

Isle of Sheppey IP Gas Main Replacement

Summary of Route Options across the River Swale relating to Availability of Easements

January 2021



Executive Summary

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1. Overview

The SGN Intermediate Pressure (IP) gas main supply serving the Isle of Sheppey, going under the River Swale via a service tunnel within the Kingsferry Bridge to Brielle Way City Gate, is considered by SGN to be in poor condition with possible low resilience to failure. This exposes the network to potential gas supply failure. SGN also have a directive to consider, where possible, the removal of assets from third party structures and tunnels.

Following a detailed feasibility study, SGN had approved the development of the necessary studies, easement agreement and detailed design for a new 400mm SDR9 HDPE pipeline under the River Swale by Horizontal Directional Drill (HDD) techniques.

As part of this design development easement agreement negotiations have commenced and in the latter part of the negotiations several parties have become more commercially aggressive in providing SGN easement rights to enable the project to be delivered.

2. Key Issues

Peel Ports (PP) are owner of rights associated with drilling under the River Swale. [REDACTED]

Doobar and Knauf are landowners and main tenant respectively of the Kemsley Park Business Estate [REDACTED]

Following a review of options in April 2020 it was concluded that to maintain progress in the overall project development that an application for a Compulsory Purchase Order (CPO) was necessary. The application for a CPO would give notice to landowner's that SGN have both the time and serious intent to resolve these issues [REDACTED]

[REDACTED]. SGN Land Agent, Dalcour Maclaren (DM), have advised that a strategy to initiate a CPO process should now be considered and progress concurrently with any ongoing negotiation. It has been indicated that a full CPO process could take in the order of 15 to 18 months.

A further review of the original routes combined with a further review of potential routes would be undertaken to ensure all viable options have been considered. In considering further routes SGN could fully demonstrate during any CPO process their diligence in considering all options prior to seeking rights to the preferred route to the south of Kingsferry Bridge.

3. Strategy Review

Given the potential for significant time delays and commercial impacts due to a CPO process for the preferred route, a further visit to site was undertaken to investigate viable alternative options. Two further potential routes were identified, and the routes were walked to determine their viability and comparison to the preferred option taking into consideration the following.

- Environmental Impact
- Engineering Difficulty
- Land Ownership and Access/Egress requirements
- Commercial Viability

Identified Alternative Options

Option A – Summary of Route (Appendix 1)

- Anticipated route Length 2100m, 1300m HDD and 800m open cut which is 3 times longer than other proposed routes
- The area locally is marshland within a SSSI, and a full environmental survey will be necessary
- Dewatering of work area during works (approximately 600m) will be required.
- The need to drill under both Highways England and Network Rail structures where tolerances associated with any ground settlement as a consequence of the works would need to be agreed in advance and further tested as being practical at the construction stage of the works
- Land Interests: - J Plumtree, Queensborough Fisheries Trust, Swale Borough Council, KCC, Highways England (freehold), Unregistered Land, Network Rail, EJM Properties (B Nash)



Option A - Summary of Key Issues

- The route is not perpendicular to the Track and offers further engineering difficulties, its orientation would be challenged by Network Rail.
- The Network Rail asset crossing would require an easement to be agreed. This option requires an Under-Track Crossing [REDACTED]
- The route is within a SSSI site where further surveys and mitigation would be necessary for great crested newts, water voles, nesting birds, flora, and fauna.
- The new gas main will cross Highways England and Network Rail assets and consents for the works would be required and could be refused based on their proximity.
- There are multiple small areas of unregistered land impacted by this route option which also increases the potential viability, risk and costs associated with this option.
- The main landowner, Queensborough Fisheries Trust, are an unknown entity at this stage and there is limited historic information available to indicate the terms that they will be prepared to agree to.

- Complex negotiations with Highways England are anticipated in respect of their freehold ownership on the Isle of Sheppey side of the project to secure both access and further land for pipe stringing.
- From a practical perspective the route and associated working areas are within wet grassland and marshes and access routes would be further complicated due to the distance from the main highway and need for significant haul roads.
- Construction of rafted access/egress routes associated with pipe stringing and monitoring present significant environmental risk and are demanding in both construction and remediation post works.
- Navigation Rights within the River Swale would require further negotiation with Peel Ports.
- Access rights across third party land would be required on the Isle of Sheppey. This will lead to the access arrangements attracting both significant time and costs in relation to any legal rights and compensation.
- Costs would be incurred dewatering the primary work areas (launch reception pits).

Required Additional consents:

Navigation Authority	A River Work Licence will be required from Peel Ports which assesses the practicalities and risk to the navigation channel posed by the works.
Flood Defences	The EA would need to provide technical consent as the drill will pass under the sea flood defences.
Network Rail	Subject to the route not being affected by Bridge foundations, further, consents would be required to cross under the rail lines and depending on access routes utilise a private level crossing for machinery access.
Highways England	Again, subject to the route not being affected by bridge foundations, consent to cross under the structure would be needed.

It is considered that the engineering challenges and the length of the HDD mean that this option is not practically or commercially viable.

Option B – Summary of Route (Appendix 2)

- Anticipated route Length 650m which is 50% less than Option A (Red route).
- A raised grassland area on the mainland however this is located within both the Highways England and Network Rail bridge structures where protracted negotiations and engineering difficulties would need to be investigated and agreed. Any costs incurred during this element could be without benefit if the proposed route could not be agreed/proven.
- On the Isle of Sheppey, the route is within a SSSI site where further surveys and mitigation would be necessary for great crested newts, water voles, nesting birds, flora, and fauna.
- Dewatering of work area during works and the need to drill under the Network Rail track where tolerances associated with any ground settlement as a consequence of the works would need to be agreed in advance and further tested as being practical at the construction stage of the works.
- Land Interests: - KCC, Highways England (freehold), large area of unregistered land, Queensborough Fisheries Trust, KCC, Highways England (freehold), Network Rail, EJM Properties (B Nash).



Option B – Summary of Key Issues

- There is insufficient space to allow a full pipe stringing operation in advance of installation. This would mean the main would have to be installed in sections as opposed to being installed in full. Because of this the main will not have been pressure tested which is in contravention of industry standards.
- The final drill shot under the railway line is only 90m long. A 200m bend radii is the maximum that could be employed based on pipe type, considering Network Rail would request the drill to be a minimum of 12m below their asset and therefore the minimum drill distance would be 135m. This means the pipe would not be in the required location local to the tie in point and would be exiting the ground vertically.
- Network Rail asset crossing would also require an easement to be agreed. As with Option A this would require an Under-Track Crossing [REDACTED]
- Should Network Rail ultimately agree to an Under-track Crossing, it is considered that the risks associated with unknown ground strata below the railway track which could be encountered during the directional drill are high. This risk could not be mitigated during any advance investigation works.
- The site is relatively constrained in respect of working area on the mainland side. When considering the size and depth of any launch/reception pit, there would likely need to be interaction with Highways England and Network Rail to secure consent to work in very close proximity to their operational assets.
- It is anticipated complex negotiations will be necessary with Highways England in respect of their freehold ownership for land at both the launch and reception areas. Again, further land would need to be secured to enable pipe stringing.
- The Queensborough Fisheries Trust are an unknown entity at this stage and there is limited historic information available to indicate the terms that they will insist upon.
- There are areas of unregistered land impacted by this option which also increases risk and costs associated with referencing.
- The access route on the Isle of Sheppey is complex and would require improvements in respect of the surface and security arrangements.
- Navigation Rights within the River Swale would require further negotiation with Peel Ports.

Additional consents:

Navigation Authority	A River Work Licence will be required from Peel Ports which assesses the practicalities and risk to the navigation channel posed by the works.
Flood Defences	The EA will need to provide technical consent as the drill will pass under the sea flood defences.
Network Rail	Consent will be required to cross under the rail lines
Highways England	Consent to work in close proximity to the Sheppey Bridge on the mainland side.

Summary of the original feasibility study

Two options were considered to pre-emptively replace the 12” steel IP main that is running within the structure of the Kingsferry bridge with a new supply via horizontal directional drilling (HDD) techniques.

- Option 1 - Crossing the River Medway from the Isle of Grain to the Isle of Sheppey
- Option 2 - Crossing the River Swale from Kent to the Isle of Sheppey

The approach taken has been to liaise with the SGN Asset Team to collate available information on the existing IP gas main route and condition. Informed by the original feasibility study and a series of site visits, both routes were assessed by specialist contractors and Land Agents to review if it was technically viable to replace the IP gas main by employing HDD.

Option 1 - Isle of Grain to the Isle of Sheppey (Appendix 3)

A connection from the gas network on the Isle of Grain to the Isle of Sheppey was considered by SGN as detailed below.

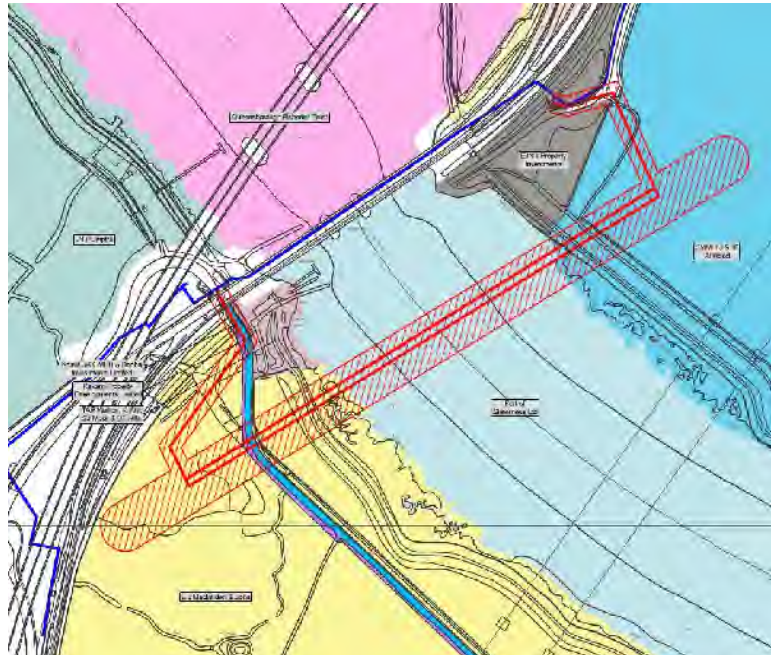


This option was discounted for the following key reasons:

- The crossing would be at least 2.5 to 3 km and a challenge, given that it is at the limits of HDD techniques (typically 1.5 km).
- Ground conditions are unknown and would require an extensive detailed site investigation
- The viable crossing intersects a busy shipping lane is very likely to be rejected by interested parties.
- The drill and reception sites for the HDD were likely to be within commercial development land and interface with significant existing infrastructure.
- If this option were undertaken, the existing gas main from Kent within the Kingsferry Bridge and under the River Swale would still need to be replaced.
- The route would incur negotiations with Network Rail to agree any crossing under the railway track local to the National Grid LNG terminal entry. [REDACTED]
- There are both High Pressure gas pipelines and Aviation fuels which would need to be navigated as part of the works. The latter being a strategic feed to Heathrow Airport.
- There strategic relevance of the Isle of Grain would necessitate 24hr access to key fuel suppliers located in the area, all of these access points would need to be crossed.
- The route is in land owned by National Grid and would need approval. On being contacted to negotiate access in advance of the works to survey the proposed route National Grid categorically denied SGN access and advised that any consents made to agree a route would be rejected.
- Consultation would be necessary with the Environment Agency with respect to breaching existing flood defences, in particular at the shoreline on the Isle of Grain.
- The proposed route would affect the A249 in Sheerness which has recently been resurfaced. A 3-year embargo is imposed on resurface works to carriageways by the Local Authority.
- In trying to avoid damage to the A249, an alternative route has been identified, however this route is heavily habited by Japanese Knotweed.

Option 2 - Sittingbourne to the Isle of Sheppey

The scope of the works is to install a new 400mm SDR9 HDPE pipeline under the River Swale by HDD techniques. This HDD main needs to be installed at a depth of 17m with the drilling shot being circa 370m in length. As detailed below, the sites will need to extend in both directions to accommodate pipeline stringing and accommodation works. Upon completion, the main within Kingsferry Bridge will be decommissioned as required by the terms of the Network Rail easement agreement.



It was therefore considered that this solution presented the most commercially viable option whilst employing minimal engineering complexity in maintaining future gas supplies to the Isle of Sheppey.

Summary of Key Progress to date

This route and impacted parties have been well progressed, and the likely complexities are understood. The proposal would utilise open cut trench works under an existing Network Rail bridge where a trench would be excavated under the existing SEJ2/743 structure. Network Rail acknowledge that the open cut proposal is distinctly preferable from their perspective rather than the constructing of a new Under Track Crossing. Trial holes will be necessary at this location to fully determine this option as the most viable and preferred route. Progress to date can be summarised as follows:

- Progression from outline to detailed design.
- An outline route from the initial phase has been developed to Cowstead Corner.
- A geotechnical survey and the utilisation of existing borehole to support HDD drilling completed.
- Q10 reports have been prepared and determined that the local pipe integrity is suitable for tie in points for Phase 1.
- Design for phase one of the works (the crossing of the River Swale at Kingsferry Bridge) has been completed by SGN designer, GPH Systems (GPH), and is currently being reviewed internally ahead of the PS6 review.

- Advanced communications with the local authorities and studies for Natural England are well advanced by DM in agreeing procedures and mitigation to enable the scheme to progress to the construction phase.
- Completion of the following surveys and associated reports,
 - Environmental Impact Assessment (EIA) Screening Opinion Request (SOR) applications scheduled for submission
 - Great crested newt survey, bat surveys (abutments), reptile surveys, breeding bird surveys, vegetation and botany surveys, wintering bird surveys
 - Habitat Regulation Assessment (HRA), archaeological surveys.
- Agreements in principle have been reached with the agent of the agricultural landowner's affected by the route.

Required Additional consents:

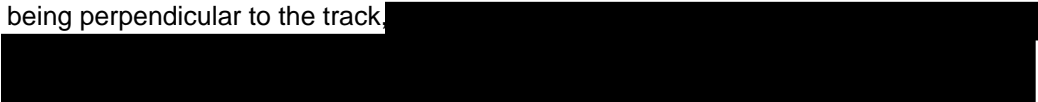
Navigation Authority	A River Work Licence will be required from PP which assesses the practicalities and risk to the navigation channel posed by the works.
Flood Defences	The EA will need to provide technical consent as the drill will pass under the sea flood defences.
Network Rail	Consent will be required to cross under the NR bridge structure with an open cut trench. Trial holes will be necessary in advance of construction to finalise the Design. A permit will be needed from the local authority and consents to excavate in the private road.
Network Rail	Removal of SGN assets. -This work will be included within the tender for the main works. A separate site visit is to be scheduled in January/February 2021 to enable a scope of work to be defined and budget costs and timescales established.

4. Overall Summary of Alternative Route Options

Alternative Route Options

All three route options recently investigated introduce several significant risks, some of which could not be fully removed in advance of any construction work. Notwithstanding these options.

- Many of the risks identified present operational difficulties , which in time may be overcome, but any impact to existing third party assets cannot be removed and the asset owners (in particular Network Rail) could refuse consent for the alternative options particularly given the original preferred route avoids these interfaces.
 - Further negotiation would be necessary with Highways England and Network Rail to gain consents for working near bridge structures. Their approval would be further complicated when dealing with 2 separate authorities with differing engineering needs associated with their assets.
 - Network Rail approvals, licensing and engineering constraints associated with Under Track Crossing (UTX). These would be difficult to obtain based on the routes not being perpendicular to the track,



- Should a UTX permit be secured, no advance ground survey work could be achieved under the railway lines. If an obstruction were encountered in this area whilst undertaking the HDD there would be no alternative other than to abandon the route and re-drill at a different profile. This would be both time consuming and costly.
 - Temporary works would need to be developed to comply with the demands of both asset holders for launch/reception pits near to the bridge structures should consent for the works be agreed.
 - Industry Standards with respect to pipe testing in advance of the works would have to be ignored.
 - Further negotiations would be necessary to agree access rights and land to enable pipe stringing.
 - Dewatering of marshland is necessary local to both alternative routes, the practicalities of which can be overcome during installation but would generate further environmental risks and engineering challenges both during construction and for future maintenance work.
 - By default, the risks associated with any directional drill increase in tandem with the length of the route. With operating pressures having to rise to continue progression of the drill head the risk of a drill fluid breakout occurring become more considerable, with the route being in SSSI RAMSAR areas drill lengths need to be kept to a minimum to manage the risk.
 - Multiple agreements for access would be necessary within marshland for both construction and future maintenance works as required.
 - Lengthy negotiation would be necessary with Crown Estates.
 - National Grid are reluctant to enter dialogue with respect to any route impacting their land.
 - There is an increased Environmental risk where the route enters Ramsar etc. by virtue of the routes being longer
 - The welding and testing of pipe prior to installation would contravene industry standards by means of the main being installed without the necessary pressure test regime.
 - By virtue of options being longer in length when the drilling technique is longer, the risks associated would be higher.
 - Any compensation to landowners would increase again based on the routes being longer.
- The alternative routes would enter an area of SSSI and marshland where further investigation would be necessary and the consent of Natural England. This would be required prior to engaging with both Network Rail and Highways England.
 - Permissions and consent for further boreholes and ground surveys would be necessary to ascertain the technical viability of the alternative routes and to determine the extent of any environmental impact and the temporary works necessary to ensure risks are mitigated but still provide viable access and egress to the site and route.
 - Full new environmental, land, archeological and ecological surveys will be required, and extended areas would need to be managed during the entire project life in relation to fauna, flora, and wildlife.
 - In pursuing an alternative route, negotiations would be necessary with newly identified landowners and whatever route is agreed on land, it will always need to cross the River Swale to which Peel Ports have further rights to consent focusing on navigational routes.
 - Further investigation and an updated design as neither of the alternative routes would fully benefit from data/information gained to date.
 - Increase in material costs, both alternative routes are longer in length where costs in materials and rates for installation could double.

