

Raywood, Simon

From: East Yorkshire Solar Farm <EastYorkshireSolarFarm@Boom-Power.co.uk>
Sent: 08 March 2024 11:37
To: East Yorkshire Solar Farm
Subject: East Yorkshire Solar Farm: Relevant Representation received from Northern Gas Networks
Attachments: East Yorkshire Solar Farm, Spaldington. High and Intermediate Pressure Gas Pipeline Safety Parameters.docx; 14904 Guidance for Temporary Pipeline Crossings Issue2-0.pdf; Working safely near high pressure gas pipelines and associated installations.pdf; Tree planting guidelines.doc; Pipeline Safety Information Nov 23.pdf; Stay safe near our pipes.pdf

You don't often get email from eastyorkshiresolarfarm@boom-power.co.uk. [Learn why this is important](#)

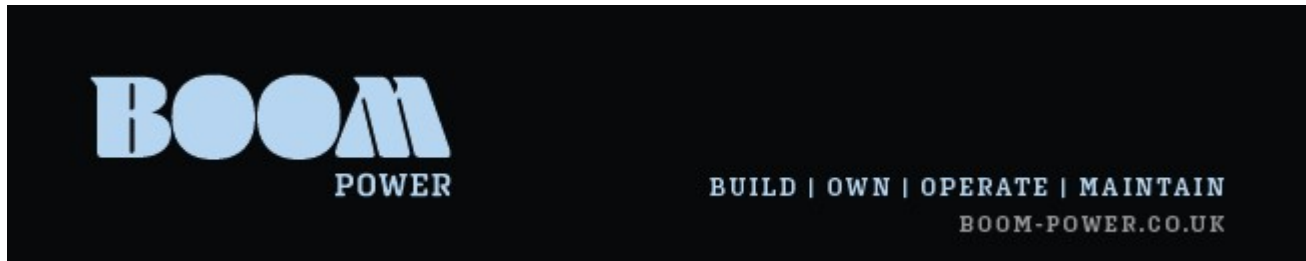
Hello,

Please find below and attached a Relevant Representation received by East Yorkshire Solar Farm on 19 February 2024. We have confirmed back to [REDACTED] [@northerngas.co.uk](mailto:[REDACTED]@northerngas.co.uk) that their email has been forwarded to the Planning Inspectorate as a Relevant Representation and will be reviewed accordingly.

If you have any issues or queries related to this, please do not hesitate to let us know via EastYorkshireSolarFarm@Boom-Power.co.uk.

Many thanks,
East Yorkshire Solar Farm team

East Yorkshire Solar Farm



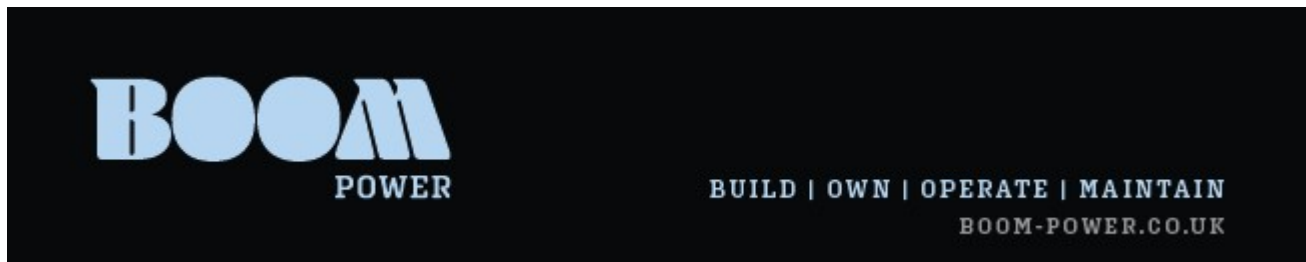
Office address: Unit 5E Park Farm | Chichester Road | Arundel | West Sussex | BN18 0AG

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Kind regards,

East Yorkshire Solar Farm



Office address: Unit 5E Park Farm | Chichester Road | Arundel | West Sussex | BN18 0AG

Please consider the environment before printing this email.

From: Callum Dale [REDACTED]@northerngas.co.uk>
Sent: Monday, February 19, 2024 2:15 PM
To: East Yorkshire Solar Farm <EastYorkshireSolarFarm@Boom-Power.co.uk>
Cc: Donald Gilbank [REDACTED]@northerngas.co.uk>; Dave Ring [REDACTED]@northerngas.co.uk>
Subject: East Yorkshire Solar Farm - NGN ref 14025

Good Afternoon,

East Yorkshire Solar Farm, Spaldington.
NGN ref: 14025

Many thanks for consulting on your proposed development, I am particularly interested in the protection and mitigation for our High and Intermediate Pressure gas assets

I have attached a word document: *“East Yorkshire solar farm, Spaldington. High and intermediate Pressure Gas Pipeline Safety Parameters”*

Please can you respond to the 12 safety stipulations outlined in the above document.

I have also attached five other relevant documents that are referred to within the above.

Hope this information is clear, but if you need further clarification, please do not hesitate to come back to me.

I have referred to the Major Accident Hazard Pipeline ‘Asselby – Harswell’ and an Intermediate Pressure pipeline within the above mentioned document, to which both pipelines pass through the locality of the development

Hope this is of assistance.

Kind regards,

Callum Dale

TOTEX Technician – Plant Protection
Northern Gas Networks

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Northern Gas Networks (NGN)

Location: East Yorkshire Solar Farm Spaldington East Riding of Yorkshire

((100mm ST HP Asselby to Harswell and 250mm PE IP DTMR*0010072917))

NGN Objection Reference: 14025/DR

{Please note that it is standard practice for our “before you dig” department to issue an “objection” to any planning proposals which are close to, or affect our High Pressure gas transmission system}.

Note 1: The issues I am addressing are related to the below assets only and thus, this document is specifically aimed towards protecting the existing Northern Gas Networks High Pressure (HP) Gas Transmission pipeline and Intermediate Pressure (IP) pipeline and associated equipment, located within the development area and immediately adjacent/or parallel to the planned development. With this being said, it must be noted that there are also Low Pressure (LP) gas pipelines that pass through and/or close to the development land. This will be dealt with separately to the HP and IP pipelines.

(please see gas plan extract below)

As stated in UKOPA (United Kingdom Onshore Pipeline Operators Association) ‘Good Practice Guide’

A Solar PV Installation could affect a buried pipeline operated by a UKOPA member company in the following ways:

- Damage to the pipeline caused during the construction of the Solar PV Installation during site preparation work including the excavation of soils associated with site levelling, the building of construction compounds, the construction of access roads, cable trenching, fencing etc.
- Damage caused by drainage of the site including the excavation of drainage ditches.
- Damage as a result of piling or the construction of foundations for the solar panels or security fencing.
- Damage caused by heavy construction traffic crossing over or close to the pipeline.
- Damage to the pipeline caused during the repair or maintenance of the Solar PV Installation.
- Electrical interference with the pipeline’s cathodic protection (CP) system, see Section 4.2.
- Restricting access to the pipeline both during normal operation of the pipeline or in the event of a pipeline emergency.

The control of risks arising from third party damage to pipelines is addressed by Regulations 15 and 16 of the Pipelines Safety Regulations 1996 (PSR). PSR Regulation 15 states:

‘No person shall cause such damage to a pipeline as may give rise to a danger to persons’.

The gas assets that are close to your proposal form part of the Northern Gas Networks bulk supply Gas Transmission system and are **registered with the Health and Safety Executive (HSE) as Major Accident Hazard Pipelines.**

Any damage or disruption to any of the pieces of plant in question is likely to give rise to grave safety, environmental and security of gas supply issues.

Going forward, I would like agreement with either the applicant (or applicants agent) and /or, with any future developer, that **ALL** our below stipulations are either **“Not Applicable”** or **will be addressed** throughout the planning, construction and subsequent operational processes, as appropriate.

If we agree that the safety and integrity of our asset will either, not be affected, or that the relevant protective measures will be incorporated within the development proposal, **then, subsequently, I will arrange for any related objection to be withdrawn.**

As I am never sure exactly what is required for the installation of a new solar farm and what groundworks are required/undertaken near our buried plant the following information and safety stipulations are to be applied, as appropriate/plant protection measures put in place as required to the actual development proposal.

I would like a response relating to items 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11 and 12 below.

1. There is 1 NGN High Pressure Gas Transmission Pipeline and 1 NGN Intermediate Pressure pipeline which passes close to and/or through the planned development area.

They are as follows:-

- 1. "**Asselby to Harswell**" which is 100 mm dia. (4") with **38bar** Maximal Operating Pressure (**equivalent to 551 pounds/inch²**). This is registered as a **Major Accident Hazard Pipeline** and the associated **Pipeline Safety Reference for this pipeline is 1961**. Under the **Land Use Planning Regulations**, I understand that the **HSE consultation distance for this pipeline is 17 metres**.

(The Pipe Reference No.1 as indicated by dashed yellow line in our MAPS extracts below Figure 1)

For this particular asset, **our safety advice** is based on industry standard (IGEM TD1 Ed. 6), which states that there should be **no "Occupied Buildings"**, within **17 metres** of the pipeline, in other words **a strip 34 metres** wide centred on the pipeline **should be clear of buildings** (This includes any permanent or temporary static caravans). The Building Proximity Distance (BPD) is 17 metres

(**Note 2:** based on; less than 30% SMYS (Specified Minimum Yield Stress) and material wall thickness of 4.78mm).

- 2. 250mm PE IP DTMR*0010062589 with a Maximal Operating Pressure of **7 bar (equivalent to 101 pounds/inch²)**.

(The Pipe Reference No.2 as indicated by dashed green line in our MAPS extracts below Figure 2)

For this particular asset, **our safety advice** is based on industry standard (IGEM TD3 Ed. 5), which states that there should be **no "Occupied Buildings"**, within **6 metres** of the pipeline, in other words **a strip 12 metres** wide centred on the pipeline **should be clear of buildings** (This includes any permanent or temporary static caravans). The Building Proximity Distance (BPD) is 6 metres.

2. **In addition**, we have a **legal rights** along the length of, and centred on the above pipelines which are recorded by way of a deeds of easement, nothing should be placed in or on the easement, that would prevent NGN gaining access to the pipe.

The deed will confirm that NGN as the pipeline owner should have access to the pipe at all reasonable times and at any time in an emergency to carryout repairs, maintenance and monitoring. The developer in laying out the development must consider NGN's right of access over the adjoining land and along the easement strip to facilitate future access for both personnel and machinery.

Regardless of item 1 above, NGN would not agree to any occupied buildings being placed within the easement.

East Yorkshire Solar Farm, Spaldington: High & Intermediate Pressure gas Pipeline Safety Parameters. BOOM Power
It is unacceptable for any building to be constructed directly over a High Pressure gas Transmission pipeline.

The developer will need to confirm that the gas pipeline will have no solar panels placed over it or within the easement and/or DPB.

