

Appendix A

MCA Table

Comparison Criteria Legend	
Significant comparative advantage over other options	Green
Some comparative advantage over other options	Light Green
Comparable to other options / neutral	Yellow
Some comparative disadvantage over other options	Light Orange
Significant comparative disadvantage over other options	Orange

				Economy							
Works Description	Summary of requirements	Option Number	Description of Option	Capital Expenditure (CAPEX): Construction, land acquisition, temporary works		OPEX: Operational costs (if or other entities), Technology advancements and future proofing / obsolescence		Train operations functionality/economic benefit		Traffic functionality and associated economic activities and opportunities	
				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 lands required temporarily for temporary works during construction		Cost to maintain the infrastructure over the whole life. Effects of infrastructure maintenance to services. Provision of ways of undertaking routine inspections and maintenance activities while minimising the effect on service to customers.		Potential improvement or deterioration of the operational conditions of the line (reduction or increase of the risk of interruption of service) Increased DART service improving connectivity and economy (leading to increased competition in economy, increased output of firms, increased tax revenue).		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	
Works around Malahide Station	To take cognisance of the planned Broadmeadow Estuary Greenway and not to do anything which would preclude the construction of the Greenway	1a	The Down line is slewed to the West towards causeway estuary; this is achieved with the installation of P21/P28.5 switch to facilitate the line speed. The divergent route, then forms a centre turnback with walkways provided. The Up line remains as is, with a lower speed turnout presented to allow egress from the turnback road to the Up Line.	Construction of Option 1a/1b is constrained by being alongside the water, although they are further from buildings which provide constraints to Option 2a/2b so these options are comparable from a constructability perspective. It should be noted that Option 1a/b would impair the cycleway during construction. Option 1a has some comparative advantage over Option 1b as the scope of the works is smaller. It has some comparative disadvantage with Option 2a because 1a requires a longer retaining wall. It has significant comparative advantage over Option 5b because 5b requires construction alongside and over water as well as bridge widening works. Long high speed switches may be difficult to install and maintain. Therefore some comparative disadvantage with Option 1b, 2b and 5b but comparable to Option 2a. This option requires the removal of existing OHLE structures in Down track over approximately 500 m north to UB29 and installation of new ones for new Down track and turnback track. Additionally it also requires the modification of some existing OHLE structures in Up track over approximately 200 m north to UB29 according to modification of the existing crossover. It requires about 850 m of new OHLE, moving 470 m of OHLE to new supports and dismantle of 500 m of existing OHLE. Option 1a is comparable to Option 2b, has some comparative advantage over Option 1b and some comparative disadvantage with the other options. From a signalling point of view, the track layout is significantly modified in all options. However, option 1a and 1b removes an existing crossover which options 2a and 2b retain. Hence, options 2a-2b have some comparative advantage of delivery cost performance over the other options. There is no proposed impact on existing bridge or civil structures as part of this option. Option 5b comprises modification to an existing bridge and the potential for structure associated with the level crossing. Hence, this option has a significant comparative advantage over Option 5b.	Long high speed switches may pose a difficulty with respect to maintenance given the need for the long length of co-planar to exist. Monitoring of the newly constructed earthworks will need to be undertaken to ensure no localised settlement occurs, thus introducing a potential twist fault into the rail. Shorter Empty Coaching Stock (ECS) move – requires no additional rolling stock.	Delivers TSS Allows for conflict free moves Mainline speed limited to 95 KPH from 110 KPH. This option has some comparative disadvantage with Options 1b, 2a and 2b.	All options are comparable in that mitigation measures during construction will have to be developed for the construction impact - in this case on the estuary and the Broadmeadow Way				
		1b	The mainline radius has been increased to slew the line at line speed away from its current location westwards, with a low speed switch installed from this diverged line to the existing track, which now forms the central turnback road. Access to the up line is afforded in a similar manner to Option 1A with the installation of a low speed switch and crossing unit.	Construction of Option 1a/1b is constrained by being alongside water, although they are further from buildings constraining Option 2a/2b so are comparable from a constructability perspective. It should be noted that Option 1a/b would impair the cycleway during construction. Option 1b has some comparative disadvantage with Option 1a as the scope of the works is larger. It has some comparative disadvantage with Option 2a because 1b requires a longer retaining wall. It has significant comparative advantage over Option 5b because 5b requires construction alongside and over water as well as bridge widening works. Elimination of long high speed switch will offer better performance and reduce capital costs. Therefore some comparative advantage over Options 1a and 2a. Comparable to Options 2b and 5b. For OHLE, the impact of this option has some comparative disadvantage with Option 1a as the extent of the OHLE works is larger. From a signalling point of view, the track layout is significantly modified in all options. However, options 1a and 1b remove an existing crossover which options 2a and 2b retain. Hence, options 2a-2b have some comparative advantage of delivery cost performance over the other options. There is no proposed impact on existing bridge or civil structures as part of this option. Option 5b comprises modification to an existing bridge and the potential for structure associated with the level crossing. Hence, this option has a significant comparative advantage over Option 5b with the level crossing. Hence, this option is comparatively more advantageous compared to Option 5b.	Standard components used throughout, elimination of high speed switch to plain line will assist in construction and maintenance. Shorter Empty Coaching Stock (ECS) move – requires no additional rolling stock.	Delivers TSS Allows for conflict free moves Mainline speed not limited. This option has some comparative advantage over Options 1a and 5b. It is comparable with Options 2a and 2b.	All options are comparable in that mitigation measures during construction will have to be developed for the construction impact - in this case on the estuary and the Broadmeadow Way				
