comparable, with no differences between the options with regards to employer's safety		All options are comparable, with no differences between the options with regards to public safety
Electrification of Northern Line: Traction Substation Locations		6		All options are comparable, with no differences between the options with regards to employer's safety		All options are comparable, with no differences between the options with regards to public safety
		7		All options are comparable, with no differences between the options with regards to employer's safety		All options are comparable, with no differences between the options with regards to public safety
		8		All options are comparable, with no differences between the options with regards to employer's safety		All options are comparable, with no differences between the options with regards to public safety
		9		All options are comparable, with no differences between the options with regards to employer's safety		All options are comparable, with no differences between the options with regards to public safety

										Envi	ronment							
			Landscape	and Visual Qualitative		Biodiversity	Nois	e and Vibration	Wa	ter resources	Archaeology, Ar	rchitectural and Cultural Heritage	Geo	ology & Soils	-	ll and non-agricultural	Air Qualit	y & Climate Change
Works Description	Summary of requirements	Option Number	Appraisal of landscape and visual impacts of options based on the sensitive viewpoints	Rationale	Qualitative appraisal on the impact on biodiversity	Rationale	Qualitative appraisal of the potential noise and vibration impact		Qualitative appraisal on the potential impacts to surface ground or coastal waters	Rationale	Qualitative appraisal of the potential impacts of proposed options on potential sub surface archaeology and impact on foundations and above ground elements of architectural heritage	Pationalo	Qualitative appraisal of the potential of the proposed options on waste and material resources including the reuse of site won materials.	Rationale	Qualitative appraisal of impacts on valued resources either from a human or natural origin with value arising for economic or cultural reasons. These assets can be existing utilities or non- renewable resources	Rationale	Qualitative appraisal of air quality and climate impacts both on the operational and construction phases	Rationale
			landscapes, protected t To avoid / minimise vi amenities. To avoid / minimise re To avoid / minimise in	mpact on designated amenities, rees or views. Isual impact on properties & emoval of trees / hedgerows. mpact from light pollution. ties to enhance the local amenity and	on biodiversity of the a enhance it.	lution provided minimises the effects area and/or provides opportunities to	•To provide a solution on noise and vibration	which ensures minimum levels of		t or provide opportunities to urface waters and associated ers and coastal waters.		on cultural heritage such as on below ground historic buildings (individual and areas), and parks.	•To provide a solution carbon. •To minimise waste.	which minimises total capital	To provide a solution v	which minimises total capital carbon.	greenhouse gas emissio	which comprises a reduction in ns. sen solution preserves or enhances
		1		Impact on setting of existing railway station, including protected station structures.		Significant comparative advantage in this location. Substation located on hard-standing (carpark). No constraints in this area.		Less impact than Options 7, 9, and 3, but more impact than Options 6 and 8		Located in zone C outside of the 1 in 1000 year flood zone		Potential to reveal below ground remains associated with the development of Drogheda Railway Station. Option 1. is located south of Drogheda Station (LCC RPS DB-055) in an existing raprix. No Direct heritage impact anticipated but there is potential negative visual impact on Drogheda Station Buildings which are protected structure the magnitude of which is low. It is predicted that it will have a slight negative visual impact.	3	Proposed location is inside IE land. There is potential for excavation of made ground/contaminated land Works will done in a previously developed site/built-up area.		Some comparative advantages because it is not located on agricultural land.		Greater separation from sensitive receptors reducing potential impacts during the construction phase.