(If applicable, this applies to the positioning of any permanent or temporary static caravans).

Asselby – Harswell – NGN Easement Reference: NE408070

250mm IP PE – NGN Easement Reference: NE408070

3. NGN would expect to be consulted and agree to any other types of structures planned within the easement. We would also want to agree to any proposed new services placed within or close the easement and if electric conductors, we may require interference testing to be undertaken by the third party in order to ensure there is no related degradation of our pipeline or its protection systems. We would stipulate a minimum clearance of 600mm between our asset and any new service.

In order to assess any impacts of the Solar PV Installation on the pipeline's cathodic protection (CP) system, NGN will be required to carry out pre-construction and post-construction monitoring. Potential impacts could be as a result of:

- The Solar PV Installation grounding rings or grounding networks shielding the pipeline from the CP system.
- AC interference from buried or above ground AC cables.
- Stay current direct current (DC) interference.

The potential for AC or DC interference could increase under fault conditions or after a period of time if some degradation of the cabling insulation occurs.

Depending upon the perceived risks of the above and / or the result of initial monitoring surveys, NGN may be required to install long term monitoring systems in order to detect any impact which may compromise the CP system.

The costs of any monitoring systems and any remediation works that are deemed necessary would be recharged to the Solar PV Installation developer.

There are likely to be pipeline related test posts situated close to the pipe and within the development area; NGN would expect that these test posts must remain in situ, or be repositioned at the developers expense. Similarly, NGN would need to agree to any new road proposals within the easement.

Note 3: If plots of land/development are sold to private individuals through which our pipeline passes, the easement rights will affect all the individuals whose property/land ownership encompasses over the easement, basically the individual property/land owners will have to comply with the easement stipulations.

e.g. not be able to place garden buildings within the easement or build extensions out into the easement.

This should be made clear to them at the point of purchase.

4. It is likely that a Solar PV Installation will result in an increased risk of a lightning strike that could impact NGN's above mentioned buried pipeline. Lightning could pass from the earth system to the pipeline. Over voltages due to lightning may cause serious damage to the pipeline CP system and other parts of the network. NGN will require a Lightning Assessment to be carried out by an expert in the relevant field.

5. NGN would also want to limit any change in ground levels over and in the vicinity of the existing pipeline(s) to ensure that the existing pipeline depth of cover is not reduced and also that any increase in overburden is limited, such that the total depth of cover is **no greater than 2.5 metres** (as measured from pipe crown to new ground level).

NGN would also need to ensure that any planned retaining walls did not adversely affect the integrity of our pipes, and in order to ensure this was the case, we would want an expert in the relevant field to assess any such proposals.

Should percussive piling be necessary, NGN would want to limit any vibration within **15 metres** of our pipelines to a measured **< 75mm/s ppv**.

(Please see attached pipeline safety document section 7.12).

6. If the development includes any **drainage ponds or Lagoons**, these must not be placed over the pipeline(s) route at any point. (In other words, the pipelines must not be submerged under water). We would want any associated batter or banking to be constructed so that it does not encroach into our easement and a safe distance is maintained. We may require confirmation that any associated banking will not transmit any loading onto the pipe.

7. Additionally, for any **recreation or landscaped spaces**, which are proposed close to our gas pipeline (s), we have tree planting guidelines which advise the types and species which are safe to plant and provide recommended minimum distances for each tree from the pipeline. (The roots of large trees can present a significant safety hazard when wrapped around buried pipes; particularly if the tree subsequently is blown over or falls over causing damage to the pipeline. ((Guidelines are attached)).

8. NGN would want to agree with the developer, any required pipeline protection, should any access points be incorporated over the pipeline (i.e. either Temporary for construction or Permanent street or road access). A load assessment will need to be carried if vehicles over 5 tonne will be crossing the pipeline. Such protection for vehicular crossing points is likely to include a specifically designed concrete plinth. In this instance, NGN would be willing to agree tangential or even offset, permanent pipeline road crossing points, so long as any required pipe protection was to an NGN approved design and provided by the developer.

(we would expect the developer to include for NGN's design approval process).

Depending on the Pipeline material, roadways constructed to Highway Adoptable standards may not require plinth protection.

9. We would also want to agree any safety precautions to be adhered to by **any third parties** carrying out **ground works** in close proximity to our High Pressure Pipelines at any point along their length. This includes the laying and positioning of services as they cross the pipe(s), or placed within the easements.

It also includes any Bore Holing.

Please see attached document " Pipeline Safety Information: requirements for third parties"

Prior to groundworks; Existing location & depth of cover must be confirmed by on site measurement by our appointed representative.

East Yorkshire Solar Farm, Spaldington: High & Intermediate Pressure gas Pipeline Safety Parameters. BOOM Power (We offer a free service ((Mon /Fri x reasonable notice)) of **locating our STEEL HP / IP pipes accurately and providing safety related advice and instruction as necessary, hence, please get back to me if you require this service. We can often provide accurate depth of cover measurements at the same time.**

10. Please confirm that no explosive Blasting Techniques will be utilised during the construction period.

11. The pipeline must not be exposed during construction unless the required assessments / supports are provided and agreed with NGN. As per Pipeline safety Regulations 1996;

Regulation 15 – No person shall cause such damage to a pipeline as may give rise to a danger to persons.

(70) It is important that the location of onshore pipelines, and in particular underground pipelines, is considered when carrying out building, excavation or dumping or other such work, as such activities may either cause damage to pipelines or deny access to them for maintenance purposes.

12. Population Density : “H” type areas where the population density exceeds 30 persons / Hectare

As a gas network and Pipeline operator, Northern Gas Networks is obliged to adhere to the Gas Industry Recommendations as set out in the “Institution of Gas Engineers and Managers” publication IGEM /TD1/Ed6.

In this updated document, there is a new clause relating to assessing the safety ramifications for increased population density within a certain distance of any High Pressure pipeline and is to identify any location near the pipeline where the population density has reached 30 people / hectare (Known as “H type” area designation for “High Contingency”).

Any Gas Transporter will be expected to abide by the new rules, and this places an onus on Northern Gas Networks to ensure that population density increases are addressed in order to try and restrict population growth in the vicinity of the pipeline and if possible, to maintain the “below 30 people / Hectare” ruling. (or carry out a safety evaluation).

Can you confirm that the population will not exceed 30 people per hectare during the development and there after?

Figure 1: Asselby - Harswell "1961" (High Pressure gas Pipeline shown in dashed yellow four locations pipeline meets the proposed development high lighted with a ● .

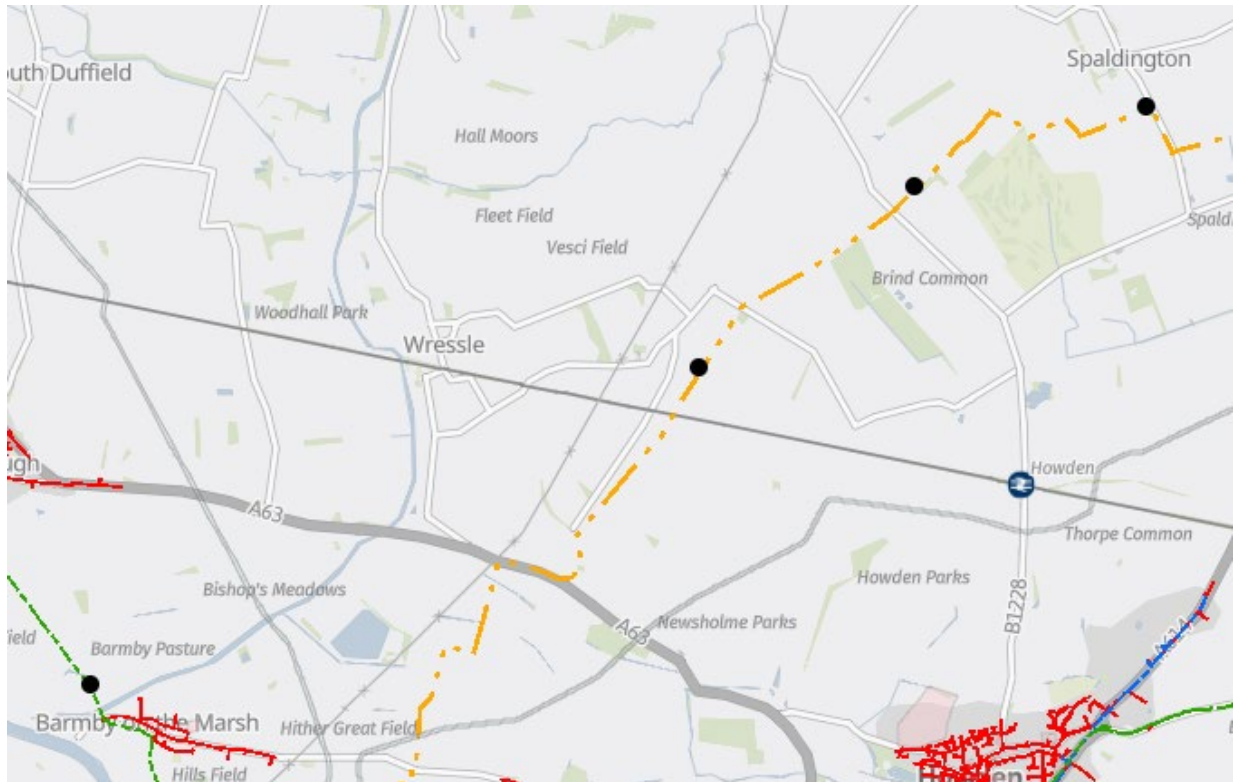
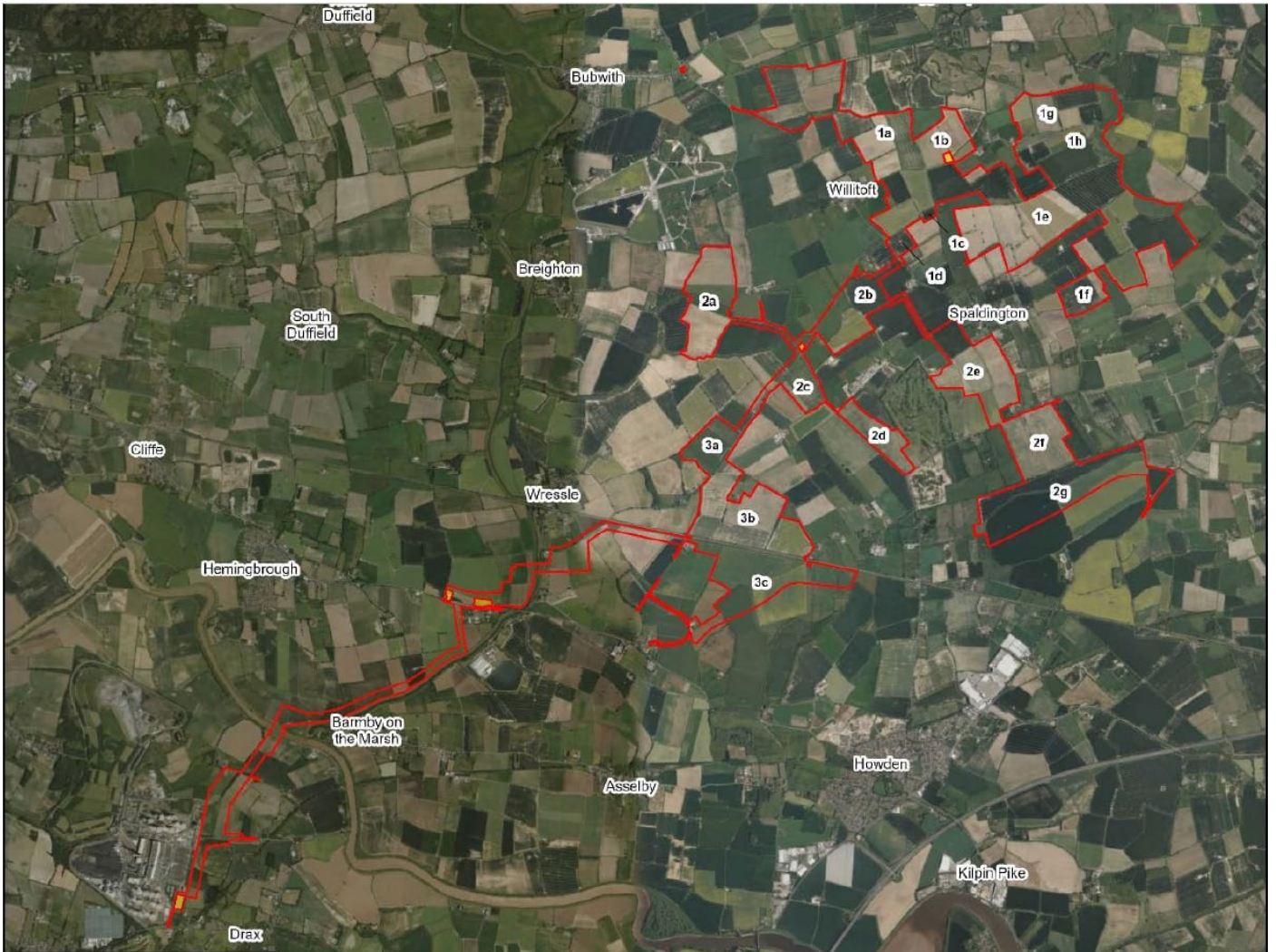