		2a	This option inverts the solution of Option 1A, whereby the main line is slewed to the east (closer to the existing residential development and sewerage works site). Access to the central turn back is created via a P21/P28.5 switch. The Existing Crossover North of the station is retained providing access from North bound line to the central cross over.	Smaller retaining wall needed than Options 1a/1b, and further from water and cycleway. However, closer to various buildings leading to constrained access for such buildings during the works and potentially more noise issues (as closer). Long high speed switches may be difficult to install and maintain. Therefore some comparative disadvantage with Option 1b, 2b and 5b but comparable to Option 1a. This option has a comparative advantage over option 1a as it requires less new OHLE installation and less dismantling of existing OHLE. From the signalling point of view, the track layout is significantly modified in all options. However, option 1a and 1b removes an existing crossover which options 2a and 2b retain. Hence, options 2a-2b have some comparative advantage of delivery cost performance over the other options. There is no proposed impact on existing bridge or civil structures as part of this option. Option 5b comprises modification to an existing bridge and the potential for structure associated with the level crossing. Hence, this option has a significant comparative advantage over Option 5b.	Long high speed switches may pose a difficulty with respect to maintenance given the need for the long length of co-planar to exist. Monitoring of the newly constructed earthworks will need to be undertaken to ensure no localised settlement occurs, thus introducing a potential twist fault into the rail. Shorter Empty Coaching Stock (ECS) move – requires no additional rolling stock.	Delivers TSS Allows for conflict free moves Mainline speed not limited, as linespeed is 80 KPH, while switch can support to 95 KPH. This option has some comparative advantage over Options 1a and 5b. It is comparable with Options 1b and 2b.	All options are comparable in that mitigation measures during construction will have to be developed for the construction impact - in this case on residential areas and wastewater treatment plant				
		2b	In a similar manner to Option 2A this option is in keeping with Option 1B with the slewing inverted to be present on the eastern side rather than the West towards the causeway.	Similar to Option 2a but larger scope of works thus lower score. Slight benefit in smaller Switch unit than Option 2a. Elimination of long high speed switch will offer better performance and reduce capital costs. Therefore some comparative advantage over Options 1a and 2a. Comparable to Options 2b and 5b. This option is comparative to Option 1a from an OHLE perspective because although it has more impact on the existing OHLE of the Up track it does not impact on the Down track. From a signalling point of view, the track layout is significantly modified in all options. However, option 1a and 1b removes an existing crossover which options 2a and 2b retain. Hence, options 2a-2b have some comparative advantage of delivery cost performance over the other options. There is no proposed impact on existing bridge or civil structures as part of this option. Option 5b comprises modification to an existing bridge and the potential for structure associated with the level crossing. Hence, this option has a significant comparative advantage over Option 5b.	Standard components used throughout, elimination of high speed switch to plain line will assist in construction and maintenance. Shorter Empty Coaching Stock (ECS) move – requires no additional rolling stock.	Delivers TSS Allows for conflict free moves Mainline speed not limited. This option has some comparative advantage over Options 1a and 5b. It is comparable with Options 1b and 2a.	All options are comparable in that mitigation measures during construction will have to be developed for the construction impact - in this case on residential areas and wastewater treatment plant				
		5b	This option sees the turnback facility re located to the north of the existing estuary crossing. The layout and arrangement is of that shown in Option 1B, whereby the mainline radius has been increased to slew the line at line speed away from its current location westwards, with a low speed switch installed from this diverged line to the existing track, which now forms the central turnback road	Construction alongside and over water and bridge widening required. This option has significant/some comparative disadvantage with the other options from construction cost perspective. Elimination of long high speed switch will offer better performance and reduce capital costs. Therefore some comparative advantage over Options 1a and 2a. Comparable to Options 2b and 5b. As this option locates the turnback facility outside of the currently electrified section, assuming the turnback installation works will be done before the electrification works for Malahide - Drogheda section, this option would not require any modification to existing OHLE, only new OHLE installation for the new tracks configuration. Therefore, it is considered as the option with lower cost from the OHLE perspective giving it a significant advantage over Option 1b and some comparative advantage over the other options. From a signalling point of view, Option 5 is in a location with no existing crossovers so it requires installation of new equipment and modifying the track layout. It is comparable to options 1a-1b and has some comparative disadvantage with options 2a and 2b. This option requires potential modification to an existing bridge and may also require a structure associated with the existing level crossing nearby. The existing bridge carries the rail over a 2-span masonry arch tidal overflow. This option is considered to have a significant comparative disadvantage when compared to the other options, which have no proposed impact on structures.	This option has the longest ECS with an extra 4km for each turnback for two trains per hour this gives an additional OPEX of EUR40million over a 30 year appraisal period.	Delivers TSS Allows for conflict free moves Mainline speed not limited Longer ECS move could reduce turnaround time, will impact performance. This option has some comparative disadvantage with Options 1b, 2a and 2b.	All options are comparable in that mitigation measures during construction will have to be developed for the construction impact - in this case on the watercourse and Broadmeadow Way				

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

				Safety				
Works Description	Summary of requirements	Option Number	Description of Option	Employer's safety		Public safety		
				Qualitative appraisal on the safety impacts on IE or railway staff	Rationale	Qualitative appraisal on the safety impacts on the public (road / rail / cycle / pedestrian)	Rationale	
				To reduce safety risks associated with construction maintenance and operations. To reduce the potential for incidents or near-misses for IE/construction staff.		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.		