Summary

As part of the review, key advisors were employed by SGN to give further insight to the operational difficulties identified within each option. LMR Drilling and Dalcour Maclaren were requested to score each individual project on merit to further substantiate the most preferable option. The findings can be found in **Appendix 4** and are clearly demonstrative that the preferred option is to pursue the proposal south of Kingsferry Bridge, namely Option 2.

The project was confirmed as a named approved project by Ofgem in the SGN GD2 determination for construction within period of 2021 to 2026.

Further internal reviews with SGN Legal department were undertaken during October / November 2020 culminating in a formal letter being issued to PP on 26/11/20 confirming SGN's intent to progress a CPO should a reasonable commercial agreement not be secured.

PP have responded to SGN on 30/11/20 suggesting development of discussions to date are at odds with SGN's understanding but requested further information and a willingness to engage in further discussion to reach a commercial agreement [REDACTED]

[REDACTED]

[REDACTED]

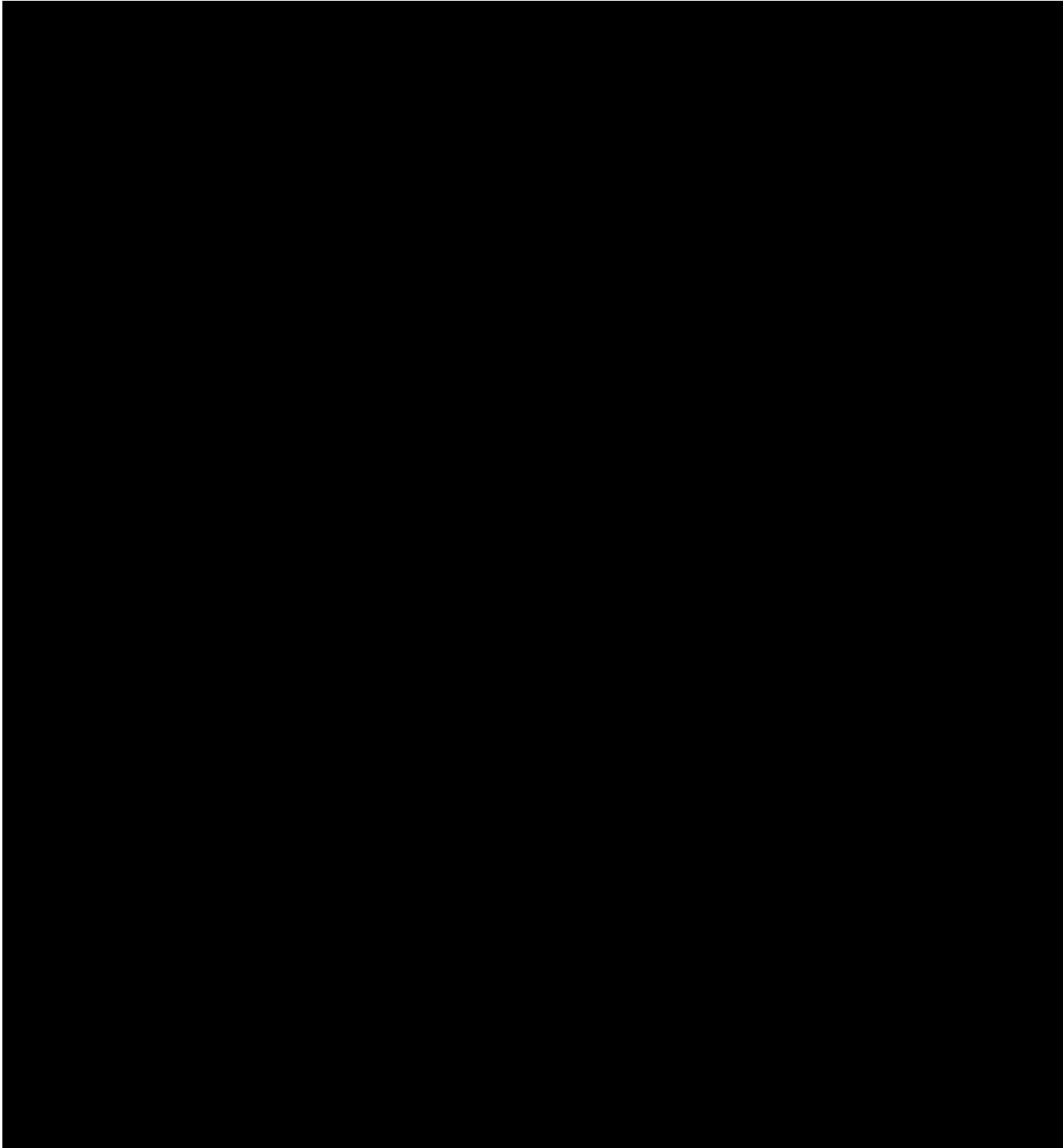
[REDACTED]

Further, consideration is also needed in relation to the development of the design, further ground investigations and the timescales this would attract for optional schemes, each alternative route would impact the Ramsar etc area, having already undertaken this work for the preferred schemes a further 18 months would be necessary for this to be completed and all seasons monitored.

It remains that the originally identified route, to the South of Kingsferry Bridge is the most practical to construct, has the least impact to the surrounding area in relation to Environmental impact and is the cost-effective option.

The team are currently progressing the next steps in tandem with the CPO process. This will include.

- Trial Holes – indicative locations have been identified. It is anticipated these works will be undertaken early in 2021.
- Redundant Asset removal from bridge structure – definition of scope of works.
- Complete Design appraisals.
- Preparation of a hand over pack for procurement and overall project programme update to reflect the CPO process



6. Appendices

Appendix 1	Option A - Kingsferry Bridge - Plumtree route Report	
	Appendices Option A	Appendix A - SGN 010919-010 Pipeline Route B
		Appendix B - Kingsferry Bridge Route B
		Appendix C - 20200916_RPT_Kingsferry_OPTION A (Land Interest)
		Appendix D - Kingsferry alternative routes Route A (Ecology - Planning)
Appendix 2	Option B Kingsferry Bridge - Between Bridges Report	
	Appendices Option B	Appendix A - SGN 010919-010 Pipeline Route C
		Appendix B - Kingsferry Bridge Route C
		Appendix C - 20200916_RPT_Kingsferry_OPTION B (Land Interest)
		Appendix D - Kingsferry routes Route B (Ecology - Planning)
Appendix 3	Option 1 Kingsferry Bridge - Isle of Grain to Isle of Sheppey route Report	
	Appendices Option 1	Appendix A - SGN 010919-010 Pipeline Route A
		Appendix B - Kingsferry Bridge Route A
		Appendix C - 20200916_RPT_Kingsferry_OPTION 1 (Land Interest)
Appendix 4	Sheppey Drill HDD Complications - Matrix 01-10-20	

05/01/2021



Isle of Sheppey IP Gas Main Replacement


Route Feasibility and Condition Survey

Mainland to Sheppey via Plumtree

August 2020



Executive Summary

1. Overview
2. Summary
3. Route
4. Observations
- 
6. Summary of major risks identified
7. Recommendation

1. Overview

The SGN Intermediate Pressure (IP) gas main supply serving the Isle of Sheppey, going under the River Swale via a service tunnel within the Kingsferry Bridge to Brielle Way City Gate, is considered by SGN to be in poor condition with possible low resilience to failure. This exposes the network to potential gas supply failure. SGN also have a directive to consider, where possible, the removal of assets from third party structures and tunnels.

The SGN objective is to ascertain if it is viable to replace the existing IP gas main thereby improving the network resilience and surety of gas supply to customers. SGN require the collation of information working closely with specialist contractors and SGN Land Agents to collate information to inform a technical feasibility study for the IP gas main replacement.

The IP gas main is in poor condition along its route as it is subject to gas leaks even though it is operating below its maximum gas pressure of 7 bar.

There is evidence of corrosion of the IP gas main and the steel support gantry in the service tunnel under the Kingsferry Bridge

It is considered by SGN to be at the end of its operational life having been installed around the 1950s. SGN also have concerns that the condition of the IP gas main could possibly cause further gas leaks that could possibly be a health and safety risk to SGN operatives responding to a fault.

SGN consider that there might be negative impact on the SGN corporate reputation due to possible gas leaks and gas supply failure to customers

The SGN corporate directive to remove assets from third party structures could be achieved as the existing IP gas main crossing the Kingsferry Bridge would become redundant and removed with the agreement of Network Rail at a time suitable to all parties and subject to the new assets being connected to the network and its operational reliability being restored.

Following a desktop review to identify the most suitable routes to replace the deteriorating asset, three options have been chosen which offer Feasible options in laying a new 400-millimetre SDR 9 HDPE pipeline to the Isle of Sheppey.

2. Summary

This report is associated with the route from the main land to Sheppey to the West of the A249 Sheppey Crossing, the obstacles and engineering difficulties associated with the construction on this route and includes a condition survey of the surrounding area and assets along the proposed route.

3. Route

Starting in scrub at a low level between Sheppey Way and the A249 Sheppey Crossing the main would be laid by open cut along the entry road to the boating club West towards the junction of Old Ferry Road before traversing within the constraints of the carriageway for approximately 300mm. At this point the trench would enter land owned by JN Plumtree, the route (continuing in open cut) would extend a further 400m before switching techniques to directional drill (HDD). A route drawing can be found in **Appendix A** of the report



Initial works would consist of approximately 800m of trench to be excavated by open cut technique in the carriageway. The directional drill would be approximately 1200m below the River Swale to the Isle of Sheppey into land under the ownership of Queensborough Fisheries before heading South Easterly a further 400m under the A249 Sheppey Crossing, Sheppey Way and also the Network Rail track to Old City Gate in land controlled by Mr B Nash.

A full and comprehensive survey and narrative can be found in **Appendix B** detailing observations made during a walk of the entire route, along with planning, environmental, archaeology and ecology requirements identified. These are summarised in sections 4 and 6 below.

4. Observations

The entire route employing both open cut and HDD techniques would be more than 2.1km.

The new gas main will cross Highways England and Network Rail assets and consents for the works would be required and could be refused based on their proximity.



The route would impact on traffic accessing the boating club and a private road serving the industrial estate. This is the only access route in the control of Ridham Docks and any interference with their tenant's operations could result to significant compensation in relation to business losses being payable.



Existing Utilities are local to work, a cluster of valves are indicative of an existing strategic crossing under the swale associated with potable water supplies to the Isle of Sheppey. There is a Deed of Grant between Kent County Council and Southern Water Authority dated 15th of June 1997. This provides full right and liberty to lay, maintain and repair a 600-millimetre diameter water main with all necessary valves and fittings. The proposed route of the new IP would be in close proximity to this Asset and would require further negotiation to determine the viability of the route.



05/01/2021

The existing carriageway shows evidence of deterioration, an existing record of its status would need to be agreed with the Local Authority in advance of the works.



Fly tipping is endemic on the route, Security may be necessary based on illegal activities. SGN would be liable to remedy any fly tipping within a working area within private land whilst in control of the site.



05/01/2021

There are multiple small areas of unregistered land impacted by this route option which also increases the potential viability, risk and costs associated with this option.



The route is within a SSSI site where further surveys and mitigation would be necessary for great crested newts, water voles, nesting birds, flora, and fauna.



From a practical perspective the route and associated working areas are within wet grassland and marshes and access routes would be further complicated due to the distance from the main highway and need for significant haul roads. There is a high risk for significant soil structure damage and the need for extensive reinstatement works to be undertaken.



Construction of rafted access/egress routes associated with pipe stringing and monitoring present significant environmental risk and are demanding in both construction and remediation post works. Similarly, during the drilling stage, the high volume of drainage ditches (which presented considerable risk of drill fluid breakout while pilot drilling). Consultation would be necessary with the drainage board in the first instance. The environmental impact would be of a high risk when considering any contingency plans should a breakout occur due to inaccessibility of the land for excavators to position pumps etc. to manage such a breakout scenario. Should ground conditions lead to significant damage to the designated sites an extensive remediation plan and ongoing management plan would have to be agreed between landowners and Natural England. This would lead to significant costs being incurred for a number of years post works.



05/01/2021

Costs would be incurred dewatering the primary work areas (launch reception pits).



There is evidence of water voles local to the proposed work area.



05/01/2021

Navigation Rights within the River Swale would require further negotiation with Peel Ports.



05/01/2021

Access rights across third party land would be required on the Isle of Sheppey to both undertake the works and further to enable the welding and stringing of pipes. This will lead to the access arrangements attracting both significant time and costs in relation to any legal rights and compensation.



The main landowner, Queensborough Fisheries Trust, are an unknown entity at this stage and there is limited historic information available to indicate the terms that they will be prepared to agree to.



05/01/2021

There is Evidence of a HV electricity cables with interchangeable routes underground and mounted on poles.



Complex negotiations with Highways England are anticipated in respect of their freehold ownership on the Isle of Sheppey side of the project to secure both access and further land for pipe stringing.



The Network Rail asset crossing would require an easement to be agreed. In finding stable dry ground to facilitate the HDD under the railway line the drill alignment under the track would be 40° from perpendicular as illustrated below.



Network Rail are highly resistant to any crossing below their lines at anything greater than 10° from perpendicular leading to the proposal being rejected given Network Rail being aware of other viable route options with less technical risks.

Timescales associated with the delivery of the entire Project would be considerable leading to long term disruptions to routes used by local business and the public in general

Required Additional consents:

Navigation Authority	A River Work Licence will be required from Peel Ports which assesses the practicalities and risk to the navigation channel posed by the works.
Flood Defences	The EA would need to provide technical consent as the drill will pass under the sea flood defences.
Network Rail	Subject to the route not being affected by Bridge foundations, further, consents would be required to cross under the rail lines and depending on access routes utilise a private level crossing for machinery access.
Highways England	Subject to the route not being affected by bridge foundations, consent to cross under the structure would be needed.

6. Summary of Major risks Identified

The new gas main will cross Highways England and Network Rail assets and consents for the works would be required and could be refused based on their proximity to foundations.

There is a Deed of Grant between Kent County Council and Southern Water Authority dated 15th of June 1997. This provides full right and liberty to lay, maintain and repair a 600-millimetre diameter water main with all necessary valves and fittings. The proposed route of the new IP would be in close proximity to this Asset and would require further negotiation to determine the viability of the route.

On entering land in the ownership of Mr Plumtree, the route is located within the Medway Estuary and Marshes SSSI, SPA and Ramsar. Consequently, a suite of surveys will need to be undertaken on the mainland in order to support any necessary EIA screening and HRA submission. On walking the route there is evidence of water voles being present

There is a non-designated heritage asset located immediately off Old Ferry Road along the route, comprising a sheepfold on the Ferry Marshes and the site of a former field barn with no associated yard (TQ 96 NW 1068).

Other Heritage features recorded within the immediate vicinity of the route include post-medieval heritage assets which comprise a mooring post (TQ 96 NW 1113) and two possible revetments (TQ 96 NW 1112; TQ 96 NW 1118), one recorded in the Ferry Marshes and another recorded on the Isle of Sheppey. Additionally, there is a modern pillbox located within the immediate vicinity of the north eastern end of Route A (MKE39148). All these areas would need to be further assessed, with consents gained for work in the proximity. An Archaeological watching brief may also be necessary. Should a watching brief be needed and the stop/start protocols employed within any such consents this would put the drilling operation at a high risk as stopping and starting of directional drilling can lead to snatching and increased pressures in moving both the drill head and pulling the pipe back on completion.

Construction of rafted access/egress routes associated with pipe stringing and monitoring of the drilling rig present significant environmental risk and are demanding in both construction and remediation post works where any.

05/01/2021

The high volume of drainage ditches could become polluted should there be a drill fluid breakout. Again, the stop/start nature of a watching brief if employed would further increase the risk of a drill fluid break out based on pressure increases. Any clean up would be both costly, damaging to the Environment and reputation of all parties involved in the scheme's delivery. The environmental impact would be of a high risk when considering any contingency plans should a breakout occur due to inaccessibility of the land for excavators to position pumps etc. to manage such a breakout scenario.

Given the proximity of the works to the River Swale flood defences and the number of drains located, it is recommend that liaison with the EA and the Internal Drainage Board (IDB) would be necessary at any early stage to discuss the proposals and determine the consents required.

Network Rail are highly resistant to any crossing below their lines at anything greater than 10° from perpendicular leading to the proposal being rejected. [REDACTED]

Indicative costs identified to date which would be in addition to the existing budget secured would be [REDACTED]. It is considered that this indicative cost would increase further should the feasibility move from a desk top study to full site investigation.

7. Recommendation

In reaching a conclusion in considering the risks above it remains that the originally identified route, to the South of Kingsferry Bridge is the most practical and cost-effective option.

8. Appendices

Appendix A	SGN 010919-010 Pipeline Route B
Appendix B	Appendix B - Kingsferry Bridge Route B Site Condition Pictures
Appendix C	20200916_RPT_Kingsferry_OPTION A (Land Interest)
Appendix D	Kingsferry alternative routes Route A (Ecology - Planning)

Kingsferry Bridge Pre-Condition Survey



Route B – HDD to West of existing Bridge Structures

1.0 Project Description

At the request of SGN, Chris Jowitt, Hargreaves Jones (HJ) Senior Consultant, visited the proposed route associated with the Kingsferry Bridge crossing to assess the existing conditions.

The focus of the visit was to determine the following.

- Local carriageway conditions, footways, and verges
- Existing Infrastructure/Utilities
- Private Land affected
- SSSI Area
- Impact on local business and public

2.0 Route – a series of Directional Drill (HDD) shots from the mainland to the Isle of Sheppey totalling approximately 600m.