Figure 2: 250mm PE IP pipeline shown in dashed green.



Figure 3: Proposed area for Solar Farm Development.



GUIDANCE FOR TEMPORARY PIPELINE CROSSINGS

CLIENT: NORTHERN GAS NETWORKS

REPORT NUMBER: 14904

REVISION NUMBER: 2

ISSUE DATE: 17/12/2020



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Rev	Date	Pages	Description	Author	Approved By
1	08/12/2020	11	First Issue	Daniel Finley	Andy Young
				[REDACTED]	[REDACTED]
2	17/12/2020	12	Update to include example vehicles	Daniel Finley	Andy Young
				[REDACTED]	[REDACTED]

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EXECUTIVE SUMMARY

Northern Gas Networks (NGN) own and maintain more than 37,000 km of gas pipes. NGN work procedures NGN/PR/SSW/2 and NGN/PR/SSW/22 provide guidance for safe working and land development in the vicinity of NGN plant. Both procedures identify that any assets should be protected at points where construction or abnormal traffic may cross.

The procedures states that protection should be by a suitable method. e.g. temporary rafts of either sleeper or reinforced concrete construction, constructed at ground level, and that ground conditions, vehicle types and crossing frequency should determine the type of raft required. As there are a wide range of situations and plant involved, it is not always clear what approach should be adopted. This can lead to inconsistent protection activities.

NGN has requested that ROSEN(UK) Limited produce a set of clear rules that defines the required protection when construction or abnormal traffic is planned to cross NGN pipelines. This guidance will be used by NGN operatives to assist when dealing with plant protection enquiries.

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1. INTRODUCTION

Northern Gas Networks (NGN) own and maintain more than 37,000 km of gas pipes. NGN work procedures NGN/PR/SSW/2 [1] and NGN/PR/SSW/22 [2] provide guidance for safe working and land development in the vicinity of NGN plant. Both procedures identify that any assets should be protected at points where construction or abnormal traffic may cross.

The procedures states that protection should be by a suitable method. e.g. temporary rafts of either sleeper or reinforced concrete construction, constructed at ground level, and that ground conditions, vehicle types and crossing frequency should determine the type of raft required. As there are a wide range of situations and plant involved, it is not always clear what approach should be adopted. This can lead to inconsistent protection activities.

Furthermore, Institution of Gas Engineers and Managers (IGEM) standard, IGEM/SR/18 Edition 3 [3], documents safe working practices to ensure the integrity of gas assets and associated installations. This includes guidance on working in the vicinity of gas assets including construction traffic.

NGN has requested that ROSEN(UK) Limited produce a set of clear rules that defines the required protection when construction or abnormal traffic is planned to cross NGN pipelines. This guidance will be used by NGN operatives to assist when dealing with plant protection enquiries.

2. EXISTING GUIDANCE

It is understood the NGN receive enquires for construction traffic to cross all types of assets. The following sub-sections outline the pipeline protection requirements for these situations that are documented in NGN procedures and IGEM standards.

2.1 NGN Work Procedures

The requirements for working in the vicinity of NGN assets are documented in work procedures NGN/PR/SSW/2 and NGN/PR/SSW/22. Within the procedures the requirements are separated between pressure tiers, however the requirements for construction traffic are identical:

- Construction traffic should cross an asset only at previously agreed locations with NGN. All crossing points should be fenced on both sides with a post and wire fence, and with the fence returned along the easement for a distance of 6 m.
- The asset should be protected at the crossing points by a suitable method agreed with NGN. Ground conditions, vehicles types and crossing frequency should determine the type of raft required.

2.2 IGEM/SR/18 Edition 3

The requirements for working in the vicinity of a gas asset exceeding 7 bar and a gas asset not exceeding 7 bar are separated within the standard, however the requirements for construction traffic are identical:

Clauses 7.3 and 8.3 state that construction traffic should cross an asset only at previously agreed locations with the operator. All crossing points should be fenced on both sides with a post and wire fence, and with the fence returned along the easement for a distance of 6 m.

The asset should be protected at the crossing points by a suitable method agreed with the operator. Ground conditions, vehicles types and crossing frequency should determine the type of raft required.

This is identical to the requirements that are documented in NGN work procedures (Section 2.1)

3. PROTECTION/ASSESSMENT OPTIONS

3.1 Bog mats

Bog mats are typically timber mats placed on the ground surface to create temporary access roads for construction projects. They protect the surface from rutting and damage from frequent crossings. See Figure 1.

They offer minimal load protection to a buried pipe because they are relatively flexible and therefore do not spread the imposed vehicle loading. Consequently, the surface load is largely transferred to the pipe as for the case without the mats.



Figure 1: Example bog mats (© Briketts <https://www.birkettsbogmats.com/size-bogmat/>)

3.2 Ground protection mats

These are similar to the timber bog mats, in that they offer protection to the ground surface from rutting and damage from frequent crossings. They are available in a variety of sizes and can be connected using propriety jointing systems. See Figure 2.

They offer minimal protection to a buried pipe as the loads are transferred to ground surface, which in turn are transferred to the pipe.



Figure 2: Ground protection mats (© GroundGuards <https://www.ground-guards.co.uk/product/maxitrack-1-8m-x-0-9m-6x3/>)

3.3 Haul Road (Granular material)

Granular material is frequently placed at surface on larger construction sites to create temporary haul roads. This can protect the surface from damage and rutting. Using granular fill to increase the cover depth at pipeline crossings can help protect the pipe from unacceptable transient vehicle loads but will increase the overburden loading. A vehicle loading assessment would be required to determine suitability of this option.

During placement of the material, pipeline protection measures should be considered because heavy vehicles or compaction equipment may be required during the construction.

3.4 Temporary Bridge/Raft

In some instances a temporary bridge/raft system can be used to form a bridge over the pipeline. Systems need to be designed such that any load transferred to the ground is sufficiently far away that any load transferred to the pipeline is minimal.

The use of any system should ensure that any crossings of the pipeline are perpendicular.

Rollover

Rollover Quickbridges are available in the same span range and unit widths as the Flat Top units, but are particularly useful where clearance to the underside of the bridge is important in applications such as over-bridging where existing structures are awaiting or undergoing repair or strengthening.



Figure 3: Example temporary bridge (source Mabeyhire.co.uk)

3.5 Concrete Slabs

NGN/SP/CE/12 [4] provides a specification for pipeline protection slabs. There are three types of slabs specified:

- Crossing point slabs

To be used at locations where analysis shows that protection from vehicle loads is required to reduce the stress to an acceptable level.

Crossing point slabs can be removed after the works have completed. Guidance in NGN/PR/SSW/2 and NGN/PR/SSW/22 should be followed when removing slabs to ensure the pipeline is not damaged.

- Impact protection slabs

To provide additional protection as requirement by IGEM/TD/1 to reduce the likelihood of pipeline damage by mechanical plant.

- Separation slabs between pipeline and other services

This could be installed for one of the following reasons:

- Where a pipeline is to be installed above other services, so as to prevent damage to the other services during its installation, testing and any subsequent maintenance or repair.
- Where a pipeline is to be installed below other services.
- Where other services are to be laid above, to prevent damage to the pipeline during installation, maintenance or repair of the other services.

3.6 Vehicle Loading Integrity Assessment

In some instances an assessment of the vehicle loading on the pipeline may show that it is acceptable without the need for additional precautions. NGN/SP/GM/1 [5] provides guidance on undertaking the assessment which is applicable to all pipelines and provides acceptance criteria for steel pipelines operating above 7 bar.

The conclusions from an assessment may be that protection measures are required such as outlined in Sections 3.1 to 3.5, however a concrete crossing point slab in accordance with NGN/SP/CE/12, Section 3.5 is commonly selected. .

4. CONSIDERATIONS FOR PROTECTING ASSETS

The following sub-sections outline the considerations for protecting assets at temporary crossings:

4.1 Vehicle Loading

4.1.1 Temporary Crossing

The predominant factor for determining the type of protection required for temporary crossings is the type of vehicle loading and the frequency that the vehicle is expected to cross the pipe during the work.

Determining whether vehicle loads are acceptable depends on:

- The vehicle weight
- The vehicle loading footprint; based on the tyre or track size and the wheel and axle spacing.
- The pipe properties and ground conditions.

It is considered that provided all the following conditions are satisfied then vehicles can be permitted to cross the pipeline without the need for a vehicle loading integrity assessment (Section 3.6):

- Pipes are laid in gardens, fields, or road verges and pavements without highways traffic loading.