Works around Malahide Station	To take cognisance of the planned Broadmeadow Estuary Greenway and not to do anything which would preclude the construction of the Greenway	Provide turnback infrastructure at Malahide which will meet the Train Service Specification.	1a	The Down line is slewed to the West towards causeway estuary; this is achieved with the installation of P21/P28.5 switch to facilitate the line speed. The divergent route, then forms a centre turnback with walkways provided. The Up line remains as is, with a lower speed turnout presented to allow egress from the turnback road to the Up Line.		All options have a centrally located maintenance walkway which will force drivers and maintainers to cross the tracks in close proximity to the existing bridge structure and station end.		All works being carried out away from the public limits, closed site, with significant level difference to where the public may be present. No material comparative difference to other options
			1b	The mainline radius has been increased to slew the line at line speed away from its current location westwards, with a low speed switch installed from this divergent line to the existing track, which now forms the central turnback road. Access to the up line is afforded in a similar manner to Option 1A with the installation of a low speed switch and crossing unit.		All options have a centrally located maintenance walkway which will force drivers and maintainers to cross the tracks in close proximity to the existing bridge structure and station end.		All works being carried out away from the public limits, closed site, with significant level difference to where the public may be present. No material comparative difference to other options
			2a	This option inverts the solution of Option 1A, whereby the main line is slewed to the east (closer to the existing residential development and sewerage works site). Access to the central turn back is created via a P21/P28.5 switch. The Existing Crossover North of the station is retained providing access from North bound line to the central cross over.		All options have a centrally located maintenance walkway which will force drivers and maintainers to cross the tracks in close proximity to the existing bridge structure and station end.		All works being carried out away from the public limits, closed site, with significant level difference to where the public may be present. No material comparative difference to other options
			2b	In a similar manner to Option 2A this option is in keeping with Option 1B with the slewing inverted to be present on the eastern side rather than the West towards the causeway.		All options have a centrally located maintenance walkway which will force drivers and maintainers to cross the tracks in close proximity to the existing bridge structure and station end.		All works being carried out away from the public limits, closed site, with significant level difference to where the public may be present. No material comparative difference to other options
			5b	This option sees the turnback facility re located to the north of the existing estuary crossing. The layout and arrangement is of that shown in Option 1B, whereby the mainline radius has been increased to slew the line at line speed away from its current location westwards, with a low speed switch installed from this divergent line to the existing track, which now forms the central turnback road		All options have a centrally located maintenance walkway which will force drivers and maintainers to cross the tracks.		All works being carried out away from the public limits, closed site, with significant level difference to where the public may be present. No material comparative difference to other options

Comparison Criteria Legend	
Significant comparative advantage over other options	Green
Some comparative advantage over other options / neutral	Yellow
Comparable to other options / neutral	White
Some comparative disadvantage over other options	Orange
Significant comparative disadvantage over other options	Red

				Environment															
Works Description	Summary of requirements	Option Number	Description of Option	Landscape and visual quality		Biodiversity (flora and fauna)		Noise and vibration		Water resources		Archaeology, architectural and cultural heritage		Geology & soils		Agricultural and non-agricultural		Air quality & 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 of the potential impacts to surface ground or coastal waters	Rationale	Qualitative appraisal of the potential impacts of options on potential sub surface archaeology and 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 from human/natural origin with value arising for economic or cultural reasons. Assets can be existing utilities or non-renewable resources	Rationale	Qualitative appraisal of the potential of the proposed options on air quality and climate impacts both on the operational and construction phases	Rationale
				To provide opportunities to enhance the local amenity, heritage value of the area and the surrounding landscape To minimise any impacts of light pollution and the impact on dark skies		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 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 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 which minimises waste and material resources including the reuse of site won materials.		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	