		3		Located in existing carpark. Visual impact on existing residential property and in close proximity to protected viaduct. Some potential for screening.		Some comparative advantage in this area as located on hard-standing. Potential constraints due to proximity to Boyne Viaduct, which has potential for roosting bats. Also closer to the River Boyne but unlikely to be a major constraint as impacts are not predicted on SAC/SPA.		Closest to residential receptors		Located in fluvial flood zone B in the 1 in 1000 year event flood zone and coastal flood zone A in the 1 in 200 yea flood zone.		This area has been previously monitored (Licence 115002) during the construction of the carpark. As this area has been previously resolved archaeologically it is seen to have advantages over other options. Option 3 is located to the west of a Boyne Valley Valuet (NIAH 1350012, UBB 81b). No Direct heritage impact anticipated but there is potential negative visual impact on the bridge. It is located below the bridge Overall, this would have a Negative, Sight impact on the architectural heritage value of the site.		Proposed location is inside IE land. There is potential for excavation of made ground/contaminated land. Possibility to encounter soft clay based on existing GI dated 2009. Works will done in a previously developed site/built-up area. IPPC, IPC & IEL (P0368) facility located very near to the north of proposed location.		Some comparative advantages because it is not located on agricultural land.		Located in relative proximity to sensitive receptors - potential air quality impacts during construction phase.
Electrification of Northern Line: Traction Substation Locations		6		Impact on existing McBride Pitch and Putt Club / amenity.		Some comparative disadvantage over other options as would require some habitat removal in the pitch and put (low quality but suitable for wintering birds) and hedgerow adjacent to the substation.		Further from residential receptors than Options 1, 3, 7, and 9, but closer than Option 8		Located in zone C outside of the 1 in 1000 year flood zone		Located in a greenfield environment in a pitch and putt course (so some disturbance has take place within the land). Potential to reveal subsurface archaeology. Option 6 is a greenfield site with no known heritage features. No significant impact is anticipated.		Proposed location is inside IE land. There is potential for loss of topsoil/growing soil.		Some comparative advantages because it is not located on agricultural land.		Greater separation from sensitive receptors reducing potential impacts during the construction phase.
		7		Impact on existing planting and located in proximity to existing residential developments.	d	Significant comparative disadvantage over other options due to removal of hedgerow, scrub and potentially trees for location and access road. Innexisite likely on birds, bats, mammals, invertebrates. Option also close to bridge with moderate roosting potentia for bats.		Closer to residential receptors than most options besides Option 3. Same impact as Option 9		Located in zone C outside of the 1 in 1000 year flood zone		tocated in rough and tree planted ground to th south of the old GNR Oldcastle Branch railway line. No recorded monuments are in the locality. Potential to reveal subsurface archaeological features. Under Option 7 there is a potential visual impact on UBB80a and UBB 80b, the historic structures within the Dropheda Station (LCC FSD SD-SD) complex and Railway Ferrace Architectural Conservation Area, the magnitude of which is low. It is predicted that it will have a slight negative visual impact.	,	Proposed location is inside IE land. There is potential for loss of topsoil/growing soil.		Some comparative advantages because it is not located on agricultural land.		Located in relative proximity to sensitive receptors - potential air quality impacts during construction phase.
	8		Located close to, but well screened from existing residential property. Steep access off end of bridge.		Some comparative disadvantage over other options due to habitat removal for location and substation. Hedgerow removal required, as well as some removal oig reashand/agricultural land. Potential impacts on birds, bats, mammals.		Furthest from residential receptors		Located in zone C outside of the 1 in 1000 year flood zone		Located in a greenfield environment to the north of Drogheda Station. Potential to reveal subsurface archaeology. Option 8 is a greenfield site located outside of the station complex with no known heritage features. It is to the rear of the station building and will be visually screened or masked by it. No significant impact is anticipated.		Proposed location is outside IE land There is potential for excavation of made ground/contaminated land There is potential for loss of topsoil/growing soil.		Some comparative disadvantages because it is located on medium sensitivity agricultural land.		Greater separation from sensitive receptors reducing potential impacts during the construction phase.	