- The depth of cover is 1 m or greater
- The permitted gross fully laden vehicle weight and pipe diameter range are as specified in Table 1.

Material	Pipe diameter	
	4 tonne vehicle	5 tonne vehicle
Cast iron and ductile iron	12 inch or less	8 inch or less
Steel and PE	All pipe sizes	All pipe sizes

Table 1: Permitted gross fully laden vehicle weight and pipe diameter range

Examples of common vehicle types, which are 5 tonne or less, are listed in **Error! Reference source not found.**

For locations that meet these conditions, the requirement for measures to protect the crossing surface should be considered, and this can be in the form of bog mats (Section 3.1) or ground protection mats (Section 3.2). These protect from rutting of the surface occurring which can cause in a reduction of depth of cover. The requirement for these additional protection measures depend on a number of factors:

- Expected weather conditions (e.g. Winter vs Summer).
 - If the ground conditions are wet, the ground surface will deteriorate rapidly and therefore surface protection is recommended.
- Frequency of crossings (number per day) – Large or small project (e.g. Road scheme = large, housing development < 10 plots = small).
 - If the daily number of crossings is high the ground surface could deteriorate and therefore surface protection is recommended.
- Duration of the project - Large or small project (e.g. Road scheme = large, housing development < 10 plots =small).
 - A large project is likely to continue over several months and involve wet periods and therefore surface protection is recommended.

For locations that do not meet the stated conditions, a vehicle loading assessment as described in Section 3.6 is required.

Dedicated crossing point(s) should be installed in accordance with the requirements of NGN/PR/SSW/22 and NGN/PR/SSW/2.

4.1.2 Permanent Road Crossings

For permanent road crossing, BS EN 1991-2 and BS 9295:2020 provide guidance on traffic loading models that should be used to assess pipes, however these loadings relate to public roads and not temporary crossings as considered in this report.

It should be noted that existing gas mains in public roads will only require a vehicle loading integrity assessment (Section 3.6) for a notified abnormal indivisible loads (AIL) crossing. In such cases the assessment should be based on the specified vehicle footprint, axle loads and tyres contact areas.

If an existing untrafficked pipe is to be covered by a new public road then the traffic surcharge applicable to a new main as described in BS EN 1991-2 [6] and BS 9295:2020 [7] should be considered. Impact protection in accordance with either IGEM/TD/1 [8] or IGEM/TD/3 [9] may be required.

4.2 Pipe Material

The material of the pipe that is being crossed requires consideration. Cast and ductile iron mains have a reduced loading bearing capacity when compared to PE and steel pipes. In addition the joints for cast and ductile iron mains can leak when disturbed.

If the main has history of leakage events then a leakage survey before work commences should be carried out. This should also be scheduled at routine intervals during the project, depending on the duration. A leakage survey after the project should also be completed.

It is expected that cast iron and ductile iron pipes will require protection to prevent disturbance of joints therefore it is expected that most construction projects should involve placement of a load bearing structure such as concrete slabs.

4.3 Ground Conditions

The ground conditions are an important consideration as they influence how the load is transferred from the vehicle to the pipeline, the surface can also degrade resulting in rutting occurring which reduce the depth of cover.

Considerations include:

- Soft ground may deteriorate rapidly due to vehicle on the running surface
- Soft ground provides less support to the pipe in resisting the surface loads than firm ground.
- Soft ground can result in ground settlement if earthworks or additional fill are placed over the pipeline
- Pipelines laid on hard ground will experience higher cross sectional loading than compared to soft ground. This could occur where rock head is close to surface for example.

It is recognised that the evaluation of site conditions is not straightforward and explains why ground investigation information that supports construction projects is important. However, where this is not available, some assessment of likely conditions is still possible based on the environment. For example, soft ground is common in lowland flood plains adjacent to water bodies. Conversely hard pipe bedding might be expected in hilly or upland areas where nearby road cuttings indicate the presence of rock.

As indicated in Section 4.1, winter conditions are likely to result in soft ground conditions for a vehicle running surface at ground level in most environments.

In instances where the depth of cover is less than 1 m, it will be necessary to protect the pipe. The use of granular material to construct a haul road (Section 3.3) can be considered to increase the depth of cover. However, the method statement and vehicles used to construct the haul road over the pipe will require consideration.

5. DECISION METHODOLOGY

Figure 4 shows a flow chart for the decision methodology to be followed.

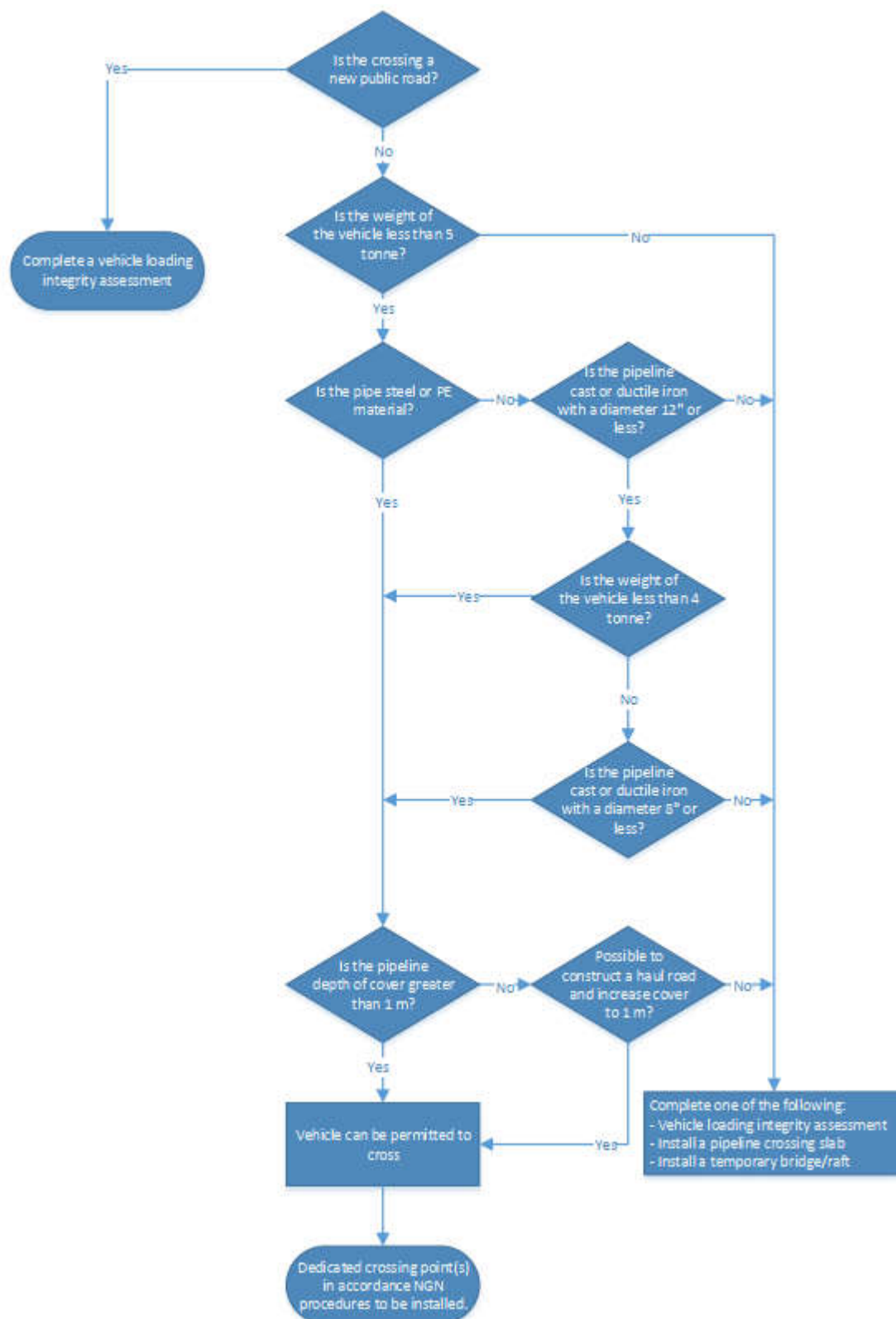


Figure 4: Decision Methodology

6. REFERENCES

- 1 NGN/PR/SSW/2. Work procedure for Safe working and land development in the vicinity of NGN plant. Northern Gas Networks, June 2020
- 2 NGN/PR/SSW/22. Work procedure for Safe working and land development in the vicinity of NGN plant – Requirements for third parties. Northern Gas Networks, June 2020.
- 3 IGEM/SR/18 Edition 3. Safe working practices to ensure integrity of gas assets and associated installations. Institution of Gas Engineers and Managers, Communication 1828, March 2019.
- 4 NGN/SP/CE/12. Specification for the Design, Construction and Testing of Civil and Structural Works Part Twelve: Pipeline Protection Slabs. Northern Gas Networks, August 2004.
- 5 NGN/SP/GM/1. Specification for the Protection of Pipelines from Ground Movement and External Loading. External Loading on Steel Pipelines and Buried Piping at Installations. Northern Gas Networks, October 2004.
- 6 BS EN 1991:2003. Eurocode 1. Actions on structures. Traffic loads on bridges.
- 7 BS 9295:2020. Guide to the structural design of buried pipes
- 8 IGEM/TD/1 Edition 5. Steel pipelines and associated installation for high pressure gas transmission. Institutions of Gas Engineers and Managers. Communication 1789.
- 9 IGEM/TD/3 Edition 5. Steel and PE pipelines for gas distribution. Institutions of Gas Engineers and Managers. Communication 1770.

APPENDIX A EXAMPLES OF COMMON VEHICLE TYPES







Vehicle Reference	Type	Operating Weight (kg)	Images
JCB 6T-2 FT	Dumper	4920	
Terex TA6s	Dumper	4270	
Thwaites MACH2066	Dumper	4420	
JCB 51R-1	Mini Excavator	4982	
Komatsu PC45MR-5	Mini Excavator	5020	
Kubota KX037-4	Mini Excavator	3505	

Table 2: Example vehicles

Vehicles references and details correct at the time of report issue, however, it is recommended that details are checked with the manufacturer/supplier as specifications can be amended.

Safe working and land development
in the vicinity of NGN High and
Intermediate Pressure Gas Plant
Requirements for third parties



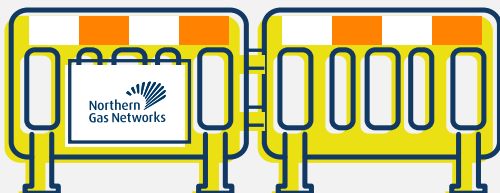
October 2023

we are
the network



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Foreword

This document was approved by the appropriate Technical Authority Level (TAL) and Standards Steering Group (SSG) for use throughout Northern Gas Networks Limited (NGN).