Works around Malahide Station	Provide turnback infrastructure at Malahide which will meet the Train Service Specification.	1a	The Down line is slewed to the West towards causeway estuary; this is achieved with the installation of P21/28.5 switch to facilitate the line speed. The divergent route, then forms a centre turnback with walkways provided. The Up line remains as is, with a lower speed turnout presented to allow egress from the turnback road to the Up Line.	Works within or adjoining existing railway corridor. No change to existing landscape / visual character. Minimal loss of trees, hedgerows. Permission exists for Greenway (ABP ref.: 30645) on west side of railway. This option has some comparative advantage over Options 2a and 2b as there is less loss of trees and hedgerows and less visual impact for properties east of the railway. It is comparable to Options 1b and 5b.	Significant comparative disadvantage over Options 2a and 2b due to likelihood of direct and indirect impacts on adjacent Malahide Estuary SAC, SPA and pNHA. Potential direct impacts include works within the designated site boundaries, potentially involving habitat removal as a result of the new track, new stepped access, and new retaining structure. Potential indirect impacts include construction related impacts (e.g. potential for water quality impacts or disturbance to birds) and new lighting which could impact on birds. This option is comparable to Options 1b and 5b.	Slightly further from sensitive receptors on east side of rail line than for Options 2a and 2b. May be more opportunity for mitigation if that becomes necessary. Closer to noise sensitive receptors than option 5b.	The proposed retaining wall works could be within areas at coastal flood risk (estuary side) The site flows into Broadmeadow Water which is a Poor status Transitional Waterbody (WB) and Malahide Bay which is a Moderate status Coastal WB. It is directly adjacent to Malahide Estuary SAC and SPA Extreme groundwater vulnerability in area that retaining walls will be built. This option has some comparative disadvantage against Options 2a and 2b. It is considered comparable with Options 1a and 5b.	There are no recorded monuments in the vicinity of the proposed works. The Dublin and Drogheda Railway began operating in 1844 and there were stations at Balbrigan (FHS0040), Skerries (FHS0223), Rush and Lusk (FHS0353), Donabate (FHS0671), Malahide (FHS0656) and Portmarnock (FHS0627) within Fingal. Both Balbrigan and Malahide stations were designed by George Papworth. The railway bridge (FCC RPS 423) at Bissetto Strand and the Malahide Viaduct (FCC RPS 420) are protected structures. The sensitivity of the fabric between the two structures has not yet been assessed, but widening the tracks on this side will have a greater visual impact on the protected structures than Options 2a and 2b so this option has a some comparative disadvantage against these options.	Soft ground associated with the Estuary - Retaining Wall on estuary side Made Ground/Contam Land/Topsoil/Growing Soil - New Tracks + Track replacements (earthworks volumes TBC) Slope Stability/Unstable Ground - Retaining Wall construction along estuary side	No agricultural land affected by each of the options.	Works proposed on both sides of the rail line - air quality not a differentiator. All options will have a benefit from climate /carbon perspective								
		1b	The mainline radius has been increased to slew the line at line speed away from it's current location westwards, with a low speed switch installed from this divergent line to the existing track, which now forms the central turnback road. Access to the up line is afforded in a similar manner to Option 1A with the installation of a low speed switch and crossing unit.	Works within or adjoining existing railway corridor. No change to existing landscape / visual character. Minimal loss of trees, hedgerows. Permission exists for Greenway (ABP ref.: 30645) on west side of railway. This option has some comparative advantage over Options 2a and 2b as there is less loss of trees and hedgerows and less visual impact for properties east of the railway. It is comparable to Options 1a and 5b	Significant comparative disadvantage over Options 2a and 2b due to likelihood of direct and indirect impacts on adjacent Malahide Estuary SAC, SPA and pNHA. Potential direct impacts include works within the designated site boundaries, potentially involving habitat removal as a result of the new track, new stepped access, and new retaining structure. Potential indirect impacts include construction related impacts (e.g. potential for water quality impacts or disturbance to birds) and new lighting which could impact on birds. This option is comparable to Options 1a and 5b.	Slightly further from sensitive receptors on east side of rail line than for Options 2a and 2b. May be more opportunity for mitigation if that becomes necessary. Closer to noise sensitive receptors than option 5b.	The proposed retaining wall works could be within areas at coastal flood risk (estuary side) The site flows into Broadmeadow Water which is a Poor status Transitional Waterbody (WB) and Malahide Bay which is a Moderate status Coastal WB. It is directly adjacent to Malahide Estuary SAC and SPA Extreme groundwater vulnerability in area that retaining walls will be built. This option has some comparative disadvantage against Options 2a and 2b. It is considered comparable with Options 1b and 5b.	There are no recorded monuments in the vicinity of the proposed works. The Dublin and Drogheda Railway began operating in 1844 and there were stations at Balbrigan (FHS0040), Skerries (FHS0223), Rush and Lusk (FHS0353), Donabate (FHS0671), Malahide (FHS0656) and Portmarnock (FHS0627) within Fingal. Both Balbrigan and Malahide stations were designed by George Papworth. The railway bridge (FCC RPS 423) at Bissetto Strand and the Malahide Viaduct (FCC RPS 420) are protected structures. The sensitivity of the fabric between the two structures has not yet been assessed, but widening the tracks on this side will have a greater visual impact on the protected structures than Options 2a and 2b so this option has a some comparative disadvantage against these options.	Soft ground associated with the Estuary - Retaining Wall on estuary side Made Ground/Contam Land/Topsoil/Growing Soil - New Tracks + Track replacements (earthworks volumes TBC) Slope Stability/Unstable Ground - Retaining Wall construction along estuary side	No agricultural land affected by each of the options.	Works proposed on both sides of the rail line - air quality not a differentiator. All options will have a benefit from climate /carbon perspective								