		9		Located in proximity to existing residential property. Steep access off end of bridge.		Some comparative advantage over other options due to low quality habitat removal. Unlikely for much (or any) hedgerow removal. Low level impacts predicted.		Closer to residential receptors than most options besides Option 3. Same impact as Option 7		Located in zone C outside of the 1 in 1000 year flood zone		Located to the west of a townland boundary (Bryanstown and Newtown) and in a greenfield environment. Potential to reveal subsurface archaeology. Option 9 is located on a greenfield to the north of UBB80a and UBB 80b. There is a potential negative visual impact but this is negligible as the substation will be screened or masked by mature trees.		Proposed location is outside IE land There is potential for loss of topsoil/growing soil.		Some comparative disadvantages because it is located on medium sensitivity agricultural land.		Located in relative proximity to sensitive receptors - potential air quality impacts during construction phase.

Comparison Criteria Legend
Significant comparative advantage over other options
Some comparative advantage over other options
Comparable to other options / neutral
Some comparative disadvantage over other options

Accessibility & Social Inclusion

				Accessibility &	Social inclusion	
			A	Accessibility	So	cial Inclusion
Works Description	Summary of requirements	Option Number	Qualitative appraisal of capacity of options to facilitate the movement of people (either within, on to or across the rail system)	Rationale	Qualitative appraisal of capacity of options to provide ease of access for the mobility and visually impaired	Rationale
			(either within, on to or Impact on the wellbeing Positive impact on pass Improve accessibility to	g of the passenger and public. enger and public experience. key facilities, such as employment, id healthcare to satisfy transport	Positive impact towards vulnerable groups Improvement of accessibility to public transport facilities, in particular from deprived geographic areas.	
		1		All options are comparable - options of substation locations do not impact accessibility in this area.		All options are comparable - options of substation locations do not impact social inclusion in this area.
	Electrification of the line from the end of the current electrified section at Malahide to Drogheda with 1500V DC overhead.	3		All options are comparable - options of substation locations do not impact accessibility in this area.		All options are comparable - options of substation locations do not impact social inclusion in this area.
Electrification of Northern Line: Traction Substation Locations		6		All options are comparable - options of substation locations do not impact accessibility in this area.		All options are comparable - options of substation locations do not impact social inclusion in this area.
		7		All options are comparable - options of substation locations do not impact accessibility in this area.		All options are comparable - options of substation locations do not impact social inclusion in this area.
		8		All options are comparable - options of substation locations do not impact accessibility in this area.		All options are comparable - options of substation locations do not impact social inclusion in this area.
		9		All options are comparable - options of substation locations do not impact accessibility in this area.		All options are comparable - options of substation locations do not impact social inclusion in this area.

				Integration									
			Adapta	bility in the future	Trans	port Integration	Land	use integration	Geographical Integration	Government policy Integration	Walking / cycling opportunities		
Works Description	Summary of	Option Number	Qualitative appraisal of capacity of options to cater for future projects or aspirations	Rationale	Qualitative appraisal of the options and their impact on integration with other transport modes	Rationale	Qualitative appraisal of the options and their impact on integration with land use policies	Rationale	Qualitative appraisal of the options and their impact on integration Rationale with geographical polices	Qualitative appraisal of the options and their impact on integration Rationale with geographical and government polices	Qualitative appraisal of the options and their impact to enable walking and cycling opportunities in a safer environment for the communities along the route	Rationale	
To de Calendario	requirements	Specifical name of the	Ability to continue to fu changes in circumstanc	unction successfully despite future es	New interchange nodes Reduce waking and wai Integration with the cyc Modal shifts figures du Changes to journey tim	It times associated with interchanges cle networks ring construction and operations es to transport nodes n of the other transport services both	plans	use strategies, regional and local	Potential to impact on external links during construction Potential to impact on external links during operations Consideration for any community severance impacts	Integration with national and international plans and policies	Connectivity to adjoining cyc Enhanced connectivity betw generators related to active Diversions, duration and imp	nities along the route ment conducive to active travel cling and pedestrian facilities een key attractions/trip modes bact on journey times and e modal shift (e.g. people opt to	
		1		All options are comparable - options of substation locations do not impact the adaptability in the future in this area		Impact on existing parking, pedestrians and cyclists at Park and Ride during construction		This Option is zoned J2- "Transportation Development Hub" in the Louth Development Plan 2021- 2027. A substation is acceptable.	All of the options are infrastructural buildings adjoining a railway line and are considered neutral.	All international, national, regional and local policies encourage improvements in relation to the efficiency of public transport. All the proposed options will facilitate the achievement of greater efficiency in public transportation long part of the east coast of the country and therefore comply with government policy.	The comprega	options are considered to be parable with each other with rds to physical activity.	