NGN documents are revised, when necessary, by the issue of new editions. Users should ensure that they are in possession of the latest edition by referring to the NGN Register of Documents available on NGN intranet.

Compliance with this document does not confer immunity from prosecution for breach of statutory or other legal obligations.

Contractors and other users external to NGN should direct their requests for further copies of NGN documents to the department or group responsible for the initial issue of their contract documentation.

Disclaimer

This safety and engineering document is provided for use by NGN and such of its contractors as are obliged by the terms and conditions of their contracts to comply with this document. Where this document is used by any other party it is the responsibility of that party to ensure that this document is correctly applied.

Mandatory and non-mandatory requirements

In this document:

- Must:** Indicates a mandatory requirement
- Should:** Indicates best practice and is the preferred option. If an alternative method is used then a suitable and sufficient risk assessment must be completed to show that the alternative method delivers the same, or better, level of protection.

Safe working and land development in the vicinity of NGN High Pressure and Intermediate Pressure Gas Pipelines and Associated Installations

Introduction

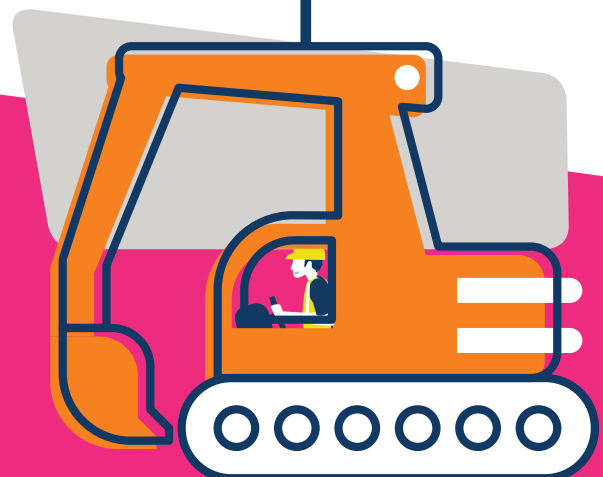
This work procedure is for issue to third parties carrying out work in the vicinity of NGN's gas assets (pipelines, Above Ground Installations, mains, etc.) and is provided to ensure that individuals planning and undertaking work take appropriate measures to prevent damage.

Any damage to a gas asset can affect its integrity and can result in failure with potential serious hazardous consequences for individuals located in the vicinity of the asset. It is therefore essential that the procedures outlined in this document are complied with when working near a gas asset. If any work is considered by NGN to be in breach of the requirements stipulated in this document, then the NGN responsible person will suspend the work until the non-compliances have been rectified.

The Pipelines Safety Regulations state that "No person shall cause such damage to a pipeline as may give rise to a danger to persons" (Regulation 15). Failing to comply with these requirements could therefore also result in prosecution by the Health and Safety Executive (HSE).

The requirements in this document are in line with the requirements of the IGEM (Institution of Gas Engineers and Managers) recommendations IGEM/SR/18 Edition 3 and the HSE's guidance document HS(G)47.

It is the responsibility of the third party to ensure that any work carried out also conforms with the requirements of the Construction (Design and Management) Regulations 2015 and all other relevant health and safety legislation.



When carrying out work in the vicinity of a gas asset, you must adhere to the following process:

Important: This flowchart should be used in conjunction with this document in its entirety and not in isolation, and if at any time during the works the pipeline is damaged, even slightly, then observe the precautions in Section 8 of this document.

Contact Us



Call: **0800 040 7766**

Or send an email to the Before You Dig team at:

beforeyoudig@northerngas.co.uk



Step 1

Contact NGN

Contact NGN to obtain formal consent – Section 2 of this document.

Note: At Least 14 days notice, prior to commencement of the work is normally required



Step 2

Consider Safety

Consider the Safety Requirements – section 3 of this document



Step 3

Inform NGN and Request Pipeline Location

Inform NGN prior to carrying out work and arrange for NGN to locate the pipeline – section 4 of this document.

Note: At Least 14 days notice is normally required



Step 4

Observe Restrictions

Observe NGN restrictions on the allowed proximity of mechanical excavators and other power tools and the measures to protect the pipeline from construction vehicles when carrying out the work – Sections 5, 6 and 7 of this document.

Note: NGN may wish to supervise the work, consult with NGN to ascertain if this is the case



Step 6

Consult NGN

Consult NGN prior to any backfilling over, alongside or under the pipeline and obtain NGN's agreement to proceed. NGN require at least 48 hrs notice prior to backfilling – section 7.2 of this document.



Step 5

Specific Activities

If work involves any of the activities specified in section 7 of this document, comply with the requirements indicated

**IF IN DOUBT
CONTACT NGN**

1. Scope

This work procedure sets out the safety precautions and other conditions affecting the design, construction and maintenance of services, structures and other works in the vicinity of NGN pipelines and associated installations operating above 2 bar, located in both negotiated easements and public highways.

2. Formal consent

Pipelines are generally laid across country within an easement agreed with the landowner or within the highway.

As the required arrangements for working within an easement and working within the highway differ, this document has been structured to highlight the specific requirements for these two types of area where work may be carried out.

Generally, normal agricultural activities are not considered to affect the integrity of the pipeline, however consult NGN prior to undertaking deep cultivation in excess of 0.5m.

In all other cases no work shall be undertaken in the vicinity of the pipeline without the formal written consent of NGN.

Any documents, handed to contractors on site by NGN, must be signed for by the site manager. NGN will record a list of these documents using the form in Appendix A, and the contractor should maintain a duplicate list.

2.1 Within an easement

The promoter of any works within an easement must provide NGN with details of the proposed works including a method statement of how the work is intended to be carried out.

Work must not go ahead until formal written consent has been given by NGN. This will include details of NGN's protection requirements, contact telephone numbers and the emergency telephone number.

On acceptance of NGN's requirements, the promoter of the works must give NGN 14 working days notice before commencing work on site. If agreed with NGN, shorter notice could be required.

2.2 Within the highway

Work must be notified to NGN in accordance with the requirements of The New Roads and Street Works Act (NRSWA) and HS(G)47.

The promoter of any works within the highway should provide NGN with details of the proposed works including a method statement of how the work is intended to be

carried out. This should be submitted 14 working days before the planned work is to be carried out or shorter, only if agreed with NGN. If similar works are being carried out at a number of locations in close proximity, a single method statement should be adequate.

Work should not go ahead until formal written consent has been given by NGN. This will include details of NGN's protection requirements, contact telephone numbers and the emergency telephone number.

3. EH&S considerations

3.1 Safe Control of Operations

All working practices must be agreed by NGN prior to work commencing. All personnel working on site must be made aware of the potential hazard of the pipeline and the actions they should follow in case of an emergency. The Plant Protection Control Form (Appendix A) should be used to record the list of relevant documents that have been provided by NGN to the contractor.

3.2 Deep excavations

Special consideration should be given to the hazards associated with deep excavations. The HSE website provides further guidance, particularly at <http://www.hse.gov.uk/construction/safetytopics/excavations.htm>.

3.3 Positioning of plant

Mechanical excavators must not be sited or moved above the pipeline unless written authority has been given by the NGN responsible person.

Mechanical excavators must not dig on one side of the pipeline with the cab of the excavator positioned on the other side.

Mechanical excavators and other traffic must be positioned far enough away from the pipeline trench to prevent trench wall collapse.

3.4 General

Activities associated with working in the vicinity of pipelines may have impact on the safety of the general public, NGN staff and contractors, and may affect the local environment. Contractors must carry out suitable and adequate risk assessments prior to the commencement of work to ensure that all such issues are properly considered and risks mitigated.

4. Pipeline location

Where formal consent to work has been given, the third party should give 14 working days notice to ensure that the pipeline is suitably located and marked out by NGN prior to the work commencing. If agreed with NGN, shorter notice could be required.

Prior to work commencing on site the pipeline must be located and pegged or suitably marked, **where assets are Intermediate or High Pressure this should be done only by NGN personnel**. In exceptional circumstances, with the prior agreement of NGN, the locating and marking out of Intermediate and High Pressure Pipelines could be carried out by competent third parties on behalf of the contractor so long as NGN is assured of their competence and the procedures to be followed.

Safe digging practices, in accordance with HSE publication HS(G)47, should be followed as both direct and consequential damage to gas plant can be dangerous both to employees and to the general public.

Previously agreed working practices should be reviewed and revised based on current site conditions. Any changes must be agreed by the NGN responsible person.

The requirements for trial holes to locate the pipeline or determine levels at crossing points must be determined on site by the NGN responsible person.

The excavation of all trial holes in the vicinity of Intermediate and High Pressure assets must be supervised by the NGN responsible person.

5. Slabbing and other protective measures

Protective measures including the installation of concrete slab protection should only be installed over or near to the NGN pipeline with prior permission from NGN. NGN will need to agree the material, the dimensions and method of installation of the proposed protective measure. The method of installation must be confirmed through the submission of a formal written method statement from the contractor to NGN.

Where permanent slab protection is to be applied over the pipeline NGN will normally carry out a survey of the pipeline to check that there is no existing damage to the coating of the pipeline prior to the slab protection being put in place. NGN must therefore be contacted prior to the laying of any slab protection to arrange for them to carry out this survey.

The design of concrete protection slabs must be approved and appraised as necessary by NGN or NGN nominated civil consultants.

The safety precautions detailed in Sections 6 to 9 of this document should also be observed during the installation of the pipeline protection.

6. Working in the vicinity of an Above Ground Installation (AGI)

Where excavations are to be made within 10m of the perimeter of an AGI, appropriate protection methods should be determined and recorded by NGN.

NGN will determine whether it is necessary for a representative to attend site when specific activities are being undertaken that may affect the operation of the AGI.

Access to the AGI must be maintained at all times.

If work is being carried out in breach of NGN requirements then work will be suspended within the NGN easement until agreement is reached.

7. Working in the vicinity of a High Pressure / Intermediate Pressure gas asset

7.1 General

NGN may need to be present to monitor the excavation work.

Any reported damage to a gas asset should be investigated and assessed by NGN to determine whether replacement or repair is required. See Section 8.

This work procedure should be read in conjunction with HSG47.

Where works are proposed to be carried out in an easement, specific consent from NGN is required to ensure any specific requirements are adhered to.

A new service should not be laid parallel to an asset within an easement unless otherwise agreed with NGN.

If work is being carried out in breach of NGN requirements, then work will be suspended within the NGN easement until agreement is reached.

7.2 Excavation

Removal of bituminous or concrete highway surface layer by mechanical means should be restricted to a depth of 300mm. This must be subject to prior confirmation of existing adequate depth of cover.

Considerations should be given to any projections off NGN's assets e.g. valve spindles, pressure points etc. These features may be identified on NGN's maps and/or by the presence of features such as valve boxes on site.

The use of chain trenchers should not be permitted within 3m of the asset.

NGN will determine the level of monitoring that is required.