		2a	This option inverts the solution of Option 1A, whereby the main line is slewed to the east (closer to the existing residential development and sewage works site). Access to the central turn back is created via a P21/28.5 switch. The Existing Crossover North of the station is retained providing access from North bound line to the central cross over.	Works within or adjoining existing railway corridor. No change to existing landscape / visual character. Some loss of hedgerows. Potential increase in visual impact for properties east of railway. This option has some comparative disadvantage against Options 1a, 1b and 5b as there is a greater loss of trees and hedgerows and increased visual impact for properties east of the railway. It is comparable to Option 2b	Significant comparative advantage over Options 1a, 1b and 5b due to absence of direct impacts on adjacent Malahide Estuary SAC, SPA and pNHA as works are on eastern side of the existing track. There may be indirect impacts on the designated sites however they are likely to be lesser than other options and/or readily mitigated. This option is comparable to Option 2b.	Closer to noise sensitive receptors on east side and may be fewer options for noise mitigation if that becomes necessary than for Options 1a and 1b. Closer to noise sensitive receptors than Option 5b.	The proposed works are outside the extreme coastal flood extents The site flows into Broadmeadow Water which is a Poor status Transitional Waterbody (WB) and Malahide Bay which is a Moderate status Coastal WB. It is directly adjacent to Malahide Estuary SAC and SPA Extreme groundwater vulnerability in area that retaining walls will be built. This option has some comparative advantage over Options 1a, 1b and 5b. It is considered comparable with Option 2b.	There are no recorded monuments in the vicinity of the proposed works. The Dublin and Drogheda Railway began operating in 1844 and there were stations at Balbrigan (FHS0040), Skerries (FHS0223), Rush and Lusk (FHS0353), Donabate (FHS0671), Malahide (FHS0656) and Portmarnock (FHS0627) within Fingal. Both Balbrigan and Malahide stations were designed by George Papworth. More information is needed to advise on the impact of this option on any extant historic fabric, but some comparative advantage over Options 1a and 1b exists as the visual impact on bridge and viaduct is reduced.	Soft ground associated with the Estuary - Retaining Wall on WWTP side Made Ground/Contam Land/Topsoil/Growing Soil - New Tracks + Track replacements (earthworks volumes TBC) Slope Stability/Unstable Ground - Retaining Wall construction	No agricultural land affected by each of the options.	Works proposed on both sides of the rail line - air quality not a differentiator. All options will have a benefit from climate /carbon perspective								
		2b	In a similar manner to Option 2A this option is in keeping with Option 1B with the slewing inverted to be present on the eastern side rather than the West towards the causeway.	Works within or adjoining existing railway corridor. No change to existing landscape / visual character. Some loss of hedgerows. Potential increase in visual impact for properties east of railway. This option has some comparative disadvantage against Options 1a, 1b and 5b as there is a greater loss of trees and hedgerows, and increased visual impact for properties east of the railway. It is comparable to Option 2a	Significant comparative advantage over Options 1a, 1b and 5b due to absence of direct impacts on adjacent Malahide Estuary SAC, SPA and pNHA as works are on eastern side of the existing track. There may be indirect impacts on the designated sites however they are likely to be lesser than other options and/or readily mitigated. This option is comparable to Option 2a.	Closer to noise sensitive receptors on east side and may be fewer options for noise mitigation if that becomes necessary than for Options 1a and 1b. Closer to noise sensitive receptors than Option 5b.	The proposed works are outside the extreme coastal flood extents The site flows into Broadmeadow Water which is a Poor status Transitional Waterbody (WB) and Malahide Bay which is a Moderate status Coastal WB. It is directly adjacent to Malahide Estuary SAC and SPA Extreme groundwater vulnerability in area that retaining walls will be built. Some comparative advantage over 1a, 1b and 5b. Considered comparable with Option 2a.	There are no recorded monuments in the vicinity of the proposed works. The Dublin and Drogheda Railway began operating in 1844 and there were stations at Balbrigan (FHS0040), Skerries (FHS0223), Rush and Lusk (FHS0353), Donabate (FHS0671), Malahide (FHS0656) and Portmarnock (FHS0627) within Fingal. Both Balbrigan and Malahide stations were designed by George Papworth. More information is needed to advise on the impact of this option on any extant historic fabric, but some comparative advantage over Options 1a and 1b exists as the visual impact on bridge and viaduct is reduced.	Soft ground associated with the Estuary - Retaining Wall on WWTP side Made Ground/Contam Land/Topsoil/Growing Soil - New Tracks + Track replacements (earthworks volumes TBC) Slope Stability/Unstable Ground - Retaining Wall construction	No agricultural land affected by each of the options.	Works proposed on both sides of the rail line - air quality not a differentiator. All options will have a benefit from climate /carbon perspective								
		5b	This option sees the turnback facility re-located to the north of the existing estuary crossing. The layout and arrangement is of that shown in Option 1B, whereby the mainline radius has been increased to slew the line at line speed away from its current location westwards, with a low speed switch installed from this divergent line to the existing track, which now forms the central turnback road	Works within or adjoining existing railway corridor. No change to existing landscape (High Amenity) / visual character. Some potential loss of hedgerows. This option has some comparative advantage over Options 2a and 2b as there is less loss of trees and hedgerows and less visual impact for properties east of the railway. It is comparable to Options 1a and 1b	Some comparative disadvantage over Options 2a and 2b due to likelihood of direct and indirect impacts on adjacent Malahide Estuary SAC, SPA and pNHA. Potential direct impacts include works within the designated site boundaries, potentially involving habitat removal as a result of the new track. Due to works being on the western side of the existing track the scale of impacts are lesser than in Options 1a and 1b. Potential indirect impacts include construction related impacts (e.g. potential for water quality impacts) and new lighting which could impact on birds. In addition, this option includes modifications to the railway bridge structure over the River Pill which drains to the Malahide estuary. These modifications could involve works affecting (either directly or indirectly) the adjacent intertidal habitats which on the eastern side fall within the Malahide Estuary SAC, and on the western side fall outside of any designation but nonetheless are likely to comprise Annex I habitat types. Works to this structure could also impact on bats if the structure has potential to support them.	