3.0 Site status at time of visit

The following pictures are indicative of the status and condition of area. In preparing this report, HJ must advise that the condition of the site could change. Whilst both a photographic and video survey of the road network was also taken it is strongly recommended that a further condition survey is undertaken prior to any work commencing on site to ensure any change is recorded to ensure responsibility is directed to the correct party.

The following comments are local to Area 1 shown below



area identified as initial launch reception pit for directional drill. The excavation will be deep and near piles and the foundations of the bridge similarly consent would be necessary from Network Rail based on the nearby railway line.



The existing carriage way proposed as the route is heavily used by both industrial traffic and locals pursuing water sports (adjacent entry to boating club).



The carriageway has evidence of recent field spells within time degenerate the existing surface.



Local water infrastructure in the verge where is demonstrate of a strategic crossing under the River Swale.



Further evidence of carriageway condition which is heavily scarred and erosion two existing surface joints.



Evidence of recent repairs to damage cottage way.



An area of barren land local to the works has the potential to be used as a side compound however previous visits have witnessed this area being inhabited by the travelling community. Note security would be necessary.



Further evidence of carriage way condition and its ongoing deterioration based on heavy use by articulated vehicles.



A major junction entering old ferry Rd where full traffic management would be necessary.





Old ferry Rd is in relatively good condition with the verge ways being heavily populated with hedgerows and Bramble.





Evidence of fly tipping can be found on the route, security would be necessary during the works.





The following comments are local to Area 2 shown below



The route would continue by means of open cut into the land owned by Mr Plumtree, this land is generally marshland with grazing cattle occupying the area. The land contains various water courses and culverts to provide access points utilised by the landowner. The area can also be considered as being a SSSI area











There is evidence a water balls or similar utilising this area as a natural habitat within the banks of the various ditches and water courses.



The directional drill under the River Swale would require consents from both peel pots and Queensbury fisheries.





The following comments are local to Area 3 shown below



The reception point for the directional drill on the Isle of Sheppey can again be determined as being triple a SSSI.



Further consents would be necessary to facilitate the welding of pipes and stringing prior to these being pulled back within the drill shot to the mainland. Consent to be considered highways England based on its proximity to the bridge structure and Queensbury fisheries.







Further evidence of fly tipping on the Isle of Sheppey local to the route would further determine the need for security.



A further directional drill Under Sheppey Way and the Network Rail track would need the consent of the Local Authority and Network Rail (UTX)





The final connection point of the drill would be in land owned by Mr B Nash, it can be noted that Mr Nash continues to re mediate his land and filling water courses without the necessary consents. It is recommended that in advance of any works the existing condition local to Mr Nash is recorded as evidence should it be required later if a dispute arose.





5. Anticipated costs

The potential costs associated with the alternative route is summarised below.

Additional Cost Risks (£)		Total £
Old Ferry Rd - Plumtree	Design/Investigation	350,000
	900m Additional HDD	800,000
	Dewatering	84,000
	Access roads	100,000
	Network Rail UTX	50,000
	Highways England	50,000
	Easements	275,000
		1,709,00

Assessment of Route Options on Private Land Interests Option A

DM Scheme code	205877
Site Name	Kingsferry to Sheppey
Grid Ref.	Approx. TQ 91289 69263
Post Code	ME9 8SS



Option A – Red

Route Overview

The route is approximately 2200 metres in length. The route is predominantly in the highway for the install stages of the scheme from the existing network, the route then enters private land, under the Swale and into council owned land. There are several road and railway networks that need to be considered in the planning of the works.

Landowners

Eight landowners have been identified through research with the Land Registry along the alignment for the scheme with two parcels of land showing as unregistered.

Kent County Council

Enquiries have been made to Kent County Council to identify the extent of information that would be required from them prior to entering into an easement agreement for the installation of the pipe. The majority of the route shown within their ownership appears to fall within the highway and therefore assume the works would be located within the adopted highway. The larger section coloured blue on the plan 180438_PLN_RSOI_22.1 is scrub land and not used for income generation and therefore any pipe installation in this section of land should not warrant a loss of income claim but would be subject to terms for land rights.

The Secretary of State for Transport

The section of main installed within the Secretary of State for Transport is shown to be mainly within the highway. It is anticipated that this will relate to Highways England's management of the Sheppey Crossing.

Highways England

As the route options are near the Sheppey Bridge crossing the Swale, we have been in contact with Highways England to discuss any constraints and concerns they may have. FM Conway Ltd are the operation and maintenance contractor and asset manager for Sheppey Route Ltd, the Design, Build, Finance and Operations Company appointed on behalf of Highways England for the A249. They maintain the A249 Network between the M2 Junction 5 Stockbury roundabout and Sheerness Docks. Highways England require Details of the works including plans if available, dates and timings of works, details of traffic management (if any), details of diversions and alternative arrangements for Non-Motorised Users (prohibited from using the Sheppey Crossing) and an onsite contact number in case of any issues on the crossing that may affect the works and workforce. If the route is proceeded with, a site visit is requested to discuss the scope of works in more detail. This would incur costs to address FM Conway Ltd.'s input.

John Nicholas Plumtree

The route alignment enters Mr Plumtree's land from the Old Ferry Road and would cross pastureland created by artificially draining marshes. Due to the high number of drainage ditches and features it is difficult to take a route that is sympathetic to the current land use and as such accommodate continued grazing on proportions of the holding. This could lead to increased levels of compensation. There are numerous large ditches and it would be necessary to consult with the Internal Drainage Board to understand and restrictions or requirements for works crossing or near the features. Due to the ditches there are also multiple culverts that would need to be used for access and it will be difficult to determine

the condition and capacity for loading. As such significant repair works would be anticipated and it would be advisable to agree a strategy with the landowner to reduce costs and risk associated with this.

If the main can be horizontally directionally drilled from one end of the field to the other, there should be lesser impact on the landowner with just two larger working areas. However if the main is to be installed via open cut, it would be beneficial to keep to the edge of the fields where access would be easier and would allow the landowner to continue to graze the a large a proportion of unaffected land throughout the works, overall reducing any compensation. The working areas would always require livestock fencing and gates to be installed and the field left secure. In addition there is a footpath along the shoreline which is identified within Mr Plumtree's land, as this section is likely to be directionally drilled, there should be no issue within keeping this open during the works, so long as there is no access to the materials and machinery undertaking construction.

It is fair to say that this route options holds the highest risk in respect of the potential for significant soil structure damage and the need for extensive reinstatement works to be undertaken. If due to the low-lying nature and potentially poor ground conditions, machinery does cause excessive rutting or ground damage then it may be necessary to remove contaminated soils and import suitable replacement materials. Given the designated nature of parts of the site this would be an extremely difficult and expensive process. If soil importation is not needed the area would require a programme of remedial cultivations, re-seeding with high provenance seed and an ongoing management and aftercare plan as a minimum.

Queenborough Fishery Trust

Queenborough Fisheries Trust are a charitable organisation dedicated to helping the community in the Swale area. Enquiries have been made with the organisation to clarify the extent of their ownership and better understand the approach that would be taken should land rights be requested for gas main. Their ownership includes the bed of the Swale and the shoreline. There would likely be no impact on any income generating activity within their ownership would be minimal and compensation in relation to this aspect would not be significant. Whilst it would be reasonable to assume a gas main would have limited impact on the value of their property the land rights required could be subject to a commercial negotiation. Given their objectives to benefit communities in the Swale area there would be a strong case to negotiate down land right costs.

Swale Borough Council

In addition to the comments above, this route has 171 metres of gas main within the council's freehold land. This land offers a good opportunity for a site compound and the launch / reception pit with a stringing out area, however it should be noted there is the railway to the north and any stringing out may need further consents.

This area is at times grazed by cattle based upon the research undertaken but none were present during the site inspection and it is currently easily accessed by the public.

Network Rail

Although this parcel of land is currently identified as unregistered with the Land Registry, it is clearly occupied by Network Rail. Enquiries have been made with Network Rail in order to establish the land rights that would be insisted upon by their land team. From an operational perspective, Network Rail would require the completion of a BAPA before any works could be undertaken within 10m either side of the railway. To progress this and the land rights required, Network Rail need to be provided with the

RAMS for the works, and full detail on working areas required along with future maintenance plans, which could in turn be agreed within the deed of easement.

EJN's Property Investment Limited

EJN's Property is owned by Mr Nash who we have met with to discuss the route corridor for the works to gain an understanding on what impact a project could have on the property but also the headline terms anticipated for a negotiation. At this stage he has indicated that he would expect terms beyond the agricultural value diminution approach agreed in principle with other parties. He uses the land for recreational purposes but does have more commercial activities planned. There is often machinery and plant situated on the site undertaking excavations which could pose a risk to any assets installed in the area.

Adopted Highway

A full highway adopted search is required to identify the full extent of the adoption, however from initial research, we have identified as above most of the affected road is maintained by Kent County Council. This route includes large sections within the road, and with the nature of the crossing, it is assumed, Kent CC would only allow for a lane closure which may necessitate additional storage space outside of the carriageway. This would be subject to a negotiated agreement and incur additional costs as a result.

A large, light blue watermark of the 'DM' logo is centered on the page, consisting of the letters 'DM' inside a circle.

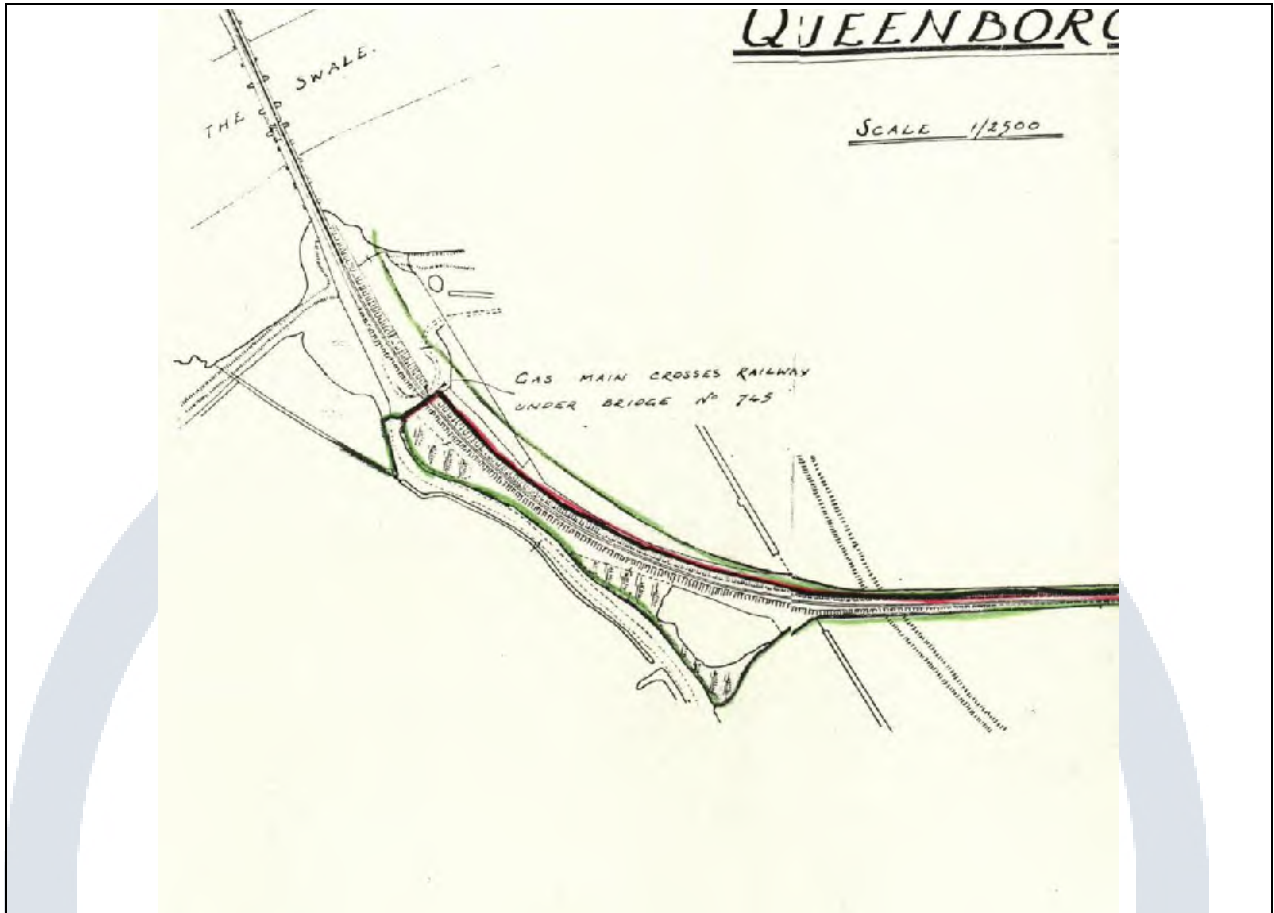
Existing Easements and utilities

There is a deed of grant between Swale Borough Council and British gas Corporation dated 14th of march 1984 With full right and liberty to laying, maintaining and repairing a main or pipe for the transmission or storage of gas or other materials connected with the exercise and performance of the function of the corporation and all necessary apparatus within the six metre strip of land coloured in pink, the depth of the gas main is not stated.



There are no other easements for the pipe and therefore a full utility search would be required along with further engagement with the landowner to understand their knowledge on the history of the site and any other services within the land.

There is a deed of grant between the British Transport Commission and South Eastern Gas Board dated 21st of June 1961, with full right and liberty to laying, maintaining, repairing or renew the and to obtain access. The eight-inch gas main in the position indicated by the red line.



Construction and working areas

Given the extent of the construction of the main within the adopted highway, it would seem likely that an additional storage and compound area would be required, and this would most likely fall within privately owned land. This would likely be secured using a Licence agreement and costs would be anticipated to address this.

Upon entering private land owned by Mr Plumtree, there would be limitation on the availability of space and location based upon the physical features including drainage channels. There is the opportunity within this area to increase working area for the siting of the drill rig or stringing out as required as part of the horizontal directional drill. The land is artificially drainage and as such there is the risk of high reinstatement costs if ground conditions are poor during the works. This could extend for years after the construction works are completed depending on the extend of soil structure loss caused.

There are large open areas on the Isle of Sheppey side of the crossing with currently limited uses other than for apparent public amenity. There would be suitable opportunities for large working area within the council's land and would be recommended as the most suitable compound and working area due to the lack on income generating occupation and temporary fencing and works required. Once the main has passed under the railway to the east and into the land owned by EJM Properties, there is more limited space available for the required connections back into the network and access will need to be maintain at all times. This could include provision of a temporary alternative route which would have associated costs and agreements. Whilst the true nature of the business activities in this area is unknown it is expected that the site use will become more formal in the future.



05/01/2021



Isle of Sheppey IP Gas Main Replacement

Route Feasibility and Condition Survey

Mainland to Sheppey between Bridges

August 2020



05/01/2021



Executive Summary

1. Overview
2. Summary
3. Route
4. Observations
-
6. Summary of major risks identified
7. Recommendation

1. Overview

The SGN Intermediate Pressure (IP) gas main supply serving the Isle of Sheppey, going under the River Swale via a service tunnel within the Kingsferry Bridge to Brielle Way City Gate, is considered by SGN to be in poor condition with possible low resilience to failure. This exposes the network to potential gas supply failure. SGN also have a directive to consider, where possible, the removal of assets from third party structures and tunnels.

The SGN objective is to ascertain if it is viable to replace the existing IP gas main thereby improving the network resilience and surety of gas supply to customers. SGN require the collation of information working closely with specialist contractors and SGN Land Agents to collate information to inform a technical feasibility study for the IP gas main replacement.

The IP gas main is in poor condition along its route as it is subject to gas leaks even though it is operating below its maximum gas pressure of 7 bar.

There is evidence of corrosion of the IP gas main and the steel support gantry in the service tunnel under the Kingsferry Bridge

It is considered by SGN to be at the end of its operational life having been installed around the 1950s. SGN also have concerns that the condition of the IP gas main could possibly cause further gas leaks that could possibly be a health and safety risk to SGN operatives responding to a fault.

SGN consider that there might be negative impact on the SGN corporate reputation due to possible gas leaks and gas supply failure to customers

The SGN corporate directive to remove assets from third party structures could be achieved as the existing IP gas main crossing the Kingsferry Bridge would become redundant and removed with the agreement of Network Rail at a time suitable to all parties and subject to the new assets being connected to the network and its operational reliability being restored.

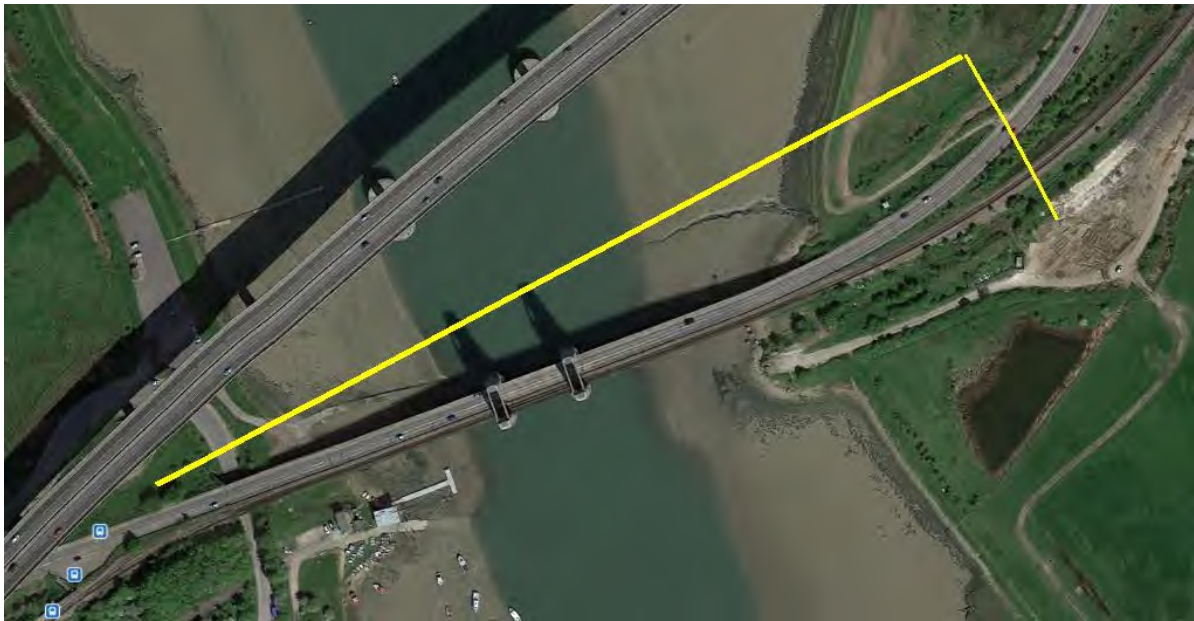
Following a desktop review to identify the most suitable routes to replace the deteriorating asset, three options have been chosen which offer Feasible options in laying a new 400-millimetre SDR 9 HDPE pipeline to the Isle of Sheppey.