Removal of the bituminous or concrete highway surface layer below 300mm deep should be by hand-held power assisted tools under supervision of NGN's responsible person.

NGN may permit a reduction of these limits with agreement and whilst they remain on site.

Excavation with a powered mechanical excavator should not be carried out closer than 3m to an asset and, with hand-held power assisted tools, no closer than 1.5m. Any fitting, attachment or connecting pipework should be exposed by hand. Excavation within 1.5m of an asset should be by hand.

Any mechanical excavation should utilise a banksman/signaller.

With agreement, NGN may reduce these agreements whilst they remain on site.

Lower risk excavation methods, for example, vacuum excavators should be encouraged subject to risk assessment.

When relaxation is applied, a powered mechanical excavator should not be allowed to excavate closer than 600 mm to the nearest part of the asset. This should only be undertaken while NGN's responsible person remains on site.

Where sufficient depth of cover exists following evidence from trial holes, light, tracked vehicles should be permitted by NGN to strip topsoil to a depth of 250 mm.

Topsoil or other materials should not be stored within the easement without NGN's written permission.

Trenchless techniques should not be used to cross an asset, unless it has been exposed to enable the safe passage of the new service to be observed.

Note: For trenchless techniques see section 7.7.

No new service shall be laid parallel to the asset within the easement. In special circumstances, and only with formal written agreement from NGN, this may be relaxed for short

excursions where the service shall be laid no closer than 0.6 metres

Where a new service is to cross above or below an asset, a clearance of 600 mm should be maintained. This distance may be reduced at NGN's discretion and subject to adequate protection being provided.

Where works are proposed to be carried out in an easement, specific consent from NGN is required to ensure any specific requirements are adhered to.

Whenever an asset is exposed, it should be protected by matting and timber cladding. The exposed asset should be suitably supported. Where assets are proposed to be exposed and unsupported, the promoter should discuss with NGN, the need to undertake a stress analysis to determine support requirements. All temporary supports should be removed prior to backfill.

Promoters should give operators at least 48 hours of intent to backfill over, under or alongside an asset. Any damage to the asset coating should be reported immediately to NGN so that repairs can be made prior to backfilling. NGN may request to be in attendance when these works are carried out.

All reinstatement materials and techniques should comply with NGN standards and NRSWA prior to being applied.

An asset should not be encased in concrete and concrete should not be positioned within 300 mm of the asset.

Fires should not be allowed in the vicinity of an asset without prior consultation with NGN.

Note: If there is evidence of a fire being present in close proximity to an asset, NGN may consider the need for a coating survey (where appropriate) and leakage survey.

Following works, the level of cover over an asset should be the same as that prior to works commencing, unless agreed otherwise with NGN.

Mechanical excavators should not be sited or moved above an asset unless written authority has been given by the NGN.

Note: For construction traffic, see section 7.3.

Mechanical excavators and any other powered mechanical plant shall not dig on one side of the asset with the cab of the excavator positioned on the other side.

Mechanical excavators and other traffic should be positioned far enough away from the trench to prevent trench wall collapse.

A change in ground conditions should be noted, as of the finer grain backfill when reinstating near a pipeline.

7.3 Construction traffic

Construction traffic should cross an asset only at previously agreed locations with NGN. All crossing points should be fenced on both sides with a post and wire fence, and with the fence returned along the easement for a distance of 6m.

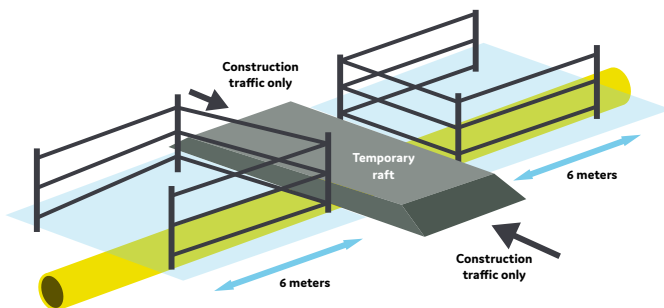


Figure 1 - Construction traffic crossing points (High Pressure / Intermediate Pressure)

The asset should be protected at the crossing points by a suitable method agreed with NGN, e.g. temporary rafts of either sleeper or reinforced concrete construction, constructed at ground level.

Ground conditions, vehicle types and crossing frequency should determine the type of raft required. An integrity assessment on the gas asset may be required as instructed by NGN.

Consideration should be given to conducting a leakage survey over any susceptible asset, before works commence and at appropriate intervals during the work.

Notices, directing traffic to the crossing points, should be erected. Speed restrictions may be applied at the crossing point.

7.4 Change in depth of cover

A pipeline integrity assessment is required for situations involving a final cover depth exceeding 2.5 metres. This assessment should take due account of both soil 'dead' loading and ground settlement due to earthworks.

Proposals for embankment construction over pipelines should be reviewed to confirm any necessary measures to prevent instability of the embankment.

No action would normally be required for pipelines with an existing depth of cover exceeding 2.5 metres. However, if an increase in cover depth has occurred without notification or approval by NGN then an integrity assessment should be required.

7.5 Crossing over an asset (open cut)

This Process must be agreed with NGN representative on site, prior to works commencing

Where a new service is to cross over an asset, a minimum clearance of 600mm should be maintained. If this cannot be achieved, a reduction, in agreement with NGN, may be permitted otherwise it will have to cross below the asset.

7.6 Crossing below an asset (open cut)

This Process must be agreed with NGN representative on site, prior to works commencing

Where a new service is to cross below an asset, a minimum clearance of 600mm should be maintained.

7.7 Trenchless techniques

This Process must be agreed with NGN representative on site, prior to works commencing

7.7.1 Crossing High Pressure / Intermediate Pressure assets using trenchless technique

Initial trial holes should be undertaken to ensure that sufficient clearance exists between the gas asset and the proposed product pipe (or the pipe to be split if a pipe splitting technique is being used).

The minimum product pipe clearance between the underground gas asset should, be 600 mm.

Note: Clearances may need to be increased due to the following factors:

- ground conditions
- largest reamer diameter
- type of reamer used, for example hollow, finned etc.
- accuracy and reliability of the equipment being used
- construction of adjacent services and structures
- configuration of other underground services crossing or running parallel to the drill path
- consequences of damage
- pipe stress increase from potential ground movement.
- presence of Cathodic Protection interfaces

The exposed asset should be suitably supported. Such support should be removed prior to backfill.

The exposed asset should be protected by matting and suitable timber cladding to reduce the risk of damage from any broken pipe fragments (if pipe splitting to be used).

All lateral crossings shall be exposed around their full circumference with an additional 250 mm clearance below. The width of the excavation shall be the greatest of either 3 times the diameter of the largest reamer or 500 mm either side of the largest reamer. These clearances shall be measured from the drill path centre, the exception

being where multiple domestic services cross the drill path profile, by virtue of the route from the distribution main/cable to the termination point of the service that no interference damage will occur.

Each crossing should be manned during the drilling/splitting operation to watch the reamer/splitter pass.

The line of the pipe to be installed/split should be monitored along its length to ensure no variance from its path.

The need for a leakage survey to be undertaken before work starts, during the works if safe to do so and following completion should be considered.

If there is any likelihood of damage to the asset, the operation should be stopped immediately.

7.7.2 Running parallel to a High Pressure / Intermediate Pressure gas asset using pipe splitting techniques

For pipe splitting running parallel to a buried gas asset, trial holes should be undertaken at suitable and frequent locations on the gas asset along the proposed route to confirm sufficient standoff distances exist and the pipe route is confirmed.

The minimum product pipe clearance between underground gas assets should be 3m.

Note: Clearances may need to be increased due to the following factors:

- ground conditions
- largest reamer diameter
- type of reamer used, for example hollow, finned etc.
- accuracy and reliability of the equipment being used
- construction of adjacent services and structures
- configuration of other underground services crossing or running parallel to the drill path
- consequences of damage
- pipe stress increases from potential ground movement
- presence of Cathodic Protection interfaces

The line of the pipe to be split should be monitored along its length to ensure no variance from its path.

NGN shall consider the need for a leakage survey to be undertaken before work starts, during the works if safe to do so and following completion.

If there is any likelihood of damage to the asset, the operation should be stopped immediately.

Note: For further guidance on trenchless contact NGN.

7.8 Tunnelling

Significant differential ground movement may occur when tunnelling in soft ground. Ground movement contours from the tunnel and associated shafts should be calculated and all gas assets within the affected zone should be identified and assessed. The affected zone is normally defined as

within the 1 mm settlement contour.

For steel assets, NGN will seek Integrity assessments. An expert on soil/pipe interaction analysis should be sought when required for the evaluation of ground movement effects on the assets.

7.9 Pressure Testing

Hydrostatic testing of a third party asset should not be permitted within 8m either side of a gas asset, to ensure protection against the effects of a burst.

Where this cannot be achieved, typically where the third party asset needs to cross a gas asset, one of the following precautions would need to be adopted:

- Limiting of the design factor of the third party asset to 0.3 at the asset's nominated maximum operating pressure (MOP), and the use of pre-tested pipe or,
- The use of pre-tested sleeving.
- Carry out Expert Risk Analysis of pipe failure to ascertain what mitigation measures must be adopted to protect our asset.

In either case, the third party shall submit their proposed precautions and method statement for consideration by NGN.

7.10 Demolition

Demolition should not be allowed within 150 m of a gas asset, or 400 m for a structure mass greater than 10000 tonnes without an assessment of the vibration levels at the asset. The measured distance extends from the edge of the area affected by falling material to the asset.

The promoter of the works should provide NGN with estimated vibration levels at the gas assets prior to works commencing, to allow NGN to assess the proposals.

For a welded steel or PE asset, the peak particle velocity should not exceed 75 mm/sec at the asset. Where the peak particle velocity is predicted to exceed 40 mm/sec, an assessment of the asset stress state, which includes the incremental load due to vibration, is required. The vibration loads shall be considered as an additional to all other relevant and transient loads affecting the asset. In addition, an assessment of cyclic loading should be carried out.

The ground vibration should be monitored by the promoter to verify estimated levels and to ensure allowable peak particle velocity is not exceeded. Alarms should be set up at suitable intervals to provide a forewarning of potential limit exceedance. Records of ground vibration levels shall be retained by the promoter.

A leakage survey should be undertaken before work starts, during the works if safe to do so and, following completion.

Where ground conditions comprise submerged granular

deposits of silt or sand, an assessment of the effect of vibration on settlement and liquefaction at the asset should be made.

7.11 Blasting

For assets operating at High Pressure / Intermediate Pressure the Maximum Instantaneous Charge (MIC) shall dictate the distance at which an assessment of the vibration levels (at the located asset) is required. The measured distances are as follows:

- 500m if the MIC is greater than 200kg
- 250m if the MIC is greater than 10kg but less than 200kg
- 100m if the MIC is 10kg or less.