Not near sensitive receptors for construction or operational noise makes this a more attractive option for noise and vibration.	The proposed bridge extension works are within areas at coastal flood risk and over River Pill. The site flows into Malahide Bay which is a Moderate status Coastal WB. It is directly adjacent to Malahide Estuary SAC and SPA. This option has some comparative disadvantage against Options 2a and 2b. It is considered comparable with Options 1a and 1b.	The closest archaeological monument is a Tide Mill (DU012-018) in Killeera townland located 400m west of the proposed works. It was previously marked on the 1837 OS 6 inch map and is likely to be the site shown on Rocque's map for 1760. Finds of 2 bann flakes and a flint blade along the shoreline in Killeera (NM topographical files) and the reclaimed nature of the land indicate an archaeological potential for the works area. Therefore it has a comparative disadvantage against options 2a and 2b. In relation to architectural heritage, the existing bridge (to be widened) to the north of the Malahide Estuary while not properly included in any existing inventories and not yet assessed, is likely to mean that there would be a negative impact on the fabric and setting of what is a potentially historic structure (Note: the bridge in question is incorrectly marked NWH 11338027. This listing relates to the bridge over Corballis Cottages, which is also included in the RPS, FCC RPS 0502).	Soft ground associated with the Estuary - Bridge widening Made Ground/Contam Land/Topsoil/Growing Soil - New Tracks + Track replacements (earthworks volumes TBC) Slope Stability/Unstable Ground - Bridge construction	No agricultural land affected by each of the options.	Works proposed on both sides of the rail line - air quality not a differentiator. All options will have a benefit from climate /carbon perspective								

Comparison Criteria Legend	
Significant comparative advantage over other options	Significant comparative advantage over other options
Some comparative advantage 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	Some comparative disadvantage over other options
Significant comparative disadvantage over other options	Significant comparative disadvantage over other options

				Accessibility & Social Inclusion			
Works Description	Summary of requirements	Option Number	Description of Option	Accessibility - stations		Social Inclusion - stations	
				Qualitative appraisal of capacity of options to facilitate the movement of people (either within, onto or across the rail system)	Rationale	Qualitative appraisal of capacity of options to provide ease of access for the mobility and visually impaired	Rationale
Works around Malahide Station	To take cognisance of the planned Broadmeadow Estuary Greenway and not to do anything which would preclude the construction of the Greenway	1a	The Down line is slewed to the West towards causeway estuary; this is achieved with the installation of P21/P28.5 switch to facilitate the line speed. The divergent route, then forms a centre turnback with walkways provided. The Up line remains as is, with a lower speed turnout presented to allow egress from the turnback road to the Up Line.	Capacity of options to facilitate the movement of people (either within, onto or across the rail system) Impact on the wellbeing of the passenger and public. Positive impact on passenger and public experience. Improve accessibility to key facilities, such as employment, education, transport and healthcare to satisfy transport demand for all trip types.	Positive impact towards vulnerable groups Improvement of accessibility to public transport facilities, in particular from deprived geographic areas.	There would be only slight impacts due to any option in terms of accessibility. The greenway (if open) will mainly be used for amenity, and journey amenity will be a lesser criteria for the minority of users who are commuters. Any closure of the greenway during construction is likely to have a minor impact given its recent opening (if open) and as long as any closure is short term.	There would be only slight impacts due to any option in terms of social inclusion. The greenway (if open) will mainly be used for amenity, and journey amenity will be a lesser criteria for the minority of users who are commuters. Any closure of the greenway during construction is likely to have a minor impact given its recent opening (if open) and as long as any closure is short term.
			1b	The mainline radius has been increased to slew the line at line speed away from its current location westwards, with a low speed switch installed from this divergent line to the existing track, which now forms the central turnback road. Access to the up line is afforded in a similar manner to Option 1A with the installation of a low speed switch and crossing unit.	There would be only slight impacts due to any option in terms of accessibility. The greenway (if open) will mainly be used for amenity, and journey amenity will be a lesser criteria for the minority of users who are commuters. Any closure of the greenway during construction is likely to have a minor impact given its recent opening (if open) and as long as any closure is short term.	There would be only slight impacts due to any option in terms of social inclusion. The greenway (if open) will mainly be used for amenity, and journey amenity will be a lesser criteria for the minority of users who are commuters. Any closure of the greenway during construction is likely to have a minor impact given its recent opening (if open) and as long as any closure is short term.	