2. Summary

This report is associated with the route from the [main-landmainland](#) to Sheppey following a corridor in between both bridge structures, namely the A249 Sheppey Crossing and Sheppey Way prior to drilling under Sheppey Way and the Network Rail track into old city gate, the obstacles and engineering difficulties associated with the construction on this route and includes a condition survey of the surrounding area and assets along the proposed route.

3. Route

Starting in scrub at a low level between Sheppey Way and the A249 Sheppey Crossing the main would be laid by directional drill (HDD) for approx. 450m before heading South Easterly a further 100m again using HDD techniques under Sheppey Way and also the Network Rial track to Old City Gate in land controlled by Mr B Nash. A full route drawing can be found in **Appendix A**.



A full and comprehensive survey and narrative can be found in **Appendix B** detailing observations made during a walk of the entire route, along with planning, environmental, archaeology and ecology requirements identified. These are summarised in sections 4 and 6 below.

4. Observations

The site is relatively constrained in respect of working area on the mainland side. When considering the size and depth of any launch/reception pit, there would likely need to be interaction with Highways England and Network Rail to secure consent to work in very close proximity to their operational assets. This consent again could be refused based on the route proximity to these assets and in particular the foundation structures.



05/01/2021

Pipe Stringing to support the drill would be restricted and would have to be undertaken in sections which would not allow for the pipe to be fully pressure tested ahead of it being installed. An excavator (15-23t) would be needed to work near the bridge piers to support the stringing route for the pipe. While it is not impossible for the string to be prepared in shorter lengths and for the drill to stop during pullback for intermediate welds, this is not without risk when drilling through predominately clayey soils (where there is a tendency for the clay to relax back into the hole and potentially 'grab' the pipe after periods of inactivity). It would certainly be preferable to conduct the pullback as a single, continuous operation.

It is anticipated complex negotiations will be necessary with Highways England in respect of their freehold ownership for land at both the launch and reception areas.



Access will be necessary on to land occupied by the boating club when tracking the drill profile, this area can become heavily congested with the public on an evening and at weekend participating in watersports.



05/01/2021

The Queensborough Fisheries Trust are an unknown entity at this stage and there is limited historic information available to indicate the terms that they will insist upon.



Information from the bridge asset owners would be necessary to determine the location of piles and supports. Their location could deem that the route cannot be achieved.



05/01/2021

There are areas of unregistered land impacted by this option which also increases risk and costs associated with referencing. This land is necessary to facilitate pipe stringing in advance of the works.



The access route on the Isle of Sheppey is complex and would require improvements in respect of the surface and security arrangements.



05/01/2021

Navigation Rights within the River Swale would require further negotiation with Peel Ports.



Local to the route is evidence of an existing water main.



05/01/2021

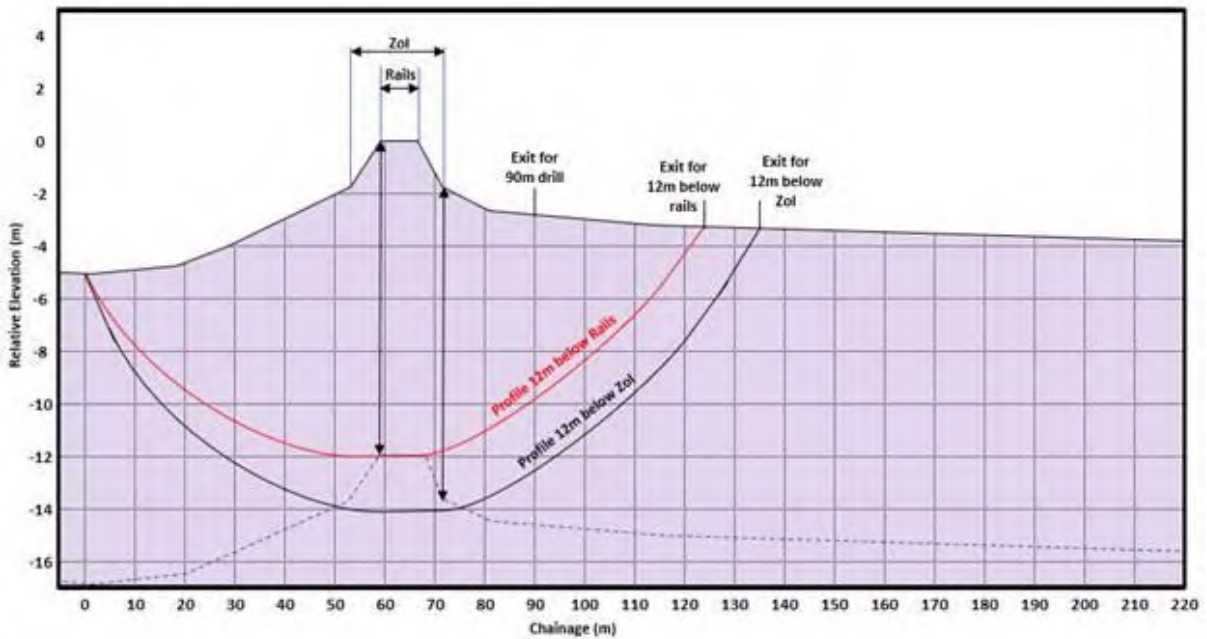
There is evidence at the reception point in Sheppey of HV power lines both below ground and pole mounted.



The Network Rail asset crossing would also require an easement to be agreed. This would require an Under-Track Crossing; [REDACTED]



The under-track (UTX) crossing is not feasible based on the short length of drill proposed. Network Rail's (NR) minimum depth requirement is generally 12m when passing below their lines. how this is applied in a scenario where the line is on an embankment (i.e.i.e., if NR want a minimum depth of cover of 12m would this be just directly below the lines or below all of their land) and also the topography along the route. The drill site (between the railway and road) is circa 5m below the level of the railway and the exit point some 3m below the railway level and, therefore, 2m above the drill entry point. On the basis that NR would want a minimum depth of cover of 12m then viable drill profiles would be significantly longer than those shown in the proposal. The schematic below illustrates this principal. The drill profiles shown are based on 200m bend radii which is the minimum as to what can realistically achieved. Based on the topographical figures the drill would have to be extended from 50m to 135m. This would result in the IP main having to be laid back on itself to connect into the current grid entry point at City



Should Network Rail ultimately agree to an Under-track Crossing, it is considered that the risks associated with unknown ground strata below the railway track which could be encountered during the directional drill are high. This risk could not be mitigated during any advance investigation works.

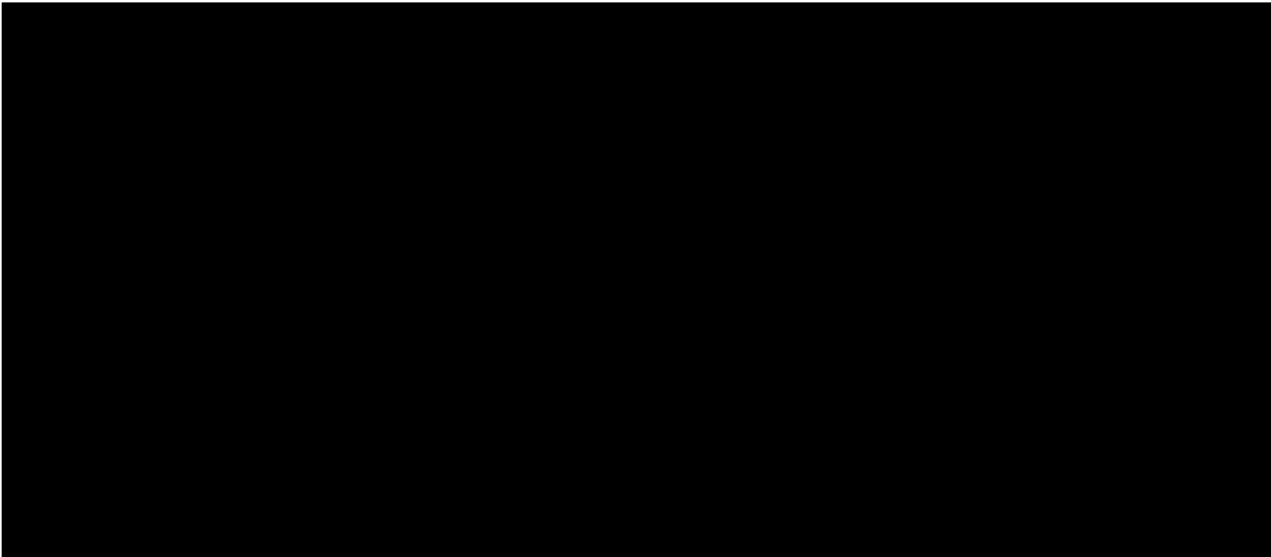


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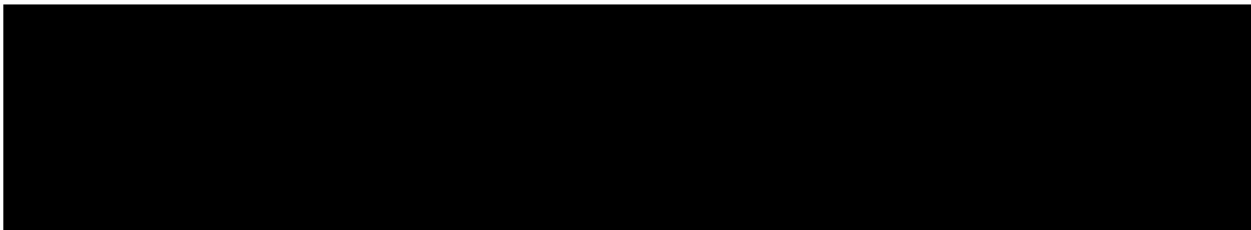


Additional consents:

Navigation Authority	A River Work Licence will be required from Peel Ports which assesses the practicalities and risk to the navigation channel posed by the works
Flood Defences	The EA will need to provide technical consent as the drill will pass under the sea flood defences
Queensborough Trust	Currently an unknown entity at this stage and there is limited historic information available to indicate the terms that they will insist upon.
Existing Utilities	Exclusion zones and approvals would be necessary to undertake the initial works combined with agreements necessary for any future maintenance
Network Rail	Consent will be required to cross under the rail lines
Highways England	Consent to work near the Sheppey Bridge on the mainland side.



6. Summary of Major risks identified



The new gas main will cross Highways England and Network Rail assets and consents for the works would be required and could be refused based on their proximity to foundations.

There is a Deed of Grant between Kent County Council and Southern Water Authority dated 15th of June 1997. This provides full right and liberty to lay, maintain and repair a 600-millimetre diameter water main with all necessary valves and fittings. The proposed route of the new IP would be in close proximity to this Asset and would require further negotiation to determine the viability of the route.

The route is located within the Medway Estuary and Marshes SSSI, SPA and Ramsar. Consequently, a suite of surveys will need to be undertaken on the mainland to support any necessary EIA screening and HRA submission.

05/01/2021

The available footprint to support pipe stringing would be insufficient to cater for the full line. This would mean the new gas main would be inserted without having being pressure tested which is an operational bad practice. Any failure in the test one the pipe is within the drill would lead to the pipe being abandoned and a further drill shot would be required.

The under-track (UTX) crossing is not feasible based on the 200m bend radii necessary to achieve the relevant distance from the Network Rail track. Based on the topographical figures the drill would have to be extended from 90min length to a minimum of 135m to meet the minimum requirement. It must also be noted that the pipes orientation in meeting this would be exiting the ground in an aggressive vertical rather than a preferred horizontal, which would introduce further design needs. This would result in the IP main having to be laid back on itself to connect into the current grid entry point at City Gate.

With no data being available of ground conditions below the Network Rail track the conditions to support HDD are unknown. More than one attempt to drill at this location may be necessary. As an alternative to HDD, micro tunnel could be considered, however the ground water conditions local to the area combined with the necessary depths needed would have to be further determined just to prove the viability of this option.

The above Network Rail associated activities are all reliant on Network consent. [REDACTED]

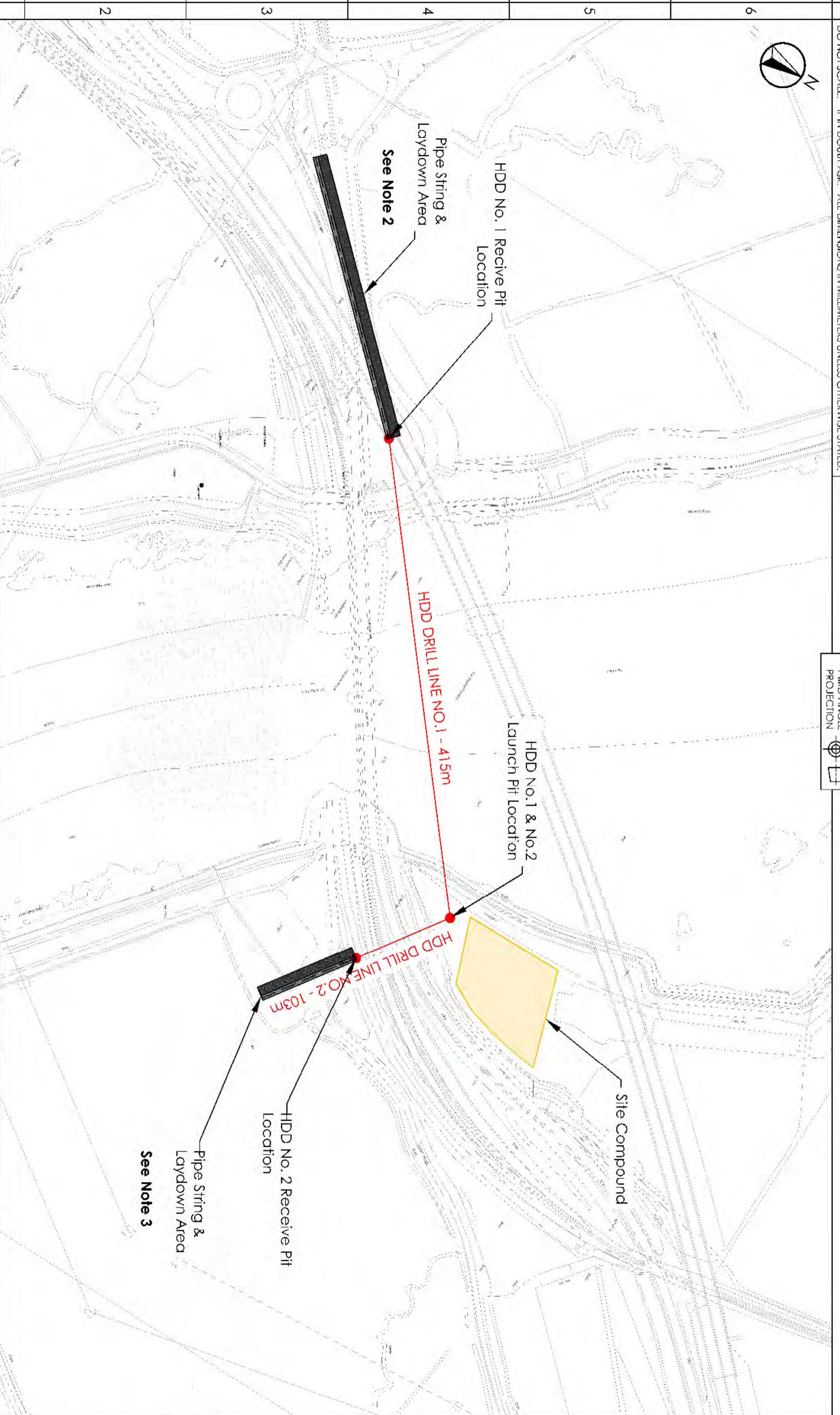
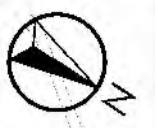
Indicative costs identified to date which would be in addition to the existing budget secured would be [REDACTED]. It is considered that this indicative cost would increase further should the feasibility move from a desk top study to full site investigation.

7. Recommendation

In reaching a conclusion, the drill profile of this proposal cannot be achieved in line with the relevant drilling and gas main testing ACOPS. It remains that the originally identified route, to the South of Kingsferry Bridge is the most practical and cost-effective option.

8. Appendices

Appendix A	SGN 010919-010 Pipeline Route C
Appendix B	Appendix B - Kingsferry Bridge Route C Site Condition Pictures
Appendix C	20200916_RPT_Kingsferry_OPTION B (Land Interest)
Appendix D	Kingsferry alternative routes Route B (Ecology - Planning)



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NOTES

- Pipeline route is indicative only and may be subject to change due to unforeseen existing services or obstructions.
- Area available for pipe string is indicated for the length of pipe to be pulled through HDD route. This is due to physical barriers such as man made infrastructure.
- Proposed pipe string also runs through existing ponds.