The promoter of the works should provide NGN with estimated vibration levels at the gas assets prior to works commencing, to allow NGN to assess the proposals.

For welded steel or PE assets, the peak particle velocity at the asset should not exceed 75mm sec⁻¹.

Where the peak particle velocity is predicted to exceed 40mm sec⁻¹ an assessment of the asset stress state, which includes the incremental load due to a vibration is required. The vibration loads shall be considered as additional to all other relevant and transient loads affecting the asset. In addition, an assessment of cyclic loading should be carried out.

The ground vibration should be monitored by the promoter to verify estimated levels and to ensure allowable peak particle velocity is not exceeded. Alarms should be set up at suitable intervals to provide a forewarning of potential limit exceedance. Records of ground vibration levels shall be retained by the promoter.

A leakage survey should be undertaken before work starts, during the works if safe to do so and following completion.

Where ground conditions are of submerged granular deposits of silt or sand, an assessment of the effect of vibration on settlement and liquefaction at the asset should be made.

7.12 Piling and boring

Piling or boring should not be allowed within 15m of buried gas assets without an assessment of the vibration levels at the location of the gas asset.

The promoter of works should provide NGN with estimated vibration levels at the gas assets prior to works commencing to allow NGN to assess the proposals.

For welded steel or PE assets, the peak particle velocity at the asset, should not exceed 75mm sec⁻¹.

Where the peak particle velocity is predicted to exceed 40mm sec⁻¹, an assessment of the asset stress state, which includes the incremental load due to vibration, is required.

The vibration loads shall be considered as additional to all other relevant and transient loads affecting the asset. In addition, an assessment of cyclic loads must be carried out.

The ground vibration should be monitored by, or on behalf of, NGN to verify estimated levels and to ensure allowable peak particle velocity is not exceeded. Alarms should be set-up at suitable intervals to provide a forewarning of potential limit exceedance. Records of ground vibration levels should be retained by the promoter.

A leakage survey should be undertaken before work starts, during the works if safe to do so and following completion.

Where ground conditions are of submerged granular deposits of silt and sand, an assessment of the effect of vibration on settlement and liquefaction at the asset should be made.

7.13 Deep mining

An asset routed within 1km of active deep mining may be affected by subsidence resulting from mineral extraction. An expert evaluation of these effects should be sought.

7.14 Surface mineral extraction

An expert assessment should be carried out on the effect of surface mineral extraction activity within 100m of an asset.

Where mineral extraction extends up to the easement, a stable slope angle and stand-off distance between the asset and slope crest should be determined by NGN. The easement strip should be marked clearly by a suitable permanent boundary such as a post and wire fence. Where appropriate, slope indicator markers should be erected to facilitate the verification of the recommended slope angle as the slope is formed.

The easement and slope should be inspected periodically to identify any signs of developing instability. This may include any change of slope profile, including bulging, the development changes in drainage around the slope. The results of each inspection should be recorded.

Where surface mineral extraction activities are planned within 100 m of an asset, but do not extend up to the easement boundary, an assessment should be made by NGN on whether the planned activity could promote instability in the vicinity of the asset.

7.15 Landfilling

An assessment should be carried out on the effect of any landfilling activity within 100m of an asset.

7.16 Cathodic protection

If the promoters works has potential for impacting the effectiveness of the cathodic protection system of the gas asset, interference tests should be carried out to determine whether the system is adversely affected.

Should any cathodic protection posts or associated equipment need moving to facilitate third party works, reasonable notice should be given.

7.17 Hot works

Hot works must only take place under NGN authorised perimetry.

Where metallic gas asset has been exposed, welding, or other hot works that may involve naked flames, should not be carried out in proximity of the gas asset unless suitable protection and precautions have been agreed.

If the gas asset is PE, or a PE asset is contained within a metallic sleeve, welding, or other hot works that may involve naked flames, should not take place within 500 mm of the gas asset unless suitable protection and precautions have been agreed to prevent against the effects of sparks, radiant heat transfer etc.

Gas leakage checks should be undertaken before, during and after the works to prevent the ignition of gas and to ensure the integrity of the gas asset.

Hot works supervision should be considered.

7.18 Seismic surveys

NGN must be advised of any seismic surveying work in the vicinity of the pipeline that will result in NGN's pipeline being subjected to peak particle velocities in excess of 50 mm/s. The ground vibration near to the pipeline should also be monitored by the contractor whilst the survey work is being carried out.

7.19 Wind turbines

The minimum proximity distance between any gas asset and any industrial/commercial sized wind turbine should be 1.5 times the fixed mast height, excluding turbine of the wind turbine.

Note: For further guidance on wind turbines, see IGEM/ TD/1 and UKOPA Good Practice Guide 13 (GPG013).

7.20 Excessive loading

Cranes and lifting equipment must not be sited or moved above the pipeline unless written authority has been given by the responsible person. Permission will only be granted after a load displacement assessment is carried out by a suitably qualified organisation.

No protective measures, including the installation of concrete slab protection, should be installed over or near to the pipeline without prior consultation with NGN. An assessment must be made of the material, the dimensions and method of installation of the proposed protective measure. The method of installation must be confirmed with prior consultation with a competent person.

7.21 Drainage / sewerage works

The promoter of any works working within a pipelines easement or within 3m of a pipeline, intending to carry out drainage / sewerage works at a depth greater than the pipeline, must provide details of the proposed works including a method statement of how the work is intended to be carried out.

Special consideration should be given to the hazards associated with deep excavations. The HSE website provides further guidance, particularly at:

<http://www.hse.gov.uk/construction/safetytopics/excavations.htm>.

Work must not go ahead until formal written consent has been given. This will include details of protection requirements.

7.22 Ditch maintenance

Ditch maintenance is a common agricultural activity and, whilst the objective of this work is not to expose the pipeline, there is a risk of damage to the pipeline. NGN must be notified about ditch maintenance using mechanical excavators and a competent person must attend site to locate the pipeline and to discuss the work to be carried out and to ascertain the depth of material to be removed from the ditch. If it is reasonably practicable to do so, the ditch should be maintained by hand excavation across the inner hazard zone and danger zones.

For all ditch clearing works using mechanical excavators or similar, the competent person must check pipeline records to confirm the position and indicated depth of the pipeline at the time it was constructed to determine if the ditch existed at the time of construction and if the pipeline depth of cover was increased for the ditch crossing. The competent person should also check pipeline records for the presence of stabbings or fittings. The competent person must use an approved pipeline locator to establish the position and indicated depth of cover of the pipeline. If the pipeline cover at the ditch crossing was increased during construction enabling safe maintenance of the ditch it is not necessary to locate the pipeline by hand excavated trial holes.

The NGN responsible person should be in attendance during the whole of the backfilling operation around the pipeline and should stipulate the necessary consolidation requirements.

If the pipeline has been backfilled without the knowledge of the NGN responsible person then he should insist the material is re-excavated to enable him to check the condition of the pipeline coating.

7.23 Solar farms

Solar Photovoltaic (PV) Installations, including their cabling, should be suitably designed, sited, constructed, commissioned, operated and decommissioned in order to minimise the impacts to a gas asset and ensuring NGN's requirements are met.

Note: For further guidance on solar farms see UKOPA Good Practice Guide 14 (GPG014).

7.24 Working in proximity to trees and tree planting

Plant and Tree roots have the potential to cause damage to pipeline protective coatings, and such damage will subsequently result in degradation of the pipe itself. Before planting any trees or shrubs in the pipeline easement, written permission should be obtained from the pipeline operator.

Any approval granted will be subject to retaining the right to remove any trees which subsequently put the pipeline at risk, or need to be removed to allow access to the pipe for routine maintenance and in an emergency.

The consent will indicate the type of tree or bushes which are permitted and the agreed area to be planted.

The following can be used as guidance along with the below "Tree Planting" guidelines illustration:-

Shallow rooting hedges and ground plants may be planted across the pipeline.

Fruit trees, such as dwarf apple stocks may be planted up to 3 metres from the pipeline.

Christmas trees may be planted up to 3 metres from the pipeline, on the strict understanding, that these are felled at intervals not exceeding 7 years.

The following trees (or similar species) are not permitted within 6 metres of the pipeline:-

beech / birch / most conifers / elm / maple / lime / horse chestnut / oak / apple and pear.

Within 6 to 10 metres they may be planted as individual specimens or as a single row.

Dense mass planting may be carried out at distances greater than 10 metres.

Poplar and willow trees should not be planted within 10 metres of the pipeline.

Contact the pipeline operator prior to any felling or shrub removal in the vicinity of the pipeline.

7.24 Continued:- Tree Planting Guidelines



**Large growing species of:
Poplars and Willows**

10.0m

Large Conifers and Deciduous Forest Trees



Scots Pine	Horse Chestnut	Apple
Black Pine	Sweet Chestnut	Pear
Cedar	London Plane	Plum
Larch	Hornbeam	Cherry
Ash	Lime Alder	Lime
Beech	Elm	
Sycamore	Oak	

6.0m

Dwarf Stock Fruit Trees

**Amenity Trees
Trees**

Ornamental



Field Maple	Mountain Ash
Wild Cherry	Whitebeam
Crab Apple	Cockspur Thorn
Cobnut	False Acacia
Birch	Lawsons Cypress
Elder	

3.0m

**Shrub Planting
Bushes**

Fruit



Holly	Dogwood	Goosberries
Laurel	Spindle	Raspberries
Privet	Guelderrose	Currants
Rhododendron		Roses
Christmas Trees		Loganberries

1.5m

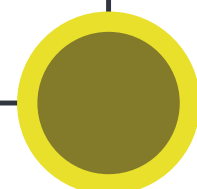
Hedgeplants and Groundcovers

**Hedgeplants only where necessary over the pipeline,
road and field crossings etc.**



Ground Cover: Hawthorn	Blackthorn	Heathers
Snowberry	Berberis	Cotoneaster

Distance from Pipeline



8. Action in the case of damage

8.1 Immediate action

If an asset is damaged, even slightly, the following precautions should be taken immediately.

- Shut down all plant and machinery and extinguish any potential sources of ignition
- Evacuate all personnel from the vicinity in accordance with the risk assessment method statement.
- Ensure no one approaches the asset.
- Notify the gas emergency number immediately.
- Provide assistance as requested by NGN or emergency services, to safeguard persons or property.
- Ensure no attempt is made to try to stop any escaping gas.

8.2 Investigation

Following a damage NGN may require control measures to be put in place to prevent future damages from occurring.

9. Glossary of terms

Chain Trencher: A piece of construction equipment used to dig trenches using a digging chain or belt that is driven around a rounded metal frame.

Contractor: The person, firm or company with whom NGN enters into a contract to which this specification applies, including the Contractor's personal representatives, successors and permitted assigns.

Easement: Easements are negotiated legal entitlements between NGN and landowner and allow NGN to lay, operate and maintain pipelines within the easement strip. Easement strips may vary in width typically between 6 and 25 metres depending on the diameter and pressure of the pipeline. Consult NGN for details of the extent of the easement strip where work is intended.