	Electrification of the line from the end of the current electrified section at Malahide to Drogheda with 1500V DC overhead.	3		All options are comparable - options of substation locations do not impact the adaptability in the future in this area		Impact on existing parking, pedestrians and cyclists at Park and Ride during construction		This Option is zoned J1 - "Transportation Development Hub" in the Louth Development Plan 2021- 2027. A substation is acceptable.	All of the options are infrastructural buildings adjoining a railway line and are considered neutral.	All international, national, regional and local policies encourage improvements in relation to the efficiency of public transport. All the proposed options will facilitate the achievement of greater efficiency in public transportation long part of the east coast of the country and therefore comply with government policy.	The comprega	options are considered to be parable with each other with rds to physical activity.	
Electrification of Northern Line: Traction Substation Locations		6		All options are comparable - options of substation locations do not impact the adaptability in the future in this area		No impacts on existing parking, pedestrians and cyclists at Park and Ride during construction		This Option is zoned J1- "Transportation Development Hub" in the Louth Development Plan 2021- 2027. A substation is acceptable.	All of the options are infrastructural buildings adjoining a railway line and are considered neutral.	All international, national, regional and local policies encourage improvements in relation to the efficiency of public transport. All the proposed options will facilitate the achievement of greater efficiency in public transportation long part of the east coast of the country and therefore comply with government policy.	The comprega	options are considered to be parable with each other with rds to physical activity.	
		7		All options are comparable - options of substation locations do not impact the adaptability in the future in this area		No impacts on existing parking, pedestrians and cyclists at Park and Ride during construction		This Option is zoned A1 - "Existing Residential" in the Louth Development Plan 2021-2027. A substation is deemed less desirable than other options that are zoned J1.	All of the options are infrastructural buildings adjoining a railway line and are considered neutral.	All international, national, regional and local policies encourage improvements in relation to the efficiency of public transport. All the proposed options wil facilitate the achievement of greater efficiency in public transportation long part of the east coast of the country and therefore comply with government policy.	comprega	options are considered to be parable with each other with rds to physical activity.	
		8		All options are comparable - options of substation locations do not impact the adaptability in the future in this area		No impacts on existing parking, pedestrians and cyclists at Park and Ride during construction		This Option is zoned J1 - "Transportation Development Hub" in the Louth Development Plan 2021- 2027. A substation is acceptable.	All of the options are infrastructural buildings adjoining a railway line and are considered neutral.	All international, national, regional and local policies encourage improvements in relation to the efficiency of public transport. All the proposed options will facilitate the achievement of greater efficiency in public transportation long part of the east coast of the country and therefore comply with government policy.	The comprega	options are considered to be parable with each other with rds to physical activity.	
		9		All options are comparable - options of substation locations do not impact the adaptability in the future in this area		No impacts on existing parking, pedestrians and cyclists at Park and Ride during construction		This Option is zoned J1 - "Transportation Development Hub" in the Louth Development Plan 2021- 2027. A substation is acceptable.	All of the options are infrastructural buildings adjoining a railway line and are considered neutral.	All international, national, regional and local policies encourage improvements in relation to the efficiency of public transport. All the proposed options will facilitate the achievement of greater efficiency in public transportation long part of the east coast of the country and therefore comply with government policy.	The comprega	options are considered to be parable with each other with rds to physical activity.	