PROJECT TITLE SCN Site of Sheppey IP Main Replacement		 Project Manager and Gas Energy Consultant Pipelines & Installation GPH Systems Ltd 01488 716472 www.gphsystems.com
DRAWING TITLE Pipeline Route Proposal Site Plan Option 1 - Btwn Sheppey & Kingsley Bridge		
DOCUMENT NUMBER SCN 010919-010	SCALE 1:3000	DATE 1/03/2023
REVISION 1 of 3	DATE 1/03/2023	BY A3

Kingsferry Bridge Pre-Condition Survey



Route C – HDD local to existing Bridge Structures

1.0 Project Description

At the request of SGN, Chris Jowitt, Hargreaves Jones (HJ) Senior Consultant, visited the proposed route associated with the Kingsferry Bridge crossing to assess the existing conditions.

The focus of the visit was to determine the following;

- Local carriageway conditions, footways, and verges
- Existing Infrastructure/Utilities
- Private Land affected
- SSSI Area
- Impact on local business and public

2.0 Route – a series of Directional Drill (HDD) shots from the mainland to the Isle of Sheppey totalling approximately 600m.



3.0 Site status at time of visit

The following pictures are indicative of the status and condition of area. In preparing this report, HJ must advise that the condition of the site could change. Whilst both a photographic and video survey of the road network was also taken it is strongly recommended that a further condition survey is undertaken prior to any work commencing on site to ensure any change is recorded to ensure responsibility is directed to the correct party.

The following comments are local to Area 1 shown below



General scrub land local to the Highway Bridge (A249) & network Rail track. Foundation drawings and consents to dig near the highway bridge would be necessary, similarly consents would be necessary from Network Rail to determine works within proximity to the existing track.



Existing IP Gas is local to this area so facilitates connection point local to Directional Drill HDD launch point



Directional of drill route would be under existing carriageway, consents from the local authority would be necessary.



Paying attention to location of existing IP Gas main



Existing Flood alleviation consents would be necessary from the Environment Agency as the HDD travels below this



Security fencing protecting boating club launch area is leaning at a precarious angle. Its existing condition would need to be further determined in advance of the works commencing.



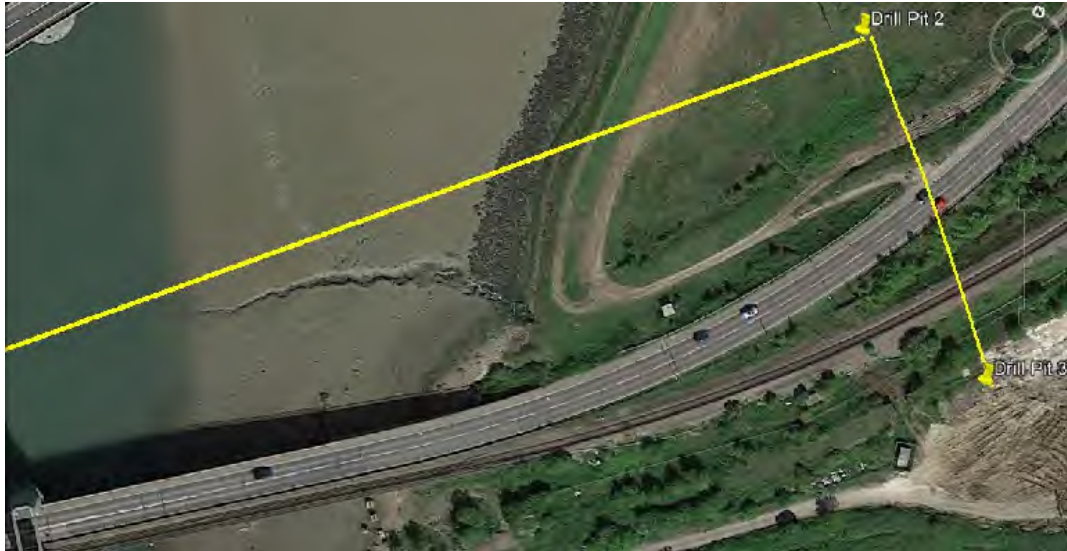
The boating club is heavily used by the public with an interest in water sports. Consents and an exclusion zone would be necessary during the works.



Directional drilling would be within the corridor between Kingsferry Bridge and the Highway crossing A249. Foundations and pile locations would need to be determined in advance to ensure any HDD is feasible.



The following comments are local to Area 2 shown below



Continued vigilance associated with the drill to navigate away from both bridge structure and other Utilities/infrastructure





Existing Flood alleviation consents would be necessary from the Environment Agency as the HDD travels below the bund on the Isle of Sheppey



The secondary launch reception pit is in land popular for walkers and off-road vehicles. An elongated zone would be necessary to facilitate the stringing of pipes in readiness for paying into the HDD line when its is being withdrawn from the mainland





Evidence of HV cables local to the proposed route both below ground and pole mounted





The final drill shot would be under both the existing carriageway and Network Rail track, consents for both would be necessary. The carriageway is likely to be a type 1 and is in good condition





The termination of the HDD and connection into the existing IP main would be in land currently under the ownership of a MR B Nash. Mr Nash is in the process of remediating the land without the relevant consents. Ant future works in the area undertaken by SGN would need to be planned diligently and all consents granted. A full existing condition report would be necessary to identify the existing status to mitigate SGN being held culpable later for Mr Nash's lack of recognition to legislation.





Assessment of Route Options on Private Land Interests Option B

DM Scheme code	205877
Site Name	Kingsferry to Sheppey
Grid Ref.	Approx. TQ 91289 69263
Post Code	ME9 8SS



Option B - Yellow

Route Overview

Option B route alignment as shown in yellow has an approximate length of 699metres and is the shortest of the three options being considered. The route alignment is shown to be between the two bridges leading to the Isle of Sheppey and is potentially offers the most restricted working area due to the in proximity of rail and road bridge structures.

Landowners

Six landowners have been identified through research with the Land Registry along the alignment for the scheme with three parcels of land showing as unregistered.

Kent County Council

Enquiries have been made to Kent County Council to identify the extent of information that would be required from them prior to entering into an easement agreement for the installation of the pipe. The majority of the route shown within their ownership appears to fall within the highway and therefore assume the works would be located within the adopted highway. The larger section coloured blue on the plan 180438_PLN_RSOI_22.1 is scrub land and not used for income generation and therefore any pipe installation in this section of land should not warrant a loss of income claim but would be subject to terms for land rights.

Highways England

As the route options are near the Sheppey Bridge crossing the Swale, we have been in contact with Highways England to discuss any constraints and concerns they may have. FM Conway Ltd are the operation and maintenance contractor and asset manager for Sheppey Route Ltd, the Design, Build, Finance and Operations Company appointed on behalf of Highways England for the A249. They maintain the A249 Network between the M2 Junction 5 Stockbury roundabout and Sheerness Docks. Highways England require Details of the works including plans if available, dates and timings of works, details of traffic management (if any), details of diversions and alternative arrangements for Non-Motorised Users (prohibited from using the Sheppey Crossing) and an onsite contact number in case of any issues on the crossing that may affect the works and workforce. If the route is proceeded with, a site visit is requested to discuss the scope of works in more detail. This would incur costs to address FM Conway Ltd.'s input.

Unregistered Land

At this stage our desktop enquires into the unregistered land along the route alignment, as coloured green on Schedule of Interest plan, have not been able to confirm ownership details for this area. Further investigations will be required to identify the owners or any occupiers of this land, including site notices to encourage those with an interest in the land to make themselves known. In the event there are no parties identified, this could leave the future of the pipe at risk if an easement is not obtained. From the site inspection it was identified that one unregistered area is heavily used for recreational purposes by members of the public to obtain access into the Swale and we anticipate that engagement with the water sports club would enable progression of this aspect.

Queenborough Fisheries Trust

Queenborough Fisheries Trust are a charitable organisation dedicated to helping the community in the Swale area. Enquiries have been made with the organisation to clarify the extent of their ownership and better understand the approach that would be taken should land rights be requested for gas main. Their

ownership includes the bed of the Swale and the shoreline. There would likely be no impact on any income generating activity within their ownership would be minimal and compensation in relation to this aspect would not be significant. Whilst it would be reasonable to assume a gas main would have limited impact on the value of their property the land rights required could be subject to a commercial negotiation. Given their objectives to benefit communities in the Swale area there would be a strong case to negotiate down land right costs.

Swale Borough Council

Enquiries have been made to Swale Borough Council regarding the process to agree the works within their land. It is understood this area of land is currently grazed over the summer period by a third-party grazer and therefore a crop loss claim would be expected as a result of the works. The land is low lying with watercourses throughout and remains wet for a large proportion of the year. In addition to this, there would also be a larger area required as a working area and stringing out area to ensure there is sufficient room for pipe storage and stringing out before. There are public footpaths through this land that will be to be closed or diverted if the working area extends over this area to ensure public safety and no disruption to the project.

Network Rail

Although this parcel of land is currently identified as unregistered with the Land Registry, it is clearly occupied by Network Rail. Enquiries have been made with Network Rail in order to establish the land rights that would be insisted upon by their land team. From an operational perspective, Network Rail would require the completion of a BAPA before any works could be undertaken within 10m either side of the railway. To progress this and the land rights required, Network Rail need to be provided with the RAMS for the works, and full detail on working areas required along with future maintenance plans, which could in turn be agreed within the deed of easement.

EJN's Property Investment Limited

EJN's Property is owned by Mr Nash who we have met with to discuss the route corridor for the works to gain an understanding on what impact a project could have on the property but also the headline terms anticipated for a negotiation. At this stage he has indicated that he would expect terms beyond the agricultural value diminution approach agreed in principle with other parties. He uses the land for recreational purposes but does have more commercial activities planned. There is often machinery and plant situated on the site undertaking excavations which could pose a risk to any assets installed in the area.

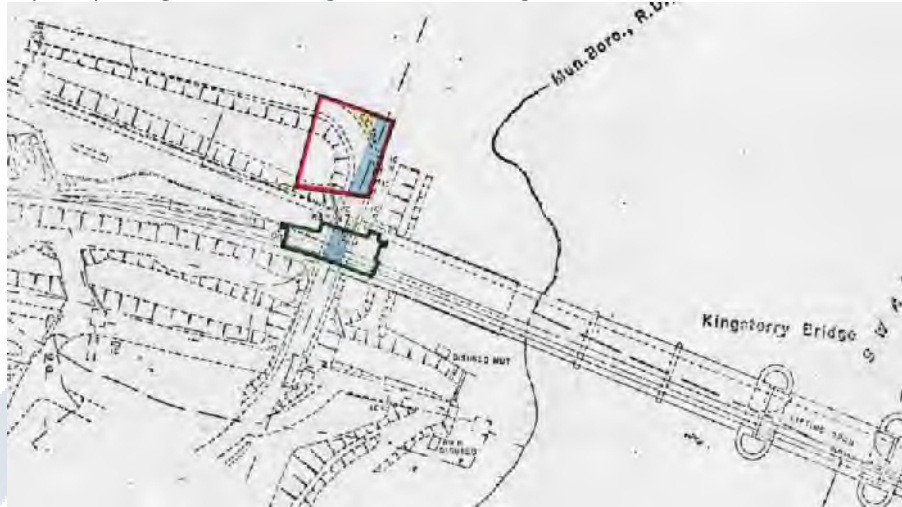
Adopted Highway

We have established that Old Ferry Road and Ridham Dock Road on the main land side are Publicly maintainable Kent County Council, as well as Old Ferry Road on the Isle of Sheppey. Whilst the Swale Crossing (A249) forms part of the public highway network, clarity on the extent of Highway England's operational boundaries have been requested. These will provide details of constraints that they would enforce beyond the hard structure onto the soft landscaping.

Existing Easements and Utilities

We have reviewed the title documents for route to assess any existing agreements that could have an impact on the route alignment or the ability to undertake the works on certain areas of the land. There is a Deed of Grant between Kent County Council and Southern Water Authority dated 15th of June 1997. This provides full right and liberty to lay, maintain and repair a 600-millimetre diameter water main with all necessary valves and fittings within the land coloured blue on be below drawing. Full right and

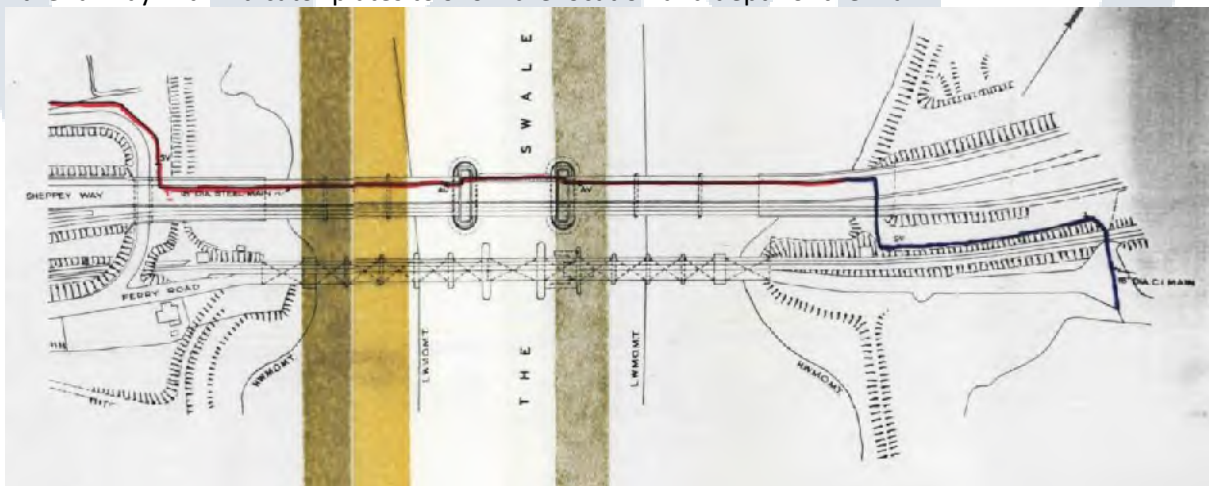
liberty to enter the land coloured in yellow for the purpose of executing works and full right at all time to the uninterrupted passage and running of water through the water main.



The depth of the watermain is not stated however it would be expected to be at least 900mm and ground cover and a protected width of five metres.

The main clearly continues into the land to the west of and along the shorefront however there are no other easements for the pipe and therefore a full utility search would be required along with further engagement with the landowner to understand their knowledge on the history of the site and any other services within the land.

In addition to the above water main, we have also identified an agreement between The British Transport Commission and Sheppey Water Board dated 27th February 1961. Within the agreement it was agreed that a pipe could be laid at a depth of three feet and no less than five feet away from the embankment of the railway with indicator plates to show the location and depth of the main.



Construction and working areas

From the information available we believe restrictions would be applied to the working area on the mainland side of the crossing due to the other infrastructure and in particular the two bridge structures in close proximity. In addition to this, due to the likely need to try and maintain access where possible, additional working space would likely be required to support works in the carriage way. The area between the two-bridge structure is also disturbed and raised land which could generate the need for level reductions over existing infrastructure to create access routes.

On the Isle of Sheppey side of the crossing, there is a large amount of space available, however the ground conditions would be anticipated to be poor for large parts of the year. The nature of the ground could have an impact on the timings of the works as once the ground becomes wet in this area, any movements will become difficult. If any environmental factors dictate the timings of the works, it may not be possible to avoid the poor ground conditions which would make the reinstatement process far more challenging and likely lead to significantly increased costs.





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Assessment of Scheme Specific Planning Requirements

DM Scheme code	205977
Site Name	Kingsferry Optioneering – Route B
Grid Ref.	Approx. TQ 91289 69263
Post Code	ME9 8SS

Proposed Development

DM understands that SGN, the client, wish to explore potential alternatives routes to the initially investigated alignment of direction drill under the Swale. These works are required to install a replacement gas main; the existing, end of life main is situated within the bridge structure. The initially investigated proposals seek to connect into the existing gas governors either side of the Kingsferry bridge, which serves as both vehicle highway (Sheppey Way) and a railway bridge with a proposed drill shot to the south of the bridge. Possible alternatives have been proposed to the north of Kingsferry Bridge; this report relates to the Route shown below.



Figure 1 - Approximate alignment of Alternative Route B (red line)

Landscape and Planning Considerations	Yes	No	Notes
Green Belt		✓	
Area of Outstanding Natural Beauty		✓	
National Parks		✓	
National Nature Reserve		✓	Elmley National Nature Reserve is approximately 850m to the southeast
Local Nature Reserves		✓	
Site of Special Scientific Interest	✓		Medway Estuary and Marshes
Ramsar Site	✓		Medway Estuary and Marshes
Special Protection Area	✓		Medway Estuary and Marshes
Special Area of Conservations		✓	
World Heritage Site		✓	
Scheduled Monument		✓	Nearest SM is approximately 1km to west of the routes.
Environmentally Sensitive Area (as per EIA regs 2017)	✓		
Country Park		✓	
Registered Park and Garden		✓	
Listed Buildings in proximity		✓	
Conservation Area		✓	
Article 4 Direction		✓	
Tree Protection Orders		✓	
Ancient Woodland		✓	
Flood Risk Areas	✓		
Common Land/Town or Village Green		✓	
Mineral Safeguarding Areas	✓		The area is included within the Sub - Alluvial River Terrace Deposits designation for the current Kent CC Minerals Plan
Air Quality Management Area (AQMA)		✓	
Public Rights of Way		✓	

Landscape and Planning Considerations	Yes	No	Notes
Development Plan Policy Check completed	✓		No allocated sites in proximity of the works

Assessment of Planning and Environmental Matters

Planning

Similar to the initially investigated proposals for the new main to be installed to the south of the bridge, as the assets to be installed are proposed to be underground, SGN should be able to complete these activities under permitted development rights afforded by Part 15A, Schedule 2 of the Town and Country Planning (General Permitted Development) Order 2015 (GPDO), as amended. That is however, assuming the local planning authority (LPA) agree the proposals do not constitute EIA development. Regulation 3(10) of the GPDO states that permitted development rights are removed until the LPA, “has adopted a screening opinion...that the development is not EIA development”.