			2a	This option inverts the solution of Option 1A, whereby the main line is slewed to the east (closer to the existing residential development and sewerage works site). Access to the central turn back is created via a P21/P28.5 switch. The Existing Crossover North of the station is retained providing access from North bound line to the central cross over.	There would be only slight impacts due to any option in terms of accessibility. The greenway (if open) will mainly be used for amenity, and journey amenity will be a lesser criteria for the minority of users who are commuters. Any closure of the greenway during construction is likely to have a minor impact given its recent opening (if open) and as long as any closure is short term.	There would be only slight impacts due to any option in terms of social inclusion. The greenway (if open) will mainly be used for amenity, and journey amenity will be a lesser criteria for the minority of users who are commuters. Any closure of the greenway during construction is likely to have a minor impact given its recent opening (if open) and as long as any closure is short term.	
			2b	In a similar manner to Option 2A this option is in keeping with Option 1B with the slewing inverted to be present on the eastern side rather than the West towards the causeway.	There would be only slight impacts due to any option in terms of accessibility. The greenway (if open) will mainly be used for amenity, and journey amenity will be a lesser criteria for the minority of users who are commuters. Any closure of the greenway during construction is likely to have a minor impact given its recent opening (if open) and as long as any closure is short term.	There would be only slight impacts due to any option in terms of social inclusion. The greenway (if open) will mainly be used for amenity, and journey amenity will be a lesser criteria for the minority of users who are commuters. Any closure of the greenway during construction is likely to have a minor impact given its recent opening (if open) and as long as any closure is short term.	
			5b	This option sees the turnback facility re located to the north of the existing estuary crossing. The layout and arrangement is of that shown in Option 1B, whereby the mainline radius has been increased to slew the line at line speed away from its current location westwards, with a low speed switch installed from this divergent line to the existing track, which now forms the central turnback road	There would be only slight impacts due to any option in terms of accessibility. The greenway (if open) will mainly be used for amenity, and journey amenity will be a lesser criteria for the minority of users who are commuters. Any closure of the greenway during construction is likely to have a minor impact given its recent opening (if open) and as long as any closure is short term.	There would be only slight impacts due to any option in terms of social inclusion. The greenway (if open) will mainly be used for amenity, and journey amenity will be a lesser criteria for the minority of users who are commuters. Any closure of the greenway during construction is likely to have a minor impact given its recent opening (if open) and as long as any closure is short term.	

Comparison Criteria Legend	
Significant comparative advantage over other options	Green
Some comparative advantage over other options	Light Green
Comparable to other options / neutral	Yellow
Some comparative disadvantage over other options	Light Orange
Significant comparative disadvantage over other options	Orange

Integration													
Works Description	Summary of requirements	Option Number	Description of Option	Adaptability in the future - transport		Transport integration - transport		Land use integration - planning		Geographical integration - planning		Government policy integration - planning	
				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 policies	Rationale	Qualitative appraisal of the options and their impact on integration with geographical and government policies	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 walking 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		Integration with national and international plans and policies	
Works around Malahide Station	To take cognisance of the planned Broadmeadow Estuary Greenway and not to do anything which would preclude the construction of the Greenway	1a	The Down line is slewed to the West towards causeway estuary; this is achieved with the installation of P21/P28.5 switch to facilitate the line speed. The divergent route, then forms a centre turnback with walkways provided. The Up line remains as is, with a lower speed turnout presented to allow egress from the turnback road to the Up Line.	Significant comparative advantage over other options	Mitigation measures required to accommodate the future Broadmeadow Way. This option has some comparative disadvantage against Options 2a and 2b.	Significant comparative advantage over other options	No significant long term impact on other existing transport systems. Comparable with Options 1b and 5b. Some comparative advantage over Options 2a and 2b.	Some comparative advantage over other options	The proposal complies with regional and local policies to improve public transport services including DART services, encouraging modal shift and allowing for increased density of development in certain areas. The development is contained within the existing "envelope" of the rail line. There is no impact on existing land uses.	Some comparative advantage over other options	All international, national, regional and local policies encourage improvements in relation to the efficiency of public transport. All the proposed options will facilitate this.	Some comparative advantage over other options	All international, national, regional and local policies encourage improvements in relation to the efficiency of public transport. All the proposed options will facilitate this.
		1b	The mainline radius has been increased to slew the line at line speed away from its current location westwards, with a low speed switch installed from this divergent line to the existing track, which now forms the central turnback road. Access to the up line is afforded in a similar manner to Option 1A with the installation of a low speed switch and crossing unit.	Some comparative advantage over other options	Mitigation measures required to accommodate the future Broadmeadow Way. This option has some comparative disadvantage against Options 2a and 2b.	Significant comparative advantage over other options	No significant long term impact on other existing transport systems. Comparable with Options 1a and 5b. Some comparative advantage over Options 2a and 2b.	Some comparative advantage over other options	The proposal complies with regional and local policies to improve public transport services including DART services, encouraging modal shift and allowing for increased density of development in certain areas. There is no impact on existing land uses.	Some comparative advantage over other options	All international, national, regional and local policies encourage improvements in relation to the efficiency of public transport. All the proposed options will facilitate this.	Some comparative advantage over other options	All international, national, regional and local policies encourage improvements in relation to the efficiency of public transport. All the proposed options will facilitate this.