Liquefaction: Liquefaction is a phenomenon in which the strength and stiffness of the soil is reduced by earthquake shaking or other rapid loading. Liquefaction occurs in saturated soils, that is, soils in which the space between individual particles is completely filled with water. When liquefaction occurs, the strength of the soil decreases and the ability of the soil to support pipelines or other components is reduced.

Low Pressure: Operating below 75mbar.

Medium Pressure: Operating between 75mbar and 2 bar.

Intermediate Pressure: Operating between 2 bar and 7 bar.

High Pressure: Operating above 7 bar.

Promoter of new works: The person or persons, firm, company or authority for whom new services, structures or other works in the vicinity of existing NGN pipelines and associated installations operating are being undertaken.

Services: All underground pipes, cables and equipment associated with electricity, gas, water (including piped sewage) and telecommunications. Also includes other pipelines which transport a range of petrochemical and other fluids. It does not include underground structures such as railway tunnels etc.

NGN: Northern Gas Networks Ltd (Independent Gas Distribution Company).

NGN responsible person: The person or persons appointed by NGN with the competencies required to act as the NGN representative for the purpose of the managing the particular activity.

Appendix A

Plant protection control form

Plant Protection Control Form			
Activity Reference:	ALL WORK MUST BE CARRIED OUT IN ACCORDANCE WITH NGN/PR/SSW/22 UTILITIES DRAWINGS MUST BE ON SITE BEFORE COMMENCEMENT OF WORKS		
Activity Location:	Grid References: E: N:	Pipeline/PON:	
TP Site Manager: Name and Number	Pressure Regime:	Pipe Diameter	
NGN Contact: Name and Number	Overview of Works:		
The Following Document were issued to: Individuals name			
Company Name and Address:			
List of Documents:			

Agreed works within the easement:

Large empty rectangular area for recording agreed works within the easement.

Protective measures agreed:

Large empty rectangular area for recording protective measures agreed.

NGN Responsible person to record this form and site photos on NGN Encroachment app

Signed: (recipient)

Signed: (NGN rep)

Date of signature:

BEFORE YOU DIG TEAM 0800 040 7766 (Option 3)

IN THE EVENT OF PIPELINE DAMAGE CALL 0800 111 999



Comments

Comments and queries regarding the technical content of this safety and engineering document should be directed to standards@northerngas.co.uk

Contact Us



Call: **0800 040 7766**

Or send an email to the
Before You Dig team at:

beforeyoudig@northerngas.co.uk

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Northern Gas Networks Limited
1100 Century Way
Thorpe Park Business Park
Colton
Leeds
LS15 8TU

**we are
the network**



Stay safe near our pipes

A guide to working near infrastructure

Who are Northern Gas Networks?

We look after the 37,000km of gas mains in the North of England. We don't own the gas but it's our job to transport it safely to you. We're responsible for most of Yorkshire, the North East and Northern Cumbria with our pipes running the equivalent distance of Leeds to Sydney, Australia and back.



Before you start work

1

Identify the **exact location** of our gas infrastructure (pipes etc) by **hand digging** trial holes or using **electronic tracers**.

Surface boxes and manholes

Never cover surface boxes or build manhole covers or other structures over, around or under a gas pipe.

Always ask our permission before doing work that may affect a cover or protection.

2

Use a **marker** to indicate the position of our pipes on site.

3

Make sure everyone involved has a copy of our **site plan** and everyone's read the **HSG47 Avoiding Danger from Underground Services** and **Utilities Guidelines on Positioning and Colour Coding of Apparatus**. You can download these for free from nug.org.uk

Tree planting

- Make sure you carefully consider the impact of planting trees and shrubs as roots can cause damage to gas pipes and make future maintenance work difficult.
- You will need to get approval from the Before You Dig Team before you can start planting.

Clearances

Never lay equipment along or above a gas pipe.

Keep a minimum clearance of 250mm or 1.5 x the external diameter of the gas pipe (whichever is the greater) between the existing gas infrastructure and any new plant. If this isn't possible, please contact the Before You Dig Team.

250mm

Deep excavations

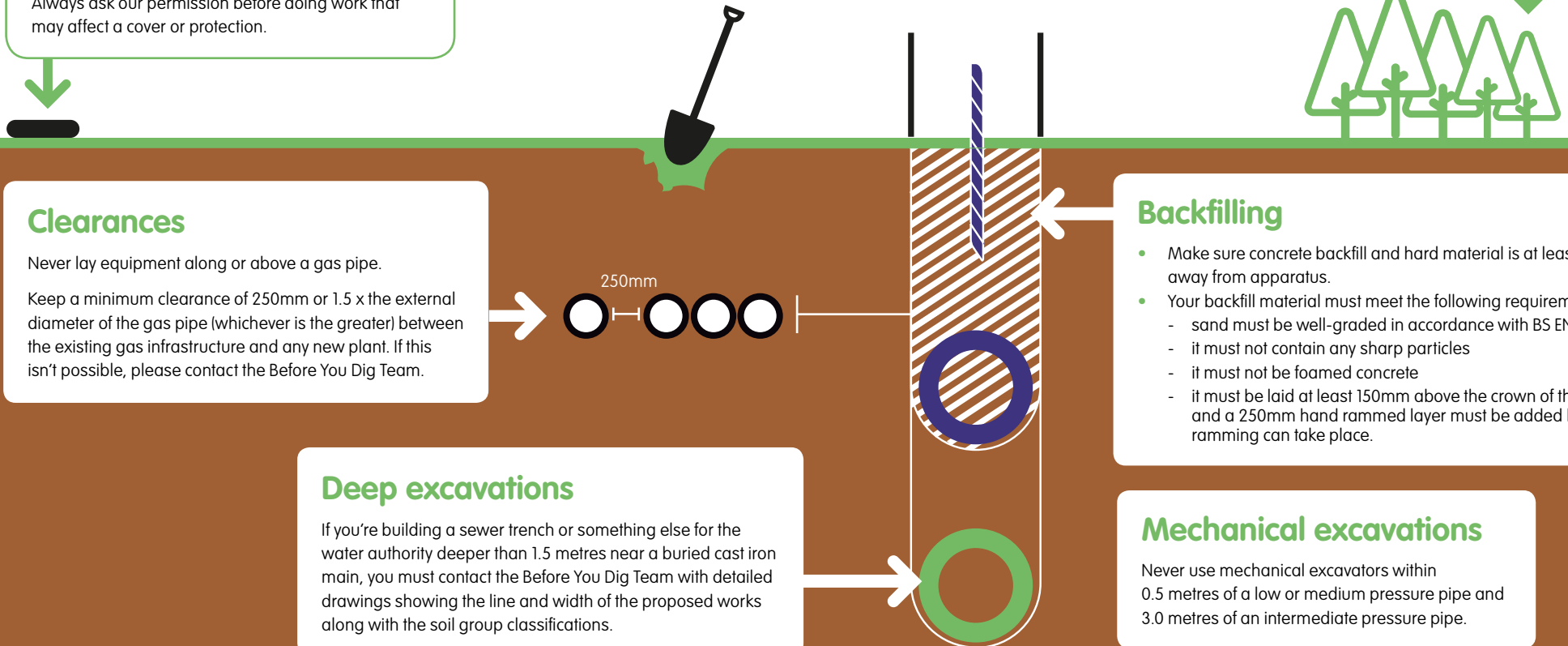
If you're building a sewer trench or something else for the water authority deeper than 1.5 metres near a buried cast iron main, you must contact the Before You Dig Team with detailed drawings showing the line and width of the proposed works along with the soil group classifications.

Backfilling

- Make sure concrete backfill and hard material is at least 300mm away from apparatus.
- Your backfill material must meet the following requirements:
 - sand must be well-graded in accordance with BS EN 1260:2002
 - it must not contain any sharp particles
 - it must not be foamed concrete
 - it must be laid at least 150mm above the crown of the apparatus, and a 250mm hand rammed layer must be added before power ramming can take place.

Mechanical excavations

Never use mechanical excavators within 0.5 metres of a low or medium pressure pipe and 3.0 metres of an intermediate pressure pipe.



Carrying out explosions, pilings, boring or deep excavations?

You need to call us for minimum safe working distances before you get started.

Financial penalties

- You will need to cover the costs of any damage to our infrastructure.
- We will charge you for any alterations needed to surface boxes or manholes caused by your work.
- If we have to move our infrastructure as a result of your work, you will need to cover the cost.

Exposed plant

- You must support our infrastructure at all times, and protect any exposed elements from impact.
- Never weld or use hot substances if there is a risk of damaging plastics or protective pipe coatings.

Make sure that you build shuttering to stop fresh concrete from encasing our infrastructure.

Access

We need access to our infrastructure at all times so make sure that access isn't blocked by temporary structures and piles of spoil.

Crossing our plant with heavy equipment

Always ask our permission before you place heavy goods, equipment and vehicles on our infrastructure.

Smell gas or suspect a gas leak?

1. Call **0800 111 999** immediately.
2. Move away from the gas pipe.
3. Don't attempt to block the leak.
4. Evacuate people from surrounding buildings.
5. Put out naked flames.

Questions?



Call: 0800 040 7766



Email: beforeyoudig@northerngas.co.uk

TREE PLANTING GUIDELINES

TREE PLANTING GUIDELINES



**Large growing species of:
Poplars and Willows**

10.0 m



**Large Conifers and Deciduous Forest
Trees**

- | | | |
|------------|----------------|--------|
| Scots Pine | Horse Chestnut | Apple |
| Black Pine | Sweet Chestnut | Pear |
| Cedar | London Plane | Plum |
| Larch | Hornbeam | Cherry |
| Ash | Lime Alder | Lime |
| Beech | Elm | |
| Sycamore | Oak | |

6.0 m



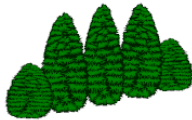
Dwarf Stock Fruit Trees

**Amenity Trees
Trees**

Ornamental

- | | |
|-------------|-----------------|
| Field Maple | Mountain Ash |
| Wild Cherry | Whitebeam |
| Crab Apple | Cockspur Thorn |
| Cobnut | False Acacia |
| Birch | Lawsons Cypress |
| Elder | |

3.0 m



**Shrub Planting
Bushes**

Fruit

- | | | |
|-----------------|-------------|--------------|
| Holly | Dogwood | Gooseberries |
| Laurel | Spindle | Raspberries |
| Privet | Guelderrose | Currants |
| Rhododendron | | Roses |
| Christmas Trees | | Loganberries |

1.5 m



Hedgeplants and Groundcovers

Hedgeplants only where necessary over
the pipeline, road and field crossings etc.

- | | | |
|-------------------------------|------------|-------------|
| Ground Cover: Hawthorn | Blackthorn | Heathers |
| Snowberry | Berberis | Cotoneaster |

Distance from Pipeline