As a licenced Public Gas Transporter, SGN can request confirmation of whether a scheme is EIA development or not from the Secretary of State (SoS) under the Public Gas Transporter Pipe-line Works (Environmental Impact Assessment) Regulations 1999 (PGT EIA Regs), as amended. If the SoS were to determine the scheme to be EIA development, an Environmental Statement would be required to be prepared and submitted alongside a planning application for the scheme. A request for a determination under the PGT EIA Regs can be made directly to the SoS, who will consult with the appropriate LPA for their written view [see Regulation 6(2)(b)], or alternatively, SGN could consult the LPA directly and support any request for a determination by the SoS with the LPA’s written responses. In doing so, if the LPA consider the scheme to be non-EIA, it would be highly unlikely that the SoS determine otherwise. Consequently, this could be deemed to be duplication of works, whereby if the LPA determined the scheme to be non-EIA this would effectively stand as a valid opinion and accordingly confirm SGN’s permitted development rights.

A formal approach to an LPA to determine whether a scheme is EIA development is typically termed a screening opinion request. If SGN were to formally request a screening opinion from Swale Borough Council, we would recommend that the request is made under the Town and Country Planning (Environmental Impact Assessment) Regulations 2017 (hereafter referred to as ‘EIA Regs’) rather than the PGT Regs. This is due to the fact that the EIA Regs are more commonly referred to in screening requests, they are more up to date, and crucially require the same thresholds to determine whether a scheme is EIA development, or not. As such, if SGN wished to subsequently request a determination from the SoS, there would be consistency across the decisions.

Under the EIA Regs, EIA development is described as either Schedule 1 development, or Schedule 2 development likely to have significant effects on the environment. Schedule 1 developments and their associated thresholds require EIA in any event, whereas Schedule 2 developments should be screened by the relevant authority as to whether they consider EIA is appropriate or not based on the likelihood of significant environmental impacts due to the size, nature or location of the development.

The nearest description of a ‘Schedule 1 development’ to these proposals is for pipelines with a diameter greater than 800mm and a length of more than 40km. it is assumed that the

proposals here are similar to those for the south of the Kingsferry Bridge, as such the proposals do not exceed the threshold as set out in Schedule 1, and therefore does not automatically require EIA.

'Schedule 2 developments' are detailed within Schedule 2 of the EIA Regulations where any part of that development is to be carried out in a 'sensitive area' (e.g. SSSI, National Park, AONB, Schedule Monument, European Site), or exceeds the thresholds as set out in Column 2 of the table contained in the schedule. Oil and gas installations are described in Schedule 2 under 10(k), which states; "*Oil and gas pipeline installations and pipelines for the transport of carbon dioxide streams for the purposes of geological storage...*". The applicable threshold provided for Part 10(k) states that; "*if the area of the works exceed 1 hectare; or in the case of a gas pipeline, the installation has a design operating pressure exceeding 7 bar gauge*". DM assume that, similar to the designed apparatus for the south of the bridge, the operating pressure will not exceed 7 bar gauge. Whilst the works are not expected to exceed the thresholds set out above, the location for development is within both a SSSI and SPA and Ramsar (European designations), therefore a sensitive area as defined in the EIA Regulations. As such, in order to confirm permitted development rights, this development should be negatively screened (return a non-EIA decision) by the local planning authority, Swale Borough Council, against the thresholds as detailed in Part 10(k) of schedule 2, and also Schedule 3 of the EIA regulations. Given the sensitivity of the site ecologically, any screening opinion request should provide a robust justification that the scheme will not likely cause any significant environmental effects in order to ensure both the LPA and Natural England as a minimum concur in order to confirm permitted development rights.

Ecology

As part of the works progressed on the already investigated proposals to the south of the bridge, DM has already undertaken extensive detailed ecological surveys to understand the baseline ecological conditions and also the presence of any protected species on the site. Given the proximity of this alternative route to the original site, it would be judicious to suggest similar habitats and protected species are present in these locations also. This is in spite of the alternative routes being within different designations, albeit still of national and European significance. As such, any EIA screening opinion request to the LPA would need to be supported by similar data and findings as were collated for the route to the south of the bridge.

The alternative route is located within the Medway Estuary and Marshes SSSI, SPA and Ramsar. The citations and conservation objectives, where applicable, are appended to this document for information. Although two of these designations are of European level, and due to 'Brexit' the legislation covering these are now no longer applicable, the requirement to undertake a habitat regulations assessment screening and if required appropriate assessment is still applicable as European law has been transposed into British law under the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019.

The initial ecological walkover of the area (April 2019), which included part of the areas for the alternative route on the mainland identified most of the area to be low in ecological diversity, mainly semi-improved grassland and often marshy in places. Pockets of the internationally rare

divided sedge *Carex divisa* were found in the survey area, though these pockets were mostly situated on the mainland south of the Sheppey Way. The initial walkover also identified potential habitat for and presence of; water vole, bats, breeding and wintering birds, great crested newts (GCN), reptiles and aquatic invertebrates. The presence of otters and badgers were ruled out.

Protected species surveys were undertaken on the site to the south of the Kingsferry Bridge which confirmed the unlikely presence of scarce or rare significant aquatic invertebrates but confirmed the presence of a low population of reptiles, medium population of GCN, water voles as well as breeding and over-wintering birds. As such, given the proximity of the site and connectivity via the railway underpass, it is unlikely that these species will be localised only to that area. Given the similarity of the habitat with marsh areas and ditch courses, it is highly likely that all species found to the south of the bridge will be present to the north. Consequently, DM would recommend a suite of surveys similar to those undertaken to the south of the bridge be undertaken on the mainland to north of the Sheppey crossing in order to support any EIA screening and HRA submission.

The area to the north of Sheppey Way on the island was not assessed in the Extended Phase 1 habitat survey – the initial walkover survey to inform whether protected species may be present – undertaken April 2019, due to access issues. As such, if these routes crossing to the north of Sheppey Way were to be progressed we would recommend a preliminary ecological appraisal be undertaken as early as possible to understand whether any protected species surveys might be required. Again, given the proximity of these works to the area surveyed to the south of Sheppey Way, although the railway and highways might provide some barrier to movement of animals, it would be sensible to assume that similar assemblages of protected species are present to the north as well.

It is acknowledged that several of the protected species could be accommodated for and any impacts mitigated against through measures such as timing the works for the end of summer, early autumn to avoid bird-nesting and over-wintering bird seasons. Similarly, species such as water vole could be avoided through constructing hoarding around water courses/ditches with confirmed habitat in. Whilst such measures constrained the works compound it allowed the construction and ecology to coexist happily. Other measures that would likely be required by Natural England (NE) would be the protection of any thickets of rare vegetation and potentially, habitat manipulation to deter reptiles from the working area prior to mobilisation. These would need to be advised by an ecologist. Perhaps the greatest constraint to the proposals were the confirmed presence of GCN.

Traditionally, if GCN are found to be on a site where works must proceed, a licence to disturb them must be sought from NE (any licence application must be justified by appropriate survey data to confirm the population size), and a campaign of trapping and translocation of newts be undertaken. As a medium population of GCN were found to be south of Sheppey Way, trapping would need to be undertaken for approximately 60 days; a large population might require 90 days of trapping. In order to provide the Client with some flexibility in order to deliver the scheme, DM were able to confirm with NE that the use of a District Licence (DL) would be appropriate in this case. This was a novel approach for NE due to the temporary nature of the disturbance; however, the confirmation of the application of DL to the south of the bridge might suggest that

it could be used for routes to the north of Sheppey Way. The cost to the client to use DL for the route to the south of the bridge would have been c.£125,000.

Whilst applications for DL do not require GCN presence be confirmed through the use of traditional surveys (e.g. bottle-trapping) or eDNA, or population data, we would recommend that if the routes to the north of the bridge be progressed, eDNA samples be taken of watercourses nearby as a minimum. If the eDNA samples return a negative result, this might reduce the calculated value for final payment to use the DL. Where ditch courses are connected these would count as one waterbody; however, NE will assess the impact of the works on ponds up to 250m away. The area of the north of the bridge on the mainland has a dense network of channels which if, due to their ephemeral network could be considered as individual waterbodies could result in a large increase in the calculated cost for the DL. This cost may make traditional GCN licencing more viable; therefore, trapping should be allowed for in any construction programme.

Overall, the landscape of the area to the north of the bridge on both the mainland and the island is similar to that of the area to the already surveyed south. Therefore, it is unlikely that any already identified protected species would not be present to the north also. If either of these routes is to be progressed we would recommend project programme should therefore be designed to accommodate a new ecological walkover and protected species surveys, which typically must be undertaken during March – September (apart from over-wintering bird surveys which are required typically October – March).

Heritage / Archaeology

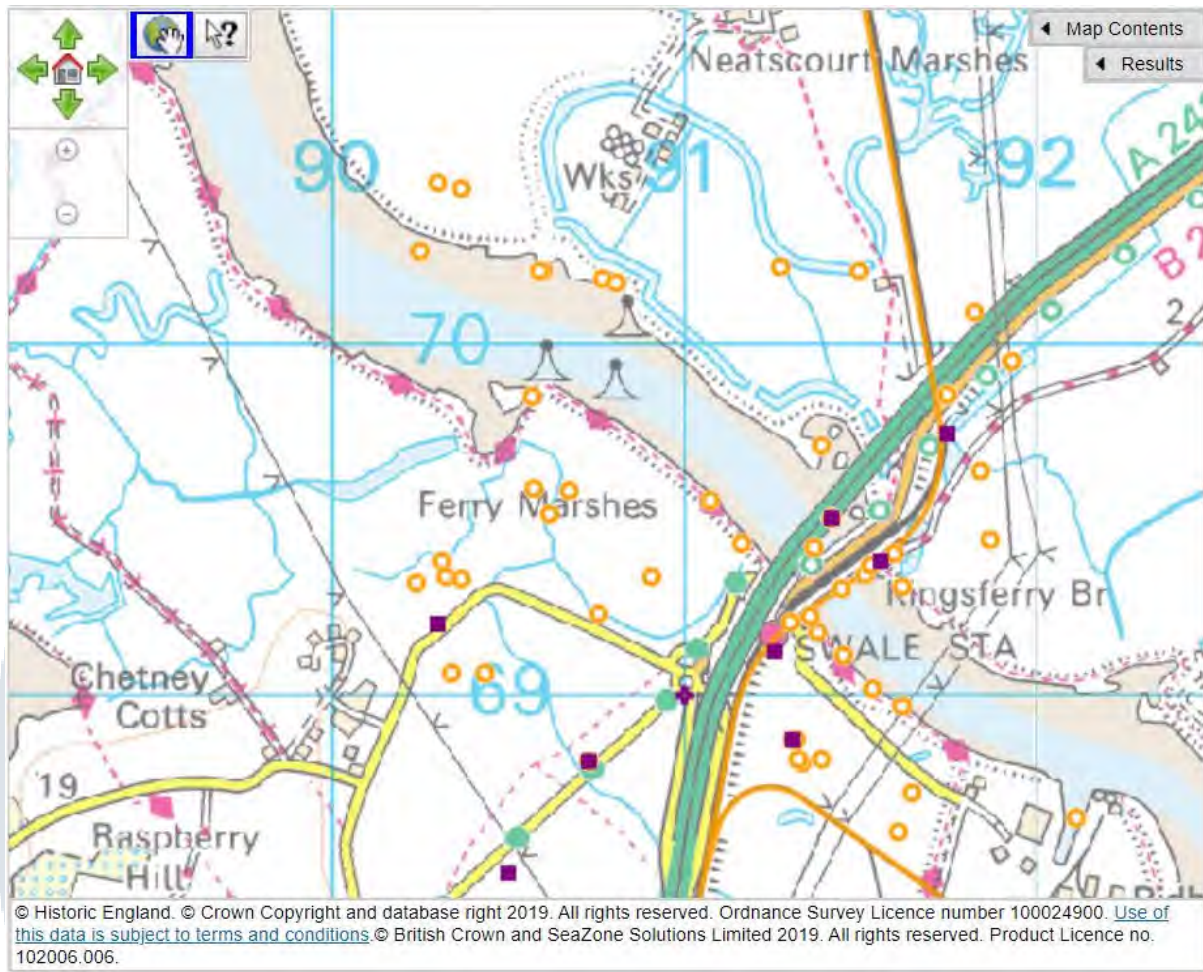
Route B

There are no recorded designated or non-designated heritage assets located along or within the immediate vicinity of Route B. Route B runs between Kingsferry Bridge and the A249 Sheppey Crossing, with numerous records for non-designated heritage assets located to the south/south-east of Kingsferry Bridge. These records include post-medieval heritage assets comprising the Isle of Sheppey Railway (TQ 96 NW 1165), Kingsferry Bridge (TQ 96 NW 63) and the site of the former Swale Halt Railway Station at the southwestern end of the route (TQ 96 NW 86). There is a record for a wooden slipway of unknown date along the bank of the Swale to the south of Kingsferry Bridge (TQ 96 NW 1034), and there is a further record for the remains of a former bridge across the Swale (TQ 96 NW 1099) to the immediate south of Kingsferry Bridge on the Isle of Sheppey.

Route B does not have any known heritage constraints due to the absence of non-designated heritage assets recorded along and within the immediate vicinity of the route, in comparison with the non-designated heritage assets located along Route A; however, given the presence of non-designated heritage assets along the bank of the Swale to the south and north of Kingsferry Bridge, the presence of hitherto unidentified archaeological remains cannot be discounted.

It is considered that Route B is the better option due to the low impact that the route will have on recorded heritage assets within the area compared to Route A. Route B will likely not require further archaeological intervention, provided that the proposals accord with the

conditions outlined within the GPDO (2015) Schedule 2 Part 15A and constitute permitted development.



Legend

- ▲ Listed Building (NHLE)
- EH PastScape
- Local HER record points
- ▲ Local HER record polygons
- National Trust HBSMR
- Building Preservation Notice
- ◆ Designation Decision Records De-listed
- Parks and Gardens (Non Statutory Data)
- ✚ Church Heritage Record (Non Statutory Data)
- Scheduled Monument (centre point)
- Registered Park/Garden (centre point)
- Registered Battlefield (centre point)
- Protected Wreck Site (centre point)
- World Heritage Site
- Certificate of Immunity
- ✚ Designation Decision Records Non-designated
- ✚ NMR Excavation Index

Flood Risk

The proposed route is located within Flood Zone 3, according to the EA’s Flood Map for Planning. These maps show the undefended scenario and therefore do not account for the protection the current flood defences provide. The proposed installation of the gas main would

constitute 'Essential Infrastructure' under the Flood Risk Vulnerability Classification and is therefore considered appropriate within Flood Zone 3, subject to the Exception Test.

The SFRA for the area shows there to be historical flooding on both sides of the river where drill pits would be located, however this may be flooding which occurred prior to flood defences. The map for groundwater flood risk shows there to be no risk from groundwater flooding at any of the proposed sites.

Flood defences, comprising of embankments, exist on both sides of the river and offer a standard of protection of 0.10% AEP. The defences are shown to be in fair/good condition. The sites are within the EA's flood warning/alert areas. The Medway and Swale Shoreline Management Plan states that the flood defences in this area will be reinforced and maintained in order to hold the current coastal defence line.

Given the proximity of the works to the river, flood defences and the number of drains located here, we would recommend liaison with the EA and the Internal Drainage Board (IDB) to discuss the proposals and determine the consents required.

DM has previously produced a Flood Risk Assessment (FRA) for the initially investigated alignment south of the Kingsferry Bridge. This would need to be amended to accord with the new proposed route.

Summary of overall risk

Given the proximity of this location to the original proposed crossing and the similarity of the landscape it is likely that an EIA screening opinion request would be required to confirm permitted development rights. Additionally, an HRA would be required to be submitted to NE as the site is in a SSSI, SPA and Ramsar, which would need to be justified by a suite of protected species surveys and mitigation proposals. The screening request would also assess heritage/archaeology, and flood risk constraints. Even if the works are timed to avoid the breeding bird and over-wintering bird seasons, other ecological constraints that would very likely need to be considered are GCN, water voles and reptiles. Similarly, there are known heritage assets in close proximity to both routes which may warrant the County Archaeologist requesting pre-construction evaluation works. Finally, the route is within Flood Zone 3 and although defended by substantial defences, consultation with the EA and Lower Medway IDB is advised as a minimum to agree any consents in order for the works to proceed. Overall, the alternative route is similarly environmentally constrained as the initially investigated route to the south of the Kingsferry bridge, and would require significant new data collections in order to support any application to Swale Borough Council and NE.