		2a	This option inverts the solution of Option 1A, whereby the main line is slewed to the east (closer to the existing residential development and sewerage works site). Access to the central turn back is created via a P21/P28.5 switch. The Existing Crossover North of the station is retained providing access from North bound line to the central cross over.	Significant comparative advantage over other options	No mitigation measures required to accommodate future transport links. This option has some comparative advantage over Options 1a, 1b and 5b.	Some comparative advantage over other options	Temporary impact on the existing local road providing access to the Malahide Marina Village. Comparable with Option 2b. Some comparative disadvantage against Options 1a, 1b and 5b.	Some comparative advantage over other options	The proposal complies with regional and local policies to improve public transport services including DART services, encouraging modal shift and allowing for increased density of development in certain areas. The development is contained within the existing "envelope" of the rail line. There is no impact on existing land uses.	Some comparative advantage over other options	All international, national, regional and local policies encourage improvements in relation to the efficiency of public transport. All the proposed options will facilitate this.	Some comparative advantage over other options	All international, national, regional and local policies encourage improvements in relation to the efficiency of public transport. All the proposed options will facilitate this.
		2b	In a similar manner to Option 2A this option is in keeping with Option 1B with the slewing inverted to be present on the eastern side rather than the West towards the causeway.	Significant comparative advantage over other options	No mitigation measures required to accommodate future transport links. This option has some comparative advantage over Options 1a, 1b and 5b.	Some comparative advantage over other options	Temporary impact on the existing local road providing access to the Malahide Marina Village. Comparable with Option 2a. Some comparative disadvantage against Options 1a, 1b and 5b.	Some comparative advantage over other options	The proposal complies with regional and local policies to improve public transport services including DART services, encouraging modal shift and allowing for increased density of development in certain areas. The development is contained within the existing "envelope" of the rail line. There is no impact on existing land uses.	Some comparative advantage over other options	All international, national, regional and local policies encourage improvements in relation to the efficiency of public transport. All the proposed options will facilitate this.	Some comparative advantage over other options	All international, national, regional and local policies encourage improvements in relation to the efficiency of public transport. All the proposed options will facilitate this.
		5b	This option sees the turnback facility re located to the north of the existing estuary crossing. The layout and arrangement is of that shown in Option 1B, whereby the mainline radius has been increased to slew the line at line speed away from its current location westwards, with a low speed switch installed from this divergent line to the existing track, which now forms the central turnback road	Significant comparative advantage over other options	Mitigation measures required to accommodate the future Broadmeadow Way. This option has some comparative disadvantage against Options 2a and 2b.	Significant comparative advantage over other options	No significant long term impact on other existing transport systems. Comparable with Options 1a and 1b. Some comparative advantage over Options 2a and 2b.	Some comparative advantage over other options	The proposal complies with regional and local policies to improve public transport services including DART services, encouraging modal shift and allowing for increased density of development in certain areas. The development is contained within the existing "envelope" of the rail line. There is no impact on existing land uses.	Some comparative advantage over other options	All international, national, regional and local policies encourage improvements in relation to the efficiency of public transport. All the proposed options will facilitate this.	Some comparative advantage over other options	All international, national, regional and local policies encourage improvements in relation to the efficiency of public transport. All the proposed options will facilitate this.

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

Works Description	Summary of requirements	Option Number	Description of Option	Physical Activity	
				Walking / cycling opportunities - transport	Rationale
Works around Malahide Station	To take cognisance of the planned Broadmeadow Estuary Greenway and not to do anything which would preclude the construction of the Greenway	1a	The Down line is slewed to the West towards causeway estuary; this is achieved with the installation of P21/P28.5 switch to facilitate the line speed. The divergent route, then forms a centre turnback with walkways provided. The Up line remains as is, with a lower speed turnout presented to allow egress from the turnback road to the Up Line.		Assuming the Broadmeadow Way would be safely accommodated there is no temporary or long term impact foreseen on walking or cycling opportunities. All options are comparable.
		1b	The mainline radius has been increased to slow the line at line speed away from its current location westwards, with a low speed switch installed from this divergent line to the existing track, which now forms the central turnback road. Access to the up line is afforded in a similar manner to Option 1A with the installation of a low speed switch and crossing unit.		Mitigation measures required to accommodate the future Broadmeadow Way. All options are comparable.
		2a	This option inverts the solution of Option 1A, whereby the main line is slewed to the east (closer to the existing residential development and sewerage works site). Access to the central turn back is created via a P21/P28.5 switch. The Existing Crossover North of the station is retained providing access from North bound line to the central cross over.		Temporary impact on the existing local road providing walking and cycling access to the Malahide Marina Village. All options are comparable.
		2b	In a similar manner to Option 2A this option is in keeping with Option 1B with the slewing inverted to be present on the eastern side rather than the West towards the causeway.		Temporary impact on the existing local road providing walking and cycling access to the Malahide Marina Village. All options are comparable.
		5b	This option sees the turnback facility re located to the north of the existing estuary crossing. The layout and arrangement is of that shown in Option 1B, whereby the mainline radius has been increased to slow the line at line speed away from its current location westwards, with a low speed switch installed from this divergent line to the existing track, which now forms the central turnback road		Assuming the Broadmeadow Way would be safely accommodated there is no temporary or long term impact foreseen on walking or cycling opportunities. All options are comparable.