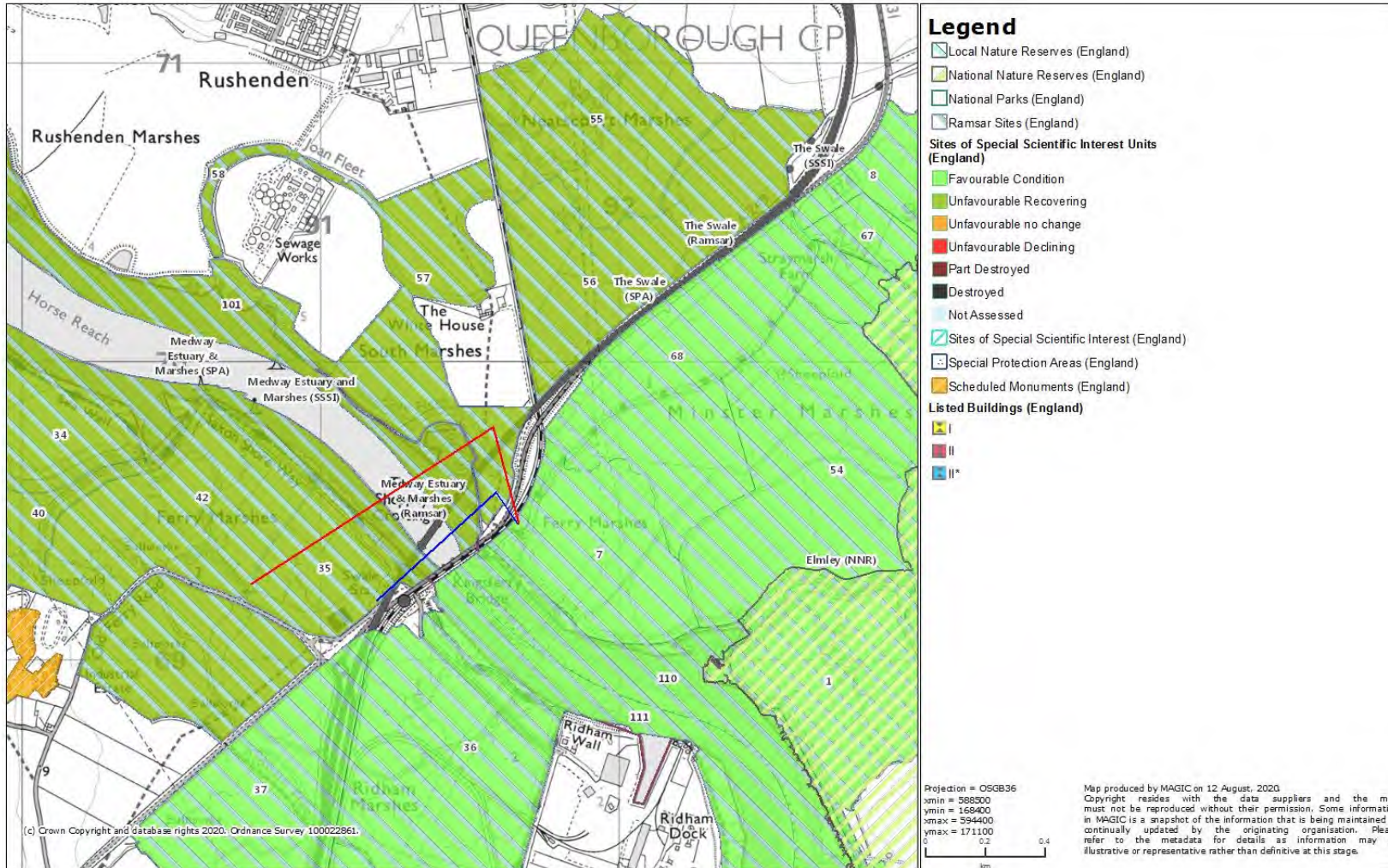
That said, this route is deliverable from an environmental and planning perspective. If sufficient time is given during the appropriate seasonal constraints to proceed to undertake any necessary surveys and consultations with various statutory stakeholders, an EIA screening opinion request and HRA could be submitted to allow considerable time for determination. If a negative screening response is given by the council (non-EIA) that would confirm permitted development rights and as long as NE are in agreement with the proposed mitigation measures, the works could proceed as early as late Summer 2021.

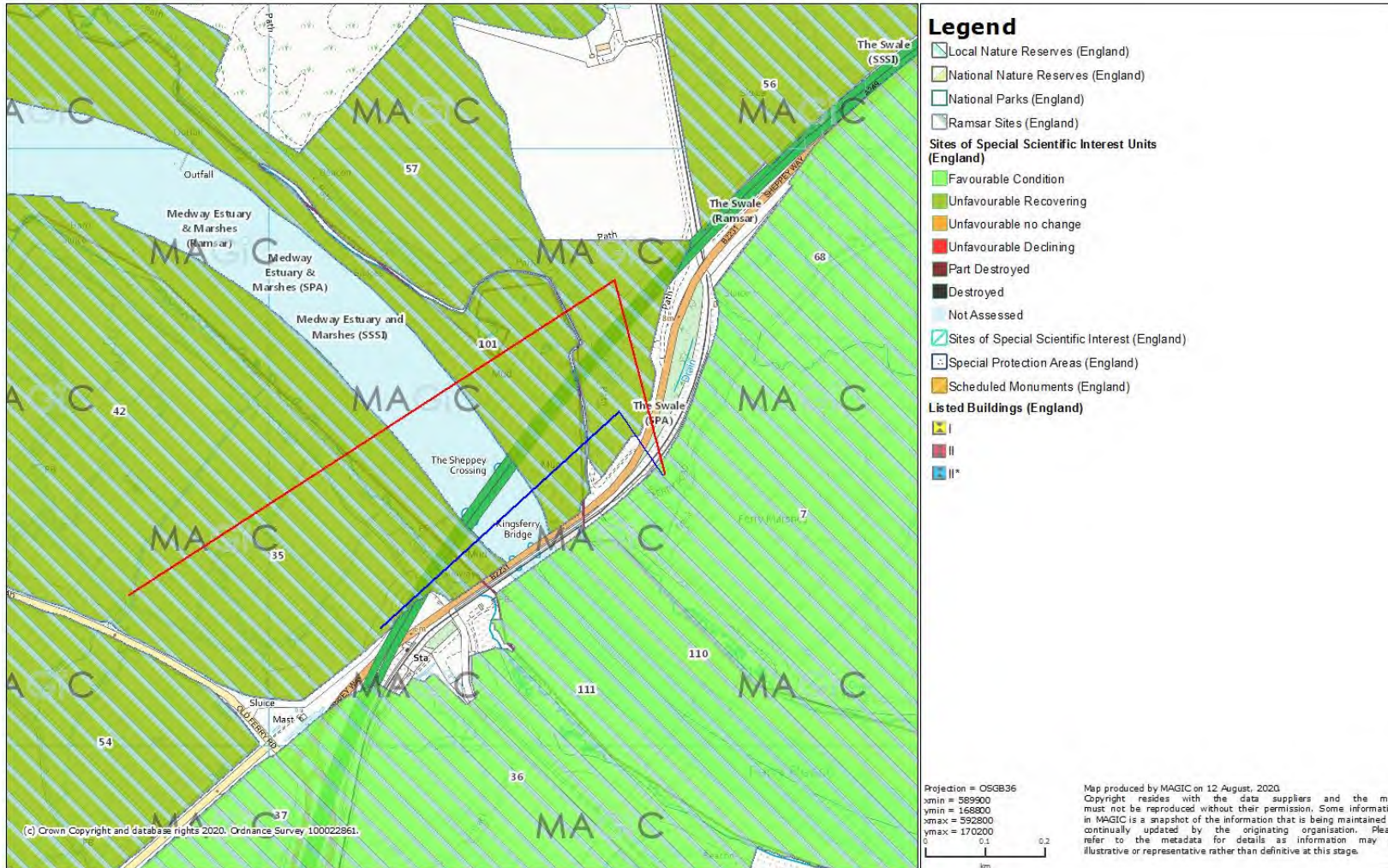


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RAG Status	
Red	
Yellow	✓
Green	









05/01/2021



Isle of Sheppey IP Gas Main Replacement

Route Feasibility and Condition Survey

Isle of Grain to Isle of Sheppey

August 2020



Executive Summary

1. Overview
2. Summary
3. Route
4. Observations
-
6. Summary of major risks identified
7. Recommendation
8. Appendices

1. Overview

The SGN Intermediate Pressure (IP) gas main supply serving the Isle of Sheppey, going under the River Swale via a service tunnel within the Kingsferry Bridge to Brielle Way City Gate, is considered by SGN to be in poor condition with possible low resilience to failure. This exposes the network to potential gas supply failure. SGN also have a directive to consider, where possible, the removal of assets from third party structures and tunnels.

The SGN objective is to ascertain if it is viable to replace the existing IP gas main thereby improving the network resilience and surety of gas supply to customers. SGN require the collation of information working closely with specialist contractors and SGN Land Agents to collate information to inform a technical feasibility study for the IP gas main replacement.

The IP gas main is in poor condition along its route as it is subject to gas leaks even though it is operating below its maximum gas pressure of 7 bar.

There is evidence of corrosion of the IP gas main and the steel support gantry in the service tunnel under the Kingsferry Bridge

It is considered by SGN to be at the end of its operational life having been installed around the 1950s. SGN also have concerns that the condition of the IP gas main could possibly cause further gas leaks that could possibly be a health and safety risk to SGN operatives responding to a fault.

SGN consider that there might be negative impact on the SGN corporate reputation due to possible gas leaks and gas supply failure to customers

The SGN corporate directive to remove assets from third party structures could be achieved as the existing IP gas main crossing the Kingsferry Bridge would become redundant and removed with the agreement of Network Rail at a time suitable to all parties and subject to the new assets being connected to the network and its operational reliability being restored.

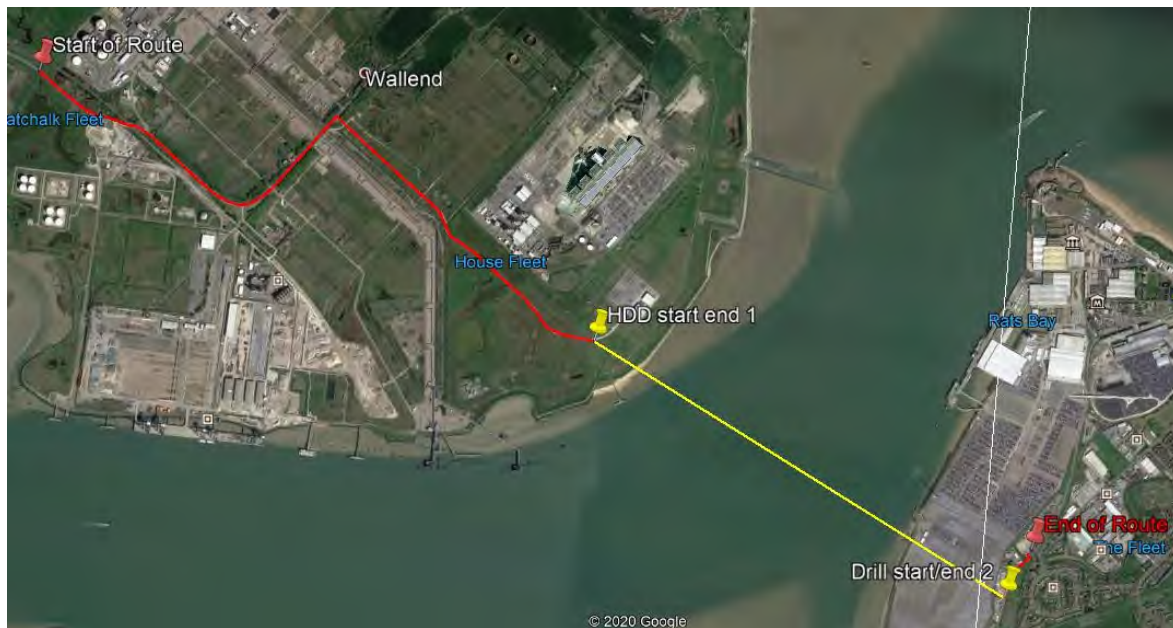
Following a desktop review to identify the most suitable routes to replace the deteriorating asset, three options have been chosen which offer Feasible options in laying a new 400-millimetre SDR 9 HDPE pipeline to the Isle of Sheppey.

2. Summary

This report is associated with the route from the Isle of Grain to the Isle of Sheppey, the obstacles and engineering difficulties associated with the construction on this route and includes a condition survey of the surrounding area and assets along the proposed route.

3. Route

Starting to the West of the main entry to the National Grid LNG facility the primary route for the laying of the new 400mm main would be by open cut within the constraints of the carriageways A228 and B2001 Grain Road, prior to entering National Grid land following the private road giving access to the Viking Power terminal'. At this location there would be for a launch reception pit to enable the directional drilling of the main under the River Medway into land currently occupied as a VW storage facility (owned by Peel Ports). A route drawing can be found in **Appendix A** of this report.



A further launch reception pit would be excavated to receive the pipe in a private lane between Rhino Asphalt Solutions and P&M Scaffolding on the A249 Sheerness. On receiving the pipe, the technique would again change from directional drill to open cut along the A249 terminating at the SGN gas holder site where the main would be reconnected to the existing network.

It is recognised that the A249 has recently being resurfaced and may be the subject of a section 58. As an alternative the directional drill could be extended to scrubland to the east of the A249 with a further directional drill north into the SGN holding site.

A full and comprehensive survey and narrative can be found in Appendix B detailing observations made during a walk of the entire route, along with planning, environmental, archaeology and ecology requirements identified. These are summarised in sections 4 and 6 below.

4. Observations

The entire route employing both open cut and HDD techniques would be more than 6km.

With an initial connection to the existing gas main needed local to the National Grid LNG site entrance, access and egress to the site would need to be maintained, if a 50m distance away from the site entry were to be enforced, the new route would cross a Network Rail line. For this work to proceed the Network Rail asset crossing would require an easement to be agreed. This option requires an Under-Track Crossing (UTX), this will be difficult to secure particularly given Network Rail are aware of other viable route options with less technical risks which would not affect their asset.





Access to the National Gris LNG site would have to be maintained 24hrs a day



05/01/2021

There are High Pressure gas pipelines local to the works where consents would be necessary.



There is an aviation fuel line feeding Heathrow Airport local to the route where consents would be necessary to enable works to progress at an early stage



05/01/2021

There is evidence of a new HV circuit within the constraints of the proposed route -carriageway



05/01/2021

There is evidence of both water and British Telecom within the constraints of the route – Carriageway and Footpath



05/01/2021

Access to Key Service Providers will need to be maintained 24hrs per day. (Power Station).



National Grid were not receptive in allowing access to their land to fully view the route, subsequent permissions to gain an easement and route would prove both complex and time consuming.



The HDD (directional drill) would be at least 2.5 to 3 km and a challenge, given that it is at the limits of HDD techniques (typically 1.5 km). The viable crossing intersects a busy shipping lane and is very likely to be rejected by interested parties or require significant scrutiny.



A drill of 2,300m introduces significantly greater risk than a drill of 500 metres. While the means by which a crossing of this length would be achieved depends to a great extent on the ground conditions, it is certainly possible that these would dictate the need for a drilling rig at both sides of the crossing and an intercept drill to be performed whereby drills are started from either end of the crossing and these are brought together below ground to form a single, 2,300m long bore. While this has been done many times (including, for example, the Solent Gas Transits), there is an increase in risk associated with the need for an intercept and the need for 2 no. drill spreads adds a significant level of cost to executing such a drill.

As a further measure and to mitigate unforeseen ground conditions (and the consequences thereof) as well as the increased technical challenges associated with a drill of such length. One other impact would be on the choice of pipe material. The tensile strength of a PE pipe is limited while the force required to install a PE pipe increases with length. For a crossing of this length either a steel pipe would need to be used or the SDR rating of the pipe would need to be increased. Competent drilling companies interviewed for the works have advised it would be necessary to increase the pipe wall thickness to provide greater tensile strength. In increasing the pipe wall thickness an increase in the diameter of the pipe to maintain the necessary bore would also be necessary.

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Peel Ports (PP) are owner of rights associated with drilling under the Medway and land on the Isle of Sheppey to which the route would travel through.



The route would involve clearance from the Environment Agency with respect to it travelling under flood alleviation gates protecting the Isle of Sheppey.



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The A249 local to the chosen route has recently been resurfacing meaning a Section 58 would be enforced by the Local Authority, a requisite of this is that if ground is broken in this area, the whole of the carriageway would have to be resurfaced and guaranteed for a further 3 year period.



The alternative route which would be employed local to the old disused Cromwell Rd to avoid works in the A249 would encroach an area where Japanese knotweed is present. The mitigation required to address this would extend to significant excavation and disposal within a limited number of Licenced disposal sites with restricted annual intake.



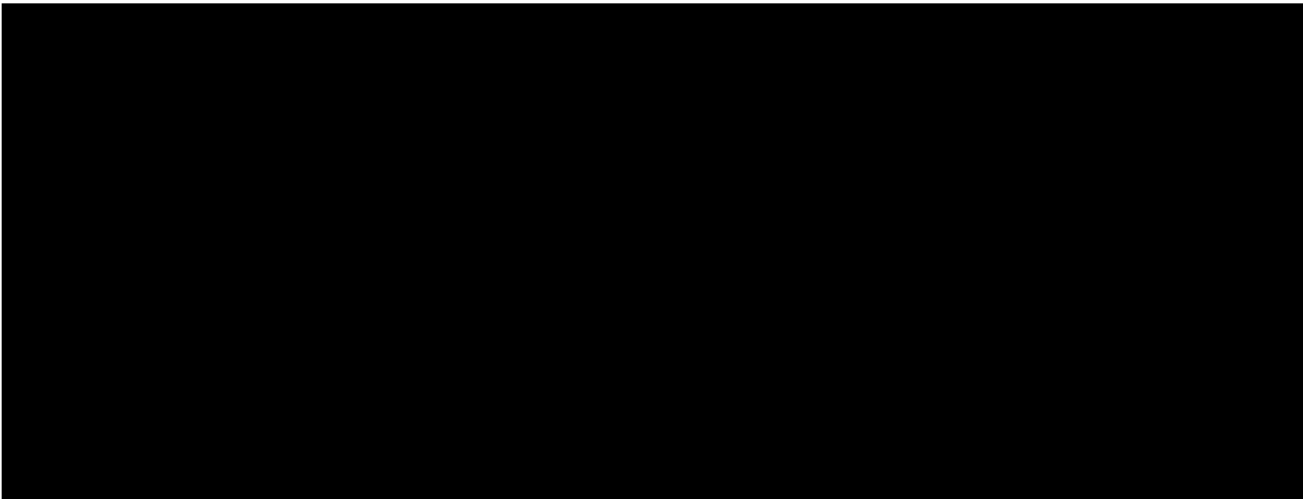
The drill and reception sites for the HDD were likely to be within commercial development land and interface with significant existing infrastructure.



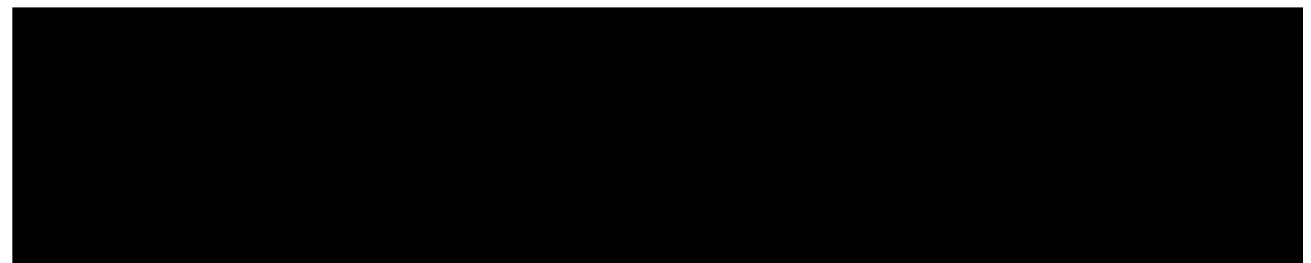
If this option were undertaken, the existing gas main from Kent within the Kingsferry Bridge and under the River Swale would still need to be removed once abandoned resulting in major excavation works at a secondary work site local to Kingsferry Bridge.


Required Additional consents:

CLH Pipelines	Aviation lines remain of strategic importance, consents to work near these assets would be necessary and have previously proven difficult to attain.
NTS – HP Gas lines	Consents, and a safe working distance/watching brief would be necessary.
Navigation Authority	A River Work Licence will be required from Peel Ports which assesses the practicalities and risk to the navigation channel posed by the works.
Flood Defences	The EA would need to provide technical consent as the drill will pass under the sea flood defences.
Network Rail	Consents would be required to cross under the rail lines and depending on access routes utilise a private level crossing for machinery access.
National Grid	Access, consents and approvals would be necessary associated with the route from the B2001 carriageway to the shoreline on the Isle of Grain.



6. Summary of Major Risks Identified



Consents would be necessary with Crown Estates. 

The route would incur negotiations with Network Rail to agree any crossing under the railway track local to the National Grid LNG terminal entry. 

There are both High Pressure gas pipelines and Aviation fuels which would need to be navigated as part of the works. The latter being a strategic feed to Heathrow Airport.

There strategic relevance of the Isle of Grain would necessitate 24hr access to key fuel suppliers located in the area, all of these access points would need to be crossed.

The route is in land owned by National Grid and would need approval. On being contacted to negotiate access in advance of the works to survey the proposed route National Grid categorically denied SGN access and advised the any consents made to agree a route would be rejected.

The proposed drill under the River Medway is at the extremities of normal drilling capabilities and would necessitate the need for 2 x HDD rigs as opposed to 1 rig being considered on alternative routes.

Consultation would be necessary with the Environment Agency with respect to breaching existing flood defences, in particular at the shoreline on the Isle of Grain.

The proposed route would affect the A249 in Sheerness which has recently been resurfaced. A 2-year embargo is imposed on resurface works to carriageways by the Local Authority.

In trying to avoid damage to the A249, an alternative route has been identified, however this route is heavily habited by Japanese Knotweed.

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Indicative costs identified to date which would be in addition to the existing budget secured would be [REDACTED]. It is considered that this indicative cost would increase should the feasibility move from a desk top study to full site investigation.

7. Recommendation

It is considered that the engineering challenges and the length of the HDD mean that this option is not practically or commercially viable. In reaching a conclusion in considering the risks above it remains that the originally identified route, to the South of Kingsferry Bridge is the most practical and cost-effective option.

8. Appendices

Appendix A	SGN 010919-010 Pipeline Route A
Appendix B	Appendix B - Kingsferry Bridge Route A Site Condition Pictures
Appendix C	20200916_RPT_Kingsferry_OPTION 1 (Land Interest)

Kingsferry Bridge Pre-Condition Survey



Route A – HDD Isle of Grain to Isle of Sheppey

1.0 Project Description

At the request of SGN, Chris Jowitt, Hargreaves Jones (HJ) Senior Consultant, visited the proposed route associated with the Kingsferry Bridge crossing to assess the existing conditions.

The focus of the visit was to determine the following.

- Local carriageway conditions, footways, and verges
- Existing Infrastructure/Utilities
- Private Land affected
- SSSI Area
- Impact on local business and public

2.0 Route – a series of Directional Drill (HDD) shots from the mainland to the Isle of Sheppey totalling approximately 6000m.



3.0 Site status at time of visit

The following pictures are indicative of the status and condition of area. In preparing this report, HJ must advise that the condition of the site could change. Whilst both a photographic and video survey of the road network was also taken it is strongly recommended that a further condition survey is undertaken prior to any work commencing on site to ensure any change is recorded to ensure responsibility is directed to the correct party.

The following comments are local to Area 1 shown below



Trench work associated with a new HV cable the trenches sunk in areas and there is evidence of joint bays throughout the route.





The existing water network in the area is in both the carriage way footway and verge, large valve configurations are evident throughout the run feeding key suppliers in the area



There is an existing level crossing affecting the route, negotiations would be necessary with Network Rail to facilitate an under-track crossing (UTX) permit.



Further evidence of the high voltage electrical network local to the entry point of the National Grid LNG facility.



The main access egress point into the National Grid LNG facility would require to be open 24 hours a day to maintain access for tankers



Further evidence of the existing water network in the area the water main at this point being in the carriage way.



Aviation fuel lines are also evident in the area.



Continuation of the existing high voltage cable route works.





British Telecom route works evidence in carriage way, footpath, and verge.



With the area being of an industrial nature heavy traffic is consistent all day.



Throughout the entire route there are areas indicative of historic entry points into the National Grid LNG facility, these areas are now redundant and bonded to avert trespassers. It must be considered that utilities will be evident and still live in these areas.





The carriageway is generally in good condition however there is evidence of deterioration local to the HV trench work throughout its entire existing path.



Surface water drainage to the carriageway would need further investigation to determine if captured rainwater travels into soakaways or to an existing drainage network.



Further, wide access egress points into the industrial estate which would require maintaining and remain open throughout the works.



Further evidence of carriageway condition where road markings are in poor condition



NTS high pressure gas network marker system.





Further evidence of major access egress points on the industrial estate which would need to be maintained during the works.



Further evidential scarring to the carriage way demonstrate if of HV cable and BT route works.



A further entry point into the National Grid LNG facility, the condition is demonstrative of this point having not been used for some time, however there is evidence of utilities being present underground.





Tanker access egress to the National Grid facility necessary to both sides of the carriage way.



Access to the power station will need to be maintained 24 hours a day.



Ongoing deterioration in condition of carriageway markings.



Further evidence of BT infrastructure.



Gas market post indication line of man into LNG facility. Note - this mark post is not indicative of HP giving reason to presume other gas systems being in the area



Further access egress point into the National Grid facility, evidence of poor condition and its use being infrequent.



Continue damage and poor condition of existing carriage way.



Further St furniture associated with utilities, asset owner unknown.



Gattic covers to BT infrastructure evident of heavy traffic use.



Main access point to National Grid LNG facility, access always required. Requested access to determine condition and route declined by National Grid.





Shoreline to facilitate excavation of launch reception pit for directional drill, restricted access.



The following comments are local to Area 2 shown below



Evidence of previous workings to facilitate Viking underground cable to facility, new fencing columns demonstrate this along with remediation the flood line defences.





The following comments are local to Area 3 shown below



Peel ports facility dockside currently utilised as storage facility for Volkswagen vehicles being delivered to UK, access declined.



Existing flood defence barrier and gate protecting the Isle of Sheppey.





Narrow access point to facilitate second launch reception pit and open cut trench work for directional drill with evidence of existing BT infrastructure (Gattick cover).





Access point for local reinstatement - tarmac contractor.



Newly resurface carriage way with potential for section 58 to be imposed should work be undertaken in this area remediation to the carriage way would be necessary under the direct instruction from local authority (potential full resurface).



Existing street furniture gas valve.



Entry to local business - scaffolding company.



Further street furniture - water.



Continued full resurfacing of carriageway - section 58.



Entry point to local business - currently not in use yard vacant.





Shallow deck bridge - with utilities crossing to the side.





Entry to SGN Holder station - redundant asset currently on the market for sale.





Alternative route avoiding section 58 in carriage way is the old road into Sheppey, Evidence of Japanese knotweed to the whole area.









Assessment of Route Options on Private Land Interests Option **1**

DM Scheme code	205877
Site Name	Isle of Grain to Sheppey
Grid Ref.	Approx. TQ 91289 69263
Post Code	ME9 8SS



Option 1 – Isle of Grain to Sheppey

Route

Overview

The route option from the Isle of Grain to the Isle of Sheppey as shown in red and yellow on the plan. The route initially begins within unregistered land, the route then enters the privately owned land heavily secured by Thamesport and their tenants. The route is shown to be in the track before entering the soft estate and the crossing to the Isle of Sheppey. The total length of this route option is 6,231 metres and affects highest number of land interests.

Landowners

There is a total of eight freehold interests affected, two parcels of unregistered land and at least four leasehold titles affected by this route option. As only longer termed leases need to be registered at the Land Registry, we would also anticipate impacting several shorter termed leasehold interests in addition to these.

We would be required agreement from all interested before proceeding with this route.

Freehold

Unregistered Land

It is assumed the first parcel forms part of the adopted highways but clarification from the Highway Authority will be required.

There is a second area of unregistered land on the Isle of Sheppey section of the route, again this is thought to be within the highway and a definition search should be undertaken to confirm this.

Thamesport Interchange Limited

Thamesport Interchange Limited own the freehold of most of the site affected by the route alignment. Thamesport are on the corporate registrations of National Grid and it is believed they own freehold titles across their property portfolio in this area as part of previous acquisitions. Following site investigations, the site is clearly managed by National Grid and discussions with the site manager have confirmed that before any further site investigations can take place within the site significant further information would be required. This would relate to the proposed project and enable National Grid to determine if they would consider entering negotiations regarding land rights or if the project would conflict too significantly with the site. They also have an independent environmental department responsible solely for the Grain site and any proposals would require their approval before terms could be progressed.

The site is used to import 20% of the UK's liquid gas which is then converted back to gas and imported into the network through the high-pressure mains within the site and in the surrounding area. There is capacity to hold 1million cubic metres of liquid gas on the site and it is a major strategic importance to National Grid. Prior to any further engagement it would be imperative to obtain a copy of the critical areas within the site and ensure and obvious conflicts could be avoided.

Port of Sheerness Limited

From previous engagements with the Port of Sheerness Limited, it is understood any terms regarding a new gas main within their ownership will require an extensive commercial agreement to be negotiated. On this route, they own the freehold of areas as well as long-term leaseholders on other sections. The length of main within their freehold ownership extends to 823 metres, the majority of which is the River Medway Estuary with only a small section being the shoreline.

The Queens Most Excellent Majesty in Right of Her Crown

It is understood that the freehold of parts of the Medway Estuary and the Port of Sheerness are owned by the Crown Estate, however parts of this area leased to Port of Sheerness Limited and the Volkswagen Group. Regardless of this land rights would still be required from the Crown Estate. Unlike the other interests impacted by the options the Crown Estate would be immune to and Compulsory Purchase Powers available to SGN and as such rights for the pipe could only be obtained by negotiation, creating an affective ransom situation. It is important to note that this is the only route option which has the risk of being unachievable, even if a CPO is granted due to the Crown Estate's immunity and ability to refuse to agree rights. The on-land ownership is predominantly hard standing and is used for the storage of cars once they have entered the UK via the docks. It would be expected that the sites would also fall under extensive customs designations impacting on several factors including site security. Further discussions would be required with the Crown Estate to obtain an understanding of the level of commercial gain that would be expected to secure rights.

P&M Scaffolding Limited

P&M Scaffolding Limited are an independent business located on the Isle of Sheppey, there are a number of buildings located on their site, however currently the route alignment would not pass through their ownership but impact on their site access. Further contact is required to understand any future development for this area of their site, any working area required within the ownership of P&M Scaffolding could impact on their business activities and in turn, income generation increasing project costs.

National Grid Property Holdings Limited

Reviewing the ownership, National Grid own a strip of land surrounding the SGN site at the end of the route on the Isle of Sheppey. Consent would therefore be required from National Grid to proceed with the route alignment prior to completing the connection withing the SGN leased site. Whilst they area also affected on the Isle of Grain; we anticipate different departments within their business dealing with each enquiry.

SGN Property Holding Limited

The route alignment termites within the ownership of SGN Property Holding Limited, which is understood to be a separate company to the SGN utility undertaking. As such rights would still be required to undertake work within this area and the land would be anticipated as subject to future development. This could lead to high compensation levels being required if land is sterilised by the works.

Leasehold

E.ON UK PLC

The lease with E.ON through the Thamesport owned site is to allow access to their site. The lease terminates on 31st March 2033 and therefore access over this area will need to be agreed with E.ON as a leaseholder as well as the freeholder. The section of lease affected is minimal, however it may impact access to their operational site which forms part of the Viking Link interconnector cable. We are aware of high commercial packages being offered in relation to this project which may generate significant expectations from both the freehold and leasehold owners.

Port of Sheerness Limited

Port of Sheerness occupy most of the land owned by the Crown Estate on the Isle of Sheppey. It is understood that this area is heavily used in association with the docks and delivery of good into the UK. Any disruption or working in this area is going to impact on their business and storage capacities and likely lead to high compensation costs.

Volkswagen Group United Kingdom Limited

VAG use the land to store their new vehicles once they enter the UK, any working area will impact the number of vehicles that can be stored on this area. Further communications would be required to understand the potential impact this would have on the business and to assess if there are any other vacant storage areas that could be utilised during the works.

Adopted Highway

The Grain Road is publicly maintainable but subject to high traffic usage associated with the National Grid and their tenants' site. It is likely to be a key concern and consideration in any negotiations.

Existing Easements and Utilities

We have reviewed the Land Registry documents to assess any existing agreements that could have an impact on the chosen route alignment or the ability to undertake the works on certain areas of the land.

Due to the nature of the area we are aware that there will be utility's infrastructures which will possibly restrict our route option, but during our Title investigation there has been limited information available of easements and the location of existing utilities.

There is a Gas main referred to in the Land registry and included in the Title Plan which we assume continues into Grain Road. However, there are no other easements for the pipe and therefore a full utility search would be required along with further engagement with the landowner to understand their knowledge on the history of the site and any other services within the land.

There is an easement between the Port of Sheerness and Gridlink from 29th of March 2018. We believe that this easement will have an impact on this route option. Also, a deed of Grant of Easements dated 23 October 2015 made between Her Majesty the Queen, The Crown Estate Commissioners, Port of Sheerness Limited and Port of Sheerness Wind Farm Limited. Unfortunately, due to lack of information available on Land registry, again further engagement with the landowner to understand their knowledge on the history of the site.

Construction and working areas

Working areas within the highway on the Isle of Grain would likely be significantly confined and as a result additional storage and management areas would be anticipated. There is good opportunity to use large verge areas to minimise the impact to project costs, however there could be existing apparatus below these which would limit the availability. If private land options need to be explored, we would anticipate limited options and high costs due to the commercial rents already changing hands in the area.

Once entering the private land of Thamesport occupied by National Grid, restrictions on movements would be greater due to the level of security in place. We would anticipate extensive restrictions in this area.

The Isle of Sheppey drill pit location offers limited working area in the proposed location and is adjacent to the highway. The Drill pit location would also block access into the site to the south. The works then proceed within the highway and into the SGN site. The use of the SGN site would be beneficial for these works as there would be limited area available in the highway for storage and welfare facilities.



**DALCOUR
MACLAREN**



Sheppey Crossing Optionneering De

Route	Engineering Difficulty	Construction Complexity	HDD Risk	Operational Complexity	Industry Practice best practice compromised (pipe stringing & pressure testing)	Risk of Drill failure	Operational Risk	Dewatering Necessary to enable works	Environmental Consents	Environmental Risk
Option 1 – Grain to Sheppey	3	4	3	3	1	4	3	2	3	2
Option 2a – South of Bridge Structures	1	1	1	1	1	1	2	1	4	1
Option 2b – Between Bridge Structures	3	3	2	2	4	3	2	2	4	1
Option 2c – North off Bridge Structures	2	2	3	2	1	3	2	3	4	3
Total	9	10	9	8	7	11	9	8	15	7

Scored 1 – 4 (1 most, 4 least favourable)

Decision Matrix

Land Rights Complexity	Highways Embargo - Section 58	Impact on Flood Barriers	Ecological Risk	Archaeological consents	Crown Consent Needed	Agreement breach by 3rd party	Land Risk	Network Rail Consents	Third Party Consents	Cost??	Total Score
4	4	4	2	2	4	3	4	3	2	4	64
1	1	4	1	3	1	4	1	1	1	1	33
2	1	4	1	3	1	4	2	3	2	2	51
3	1	4	2	4	1	4	3	3	2	3	55
10	7	16	6	12	7	15	10	10	7	10	